Bipole III Transmission Project

Land Use Technical Report

MMM Group Limited
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Manitoba Hydro

BIPOLE III LAND USE TECHNICAL REPORT

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1.0 INTRODUCTION

This technical report to the Environmental Impact Statement (EIS) is one of several technical reports that have been prepared in support of Manitoba Hydro's application for environmental licensing of the Bipole III Reliability Improvement Project (the Project). The technical reports have been prepared by independent discipline specialists who are members of the environmental study team retained to assist in the environmental assessment of the proposed Project. These reports have contributed to the preparation of the Environmental Impact Statement (EIS) and provide background information and analysis in specific discipline areas. This technical report focuses on aspects of land use as described in the Environmental Assessment Scoping Document prepared by Manitoba Hydro (June 2010). For the purposes of this report, land use focuses on activities associated with the following: property ownership and tenure, including rural residential development, commercial resource use (i.e., mining, hunting, trapping), recreation and tourism, and regional infrastructure and services. A separate technical report has been prepared dealing with the agricultural land use component (J&V Nielsen and Associates Ltd., 2011) and is not included within this report.

The process of documenting existing land use issues and potential impacts relied on information provided by government and industry sources. Correspondence with government officials and searches of government databases provided additional information with regard to land use activities as did field drive-by survey. The scope of the assessment consists of a description of current conditions focusing on the general regional study area as well as specific corridor/rights-of-way (i.e., HVdc transmission line, collector lines, electrode lines) and site areas (i.e., converter station and ground electrode sites).

Most of the potential issues identified are generally avoided through the Site Selection and Environmental Assessment (SSEA) process. The potential effects of the proposed Project on land use are identified and assessed, including, where applicable, the enhancement of positive effects. Mitigation measures have been developed to avoid or minimize potential adverse effects based on previous experience from past environmental assessment studies on major transmission line projects, professional judgment, local knowledge, stakeholder consultation and First Nation input (i.e., Traditional Knowledge). Effects were evaluated based on both qualitative and quantitative information sources according to the stage of Project development activities (construction phase and operations and maintenance phase).

This report is organized as follows:

- Introduction – This section provides a general overview on the background, purpose and scope of the supporting volume to the Project EIS.

- Study Area – This section provides an overview description of the general regional study area as well as the more specific transmission corridor/rights-of-way and station/ground electrode site areas.

- Methodology – This section provides an overview of the SSEA process, its purpose and objectives, and discusses the methodology and activities undertaken to describe constraint criteria (including routing opportunities), evaluate alternative corridors, and select a preferred route and document potential environmental effects.

- Project Description – This section identifies the project components and activities likely to affect the environment.

- Environmental Setting – This section provides a general regional overview of the existing environment, a review of the literature, including the associated data and information sources, as well as valued environmental components.

- Description of Alternative Route Corridors and Selection of a Preferred Route – This section describes the three alternative route corridors identified in terms of their respective degree of interaction/avoidance with regional siting constraints, the potential to utilize siting opportunities and includes a summary of the constraints avoided and the advantages and disadvantages associated with each of the identified alternative route corridors. This section also provides an overview and evaluation of the selected preferred route from a land use perspective.

- Environmental Effects Assessment – This section provides a review of the potential environmental effects and proposed impact management options considered for the preferred transmission line routes (both the HVdc transmission line, 230 kV northern collector lines) and the potential effects and mitigation options associated with proposed converter station (both Keewatinoow and Riel), the 138 kV construction power line for Keewatinoow, and ground electrode site development. Determination of residual environmental effects associated with the Project (after mitigation) and an assessment of cumulative effects has been provided.

- Summary and Conclusions – This section provides an overview summary and conclusions with respect to Project effects, mitigation requirements and proposed follow-up monitoring requirements if any, residual effects and cumulative effects.

This report includes supporting tables, figures, and maps where appropriate as well as a complete listing of sources and references which is included at the end of this document.

2.0 STUDY AREA

Manitoba Hydro is proposing to develop a new 500 kV high voltage direct current (HVdc) transmission line, known as Bipole III, on the west side of Manitoba. The Bipole III Reliability Improvement Project will consist of the HVdc transmission line, originating at a new Keewatinoow Converter Station site to be located near the site of the future Conawapa Generating Station (located on the Nelson River, approximately 90 km downstream of Gillam). The preferred right-of-way for Bipole III transmission line is routed to the west and southwest of lakes Winnipegosis and Manitoba and terminates at a new converter station on the Riel site immediately east of the Red River Floodway in the Rural Municipality of Springfield (**Map 1**). Each of the two new converter stations requires a separate ground electrode site connected to the station by a low voltage dc line. As well, new 230 kV ac transmission lines are routed to connect the new northern converter station with the existing northern collector system of ac transmission lines at the existing 230 kV switchyards at Henday Converter Station and Long Spruce Generating Station on the lower Nelson River. One 138 kV construction power line is also required and involves extending an existing 138 kV transmission line, routed from Kelsey Generating Station to the Limestone construction power substation, to a new construction power substation located near the Keewatinoow converter station site. The Bipole III HVdc transmission line, the routing of which is the focus of this report, will be strung on steel structures occupying a 66 m wide right-of-way over an approximate distance of 1,384 km. Self-supporting steel structures will be used in intensive agricultural areas in southern Manitoba to minimize adverse effects on cropping operations; guyed steel structures will be used in forested/pasture areas in the south and in northern Manitoba.

The HVdc transmission line will cross through diverse regions of Manitoba. Apart from townsites and related resource development facilities, Crown lands are predominant in the North and include First Nation Reserves and related treaty land entitlements, Resource Management Areas (RMAs) associated with various First Nation and Aboriginal communities, related traditional use areas, Registered Trapline Districts (RTLs), mining and timber leases, as well as parks and protected areas. While privately-owned lands and agricultural land use are predominant in southern Manitoba, the development pattern is complicated by a greater density of urban and residential land use as well as by parks and various types of conservation areas.

The site for the Keewatinoow Converter Station is located in unorganized territory within the Fox Lake Resource Management Area (RMA) and Town of Gillam municipal boundaries. The new northern 230 kV ac transmission lines will cross over unorganized territory associated with the Fox Lake RMA, the Split Lake RMA and Town of Gillam boundaries. The new northern converter station site and northern collector lines also cross through the Churchill Wildlife Management Area (WMA). Alternative ground electrode sites investigated for the northern converter station site as well as a low distribution connecting line are also located within the boundaries noted above.

The site of the Riel Converter Station site has been established on land owned by Manitoba Hydro in the R.M. of Springfield, east of the city of Winnipeg and north of the Deacon Water Reservoir along the Red River Floodway. Alternative ground electrode sites investigated for the southern converter station and the low voltage distribution connecting line will be situated within the municipal boundaries of Springfield.

3.0 METHODOLOGY

3.1 Study Overview

Careful routing and siting of transmission facilities is critical to avoidance and minimization of potentially adverse effects associated with their development. As such, the process of identification and comparison of alternative route corridors (as outlined in this report) is based on generic criteria related to environmental issues and concerns, on project-specific criteria identified during the course of the study area delineation and characterization, including preliminary consultation, and on the technical and economic feasibility requirements of the transmission facilities.

The range of issues/concerns and related impacts will vary for the different project components (e.g., HVdc transmission line, northern and southern converter stations and associated ground electrodes, and ac transmission connections to Manitoba Hydro's northern collector system and southern receiver system) and for the specific areas being studied (i.e., northern resource areas vs. southern agricultural areas; undeveloped lands vs. more intensively developed urban/residential areas and communities, etc.) The SSEA process was tailored to match the particular requirements of the project components and the corresponding issues.

Based on prior experience with siting and environmental assessments for similar transmission projects, SSEA-related issues for land use typically cover a spectrum of concerns. Some will relate specifically to potential project effects. Others will reflect perception of potential land use conflicts and related effects on the enjoyment or value of property. Related concerns may vary regionally in relation to such factors as geographic context and property tenure, as well as existing and prospective land and resource use patterns. A listing of potential issues and concerns is provided below and is indicative of the range of analyses undertaken in the course of SSEA research and liaison activity:

- Designated lands and other recreation areas (provincial parks, provincial forests, wildlife management areas).

- Conservation Lands (DUC, MHHC, NCC, MWF[1]), Conservation Districts, Biosphere Reserve.
- Canoe Routes, Snowmobile Trails, Recreational Trails (e.g., TransCanada Trail).
- Mineral exploration license areas, mining claims, mineral leases, mine sites/properties, quarry leases, quarry/pits, and aggregate deposits.
- Crown land encumbrances, lodges/outfitters, cottage subdivision areas, wayside parks, picnic areas.
- Agricultural Crown lands, community pastures, organic farms.
- Municipal recreation areas or cultural lands/festival sites (including open space areas/facilities).
- Communication facilities.
- Aerodrome, airport and seaplane facilities.
- Waste disposal sites/sewage lagoons.
- Linear infrastructure (including pipelines, transmission lines, provincial highways and roads, rail lines, resource roads, other trails).
- Existing rural residential development (and areas for future urban development).
- Property ownership patterns and property splits.

The first stage of the Bipole III site selection process was based on identification and a coarsely filtered comparison of broad corridors sufficient in width to contain technically viable alternative routing choices. The identification of preliminary alternative corridors was primarily intended to highlight and respond to regional differences in the study area. This process emphasizes avoiding, to the extent possible, areas of environmental sensitivity or public concern. Alternative corridors were established on the basis of a five km width, within which alternative routes can be identified based on a 66 m wide right-of-way. The corridors facilitated identification and lateral adjustment of alternative route options within the corridors, and allows for the interconnection of numerous routing options between the main route segments (i.e., Alternatives A, B, and C).

[1] DUC – Ducks Unlimited Canada, MHHC – Manitoba Habitat Heritage Corporation, NCC – Nature Conservancy of Canada, MWF - Manitoba Wildlife Federation

The identified alternatives were then subject to more detailed evaluation, leading ultimately to the selection of a preferred route.

In identifying continuous alternative corridors through the study area, it was not possible to avoid all of the identified socio-economic (land use) constraints. Avoidance of these constraints was initially based on their apparent relative sensitivity to transmission line construction and operation in respect of environmental, land use and jurisdictional considerations. Accordingly, application of the constraint criteria was preliminary and subject to ongoing research and consultation. The identified alternative corridors were intended simply to characterize the options available and to highlight the range of follow-up analyses required. The constraint features were refined based on additional issues/concerns identified during the course of SSEA research and liaison activity, including public input received during the consultation process.

In addition, identification of the alternative corridor options reflected technical and cost considerations, such as system security (e.g., maximizing separation from the existing Bipoles I and II and other major transmission corridors, avoiding difficult surficial terrain so as to facilitate construction access and tower foundation requirements, and avoiding large water bodies, so as to minimize the need for long spans between towers). The EA study team subsequently refined and synthesized the alternative corridor options, through consideration of all biophysical and socio-economic regional siting features, to identify three candidate options encompassing a range of routing choices. The initially identified alternative corridors and routes were further refined leading to the identification of a preliminary preferred and selection of a final preferred route through review with Manitoba Hydro's study team and on the basis of feedback received in the course of Rounds 3 and 4 of the public consultation process.

3.1.1 Literature Review

Reviews of previous environmental assessment studies and existing published literature on transmission line projects were conducted to identify information on the land use environment to ensure the full range of SSEA issues and concerns were addressed. Typical environmental effects associated with transmission line development are generally well understood and are based on conventional siting-related research and analysis. The process utilized, gradually narrowed the focus from a regional study area down to the specific component site or route. Each stage involved progressively more detailed analysis and comparative evaluation of alternatives. Environmental effects were identified based on the description for each project component (transmission lines, ground electrodes and converter station), review of available studies/literature and assessment results. Potential issues with respect to land use (i.e., changes to property values, land use, aesthetics) are identified on the basis of real or perceived impacts arising from construction and operation of the various Bipole III project components. Project components likely to affect land use are discussed in Section 4.0. Potential effects identified from the literature and study results are discussed in Section 7.0.

During the Environmental Assessment Consultation Program, members of the general public expressed concern regarding the effects that transmission lines may have on property values. A review of the literature from reputable and relevant sources describing the effects on property values caused by transmission lines, and the over-all conclusions drawn, are highlighted below.

- Jackson and Pitts (2010) addressed the effects on property value from proximity to transmission lines (from 60 kV up to 500 kV HVTL) by reviewing numerous studies already conducted on the issue (i.e., survey based approach of opinions and perceptions; empirical studies of sale price effects; and a mixture of paired sales analysis, case studies, and sale/resale analysis). The authors concluded that the results were inconsistent but generally the effects on property values from transmission lines were small or not at all. The paper also noted that in some cases a premium was observed because of the additional open area of the transmission line corridor. In cases where some studies found a negative effect from transmission lines, that effect was observed to dissipate with time and distance. The effect on property values were determined to range from roughly two percent to nine percent.

- Chalmers and Voorvaart (2009) looked at an existing 345 kV transmission line and the effects on property values sold between the years of 1998 and 2007. The authors concluded that, with respect to proximity and visibility, there was no statistical effect on property values in residential neighborhoods. A consistent negative effect was found when studying effects on encumbrance of the transmission line easement to adjoining properties. However, the statistical significance to this effect varied. In addition, no data was found to support either of two hypotheses: that property values are more vulnerable to transmission line effects in a down turn market and that higher valued properties are more vulnerable to effects from transmission lines. Chalmers and Voorvaart (2009) concluded that "The professional literature cited, combined with the results reported here, support the position that a presumption of material negative effects of HVTLs (High Voltage Transmission Line's) on property values is not warranted".

- Grover, Elliott & Co. Ltd. (2008) conducted a Property Value Assessment for the Interior to Lower Mainland (ILM) 500 kV ac Transmission Project in British Columbia. The authors noted that the potential value effects of High Voltage Transmission Lines (HVTL) have been well studied in a number of statistical studies published in peer-reviewed professional appraisal and real-estate journals. General conclusions noted included the following:

  - Rights-of-ways can have moderate negative effects on the value of property that contains the right-of-way, and on immediately adjacent properties.

  - The value effect is much greater for small properties than for large properties and for urban properties than those in unpopulated rural or remote locations.

- The value effect diminishes quickly with distance.
- The value effect varies the extent to which the HVTL is visually seen.

This project, for the most part, utilized existing rights-of-way. Grover et al concluded that for properties already encumbered by the existing rights-of-way, and where no changes were planned to the rights-of-way boundaries or tower placements, physical changes to transmission infrastructure such as the addition of new towers would lead to no or very small changes in value. If the overall right-of-way line and tower were to become more visible, there would be a negative change. If the project were to result in a change in the routing of the existing right-of-way within privately-owned lands, the effects on property value would be expected to be greater. Where additional right-of-way is required resulting in an expropriation, the provincial Expropriation Act provides for compensation to the property owner.

Grover et al concluded that the majority of adverse effects to property values from the Project would be associated with the visibility of the HVTL. Minimizing the potential effects of the towers and lines on visual quality would serve to reduce potential negative effects on property values.

- Bottemiller (2000) was an update of a Cowger et al (1996) study. It utilized the same study methodology, but compared houses sold in the years 1994 and 1995. Bottemiller (2000) showed that high voltage power lines do have an impact on property values. That impact is, however, minimal with a decrease of around 0.04 percent to 2.05 percent. Greater short-term impacts were noted under conditions related to the construction of a new transmission line, or a rebuild.
- A study conducted by Cowger et al (1996) that looked at High Voltage Urban Transmission Lines and Urban Property Values for the Heartland Transmission Line Project utilized a matched pair method using multiple regression analysis. Cowger et al concluded that high voltage transmission lines had minimal impact on property values.
- Colwell (1990) looked at whether high voltage transmission lines and/or their towers impact the selling price of residential land located in close proximity to the transmission line. The study also looked at the magnitude of this effect (if any), and whether this effect is diminished through time. Colwell concluded that that proximity to a power line is associated with reduced selling prices, but this effect is diminished with time. The cause of the diminished effect is thought to be as a result of tree/vegetative growth surrounding the corridor. Further conclusions state that there is a negative effect on property value situated in close proximity to transmission towers and that this effect does not dissipate over time.
- The conclusions drawn from studies undertaken between 1990 and 2010 suggest that generally the effects on property values from transmission lines were minimal or none at all. With respect to proximity and visibility, there was no statistical effect on property

values in residential neighbourhoods. It was further noted that any value effects vary with the location and size of the property (i.e., urban vs. rural, large vs. small), were greater in the short-term but diminished with distance and time, and varied to the extent that the transmission line is visually seen.

The literature review on the topic of land use included a number of environmental assessment studies and reports summarizing perspectives on land use changes and aesthetic effects from transmission line development.

- In its study of environmental impacts on transmission lines, the Public Service Commission of Wisconsin (2010) identified various changes in land use, particularly recreational lands. The report noted that transmission lines (i.e., 100 kV to 345 kV or > 345 kV) can affect recreational areas such as parks, lakes and trailways by:
  - Repelling potential users of recreational areas with the reduced attractiveness of the transmission towers.
  - Preventing and restricting the location of future buildings.
  - Posing potential safety risks from transmission poles or wires.
  - Creating better access to previously inaccessible areas for those who snowmobile, ski, bike, hunt, etc.

Creating recreational facilities along the transmission right-of-way that utilize the cleared corridor is identified as a way to mitigate potential negative effects on recreational activities. Routing the transmission line along property boundaries and existing linear features such as roads and railways is another way to mitigate potential negative impacts of the transmission line.

- BC Hydro (2008) conducted a Visual Quality Assessment for the Interior to Lower Mainland (ILM) 500 kV ac Transmission Project in British Columbia. The report concluded that the potential effects of the Project on visual quality are dependent on the visual sensitivity of the landscape to alteration, the viewer sensitivity and the degree of Project related disturbance. Mitigation was discussed and included: locating the new line adjacent to existing lines, which limits required clearing and avoids pristine areas, thereby reducing visual impacts; and where a new right-of-way is required, selecting routes with limited visibility. It was noted that potential visual effects of selected routes can be minimized through revegetation, spanning water courses and selection of less visible or contrasting transmission structures. Additional mitigation approaches using vegetation or other forms of visual screening could potentially be incorporated into Project design. Medium magnitude effects were found in areas where the potential alignment was located near populated and sensitive areas. Where the proposed alignment passed through remote areas that were not readily visible from populated or sensitive locations, the resulting potential for residual effects were of low magnitude and considered insignificant.

Overall, it was concluded that the Project would have no anticipated significant effects on visual quality.

- The Vancouver Island Transmission (138 kV ac [2], 300 kV HVdc, 500 kV ac [2]) Reinforcement Project (2006) involved overhead lines running through mostly agricultural land, dense forest and beaches, and through a few residential, commercial and park areas. The study identified an Aesthetics and Viewsheds Assessment Area that included all lands within the Project right-of-way and lands used for transmission substations and terminals. In addition the Assessment Area included approximately 2 km on either side of the right-of-way, noting that these areas are most likely to experience potential visual effects of the Project. A summary of aesthetic issues noted that opinions on the visual effects of electrical transmission corridors are often divided: some residents and stakeholders feel that transmission structures disrupt natural landscapes and viewsheds while others believe structures have few effects on community character. In this particular project, it was determined that there would be a positive effect on Aesthetics and Viewsheds because fewer number of structures would be used for the proposed system versus the number of structures that they would be replacing under the existing system (BC Hydro, 2006).

- The Big Stone Transmission Line Project EIS (2006) involved construction of two new 230 kV and 345 kV transmission lines as well as the rebuild of two existing 115 kV transmission lines. The study characterized viewer sensitivity based on three levels: low visual sensitivity (most motorists would see transmission lines at limited locations from roads that they travel; moderate visual sensitivity (recreationalists whose activity is specific to a finite geographic location and who are sensitive to man-made structures and their impact on the view of the natural environment); and high visual sensitivity (residential viewers who own property within 500 ft. (150 m) of the proposed routes and who are concerned about transmission structures and how they impact the view on the natural environment). The Project EIS noted that although the transmission line would be a contrast to surrounding land uses, landowners would be consulted to identify concerns related to the transmission line, substation, and aesthetics. Potential mitigation measures identified in the EIS included: structure placement to maximize distance from residences within limits of structural design; locating structures, right-of-way and other disturbed areas considering the input from landowners or government agencies to minimize visual impacts; taking care not to unnecessarily cause destruction, scarring or defacement of natural surroundings in the vicinity of the work site; to the extent practical, parallel with existing transmission lines and other rights-of-way within sound engineering principles and system reliability criteria; and placing structures at the maximum feasible distance from highway and trail crossings within the limits of structure design. Where possible the proposed transmission lines were routed alongside existing power lines and section lines,

as well as within road, rail, and utility rights-of-way, to minimize any adverse impacts (Minnesota Department of Commerce, 2006).

- In the Cumberland-Montgomery 500 kV Transmission Line study (2005), visual consequences were examined in terms of the changes between the existing landscape and the landscape as altered by the proposed actions. The report noted that visual impacts associated with the construction of a transmission line results from the construction of access roads and material lay-down areas, removal of trees and most other vegetation from the right-of-way, erection of tall, silvery-gray laced steel transmission line structures, and installation of silvery-gray metal conductors between structures. The operation of construction equipment during this phase of the project results in an additional, short-term visual impact. The transmission line structures and conductors become essentially permanent features in the landscape. Various visual impacts were identified: where new laced-steel towers and lines would be visually comparable to those seen in an area now along major residential and commercial developments, there would be no significant visual impacts; additional minor visual discord during the construction period may result due to an increase in personnel and equipment and the use of laydown and materials storage areas – these visual obtrusions were deemed minor and temporary until the proposed right-of-way and laydown areas had been revegetated; additional visual impacts would occur for property owners and motorists along minor roads, mostly in the foreground, dependent upon the exact location of the transmission line, which could result in scenic views irreversibly being altered by introducing new vertical structures and broadly horizontal expanses of transmission lines; the addition of structures near an existing substation would increase the number of adversely contrasting elements seen in the landscape, and although the incremental change may not be individually significant in and near that location, taken together they would add to existing disruptions of visual coherence and harmony; and a short-term minor visual impact was identified to follow each vegetation management cycle where the recently treated vegetation would contrast with untreated vegetation adjacent to the right-of-way – would typically only last a few weeks and be most evident in the growing season (Tennessee Valley Authority, 2005).

- The conclusions drawn from the studies reviewed suggest that transmission lines and substations can influence the visual landscape in urban or rural settings or in other sensitive circumstances. Aesthetic impacts, to a certain extent, differ according to a person's values and perspectives. An individual's response to visual changes in the landscape and the magnitude of the concern or sensitivity related to a particular viewscape is a function of the type of views involved, as well as the distance, perspective and duration of the view. Although considered essentially permanent features in the landscape, application of mitigation measures can serve to minimize potential effects on visual quality (e.g., route adjustment, structure placement, visual screening).

3.1.2 Data and Sources

The land use data collection process involved contact with a variety of local and provincial government agencies, as well as institutional and private organizations (i.e., DUC, MHHC), and searches of both published and unpublished reports and land use data sets. In some instances, original data (e.g., rural residential areas) were collected through field work for the purpose of determining and evaluating specific alternatives. Land use field survey of the preliminary preferred route were also undertaken to update, verify and expand the land use data. Aerial photographs, property ownership maps and other land use maps prepared by various sources were also used to verify the land use data.

Results of the study area delineation and characterization, as well as land use constraint data, were documented in a series of maps. The regional 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. GIS was used to store all of the mapped information and to standardize raw data derived from sources at different scales. The constraint and opportunity maps were the main tool used in the alternative corridor route identification and evaluation process.

Additional issues identified during the course of SSEA research were added to the issues list and mapped in the GIS database. Public and stakeholder input during the public consultation program also provided an updating or verification, in some cases, of the land use data. A complete listing of sources and contacts are listed in the Reference section at the end of this report. Section 5.0 describes the land use environmental components considered in the analysis and evaluation of alternative routes and the selection of the preferred route.

3.1.3 Alternative Route Identification and Selection Process

As part of a route selection and environmental assessment process, a multi-staged approach (route identification and route comparison) was used to evaluate selected alternative routes within 5 km (3 mi) corridors. The process was based on the identification of generic environmental issues and concerns, derived during the course of study area delineation and characterization, derived primarily from desktop surveys for areas requiring avoidance, including preliminary consultation input and incorporation of public input from the consultation process, on technical and economic feasibility requirements for transmission facilities, and on study team review of the compiled data. The following sections outlines the procedure followed for the comparative evaluation that was undertaken of the three initial alternative route corridors, including the segments within.

The SSEA study process for Bipole III commenced with the definition of a general study area which covered an extensive area of northern and southern Manitoba and was sufficiently broad and representative to allow for the identification of several alternative route corridors.

Following the delineation of a project study area, environmental information about its socio-economic (land use) characteristics, such as locations of communities, conservation areas, economic land uses (e.g., mining and aggregates), and other land use interests, was assembled from existing published and unpublished sources of information. The study area characterization, although broadly focused on all aspects of the environment, was guided by prior SSEA experience through which Manitoba Hydro has established an understanding of the environmental issues and concerns associated with the development of transmission facilities.

Through study area characterization, the locations of sensitive socio-economic (land use) features (potential impact areas) which suggest either constraints or potential routing opportunities (e.g., existing transmission line rights-of-way) were identified. The listing of potential issues and concerns developed for the study area was subsequently translated into regional and point specific constraints.

Subsequent to the collection and mapping of land use data, an initial analysis was undertaken in GIS on a segment/node basis to identify alternative route corridor intersects with listed constraint features. The results of the comparison and evaluation were presented in tabular form and depicted on series of maps (MMM Group Limited, 2010a). Additional analyses were undertaken of subsequent route segments identified in the course of ongoing alternative route comparison (MMM Group Limited, 2010b & c). The analyses were point in time evaluations only subject to, in some cases, use of older or incomplete data sets or data sets that were continually being updated and revised and was considered as a limitation in the process.

3.1.4 Preferred Route Selection Process

The preferred route selection process integrated the findings of all biophysical and socio-economic (including land use) disciplines, public input received during stakeholder consultations (including Aboriginal input), and technical considerations with respect to transmission line design, to derive a preliminary and final preferred route. The purpose of the process was to select route segments from the three main alternative route corridors through the following:

- Documentation of available biophysical, land use, socio-economic, consultation and technical information.
- Establishing factors and criteria for evaluating route segments and ranking or rating the alternative route segments accordingly.
- Identifying and describing environmental issues and potential impacts for the alternative route segments.
- Selecting alternative route segments for the preferred route.

The three alternative route corridors were divided into segments at pre-determined node locations for evaluation and comparison based on geographic features, potential opportunities, technical considerations and professional judgement (nodes were areas between segments or areas where segments came together). The alternative route corridors were separated into 13 sections for analytical purposes (**Map 2**). During the course of the preferred route selection process, several adjustments were made to the original alternative route segments based on additional input provided by the EA study team and various stakeholders (e.g., mining and agricultural interests). Details of Manitoba Hydro's multi-stage approach to identify, analyze and select a preferred transmission line route are found in the report entitled, Bipole III Transmission Line Project: Preferred Route Selection Process prepared by Falk Environmental (Manitoba Hydro, June 2010).

4.0 PROJECT DESCRIPTION

The basic Bipole III transmission concept includes the following major components:

- A 500 kV HVdc transmission line.
- A new northern converter station; the Keewatinoow converter station, which is to be located near the proposed site of the Conawapa Generating Station including a construction camp, construction power and a 138 kV construction power line.
- A new southern converter station located at the Riel site in the Rural Municipality of Springfield, including construction power, and sectionalization of an existing 230 kV transmission line (R49R) at Riel.
- New northern 230 kV transmission lines linking the Keewatinoow converter station to the northern collector system at the existing 230 kV switchyards at Henday Converter Station and Long Spruce Generating Stations.
- New ground electrodes for each converter station, connected to the station by a low voltage feeder line.

Project activities related to transmission and station site development include: site preparation, primarily related to clearing; access and civil works requirements (i.e., drainage works, sewer and water requirements, etc.); basic construction for both transmission structures (i.e., foundations, tower erection, conductor stringing, etc.) and access routes; converter station and equipment layout (i.e., transformers, switchyards, control buildings, protection and communications systems, etc.); and subsequent operation and maintenance activities (i.e., equipment and tower inspections, right-of-way vegetation maintenance, emergency repairs, etc.).

HVdc Transmission Line

The Bipole III HVdc transmission line will originate at the Keewatinoow converter station and terminate at the new southern converter station on the Riel site. The overall length of the line is about 1,384 km located on a 66 m wide right-of-way.

Two basic tower types will be used for the straight line sections of the transmission line. In northern Manitoba and forested/pasture areas in the south, the line conductors will be suspended from guyed lattice steel towers. In the more densely developed areas of southern Manitoba, self-supporting lattice steel towers will be used to minimize potential effects on farming practice (i.e., to reduce the tower footprint) and to reduce the land acquisition requirement. Typical tower dimensions will be 45 m in height with a 7.8 m square base footprint for self-supporting towers. Towers will be spaced approximately 480 m apart in most areas.

Prior to construction, the right-of-way and required easements will first be surveyed and flagged to establish the line alignment. Clearing and disposal of trees on the proposed right-of-way will be undertaken in advance to facilitate construction activities. Clearing requirements for the new transmission line rights-of-way will also require selective clearing of “danger trees” beyond the right-of-way. Such trees could potentially affect the function of the transmission line or result in safety concerns, and are normally identified during initial right-of-way clearing activities and removed.

A variety of methods are available for right-of-way clearing. Typically, these include conventional clearing done by tracked bulldozers, mulching by rotary drums, selective tree removal by feller bunchers (e.g. for removal of danger trees with minimal adverse effect to adjacent vegetation and trees) and hand clearing with chain saws in environmentally sensitive sites. Ground vegetation will not be “grubbed” except at tower sites, where the foundation area will typically be scraped to allow unencumbered access for equipment and safe walking areas for workers.

Marshaling yards will typically be established near the transmission line route for the storage of construction materials and equipment, and for further deployment to the construction site. The exact number and location of marshaling yards will be determined during the course of developing detailed construction specifications and contract arrangements.

Potential borrow locations have not been specifically identified at this time. Typically, borrow pit locations will be located along the right-of-way to minimize environmental disruption, haul distances and cost. Where suitable sources are not available along or close to the right-of-way, nearby deposits may have to be identified and the surrounding brush cleared to gain access to the line.

Clearing and construction workers on the transmission line may be housed in mobile construction camps, or where feasible and practical, in suitable accommodations available in local communities.

Where mobile construction camps are required, these will typically include sleeper units, a wash car, cooking and eating trailers, offices and a machine/parts shop. Mobile construction camps are generally relocated along the right-of-way as the various construction activities proceed. As construction moves down the line, the camps will be relocated at intervals of approximately 32 to 64 km (about 20 to 40 mi.) to minimize travel time for workers.

Keewatinoow Converter Station and Ground Electrode Facility

The new Keewatinoow converter station will be located about 5 km southwest of the Conawapa generating station site on the Nelson River. The principal components of the converter station are a converter building, a high-voltage ac switchyard and a high voltage dc switchyard required to terminate the 230 kV transmission line connections to the northern collector system, to convert the ac power from the collector system to dc power, and to provide the HVdc switching facilities necessary for termination of the new Bipole III transmission line. The converter station site is estimated to require a roughly rectangular site area, approximately 500 x 600 m in dimension for a total area of 24.5 hectares.

Construction activities for the converter station development will typically involve site preparation (e.g., removal of existing vegetation and organic topsoil from the site; addition and compaction of inorganic fill material, installation of station surface material) and initial infrastructure development (e.g., installation of station access roads and associated drainage, followed by installation of perimeter fencing and gates). Once general site improvements have been completed, other necessary civil works and systems will be installed (e.g., foundations for building and equipment, grounding arrangements, water supply, oil spill containment, site services and buildings). Station apparatus and equipment installation will follow, including filling of equipment with insulating oil, construction clean-up and commissioning.

The ground electrode required for the converter station will be located approximately 10 km south of the converter station site on the west side of the Conawapa access road. On the assumption of a shallow land ring electrode (similar to the electrodes used at the existing Henday and Radisson converter stations), the electrode will be a buried iron ring approximately 500 m in diameter and will require a site area in the order of one mile square, together with an access road for construction and ongoing maintenance. There will also be a low voltage overhead distribution line connection between the ground electrode site and the converter station. The low voltage line will be supported on guyed, single wood poles and routed along an existing right-of-way.

A temporary start-up and main construction camp will be established at the future Conawapa Generating Station site to house workers involved in the Keewatinoow Converter Station and ground electrode. The construction camp may potentially include a sewage lagoon. Two potential sites for a lagoon, both west of the main camp adjacent to Creek 14, are being investigated by Manitoba Hydro. Final selection is subject to further geotechnical investigation.

This temporary facility may be subject to future development requirements associated with the development of the Conawapa Generating Station.

Construction power for the construction camp, converter station and electrode site will be provided by extending the existing 138 kV transmission line that runs from Kelsey Generating Station to the Limestone construction power substation about 31 km to a new construction power substation located near the Keewatinoow converter station site. The proposed site for the construction power substation is to be located on a former construction site used during development of the Conawapa access road. The overall site area is expected to be approximately 150 m square with a graded and fenced area occupied by station equipment being approximately 90 m x 65 m in dimension. Two site access roads will be provided between the fenced area and the Conawapa access road.

In the course of borrow area development and site preparation for the various Keewatinoow components, a considerable amount of earth and rock materials will be excavated. Some of the soil and organic materials will be stored and used in site construction and borrow area rehabilitation. The remainder will be placed in an excavated material placement area (see Chapter 3.0 of the EIS for illustration). Materials will be placed to a height of up to eight metres. The central portion will be largely composed of impervious silts and clays and will have very shallow outer slopes. Rock filled berms will be used at the toe of the disposal area to prevent erosion. The majority of drainage water will be reabsorbed within the immediate area and runoff will naturally flow towards the Nelson River.

Other supporting construction infrastructure and activities will include aggregate processing and concrete batch plant operation, and development and operation of equipment storage and work areas.

Connections to the Northern Collector System

The proposed connections include one 230 kV transmission line about 55 km in length, from the existing 230 kV switchyard at Long Spruce Generating 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, each about 27 km in length, 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. The lines will share a common right-of-way 310 m in width. Guyed lattice steel towers will be used for the collector lines.

The construction workforce for the northern collector lines is expected to be accommodated either in the main Keewatinoow construction camp or in mobile camps as described for construction of the HVdc line.

Riel Converter Station and Ground Electrode Facility

The new southern converter station will include the HVdc switchyard facilities necessary to terminate the new Bipole III transmission line, together with the converters and the ancillary facilities required to convert the dc power from the Bipole III transmission line to ac power at the 230 kV level necessary for injection into the southern receiving system. The southern converter station will be located at the existing Riel station site in the R.M. of Springfield, just east of Winnipeg, which is now under construction for sectionalization purposes. Site development under the sectionalization project includes the portion required for the converter station site.

Construction activities for converter station development will involve necessary civil works and installation of systems (e.g., foundations for building and equipment, grounding arrangements, water supply, oil spill containment, site services and buildings). Station apparatus and equipment installation will follow, including filling of equipment with insulating oil, construction clean-up and commissioning.

The ground electrode required for Riel Converter Station will be located approximately 20 km from the station site. On the assumption of a shallow land ring electrode (similar to the electrodes used at the existing Henday and Radisson converter stations), the electrode will be a buried iron ring approximately 500 m in diameter and will require a site area in the order of one mile square, together with an access road for construction and ongoing maintenance. There will also be a low voltage line connection between the ground electrode site and the converter station. The line will be an overhead line routed on a right-of-way yet to be determined, and may involve either private property and/or municipal road allowances.

Construction power from the Riel sectionalization portion of the Riel station will be used for the Riel Converter Station and electrode site.

Connections to the Southern Receiver System

The Bipole III transmission line terminates at the Riel Station converter site, where the connections to the southern receiver system occur. The southern receiver system, serving Winnipeg and southern Manitoba, is fed from a network of 230 kV transmission lines originating at Dorsey Station and at a number of existing substations in the Winnipeg area. The Riel Sectionalization project includes sectionalization of several of these existing transmission lines, in order to enable injection of power from the sectionalized D602F at Riel. Although the resultant capacity of the 230 kV connections at Riel facilitates injection of power from Bipole III, additional transmission capacity will be required. The additional capacity will be provided by sectionalization of the existing Ridgeway-Richer 230 kV transmission line (R49R) at Riel Station.

Access Requirements

For Bipole III construction and maintenance purposes, Manitoba Hydro will use 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.

Where possible, Manitoba Hydro will limit all-weather access development to spur roads extending from existing roads to: the converter station sites, the northern work camp, the construction power station site and, the ground electrode sites. Access related to the construction and maintenance of the ground electrode lines, the construction power line (KN36), collector lines (L61K, C61H, C62H, C63H, C64H) and the Bipole III transmission line will be limited to existing infrastructure and the development of seasonal trails for winter work as much as possible. The access trails on transmission rights-of-way will be limited to seasonal trails.

Communications

Apart from the two conductor bundles, the towers will also support an optical protection ground wire (OPGW), strung between and attached to the peaks of the towers. The OPGW will serve both to provide lightning protection, and to transmit communications for line control and protection. The fibre optic cable will be subject to splicing at intervals of approximately five km (3.1 mi.), in splice boxes mounted high on the transmission tower. Repeater stations will be required at intervals of approximately 300 km (186 mi.) for regeneration of communications signals. Where feasible, these will be housed at the sites of existing or future transmission stations in the vicinity of the right-of-way, in order to take advantage of the additional communications capacity. Otherwise, they will be housed in a repeater building housed within the HVdc line right-of-way.

5.0 ENVIRONMENTAL DESCRIPTION

5.1 Environmental Setting

Routing and site selection studies for the 500 kV HVdc transmission line, northern collector lines, and converter station sites, including the ground electrode sites and distribution line connections, involve a study area that is made of diverse regions of Manitoba. From a biophysical perspective, the existing environment for the Project comprises five ecozones (or portions thereof): Hudson Plains Ecozone (3 percent); Taiga Shield Ecozone (3 percent); Boreal Shield Ecozone (37 percent); Boreal Plains Ecozone (35 percent); and Prairie Ecozone (23 percent).

Biophysical characteristics of the study area include the following: wetlands, in the form of fens and bogs, with widespread permafrost within the Hudson Plains; open and often stunted conifer dominated forests and shallow soils with many lakes in the Taiga Shield; contrasting areas of exposed bedrock, mineral soils and peatlands covered by a range of vegetation communities with small to large lakes common throughout in the Boreal Shield; a mix of coniferous and broadleaf vegetation on top of a variety of surficial materials, including wetlands and peatlands, and the increasing predominance of agricultural soils in the southern portion of the Boreal Plains; and the vegetation mix of the Aspen parkland which marks the transition between the boreal forest and the grasslands, almost all of which has been converted to cropland or strongly modified for haying and grazing as rangeland and supplanted the native vegetation of the Prairies.

From a land use perspective, apart from town sites and related resource development facilities, unorganized Crown lands are predominant in the North and include First Nation Reserves and related Treaty Land Entitlement (TLE) sites and land claims, Resource Management Areas (RMAs) associated with various First Nation and Aboriginal communities, related traditional use areas, Registered Traplines (RTLs), mining interests and timber leases, as well as parks and protected areas. Economic activity associated with land uses in the north and central portions of the study area include: mining, hydro development, forestry, hunting, trapping, commercial and sport fishing, water-oriented recreation (i.e., use of national and provincial parks) and tourism (e.g., lodge operation) and agricultural development. While most of the population is found in urban areas, subsistence hunting, fishing and trapping remain important land uses. Privately-owned lands and agricultural land use are predominant in southern Manitoba, although the development pattern is complicated by a greater density of urban and residential land use as well as by the presence of parks and various types of conservation areas. Regional infrastructure and services occur throughout the study area but are more concentrated in the south as compared to northern portions of the study area. More detail is provided in a land use study area characterization prepared for the Bipole III study area (MMM Group Limited, 2011a).

5.1.1 Land Use Development Controls

Much of the land within the northern limits of the project area is unorganized Crown land and therefore not subject to municipal zoning or development control regulations. Land use planning responsibilities within the organized areas in central and southern Manitoba fall under the jurisdiction of the respective municipalities or planning districts. Municipal jurisdictions may adopt development plans and zoning By-Laws to guide land use decisions within their boundaries. The following section describes the land use development controls of organized municipalities along the preliminary and final preferred route. Rural Municipality's that do not fall under a planning district or are without a development plan are subject to Provincial Land Use Policies (Regulation 81/2011). Along the final preferred route, this only includes the R.M. of Alonsa.

- Town of Gillam

  Development in the Town of Gillam is subject to a development plan (LGD of Gillam Development Plan, By-Law no. 258) and a zoning By-Law (LGD of Gillam Zoning By-Law No. 335). Within the boundaries of the LGD (Town) of Gillam, the majority of lands are designated and zoned as LD – Limited Development. This designation identifies lands that have not yet been selected for specific urban uses due to a variety of factors including, physical or economic unsuitability, inaccessibility to the built-up area, or inadequate municipal servicing, and is intended to protect such lands from untimely and inappropriate permanent development. Land use along the final preferred route within the Town of Gillam boundaries, outside the urban communities of Gillam, Bird and Sundance, is zoned "LD – Limited Development".

- LGD of Mystery Lake

  Land use in the LGD of Mystery Lake is subject to the Thompson Planning District Development Plan No. 36-2008 and Zoning By-Law (No. 541). The LGD of Mystery Lake, with the exception of the City of Thompson, is designated as "LD – Limited Development", including along the final preferred route. This designation identifies lands that have not yet been selected for specific urban uses due to a variety of factors including, physical or economic unsuitability, inaccessibility to the built-up area, or inadequate municipal servicing, and is intended to protect such lands from untimely and inappropriate urban development. Those areas designated "LD – Limited Development" are restricted for that purpose under the Zoning By-Law.

- R.M. of Kelsey

  Land use in the R.M. of Kelsey is subject to the R.M. of Kelsey Development Plan By-Law No. 16-92. Under the Development Plan, land use in the R.M. of Kelsey, excluding the Town of The Pas, is dominated by areas designated Agricultural with smaller sections of Natural Resource Management in the southwest corner of the R.M. There are also several areas of Limited Development closer to town and along PTH 10 to the south and west. In addition, there are areas of Residential and Highway Commercial just beyond the town limits. Other lands identified within the R.M. of Kelsey are First Nation lands as part of OCN Reserve blocks. Under the R.M. of Kelsey (formerly Consol) Zoning By-Law, land use along the final preferred route is zoned either "AR40 – Agriculture Restricted" or "LD – Limited Development".

- Swan Valley Planning District

  Land use in the R.M. of Mountain North, the R.M. of Mountain South, and the R.M. of Minitonas are subject to the Swan Valley Planning District Development Plan By-Law No. 2/2004. The majority of the area in this planning district is designated as

Agriculture/Rural area. Under the R.M. of Mountain Zoning By-Law No. 08/04, lands along the preferred route are zoned as "AG – Agricultural General Zone". The closest community to the preferred route is the Unincorporated Village of Cowan, which is designated as General Development Area.

- Lakeshore Planning District

Land use in the R.M. of Lawrence and the R.M. of Mossey River are subject to the Lakeshore Planning District Development Plan By-Law No. 1-2001.

Within the R.M. of Mossey River, the area is almost entirely designated as Agricultural/Rural Area. There is one Seasonal Recreation area located along the north east boundary along Lake Winnipegosis. The Village of Winnipegosis is an Urban Community located in the northeastern corner of the R.M. The Urban Community mostly consists of a General Development Area with a Rural Residential Area along the southern border of the Village of Winnipegosis and an Urban Expansion area along the northwest corner of the village. Under the R.M. of Mossey River Zoning By-Law No. 7-01, land use along the preferred route is zoned "AG – Agricultural General Zone".

Within the R.M. of Lawrence the area is almost entirely designated as Agricultural/Rural Area. There is one Seasonal Recreation area located at the northern R.M. boundary along Lake Winnipegosis. The Urban Community of Rorketon is located centrally in the R.M. and is designated as a "General Development" area. Under the R.M. of Lawrence Zoning By-Law No. 02-2002, land use along the preferred route is also zoned "AG - Agricultural General Zone".

- Big Grass Planning District

Land use in the R.M. of Lakeview and the R.M. of Westbourne are subject to the Big Grass Planning District Development Plan (2004). In this planning District there are two Community Development areas along the preferred route, Langruth and Westbourne. They are located along PTH 50 and PR 242 respectively. Surrounding land use through these two municipalities is primarily designated "A – Agriculture". An area designated as "PR – Protected Recreation" is located adjacent to the preferred route in the R.M. of Lakeview east of PTH 50. Both the Whitemud River and Squirrel Creek, which are crossed by the preferred route, are designated as "W – Water and Shoreline Areas" under the development plan. Under the Water and Shoreland Policies, waterways, water bodies and shorelands may require protection to limit adverse impacts of development. Development will be encouraged in a manner that ensures that these designated areas are sustained.

Land use zoning along the final preferred route in the R.M. of Lakeview and the R.M. of Westbourne are subject to Zoning By-Law No. 48-05 and Zoning By-Law No. 1937 respectively. The R.M. of Lakeview's Zoning By-Law is in the process of being reviewed and revised. Land use along the preferred route in the R.M. of Lakeview is primarily zoned "AG – Agricultural General" with an area of "AR-1 – Agricultural Restricted – Urban Fringe" surrounding the community of Langruth.

- Portage la Prairie Planning District

Land use in the R.M. of Portage la Prairie is subject to the Portage la Prairie Planning District Development Plan By-Law No. 1-2006. The majority of the land use along the preferred route in the R.M. of Portage la Prairie is designated as Rural/Agricultural Policy area. There is one Limited Service Rural Settlement Centre designated in proximity to the preferred route. Macdonald is located along PTH 16 in the northwest part of the R.M. Land use zoning is subject to the R.M. of Portage la Prairie Zoning By-Law No. 2459. Land use along the final preferred route is zoned as "AG – Agricultural General Zone".

- Nor-Mac Planning District

Land use in the R.M. of North Norfolk is subject to the Nor-Mac Planning District Development Plan By-Law No. 84-1. Land use along the preferred route is primarily designated "A – Agriculture". The communities of Bagot and Rossendale are designated as "General Development" areas located along PTH 1 west and east and to the southeast along PR 242 respectively. Under the R.M. of North Norfolk Zoning By-Law No. 460, land along the preferred route is zoned "A80 – Agricultural Zone".

- South Central Planning District

Land use in the R.M. of South Norfolk is subject to the South Central Planning District Development Plan 2016 By-Law No. 3-2003. The preferred route crosses through lands primarily designated as "Rural" Policy area. The Whitemud Watershed Wildlife Management Area in the R.M. of South Norfolk is located along the south banks of the Assiniboine River. Two parcels are located in close proximity to the preferred route. Under the R.M. of South Norfolk Zoning By-Law No. 2452-05, land use along the preferred route is zoned "AG – Agricultural General Zone".

- Grey-St. Claude Planning District

Land use in the R.M. of Grey is subject to the Grey-St. Claude Planning District Development Plan By-Law No. 2-99. The area in this Planning District is mostly designated "A – Agriculture". The Village of St. Claude is located along PTH 2 and PR 240, approximately 2.4 km to the north of the preferred route. Two other communities are

located north of the preferred route along PTH 2, the LUD of Haywood located west of PTH 13, which is designated as a Village Centre and the LUD of Elm Creek along PTH 13 AND PTH 2. The designated Village Centre of Fannystelle is located along PTH 2 and PR 248 and is the furthest removed from the preferred route. Under the R.M. of Grey Zoning By-Law No. 5/03, land along the preferred route is zoned as "AG – Agricultural General Zone".

- R.M. of Dufferin

Land use in the R.M. of Dufferin is subject to the Dufferin Development Plan, By-Law No. 1800. Land use along the preferred route is primarily designated as "Rural Policy" area. Lands in a band north and south of PR 245 outside of the Town of Carmen and communities of Homewood, Graysville and Roseisle, and the Stephenfield Reservoir (which is designated as a "Recreation Policy" area) are designated as "Restricted Agriculture Policy" areas. Under the R.M. of Dufferin Zoning By-Law No. 1801, land along the preferred route is zoned as "AG – Agricultural General Zone".

- Macdonald-Ritchot Planning District

Land use in the R.M. of Macdonald and the R.M. of Ritchot are subject to the Macdonald-Ritchot Planning District Development Plan By-Law No. 2/02. The majority of the area is designated as "Rural Policy" area. The "Urban Policy" area of Brunkild, which is designated as "General Development", is located to the southwest of the preferred route along PTH 3. The Village of Ste. Agathe is located along the west side of the Red River along PTH 75 north of the preferred route. The preferred route east of Brunkild and south of Ste. Agathe to the eastern boundary of the R.M. of Ritchot crosses the "Red River Valley Designated Flood Area". Under the R.M. of Macdonald Zoning By-Law No. 15/95, land use along the preferred route is zoned as "AG – Agricultural General Zone". Land use along the preferred route through the R.M. of Ritchot Zoning By-Law No. 28-2003 is zoned as "AR – Agricultural Restricted Zone" in the river lot portion of the R.M. south of Ste. Agathe and "AG – Agricultural General Zone" along the remainder of the route.

- R.M. of Hanover

Land use in the R.M. of Hanover and the Local Urban Districts (LUDs) of New Bothwell, Mitchell and Blumenort are subject to the R.M of Hanover's Development Plan Number 2170. The lands outside the LUDs are either designated as "General Agricultural" area or "Rural" area along the preferred route. The LUD of New Bothwell is the closest community to the preferred route, located along PR 216. The Town of Niverville is located approximately 3.6 km north of the preferred route west of PTH 59. Under the R.M. of Hanover Zoning By-Law No. 2171, land use along the preferred route is zoned as a mixture of "A – Agriculture Zone" and "R – Rural Zone".

- R.M. of Ste. Anne

  Land use in the R.M. of Ste. Anne is subject to the Rural Municipality of Ste. Anne Development Plan By-Law No. 10-93. The majority of the area in the R.M. of Ste. Anne is designated as "Rural" Area. The Village of Ste. Anne is located north along PR 210 and east of PTH 12 and is located southeast of the preferred route. Under the R.M. of Ste. Anne Zoning By-Law No. 12-1998, land use along the preferred route is zoned as "AG – Agricultural General Zone".

- R.M. of Tache

  Land use in the R.M of Tache and the LUD's of Lorette and Landmark are subject to the Rural Municipality of Tache's Development Plan By-Law No. 4-2000. The majority of the land within the R.M. of Tache is designated as "Agricultural General" area. The LUD of Landmark is located to the west of the preferred route at the junction of PR 210 and PR 206. Two "Rural Residential" designated areas are located along the preferred route, one east of the LUD of Landmark along the municipal boundary with Ste. Anne, and the other adjacent to the route north of PR 501 to the east of the Settlement Centre of Dufresne. Under the R.M. of Tache Zoning By-Law No. 12-2009, land use along the preferred route is zoned as "AG – Agricultural General Zone".

- R.M. of Springfield

  Land use in the R.M of Springfield is subject to the Rural Municipality of Springfield's Development Plan By-Law No. 98-22. The majority of the land along the preferred route in the R.M. of Springfield is designated as "Agricultural Preserve" area. A quarter-section of land west of PR 207, to the north of the Deacon Reservoir site, is designated as "Industrial" under the municipal development plan. This site is identified as part of the overall land parcel required for the development of the Riel Converter Station. Under the R.M. of Springfield Zoning By-Law No. 08-01, land use along the preferred route is zoned as "AG – Agricultural General Zone".

From a development control perspective, the preferred route primarily crosses through lands designated as either Agricultural or Rural policy areas under individual municipal development plans. In all cases, specific municipal or planning district development plan policies noted that the essential activities of government and public and private 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 so as to minimize any incompatibility with neighbouring land uses.

5.2 Valued Environmental Components

The selection of Valued Environmental Components involved a scoping of issues pertinent to the Bipole III Project as an initial starting point. Based on the preliminary listing a subjective

screening was then undertaken to identify the potential effect of the Project on each VEC and included consideration of past experience with other similar projects. Comments and concerns gathered from stakeholders on potential effects of the Project during the environmental assessment consultation process as well as professional judgement were also considered in identifying VECs. Four VECs were determined for inclusion in the environmental assessment for the Project. Table 1 presents the selected VECs, rationale for selection, environmental indicator, measurable parameter, potential environmental effect, and applicable project phase where the effect may occur.

Table 1: Valued Environmental Components Selected for Land Use

Category – Valued Environmental Component	Rationale for VEC Selection	Environmental Indicator	Measurable Parameter	Environmental Effect	Project Phase
Land ownership and tenure – property and residential development	Community or municipal concerns; identified within development plans	Presence or absence; property values, viewscape; change in land tenure	Number of concerns; Proximity, numbers affected; Land area (ha)	Disturbance effects from line, station or site presence; Nuisance effects from noise, traffic	Pre-construction/ construction, and operation and maintenance
Resource Use – commercial use (mining, trap lines, outfitter areas, wild rice areas)	Exploration and development conflicts; industry/operator concerns	Presence or absence; Exploration interference, access interactions	Numbers affected Access (positive/ negative)	Disruption of mining interests and exploration activities; interference with survey technology	Pre-construction/ construction, and operation and maintenance
Recreation and Tourism – parks and conservation lands, recreational areas (lodges, cottages)	Natural aesthetic concerns	Presence or absence; Natural aesthetic value; access interactions	Proximity, numbers affected Access (positive/ negative)	Disturbance effects, increased access (resource loss, recreational opportunities), intrusion effects	Pre-construction/ construction, and operation and maintenance
Infrastructure and facilities* – aerodromes, communication towers, roads, rail, pipelines	Operational conflicts and concerns	Presence or absence; Broadcast or navigation interference	Numbers affected	Interference levels	Pre-construction/ construction, and operation and maintenance

Note: *Identified for consideration as a VEC, issues with respect to impacts on infrastructure and facilities from transmission development are subject to application and adherence to established design protocols and procedures and are readily mitigable to address any associated potential interference or operational effects. As such, the discussion of effects is based on prior experience in SSEA studies for transmission facilities in the context of established issues and concerns, and not explicitly presented as a VEC.

Property Tenure and Residential Development

First Nation Reserves and Treaty Land Entitlement Lands are subject to jurisdictional/governance issues and are established for the sole use of the First Nations involved. These lands have been treated as regional constraints and have been avoided in identification of alternative routing and in the selection of the preferred route. Other regional features include unorganized Crown lands in the north where aboriginal communities have traditional resource use or are involved in co-management of resources within established Resource Management Areas (RMAs).

Existing towns, villages and settlements (including all areas designated as such under municipal Development Plans and/or Zoning By-Laws) generally involve residential land uses and development densities which tend to conflict with transmission line development. Such areas have been treated as sensitive regional avoidance features and a valued environmental component for the assessment due to the potential for community and/or municipal concerns associated with conflicting development.

Similarly, any areas designated as Rural Residential under Development Plans and/or Zoning By-Laws were considered potential areas for future urban development and have also been treated as regional avoidance features. In circumstances where proximity to urban and rural residential development cannot be entirely avoided because of the functional requirements of the transmission system (e.g., location of stations and connecting transmission lines in the Winnipeg area), mitigation can be addressed through specific design and routing measures.

Commercial Resource Use

Transmission line development can interfere with surface mining of mineral and aggregate resources. Accordingly, mineral interests and aggregate deposits were regionally mapped as a routing constraint. Mining interests included mineral exploration licence areas, mineral lease areas, mining claims, and quarry leases. Mineral interests and mapped deposits were identified from GIS databases, aggregate compilation maps or from geology reports/maps. Locations of active or dormant surface mining operations (i.e., mines, pits/quarries) were mapped; however, these are site-specific and are readily avoidable in detailed routing analysis and selection. Trapping and outfitting activities are subject to potential disturbance/interference related to increased access and habitat loss from project development, and as such were documented. Potential sensitivities associated with project development include mineral exploration and development and resource harvesting conflicts. These project-related issues and concerns were also expressed by industry, operator and resource harvesters through the consultation process. As such, commercial resource use was considered as a valued environmental component for assessment purposes.

Recreation/Tourism Areas and Conservation Lands

Due to their use for recreational purposes, this category of constraint extended to Provincial Parks, Provincial Forests and Wildlife Management Areas. Other features considered consisted of lodges, cottage subdivisions, and other recreational areas/facilities (i.e., campgrounds and trails). Designated recreational areas identified under municipal Development Plans and/or Zoning By-Laws were also considered to be a routing constraint. The extent to which these regional features require avoidance was addressed further in detailed analysis of alternative routes and preferred route selection. Subsequent to the analysis, it was determined that Provincial Parks would be avoided. A potential issue of concern associated with project development relates to impacts on the natural environment and aesthetic values (i.e., visual intrusion), including the prospect of differing public perceptions (real or perceived). This potential sensitivity necessitated consideration of recreation and tourism, particularly parks and recreation, as a valued environmental component for assessment purposes.

Infrastructure Facilities

Linear infrastructure includes existing rights-of-way associated with provincial highways and roads, railways, pipelines, and other transmission lines which have been crossed as identified in the alternative route analysis and preferred route selection. Other features considered included existing substations and municipal waste disposal grounds and/or lagoons, communication towers, licensed airstrips, aerodromes and float plane bases. These site-specific locations can be easily avoided during route selection. The potential for conflicts and concerns regarding possible interference levels with broadcast, navigation or infrastructure operations suggested its inclusion as a valued environmental component. For assessment purposes, it has been discussed in the context of an established issue and concern based on prior transmission line development experience.

5.3 Routing Opportunities/Limitations

Existing Linear Rights-of-Way

Established linear rights-of-way, as identified on existing 1:250,000 National Topographic System (NTS) map sheets, were treated as potential siting opportunities for alternative route corridors. These included existing transmission line rights-of-way, rail rights-of-way, provincial highway and road rights-of-way, and municipal road allowances. Public input during the four rounds of consultation, supported the use of existing rights-of-way (e.g., use of an abandoned rail right-of-way between Dauphin and Mafeking). Further evaluation of these potential siting opportunities was undertaken in the course of detailed route analysis.

The literature review on land use changes and aesthetic effects from transmission line development suggests support for routing transmission lines along existing linear features such as roadways and railway to mitigate potential effects of a transmission line (Public Service Commission of Wisconsin, 2010). Other transmission line project proponents (BC Hydro, 2008 and Minnesota Department of Commerce, 2006) make explicit reference to locating new transmission lines adjacent to existing lines and other rights-of-way based on sound engineering principles and system reliability criteria.

Prevalent Siting Features

Portions of the study area feature numerous instances of agricultural Crown land and community pastures. Several community pastures and other non-intensively used parcels of Crown land exist within the Project study area, particularly in the Interlake Plain area and may offer routing opportunities. Possible routing through these parcels was evaluated further during detailed route analysis in relation to other potential issues or sensitivities (e.g., sensitive biophysical qualities).

Bottleneck Areas

The siting of the three alternative routing corridors (i.e., A, B and C) has been influenced to a large degree by the presence of several designated features and large waterbodies in the regional landscape. The locations of Moose Lake (North and South), Cedar Lake, Lake Winnipegosis and Lake Manitoba contribute particularly to establishment of two major bottleneck or pinch point areas (**see Map 2**).

- One occurs between the Cormorant area down to The Pas, where Alternatives B and C converge at a common area where one major Wildlife Management Area (Tom Lamb), one provincial park and forest (Clearwater), as well as other land tenure interests (i.e., First Nation Reserves and TLE lands) are present.

- The second bottleneck area, involving Alternative corridors B and C, occurs in the vicinity of Red Deer Lake between the Porcupine Forest Reserve and Lake Winnipegosis. Other land tenure constraints at this location include a First Nation TLE selection along the Red Deer River that limits the potential route to one crossing point. As an alternative to this pinch point, a third routing option (i.e., Alternative C) was extended further to the west to cross south through the Porcupine Forest Reserve, or to the southeast using sub-segment AC2, to avoid this pinch point.

Other designated lands further to the south, namely Duck Mountain Provincial Park and Riding Mountain National Park, affect routing of Alternatives A and C. Although both Parks are avoided, Alternative A crosses through the Duck Mountain Forest Reserve to the west of the provincial park.

As well, the presence of Spruce Woods Forest Reserve and Provincial Park and Lake Manitoba (including Delta Marsh), focus the siting of alternative route corridors to a common pinch point area southwest of the City of Portage la Prairie and in the vicinity of the Long Plain First Nation.

6.0 DISCUSSION OF ALTERNATIVES AND SELECTION OF PREFERRED ROUTES AND SITES

Three general alternative routing corridors for the Bipole III HVdc transmission line were identified within the Project study area (**Map 3**). Each includes sub-segments, or sub-alternatives, connecting different portions of the main corridors. All three originate from a common point (the proposed northern converter station near Conawapa) and then extend successively westerly, southerly and then easterly to a common termination at the Riel Station site on the east side of Winnipeg.

Alternatives A, B and C share a common corridor north of Stephens Lake to an area between Lake Waskiowaka and Split Lake northwest of Kelsey Generating Station. From this point, Alternative A is the northernmost alternative, crossing north of Nisichawayasihk Cree Nation (NCN) reserve lands to a point northwest of the Town of Snow Lake. From this point, Alternative A proceeds south to the west of the Town of Snow Lake before turning west to cross south of Grass River Provincial Park to a point near the Manitoba/Saskatchewan border. From the node intersection northwest of Snow Lake, a sub-segment of Alternative A, route A2, continues on a southwesterly alignment and subsequently crosses along the west side of Grass River Provincial Park, through the community of Cranberry Portage, to a point in the R.M. of Kelsey southwest of The Pas. Alternative B is the southernmost route, crossing to the south of the City of Thompson, and through the Town of Snow Lake municipal boundary, east of the community. From this point, Alternative B proceeds in a southwesterly direction to the south of the community Cormorant and Clearwater Lake Provincial Park, before reaching The Pas area south of the town limits. A sub-segment of Alternative B is aligned to the east of Sasagiu Lake, around the community of Wabowden, before re-joining with Alternatives B and C at a common node intersection northeast of the Tom Lamb WMA. Lastly, Alternative C is the central route through this area, crossing to the south of NCNs reserve land to a common node point with Alternative A west of the community of Snow Lake. Alternative C then proceeds southerly to join with Alternative B at a common node point northeast of Tom Lamb WMA before continuing on in a southwesterly direction to the common point south of The Pas.

From a point in the R.M. of Kelsey, southwest of The Pas, Alternative Route A is the most westerly alternative, crossing through the Porcupine Forest Reserve and along the west side of the Duck Mountains and Riding Mountain National Park before proceeding southeasterly to a common node intersection in the Neepawa area.

Alternatives B and C generally proceed in a southerly direction, south of The Pas, west of Moose Lake (North and South) and Cedar Lake, continuing south between Red Deer Lake and Lake Winnipegosis, and subsequently between the Porcupine Forest Reserve and Swan Lake to a common node intersection northeast of Duck Mountain. From this point, Alternative B and its sub-alternatives, continue as the most easterly alternative route, passing between Dauphin Lake and Lake Manitoba, to a common node intersection with Alternatives A and C southwest of Portage la Prairie. Alternative C continues south as the central route from the common node intersection northeast of Duck Mountain, passing between Dauphin Lake and Riding Mountain National Park, to the common node intersection with Alternative A southeast of Neepawa.

Southwest of Portage la Prairie and the Long Plain/Dakota Plains First Nations, all three alternatives extend south across the Assiniboine River and then in an easterly direction to the south of Winnipeg before turning north and west to terminate at the Riel Station site. Alternative A is the most southern route before crossing the Red River south of Ste. Agathe. It then becomes the most easterly alternative route before joining a common route segment with Alternatives A and B extending west into Riel Station. Alternative B, and its sub-alternatives, is the most northerly route, crossing the Red River between Glenlea and Ste. Agathe, before proceeding north as the most westerly route to the common route segment into Riel Station. Alternative C is the central route, also crossing the Red River between Glenlea and Ste. Agathe, and then proceeding north as the central route to the common route segment with Alternatives A and B into Riel Station.

The following sections describe and provide a summary overview of the comparative evaluation of the three alternative route corridors.

6.1 Alternative Corridor Descriptions

Alternative A

From the proposed converter station in the Conawapa area, Alternative A is sequentially the northernmost, westernmost and southernmost route corridor alignment. Overall, it is the longest and least direct route of the three options (1,485 km), traversing upland boreal forest, boreal plain, western parkland, central plain and Red River valley agricultural lands. Extending west from the northern converter station site, this alternative route crosses north of Stephens Lake between Lake Waskiowaka and Split Lake. Continuing west, it takes a path south of Amisk Park Reserve to a point northeast of Grass River Provincial Park. From this point, it proceeds south through the municipal town boundary of Snow Lake before turning west and crossing to the south of Grass River Provincial Park to a point near the Manitoba/Saskatchewan border. From this point, it proceeds south through the Saskeram WMA to an area southwest of The Pas in the R.M. of Kelsey. Southwest of The Pas, the option extends south to the west of Red Deer Lake, crossing through Porcupine Provincial Forest and the western edge of the Duck Mountains west of Riding Mountain National Park.

Southwest of Riding Mountain, this route option extends in a southeasterly direction between Neepawa and Portage la Prairie where it proceeds in an easterly direction to a crossing point of the Red River south of Ste. Agathe, before turning north and then west towards the Riel Station site east of Winnipeg.

Alternative B

In contrast with Alternative A, this option is the shortest (approximately 1,290 km) and least circuitous of the three alternatives. From the northern converter station to the Riel Station site, it is sequentially the southernmost, easternmost and northernmost of the three alternatives. As with Alternative A, this route traverses upland boreal shield, boreal plain, western parkland, and Red River valley agricultural lands. However, a greater portion is located within the Interlake plain region in relative proximity to lakes Winnipegosis and Manitoba.

Alternative B shares the same corridor area with Alternative A north of Stephens Lake west to an area northwest of Split Lake, where B then diverges southwest to Sasagiu Lake, west to Wekusko Lake and then continues southwest to the southeast of Cormorant and Clearwater lakes to an area south of The Pas. From The Pas area, it continues south to a point between Red Deer Lake and Lake Winnipegosis, and then continues south to the west of Swan Lake, to a point northeast of the Duck Mountains. From there, it continues southeast between Dauphin Lake and Lake Manitoba to cross the Assiniboine River southwest of Portage la Prairie where it extends in an easterly direction to cross the Red River between Glenlea and Ste. Agathe, before turning north and west towards the Riel Station site.

Alternative C

Alternative C uses a combination of both Alternatives A and B for short segments, principally in its northernmost segment (to a point northwest of Split Lake); west of the Town of Snow Lake; from Dyce Lake southeast of Cormorant and Clearwater lakes to The Pas area; south of The Pas to the Minitonas area; and through the central plains area between Neepawa and a point south of the Assiniboine River and southwest of Portage la Prairie. Alternative C represents an intermediate route in terms of length (approximately 1,350 km). From the northern converter station, this route option shares a common alignment with Alternative B west to a point near Moak Lake. From there, it proceeds southwesterly to a point on the west side of the community of Snow Lake, then crosses to the east of Grass River Provincial Park, before proceeding in a southwesterly direction through the Tom Lamb WMA to the southeast of Clearwater Lake, to a point south of The Pas. From The Pas, it proceeds in a southerly direction along a corridor similar to Alternative B, extending south to a point between Red Deer Lake and Lake Winnipegosis, down to the Minitonas area. From this point, it continues southeast between Dauphin Lake and Riding Mountain before it crosses the Assiniboine River southwest of Portage la Prairie (similar to Alternative A). Like Alternative B, Alternative C then proceeds in an easterly

direction to cross the Red River between Glenlea and Ste. Agathe and then extends north and west towards the Riel Station site.

6.2 Alternative Route Evaluation and Comparison

6.2.1 Initial Alternative Corridor Evaluation

The three identified alternative corridors tend to either traverse or avoid regional constraint features to a similar extent. All three alternative route corridors avoid crossing through National Parks. Constraint features which are in the vicinity of the alternative route corridors to varying degrees but which can be avoided at the more detailed routing analysis stage include:

- Ecological Reserves
- Provincial Parks
- Conservation (MHHC/DUC) and Other Project/Program Sites
- Municipal Recreation/Cultural Areas and Sites
- Existing Towns, Villages and Settlements, Rural Residential Areas
- Communication Towers/Navigation Facilities

Constraint features traversed to a similar extent by all three alternative route corridors include:

- Provincial Forests
- Wildlife Management Areas
- Agricultural Crown Land Parcels
- Mineral Disposition Areas and Aggregate Deposits
- Community Pastures
- Linear right-of-way features (i.e., roads, railway lines, transmission lines, pipelines)

Distinctions between the three corridors relate principally to select criteria and technical constraint issues and generally represent trade-offs between the alternative corridor segments.

Alternative A offers the greatest separation from Bipoles I and II. However, this option is the longest and, therefore, likely the most costly of the three. Apart from its physical separation from the existing Bipole transmission lines, it offers no obvious land use advantage. One possible trade-off with this alternative involves segments that cross through an area of northern Manitoba

with fewer mineral dispositions/aggregate deposits versus other alternative sub-segments (particularly Alternative B and its sub-segments). Disadvantages associated with Alternative A include crossing through the entire length of the Porcupine and Duck Mountain Forest Reserves as well as crossing through a longer section of the western parkland area where numerous Ducks Unlimited Canada and Manitoba Habitat Heritage Corporation and other project site/program lands are located.

Alternative B provides the shortest route length and likely the lowest construction cost, but offers less physical separation from the existing Bipole transmission lines than does Alternative A. An advantage of this corridor is its potential use of marginal agricultural lands, including community pastures, along the west side of Lakes Winnipegosis and Manitoba as well as its crossing of a greater number of undeveloped parcels of Agricultural Crown land.

Alternative C falls between Alternatives A and B in terms of line length, construction cost and separation from the existing Bipole transmission lines. It shares the advantages associated with Alternative B in terms of types of lands crossed through the Interlake Plain area, but to a lesser extent.

Analysis of the extent to which the three alternative corridors avoid or intersect with regional and point constraint features and utilize siting opportunities by route segment and node forms the basis of the evaluation of Alternative Route Corridors A, B and C. Details of the land use constraints and features traversed by the alternative route corridors as well as routing opportunities are presented below.

Based on the potential overall number of intersects between the alternative corridors, higher levels of interaction are clearly reflected in Table 2 for one alternative corridor (as a whole) over another (e.g., conservation habitat lands along Alternative A). In other instances, selected specific feature counts are relatively comparable (e.g., overlap with provincial parks and forests). Along with the regional features, the land use point constraints reflect the extent of land use activity levels identified.

From a land use perspective, there is little evident distinction between the three alternative corridors as a whole in relation to potential regional and point specific constraints or linear crossing features. All three corridors have similar types of land use interactions. Differences in the above include situations associated with the extent to which conservation habitat lands and/or wildlife lands are crossed, the extent to which other land use interests are affected (e.g., mining interests), the extent to which more marginal pasture lands and/or agricultural Crown lands are utilized, and the number of crossings of existing linear features. From a construction perspective, Alternative Route A is the longest of the corridors. It has the fewest number of crossings (143) of existing linear features (i.e., transmission line, rail, road and pipeline rights-of-way. Alternative Route B is the shortest of the corridors. In comparison, this alternative route has the highest number of crossings (194) of existing linear features. Alternative Route C falls

between the two, in terms of total line length, and the number of crossings (165) of existing linear features.

Table 2 – Alternative Corridor Summary – Constraint Features[1] and Routing Opportunities			
Regional Feature/Site	**Route Option A (Western)**	**Route Option B (Eastern)**	**Route Option C (Central)**
Land Use			
Overlap with National Parks, Provincial Wilderness Parks, Ecological Reserves	1	2	1
Overlap with Provincial Parks and Forest Reserve Areas, Biosphere Reserve	6	4	4
Overlap with Wildlife Management Areas	8	10	12
Overlap with Conservation Habitat Lands	114	9	19
Overlap with Other Recreation Areas/Sites, Lodges, Cottage Areas, Canoe Routes	21	11	15
Overlap with Snowmobile Trails, TCT, Other Trails	284	265	154
Overlap with Mineral Exploration Licences/Mineral Claim and Lease Areas/Mines Sites & Aggregate Deposits	42 / 252 / 84	21 / 1286 / 94	16 / 713 / 72
Overlap with Agricultural Crown Lands (potential routing opportunity)	64	410	133
Overlap with Community Pastures (potential routing opportunity)	1	6	3
Overlap with Organic Producers	6	4	1
Overlap with Developed Areas, Settlements	30	24	35
Overlap with Communication Towers/Navigation Facilities	18 / 3	19 / 3	22 / 3
Agricultural / Forest / Crown			
Agricultural Land Cover Crossed (km) [2]	401	207	292
Forested Land Cover Crossed (km) [2]	458	465	458
Agricultural Crown Land Crossed (km) [3]	115	134	133
Engineering / Technical			
Right-of-Way Length (km) [4]	1485	1290	1350
Crossing / Opportunity to Parallel Existing Transmission and Sub-transmission Lines [5]	42 / 10	59 / 23	55 / 19
Crossing/Opportunity to Parallel Existing Rail [5]	22 / 5	35 / 12	27 / 10
Crossing and/or Opportunity to Parallel Existing Roads (PTH / PR) [5]	71 / 15	91 / 19	75 / 16
Crossing Pipelines (including aqueduct)	8	9	8

Notes: [1] based on overlap of the feature with the 5 km (approximately) corridor along alternative routes consisting of segments and sub-segments; [2] based on National Land Cover Classification data (Agricultural consists of cultivated land and annual crops only; Forested consists of coniferous, broadleaf and mixedwood covers); [3] based on Provincial Agricultural Crown land data; [4] based on distance of main A, B, and C routes centred within 5 km corridor; [5] includes corridor segments only.

6.2.2 Alternative Route Segment Evaluation

Further research and analysis was conducted to refine/adjust potential alternative routes segments within the alternative corridors, prior to the selection of a preferred route. This was augmented through feedback from public and other stakeholder groups during Round Three of the public consultation process.

Each of the alternative route corridors were separated into segments at pre-defined nodes for evaluation purposes. Nodes were established as areas between segments or where segments came together. Segments were based on a linear centre line within a 5 km (3 mi.) corridor.

The corridor was established to allow for the movement of the centre line within the corridor to take into account routing features and sensitivities. The line segments were grouped into 13 sections for further analysis (**Map 3**). Individual interactions along each of the alternative route segments and nodes in relation to common constraint features and opportunities were tabulated based on the 5 km corridor width. Point count intersects along the various segments and nodes of the alternative route corridors and the results of the segment evaluation are summarized. **Map Series A100** (Appendix A) identify the alternative routes, where along the segments land use activities and/or interests are high and where geographically these intersects occur.

The initial evaluation of the alternative route segments and nodes indicated that most of the route segments have a “Low” or “Medium” constraint ranking for land use interests and activities. Thirteen of the alternative route segments (A15, A17, B10, B11, B25, B28, C9, C13G, C19, C21, C22, C24, and C31) and two sub-alternatives (AA2, BB2) had a ranking of “High”. Differences between the segments were associated with the extent to which conservation habitat lands and/or wildlife lands were impacted, the extent to which other land use interests were impacted (e.g., mining interests), the extent to which more marginal pasture lands and/or agricultural Crown lands were utilized, and the number of crossings of existing linear features. However, even though other segments ranked as “Medium” or “Low” there were numerous land use constraints and issues (i.e., activities and interests) that were taken into consideration for those segments in the identification and final selection of a preferred route corridor and its subsequent alignment. Further evaluation allowed for the consideration of opportunities to avoid interactions and address, by route adjustment, land use constraints.

Crossings of linear features within the three alternative corridors, including opportunities to parallel, are apparent in the majority of segment and node locations. Of important note for three alternative corridor segments (and nodes) east of the Riel Station site (i.e., AC5, CB1 and B29) is the potential for a crossing and parallel situation involving one 500 kV transmission line (D602F), which is a major import/export line to the U.S. The selection of a preferred route right-of-way from the alternative route segments will require further review from a technical design perspective with respect to potential effects on linear rights-of-way.

6.2.3 Additional Alternative Route Segment Evaluation

As part of a continuing process of route selection, subsequent identification and route comparison was used to evaluate 16 new alternative route segments within 5 km (3 mi) alternative corridors. The process was based on the previous identification of generic environmental issues and concerns, derived during the course of study area delineation and characterization, public consultation input, and technical and economic feasibility considerations.

Following the identification of new alternative route segments, an analysis was undertaken in GIS on a segment basis to identify new alternative route intersects with listed constraint features.

As with the previous alternatives analysis, the objective of this additional analysis was to evaluate new alternative route segments with respect to the amount of land use constraints/features affected. In this subsequent analysis, nodes were not identified or evaluated.

From a land use perspective, there is little difference between the new alternative route segments with respect to potential regional and point specific constraints in relation to the original alternative route segments. The new alternative route segments have similar types of land use interactions as with the previous alternative segments. Distinctions between the new alternative route segments themselves include situations associated with the extent to which conservation habitat lands and/or wildlife lands were impacted, the extent to which other land use interests were impacted (e.g., mining interests), the extent to which agricultural Crown lands were utilized, and the extent to which developed areas, recreation areas and other point specific constraints (e.g., communication towers, aerodromes/airfields) were affected.

Map Series A200 (Appendix A) identify the new alternative route segments and the associated land use activities and/or interests (i.e., geographic intersect occurrences). It should be noted that the new analysis conducted involved a smaller set of alternative route segments than the initial evaluation which did not allow for a direct comparison of segment rankings between the initial alternatives analysis and the subsequent alternatives segment evaluation.

The evaluation of the 16 new alternative route segments indicates that the majority of the route segments have a “Low” or “Medium” constraint ranking for land use interests and activities. Seven of the new alternative route segments (B10-1, B18-1, B22-1, C22BA4-2, B23-1, A23-1 and A23-2) or just less than half had a ranking of “High”. As noted in the initial analysis, new segments ranked as “Medium” or “Low” also have land use constraints and issues (i.e., activities and interests) that were taken into consideration in the identification and final selection of a preferred route corridor route and its subsequent alignment.

As with the previous analysis, further evaluation allowed for the consideration of opportunities to avoid interactions and address, by route adjustment, land use constraints.

6.2.4 Additional Preliminary Preferred Route Segment Evaluation

The process of route selection and identification concluded with an additional round of route comparison used to evaluate four new alternative route segments for the preliminary preferred route within 5 km (3 mi) corridors. As noted in the sections above, the process was based on previous identification of generic environmental issues and concerns, derived during the course of study area delineation and characterization, public consultation input, and on technical and economic feasibility considerations.

Four additional alternative route segments (labeled P1 to P4) were analyzed using the GIS database to determine intersects between a series of constraint features with the new alternative route segments. The evaluation of new preferred alternative route segments (P1 to P4) from a land use perspective included the identification of regional and point-specific constraint interactions on an alternative segment basis.

As with the previous analyses, there is very little difference between preferred alternative segments P1 to P4 with respect to potential regional and point specific constraints in relation to the previous alternative route segments from a land use perspective. The latest set of new route segments had similar types of land use interactions with the previous alternative segments evaluated. Distinctions between the preferred alternative route segments themselves are associated with the extent to which land use interests are impacted (e.g., mining interests), the extent to which agricultural Crown lands are utilized, and the extent to which recreational resources or areas (e.g., canoe routes), and other linear infrastructure are affected.

The results of the constraint feature interactions along the new preferred alternative route segments are presented on **Maps A1 to A3** (Appendix A). It should be noted that the analysis conducted involved four separate preferred alternative route segments which were distinct from the previous alternative segments evaluated and did not allow for direct comparison and evaluation. As with the other alternative segments reviewed, avoidance through route adjustment where possible will serve to mitigate any potential impacts on land use constraints identified.

6.2.5 230 kV ac Transmission and Construction Power Line Evaluation

The route selection for five 230 kV ac transmission collector lines (two of which are temporary) consisted of an evaluation of one common right-of-way 310 m in width between the existing Henday Converter Station and the proposed Keewatinoow Converter Station site and utilizing a 60 m right-of-way for one 230 kV ac collector transmission line within an existing easement between Henday Converter Station and the Long Spruce G.S. site (**Map 4**). In addition to the collector lines, one construction power line will be provided by extending an existing 138 kV transmission line running from Kelsey G.S. to the existing Limestone construction power substation on a separate 60 m wide right-of-way (at the Nelson River crossing) and subsequently within the common 310 m right-of-way to the new construction power substation at Keewatinoow.

From a land use perspective, this corridor is located within the municipal boundaries of the Town of Gillam, a portion of TCN's and Fox Lake's RMAs (as well as Fox Lake's intensive land use area), the Cape Churchill WMA. The corridor also crosses through Manitoba Hydro's Water Power and License areas associated with developments on the Nelson River. Otherwise, the corridor crosses the active HBR rail line to Churchill at two points (at Limestone and Avery) and an abandoned portion of rail line before proceeding to the Conawapa G.S. site area.

The route selection for the northern collector lines also involves an extension of the corridor between the Conawapa G.S. site area and Long Spruce G.S. to accommodate one of the four 230 kV ac transmission collector lines. From a land use perspective, the issues are similar to those outlined for the portion of the corridor between Henday Converter Station and the Conawapa G.S. site area. The only major difference is a required crossing of the Nelson River upstream of the Limestone G.S. site. Linear infrastructure crossed includes PR 290 as well as other existing Manitoba Hydro transmission lines.

As the northern collector and construction power transmission corridor is located within the Town of Gillam municipal boundaries, they are subject to the LGD of Gillam Development Plan By-Law No. 258. Most of the town boundaries outside developed areas along the Nelson River, between the urban communities of Gillam and Sundance, remain in a natural state. The major development in the planning area (i.e., hydroelectric dams, roads, settlements, etc.) is contained within four miles of the Nelson River. Development policies within the Development Plan specifically apply to existing and planned developments along the Nelson River. Under the LGD of Gillam Zoning By-Law No. 335, the proposed corridor crosses through lands zoned as "LD - Limited Development". Under this zoning district, public utilities, public works and public services are permitted uses.

Subject to further discussions with the Fox Lake Cree Nation and TCN, and the ability to satisfy technical requirements as determined by Manitoba Hydro, there appear to be no major concerns from a land use perspective that would affect the siting of the 138 kV construction power line or the northern 230 kV ac collector transmission lines.

6.2.6 Alternative Converter Station and Ground Electrode Site Evaluation

Keewatinoow Converter Station

Six alternative sites were reviewed for the location of the Keewatinoow Converter Station (northern converter) site. Site locations are identified on **Map 4.** Land use and other constraints/issues were incorporated into the site selection process for the preferred station site that was based largely on technical factors as determined by Manitoba Hydro. All six alternative northern station sites were located in the Cape Churchill Wildlife Management Area (WMA), but appear to be outside of the portion of the WMA identified as an Area of Special Interest (ASI), and are within the Town of Gillam municipal boundaries. All six sites were located within the Fox

Lake Resource Management Area (RMA), three of which were also located entirely within the Fox Lake Community Interest Zone (CIZ) (NCS-4B, NCS-4A, NCS-3). Two alternative sites (NCS-1A, NCS-1B) were partially located within Fox Lake's CIZ, while one site (NCS-2) was located outside of the CIZ. Five of the six sites were located along an existing all-weather road (i.e., Conawapa access road), while one site (NCS-2) was not. All alternative sites were located southeast of an abandoned rail line.

As with the northern collector and construction power line corridor, all alternative converter station sites are located within the Town of Gillam municipal boundaries, and are subject to the LGD of Gillam Development Plan By-Law No. 258. Development policies within the Development Plan specifically apply to existing and planned developments along the Nelson River. Under the LGD of Gillam Zoning By-Law No. 335, the alternative converter station sites are all zoned as "LD – Limited Development". Under this zoning district, public utilities, public works and public services are permitted uses.

As a result of the evaluation, there was no clear preference between the alternative station sites with respect to land use issues. Subject to further discussions with the Fox Lake Cree Nation, and the ability to satisfy technical requirements as determined by Manitoba Hydro, there appear to be no major concerns from a land use perspective that would affect the siting of the northern converter station site.

Northern Ground Electrode

Twenty-one potential ground electrode sites were investigated for the Keewatinoow Converter Station site by Manitoba Hydro as illustrated on **Map 4**. The selection of a preferred ground electrode site incorporated land use and other constraints/issues into the analysis and was subject to satisfying a set of technical criteria established by Manitoba Hydro. Thirteen alternative sites were originally identified for review. Of these sites, Sites 1 to 9, Site 10 and Site 13 were all located within the Cape Churchill WMA. A portion of the WMA is also identified as an ASI under Manitoba's Protected Areas Initiative. None of the sites fall within the ASI boundary. Sites 1 to 8, 10, and 13 fall within the Fox Lake RMA, whereas Sites 9, 11 and 12 do not. With the exception of Site 12, all other sites fall within the Fox Lake Intensive Land Use Area, whereas Site 12 falls within Fox Lake's Seasonal Land Use Area (both coincide with Fox Lake's traditional territory). Sites 11 and 12 fall within TCN's RMA. Sites 1 to 9 and 13 fall within the municipal boundaries of the Town of Gillam; Sites 10 to 12 do not, falling within unorganized territory. Road access (i.e., Conawapa access road) is available for Sites 1 to 9 and 13. No road access is available for Sites 10 to 12. There is rail access to the east of Site 11 up to Weir River on the way to Churchill. Sites 6 to 9 and 13 are located in proximity to an existing 12 kV distribution line and a proposed 138 kV transmission line crosses in proximity or through Sites 4, 9 and 13. Sites 8 and 9 are in close proximity to existing borrow areas. First Nation owned lands at Sundance are removed from the alternative ground electrode sites along the Nelson River, the closest being Site 9. None of these alternative ground electrode sites are affected by TLE selections.

Subsequently to identifying these alternative sites, an additional eight alternative ground electrode sites were identified for review (Sites 14 to 21). All alternative sites were in the vicinity of the existing Henday ground electrode site and located north of PR 290. All sites are located in the municipal boundaries of the Town of Gillam between Long Spruce and Limestone generating stations in and around the vicinity of Leslie Creek. These additional eight alternative sites are also all located within Fox Lake's Intensive Land Use Area and TCN's RMA.

Eighteen of the 21 alternative northern ground electrode sites fall within the municipal boundaries of the Town of Gillam. As such, they are subject to the LGD of Gillam Development Plan and Zoning By-Law noted above. The 18 alternative sites are located in the "LD – Limited Development" zone of the town boundaries and would thus be considered permitted uses under the Zoning By-Law as being a public utility, public work and public service.

As a result of the evaluation, there was no clear preference between the alternative ground electrode sites with respect to land use issues. Subject to further discussions with Fox Lake First Nation and TCN, and the ability to satisfy technical requirements as identified by Manitoba Hydro, there appear to be no major concerns from a land use perspective that would affect siting of the northern ground electrode site.

Riel Converter Station and Southern Ground Electrode

The site of the preferred Riel Converter Station has been previously established on approximately 100 ha of land owned by Manitoba Hydro, located in the east half of Section 26, Township 10, Range 4 EPM in the R.M. of Springfield, west of PR 207 and north of the City of Winnipeg's Deacon Reservoir (**Map 5**). Development of this site was previously licensed in 2009 under the Riel Reliability Improvement Project (Riel Sectionalization) which dealt with the sectionalization of D602F (a 500 kV international transmission line) and the construction of a 230 kV switchyard) and noted the intent for the ultimate development of the Riel Converter Station at this location.

Seven southern alternative ground electrode sites, and one sub-option of a site, were evaluated for the Riel Converter Station, all located within the R.M. of Springfield (**Map 5**). Manitoba Hydro identified the alternative ground electrode sites for evaluation based on one entire section of land (259 ha). Five of the alternative sites were located north of PTH 15 and two sites were located south of PTH 15. Six of the seven sites were located east of the community of Anola and PTH 12. One site, and a sub-option, was located midway between the community of Anola and the Hazelridge area to the west of PTH 12. Three of the sites (Sites 1, 1c, 2 and 11) have farmsteads and/or rural dwellings within the sections, with Site 1 containing the most farmsteads and/or dwellings. Land use within Site 1 (22-11-6 EPM) is primarily agricultural with most of the section under cultivation. Land use with Site 1c (21-11-6 EPM) comprises mostly agricultural land with limited development. Sites 2 and 11 include small cleared agricultural fields in amongst dense tree cover. Sites 3, 8, 9, and 10 are primarily undeveloped with either dense tree cover or

patchy shrub and pasture. Other land uses noted within the southern alternative ground electrode sites include: a municipal service garbage dump and private sand and gravel pit within Site 2 (26-11-7 EPM); an existing transmission line running through Site 8 (24-10-7 EPM); a low quality aggregate deposit in the west half of Site 9 (20-11-8 EPM); and one medium and one low quality aggregate deposit located in the east half of Site 11 (9-10-7 EPM).

Under the R.M. of Springfield Development Plan No. 98-22, the alternative ground electrode sites are designated as either "Agricultural Preserve Area", "Natural Resource Area" or "Aggregate" or a mixture thereof. Under the development plan, public utilities may be located in all rural area designations. Under the R.M. of Springfield Zoning By-Law No. 08-01, the alternative ground electrode sites are zoned as a mixture of "AG – Agricultural General",-"AG-1 - Agricultural General (Site Specific)", "SNR – Sensitive and Natural Resource" and "MXH – Industrial Extractive Holding". Within the SNR zoning district, a Public Utility Service is a conditional use (i.e., allowed at the discretion of Council). The MXH zoning district is established to protect aggregate resources and does not list a Public Utility Service as a permitted or conditional use.

From a land use perspective, Site 1 would appear to be the least preferred given the number of rural dwellings and farmsteads within that section, followed in equal measure by Sites 1c, 2, 3, and 11. Site 1c is also adjacent to a half-section that is designated and zoned as "Rural Residential" under the R.M. of Springfield Development Plan and Zoning By-Law. Sites 8, 9, and 10 have no dwellings or farmsteads within their respective sections and would be more preferable. Consultation would likely be required with the R.M. of Springfield in selecting between alternative Sites 8, 10, and 11 given the zoning applicable to these sites, specifically in relation to the SNR and MHX zoning districts. In the former, public utility services is a conditional use (which applies to all three of these sites) while the latter is established for the protection of aggregate resources which applies to Site 10 only. Other than one low quality aggregate deposit within its section, Site 9 would appear to have the least potential for conflict with land use issues in selecting a ground electrode location. This analysis would, however, be subject to adequately satisfying technical requirements for ground electrode development as identified by Manitoba Hydro.

6.2.7 Overview of Preferred Routes, Converter Station and Ground Electrode Sites

The identification and selection of the preferred transmission line routes, station sites and associated ground electrode sites attempts to minimize disruption to people and the environment within the context of technical and cost implications. Below is a brief description of the project components which are subject to assessment of the potential impacts on land use (Section 7.0).

Local knowledge regarding land and resource use in the Bipole III Study Area was obtained during Aboriginal Traditional Knowledge (ATK) interviews conducted by Northern Lights Heritage

Services Inc. and MMM Group Limited. A review of ATK gathered from group and individual interview summaries and maps indicates that numerous land and resource use activities occur within the study area (Northern Lights Heritage Services, 2011). Traditional resource use documented includes hunting, fishing, trapping, and gathering both from domestic/subsistence and commercial perspectives. Gathering includes the collection of berries, medicinal plants, tree products (e.g., logging, sap and bark for craft uses) and firewood, and ceremonial items. Commercial fishing and trapping, though considered separate from traditional resource use activities, often occurs at the same time as domestic harvesting. Additional discussion of domestic or traditional resource use within the study area is included where applicable by the section within which the activity has been recorded. Several First Nation communities and Aboriginal groups also undertook their own individual ATK studies which were to be incorporated into the route and site selection and overall environmental assessment. These communities and groups included: Tataskweyak, Fox Lake, and Opaskwayak Cree Nations, Wuskwi-Sipihk, Swan Lake, and Long Plain First Nations and the Manitoba Métis Federation. These studies were also reviewed with respect to ATK.

6.2.7.1 Bipole III 500 kV HVdc Transmission Line

The preferred route starts and terminates at the proposed Keewatinoow and Riel converter station sites, respectively, following a course west of lakes Winnipegosis and Manitoba (**Map 6**). For description purposes, the preferred route was divided up into 13 sections. An overview of the final preferred route is presented as **Map Series A300** (Appendix A).

Section 1

Starting in the north, the preferred route proceeds westerly across Section 1 for approximately 92.4 km through a very sparsely populated area before it crosses an abandoned rail right-of-way and the existing Hudson Bay Railway (HBR) line. It is then routed through the Churchill WMA (a portion of which is also designated as an ASI) for approximately 14.0 km (5.1 km of the ASI). East of the HBR line, the preferred route is located within the Town of Gillam boundaries (the lands within which are designated as “LD – Limited Development” under the Town of Gillam Development Plan) and crosses through the Fox Lake RMA and Fox Lake Intensive Land Use Area. West of the HBR line, the preferred route crosses through unorganized territory and through the Stephens Lake ASI just northeast of Stephens Lake for approximately 60.9 km. The preferred route crosses an existing 138 kV transmission line to Churchill before it crosses through an unclassified aggregate deposit located to the east and south of Little Limestone Lake. Crown land encumbrances include easements for fibre optics (i.e., MTS) and reservations for linear rights-of-way (Crown Lands and Property Agency, 2010). Community members of the Fox Lake Cree Nation shared their ATK with respect to the Keewatinoow Converter Station component of the Project (see Section 6.2.7.3 for further details). The Manitoba Métis Federation (MMF) identified traditional use activities in and around the Bipole III study area, including the Bird Gillam area, including large animal harvesting and fishing (MMF Interim Report, 2011).

Section 2 and Section 3

In Section 2, the preferred route proceeds in a southwesterly direction south of Limestone and Waskiaowaka lakes and north of the Tataskweyak Cree Nation (TCN) Reserve at Split Lake for a total length of approximately 117.8 km. The preferred route crosses through the Stephens Lake ASI in this segment for approximately 14.9 km. It also crosses through one mineral exploration license area for approximately 5.6 km located north of Hunting Lake held by VMS Ventures Inc. In Section 3, the preferred route continues in a southwesterly direction between Pukatawakan and Orr lakes for a distance of approximately 28.1 km and crosses two mineral exploration license areas held by VMS Ventures Inc. for a total of approximately 19.5 km. The preferred route then crosses PR 280 and parallels the road for approximately 2.5 km east of Orr Lake and just north of the Odei River before crossing an unclassified aggregate deposit located north of the Burntwood River. Tataskweyak Cree Nation provided comments on the preliminary preferred route within their RMA in the form of documented constraints based on traditional land and resource use (Tataskweyak Cree Nation, 2010). Members reported engaging in traditional activities throughout the Bipole III study area and similar intensity of activity was noted along the preliminary preferred route and alternative corridors. The highest intensity of traditional use activity was associated with certain key lakes (i.e., Limestone Lake, Waskaiowaka Lake and Assean Lake) and transportation routes. Intrusion through diverse and pristine wilderness areas was noted. Members recommended that opportunities existed in several locations to make adjustments to the preliminary preferred route so as to have a transmission line located reasonably close to PR 280. A general understanding of land use activities with respect to cabins, trails, and traditional hunting, trapping and fishing, medicinal plants and traditional cultural sites was subsequently provided (Tataskweyak Cree Nation, 2011). MMF traditional use activity areas include east of Limestone Lake, particularly for large animal harvesting.

Section 4

From the crossing of the Burntwood River, the 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 290.3 km. At this location, the preferred route crosses through one mineral exploration license area held by Vale Inco Limited (for approximately 30.6 km), a designated canoe route along the Grass River and an HBR spur line to Thompson staying east of Paint Lake Provincial Park. Southeast of Paint Lake down to the east of Wabowden and then west to the Ponton area, the preferred route crosses one mining claim held by Anglo American while avoiding numerous other mining claims and mineral lease areas within the Thompson nickel belt. From the Ponton area southwest to the Dyce Lake area the preferred route crosses four mining claims held by Hudson Bay Exploration and Development. South and west of the junction of PTH 6 and PTH 39, the preferred route crosses through four other mineral exploration license areas held by Hudson Bay Exploration and Development (2 license areas for a distance of approximately 33.7 km), W.C. Hood (1 license area for 2.7 km) and Murgor Resources Inc. (1 license area for 13.0

km). One sand and gravel pit is located just east of PTH 6 and the preferred route south of Ponton. A low quality aggregate deposit is crossed at Wekusko north of Hargrave Lake. The preferred route also roughly parallels existing transmission line rights-of-way in two areas, the first south of Ponton for approximately 7.5 km adjacent to PTH 6 and the second for approximately 3.9 km north of Dyce Lake (also parallel to an intervening existing HBR line right-of-way).

Other linear features paralleled by the preferred route includes: variously on the north and south sides of an existing HBR line for approximately 80.5 km from a point south of Ponton southwest to Dyce Lake. Linear rights-of-way crossed by the preferred route include: the HBR line east of Halfway Lake, PR 373 southeast of Wabowden, an existing transmission line east of Gormley Lake, PTH 6 and the HBR line south of Ponton, a designated snowmobile trail head southwest of Ponton, PR 596 north of the rail stop at Wekusko, and the HBR line north of Dyce Lake.

A review of Crown land encumbrance listings in Section 4 by quarter-section indicates that land use activities typically include: a general permit for a trappers cabin (NE13-62-19WPM); and easements and reservations for linear rights-of-way (Crown Lands and Property Agency, 2010).

The communities of Pikwitonei, Thicket Portage and Herb Lake Landing identified several traditional resource activities, including: commercial, domestic and recreational fishing, including catch and release of sturgeon due to declining populations); hunting and outfitting activities; community plant harvesting for medicinal purposes and berry harvesting of strawberries, raspberries and saskatoons; trapping of fur-bearing mammals (i.e., ducks, moose, rabbit, prairie chicken, beaver, fox) including group trapping; and community firewood gathering.

In Pikwitonei, locations of hunting camps were identified as well as species of birds and mammals hunted. Trapping was identified as an important community activity. Areas for harvesting plants for dietary and medicinal purposes were noted as were the locations where community members gather firewood. Landforms, rocks and minerals in the area around Pikwitonei were discussed, including the location of a large rock in a scenic area, known as Standing Stone, the location of a local gravel source and sand beaches near the community that is used recreationally. The community fishes commercially. The Grass River, used for domestic fishing, and part of Partridge Crop Lake, used for ice fishing, are crossed by the preferred route. Important transportation routes, including waterways and portages, were noted.

Community members in Thicket Portage described the hydrology of the area and discussed the use and importance of many water bodies (i.e., for transportation and source of livelihood through fishing and trapping). The Grass River water route (linked to the Nelson River) is crossed by the preferred route. Portages still commonly used were noted. A winter route link between Thicket Portage (Wintering Lake) and Paint Lake is also crossed by the preferred route. Fish spawning areas are indicated and specific areas where certain species are fished commercially, for sport, or recreationally were identified. Commercial fishing was noted as being very important to the community. In particular, the distribution and management of sturgeon was noted. Locations of

sand and gravel pits were mentioned and the importance of mining in the area was noted, including a potential ore body found near McLaren Lake. The use of different kinds of trees for firewood and locations for harvesting were identified. Pulpwood was noted as an important resource in the area. Medicinal herbs and their uses were discussed and locations of edible plants (berries) were mentioned.

Trapping activities are mentioned, including locations of trap lines and cabins, the different types of species trapped, and in some cases specific areas or habitats where fur-bearing species are found. Different types and locations of berries were discussed, which are primarily picked for personal use. The importance of moose hunting in the area was discussed, and although not widely used at present, is still fairly common. People from the community also hunt waterfowl (ducks and geese) in the spring.

Herb Lake Landing residents indicated that the preferred route crosses in the vicinity of an old school site at Wekusko siding and a freight transportation route between Wekusko and the community (PR 596, PTH 39). MMF traditional use activity areas include west and south of Thompson, west of Setting Lake, north of Sasagui Rapids, in the Wabowden area, and in the Snow Lake/Wekusko Lake area for large and small animal harvesting and fishing.

Section 5

From Dyce Lake to The Pas area, the preferred route in Section 5 crosses through the Tom Lamb WMA (and ASI) for approximately 50.2 km before crossing the Saskatchewan River east of The Pas through Ralls Island in the R.M. of Kelsey. The total distance of the preferred route in Section 5 is approximately 100.6 km. One mineral exploration license area held by Murgor Resources Inc. is crossed by the preferred route for a distance of approximately 426 m southwest of Dyce Lake. The preferred route crosses two segments of the Middle Track and Hayes River canoe route, southeast of Little Cormorant Lake and at the Saskatchewan River crossing. Within Rall's Island, the preferred route crosses through four parcels of agricultural Crown land for approximately 3.2 km. The preferred route crosses PR 384 in the Tom Lamb WMA to Moose Lake and is routed adjacent to PR 285 at Rall's Island. Other linear infrastructure rights-of-way are paralleled by the preferred route including: on the south side of the existing HBR line for approximately 20.3 km south of Cormorant Lake; a newly constructed 230 kV transmission line between Dyce Lake and Clearwater Lake for approximately 65.0 km; and an existing transmission line and designated snowmobile trail for approximately 1.9 km south of The Pas.

A review of Crown land encumbrance listings in Section 5 by quarter-section indicates that land use activities typically include: a general permit for a trappers cabin (SW20-58-23WPM); forage permits; renewable grazing permits; general permits for recreational trails (i.e., Snowman Inc.); general permits, easements and reservations for linear rights-of-way (Crown Lands and Property Agency, 2010).

The community of Cormorant identified various traditional resource use activities, including: hunting by family members and friends; trapping of fur-bearing mammals; recreational, domestic and commercial fishing and use of waterways; harvesting wild bird eggs; community berry/plant harvesting for dietary, medicinal and economic purposes; and use of trees for logging and firewood. Hunting areas for bear, moose and spring geese are crossed by the preferred route.

Land uses and areas identified in the vicinity of the preferred route include: access from bear baits to a camp area (adjacent to an existing rail line and transmission line southeast of PR 287), a cabin area, a transportation water route between North Moose Lake and Little Cormorant Lake and a local fishing area (including a camp removed from the crossing site), mineral exploration, hunting, winter angling, and trapping (including two trapper's cabins south of the rail line) at Dyce Lake.

OCN community members have been, and continue to be, engaged in trapping. 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. Decreased numbers of fisher and marten were noted in this zone. Further, the Ravenest zone, which includes the northern portion of Kelsey Lake, is within close proximity of important spawning grounds. Kelsey Lake is also an area of cultural importance to OCN as they historically have harvested birch trees for the construction of canoes along the southern shoreline (OCN Natural Resource Council, 2011). MMF traditional use activity areas include the Cranberry Portage area for fishing.

Section 6

South of The Pas the preferred route generally crosses through unorganized territory in Section 6 to the Red Deer River flowing into Dawson Bay on Lake Winnipegosis, for a distance of approximately 104.5 km. The preferred route generally follows along an existing transmission line and designated snowmobile trail to PTH 60, paralleling these linear features for approximately 41.1 km. At the junction of PTH 10 with PTH 60, the preferred route deviates east and then south to avoid Plummers Marsh, roughly paralleling PTH 60 for approximately 1.0 km before crossing PTH 60 and PTH 10 respectively at separate locations. A designated snowmobile trail is crossed at two locations, north of Overflowing River adjacent to PTH 10 and east of Red Deer Lake. North of the Red Deer River and Red Deer River Provincial Park, the preferred route crosses PTH 10 once more as well as an existing transmission line. Three unclassified aggregated deposits are crossed by the preferred route, all located in the area south of The Pas and north of the PTH 10/PTH 60 junction. Two sand and gravel pits are located in the vicinity of the preferred route just to the north at the highway junction. The preferred route also crosses one quarry lease at the Red Deer River crossing held by Graymont Western Canada Inc. Three proposed WMAs, as put forward by Manitoba Conservation under the Protected Areas Initiative (PAI) are also crossed by the preferred route. The proposed Red Deer WMA (to be protected under PAI) is crossed for

approximately 27.2 km. The proposed Summerberry WMA portions (both protected and unprotected) are crossed for approximately 17.1 km and 29.3 km respectively.

A review of Crown land encumbrances in Section 6 indicates that land use activities typically include: miscellaneous and general permits for a recreational lot and remote cottage (NW16-45-25WPM); renewable grazing permit; general permits for recreational trails (Snowman Inc.); easement agreements (MTS); and easements and reservations for linear rights-of-way (Crown Lands and Property Agency, 2010).

The Chemawawin First Nation and the community of Easterville's traditional resource use activities include: fishing, huts, fishing derbies for commercial and recreational purposes; moose hunting and group bird hunting expeditions; trapping of fur-bearing mammals; berry harvesting (i.e., strawberries, raspberries, blueberries, chokecherries); harvesting of plants (i.e., Seneca root, ginger roots) 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]). The importance of waterways with regard to transportation, fishing, trapping, hunting and drinking water was indicated. Many different fish camps and islands as well as present day cabins are used for fishing and trapping.

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; community hunting (i.e., prairie chickens, moose, jumpers, ducks and geese); recreational and commercial fishing; and trapping. The preferred route crosses the Red Deer River which is used for non-commercial fishing. An area of trapper's cabins was noted along the stretch of the Overflowing River which is crossed by the preferred route west of the community of Overflowing River on PTH 10.

Duck Bay community members participate in recreational, domestic and commercial fishing; shared community hunting and outfitting; trapping for fur and food; community blueberry gathering in the Kettle Hills area (also an important place for gatherings, ceremonies), including ceremonial sweat lodges and smudges and a harvest ending jamboree; plant harvesting for medicinal purposes (i.e., trees for firewood, building materials, artistic endeavours); and Métis week with traditional activities such as dancing, shooting, and bannock making. An old trail road (also an existing roadway) leading north to the Kettle Hills area is crossed by the preferred route. A wild bison area on private land that has since been fenced is also crossed by the preferred route between Pulp River and Duck River. MMF traditional use activity areas include the Cormorant/Clearwater Lakes area and south of The Pas in the Summerberry area for large animal harvesting and fishing.

Section 7

In Section 7, the preferred route generally proceeds in a southeasterly direction between the Porcupine Mountains and Swan Lake from Mafeking to Cowan for approximately 112.2 km. The preferred route crosses through the R.M.s of Mountain (North) and Minitonas.

Three quarry leases are crossed by the preferred route north of Mafeking and along PTH 10, two of which are held by Graymont Western Canada and one held by CBR Cement Canada. The preferred route crosses 111 parcels of agricultural Crown land for a distance of approximately 65.0 km principally located in three areas, north and east of Bellsite and Mafeking, west of Swan Lake at Indian Birch, and north and east of Cowan. The preferred route crosses through the Swan-Pelican Provincial Forest Reserve for approximately 15.0 km and also is routed adjacent on the west sides to the Steeprock WMA, north of Mafeking, and the Lenswood Community Pasture, east of Lenswood. Additional land features crossed by the preferred route includes a low quality aggregate deposit north of Lenswood, as well as along the edges of three unclassified aggregate deposits between Bellsite and Lenswood. One sand and gravel pit west of the Lenswood Community Pasture and south of Lenswood is located in the vicinity of the preferred route on the west side of the right-of-way. The preferred route crosses PTH 10 at two locations north of Mafeking. Other linear infrastructure crossed by the preferred route includes an existing transmission line north of Mafeking as well as an abandoned stretch of rail right-of-way north of Mafeking. This abandoned stretch of railway is also paralleled by the preferred route for approximately 2.9 km.

A review of Crown land encumbrances in Section 7 indicates that land use activities typically include: forage permits; easement agreements (MTS); and easements and reservations for linear rights-of-way (Crown Lands and Property Agency, 2010).

Several communities, including Barrows, Camperville, Pelican Rapids, and Pine Creek, have documented their traditional land use activities within the study area for the preferred route.

Barrows community member traditional activities include: hunting by family members and friends; recreational fishing derbies; trapping of fur-bearing mammals (including commercial use); harvesting plants for medicinal/ceremonial purposes (i.e., cranberry bark, sage, Seneca root, rat root, sweet grass [sold as source of income]) and family harvesting of blueberry patches; and curling and music festivals. Red Deer Lake is important for commercial fishing. Non-commercial fishing occurs in the Red Deer River.

At Camperville, community members participate in hunting (birds and mammals), trapping and fishing; traditional plant gathering for medicinal, domestic and commercial resource use (i.e., Seneca root, cranberry bark, berries, herbs, nuts, mushrooms) and family harvesting of blueberry patches (also economically important); traditional pow-wows and sweat lodges and community bonding events (i.e., Métis Days, dances, baseball tournaments, fishing derbies); community

firewood gathering; and making sugar from birch trees. Fishing on the Pine River and a garden area at Pulp River were identified as activities along the preferred route.

Pelican Rapids community members participate in recreational and commercial fishing, hunting and trapping (i.e., moose, deer, rabbit, prairie chicken, geese, duck, beaver, muskrat, fox, wolf, mink, marten); harvesting blueberry patches (Kettle Hills area); and collecting firewood.

Pine Creek community member traditional activities include: harvesting of plants (i.e., herbs, berries and roots for traditional medicine), trees for firewood, blueberry patch gathering, teaching of traditional drumming, dancing and language; trapping (has been in decline over time because of decline in fur prices); recreational fishing; hunting with family and friends; and Pow-wows and treaty days. A new buffalo (bison) area (between Pulp River and Duck River), an old coal mine site (near Pulp River), wagon road/trails (northwest of Cowan), an existing road from Pulp River used to access harvest areas, and trapline trails (east of Briggs Spur) were identified along the preferred route.

Wuskwi Sipihk First Nation undertook its own ATK study with respect to land use activities in their traditional area, covering lands from the Red Deer River to Kettle Stones Provincial Park and from Swan Lake to the Porcupine Mountains (Whelan Enns Associates Inc., 2011). Traditional land use activities identified include: fishing (including spawning locations); hunting (for moose, deer and elk); bird hunting (goose, duck, other waterfowl); general trapping; multiple gathering (including medicinal); and occupancy and travel routes. Types of gathering and cultural activities documented include: Seneca root, sweet grass, maple sap and egg collecting, berry picking, wild rice gathering and sowing, gathering rocks for sweat lodges and ceremonies. Several cabin and camp locations within their traditional area were noted, including: Red Deer Lake, Red Deer River, mouth of the Shoal River, Swan Lake, Little Duck Lake, Kettle Hills, and Steep Rock Lake. Numerous travel routes were identified, including: Swan River, Woody River, Birch River, Shoal River, Red Deer River, Red Deer Lake, Dawson Bay, Indian Birch, Kettle Hills road, Lumax route, Highway #10, and other main roads. Recreational activities consist of swimming, camping, picking medicine and berries, picnic and barbeques, sports, Treaty days, hunting and trapping. Areas used for recreational activities include: Shoal River, Birch River, Kettle Hills, The Point, and the Wuskwi Sipihk First Nation reserve. Other land uses include gravel pits and quarries, some of which are still being used, principally along PTH #10, Mafeking, and Kettle Hills area, along the Porcupine Mountains, Shoal River and at Swan Lake. Reference was also made to nickel mining that is abandoned. It was also noted that there is lots of exploration activity going on, most commonly for limestone.

Traditional use areas identified by the MMF include the Red Deer Lake/Porcupine Mountains and Swan Lake areas for large and small animal harvesting and gathering activities.

Section 8

Through Section 8, the preferred route generally follows southeasterly along the western shores of lakes Winnipegosis and Manitoba for approximately 156.3 km, 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 preferred route crosses through the R.M.s of Mountain (South), Mossey River, Lawrence and the northern half of Alonsa. Through this area, the preferred route crosses a total of 147 agricultural Crown land parcels for approximately 82.8 km, concentrated in three separate locations, between the Duck and Mossey rivers, southeast of Winnipegosis, and between Rorketon and Eddystone. The preferred route crosses in the vicinity of a lodge and outfitter location (Trapper Don's Lodge and Outfitting Service), approximately 2.3 km to the west. The Waterhen Country designated canoe route, located along the Mossey River, is crossed by the preferred route south of Winnipegosis. One historic school site (Cork Cliff) is located along the preferred route southeast of Winnipegosis. Six quarry leases are affected by the preferred route, which are held by three companies including: Canadian Infrastructure Corporation (4), Goldsource Mines (1), and 4371683 Manitoba Ltd. (1). Two unclassified aggregate deposits are also crossed by the preferred route, to the north and south of Pulp River at the junction of PR 271 and PR 489. In addition, one sand and gravel pit is located along the west side of the preferred route, south of Eddystone and west of PTH 68. Linear infrastructure crossed by the preferred route includes: PTH 20 southeast of Cowan, PTH 68 south of Eddystone, PRs 271 and 489 at Pulp River, PRs 364 and 269 south of Winnipegosis, PRs 481 and 276 near Rorketon, and PR 278 south of Eddystone. Two existing transmission lines are crossed by the preferred route, one north of the Weiden WMA and the other to the south of PR 278 west of the Ebb and Flow First Nation reserve at Ebb and Flow Lake. In addition to these features, one abandoned rail line between Fork River and Winnipegosis is crossed by the preferred route.

A review of Crown land encumbrances in Section 8 indicates that land use activities typically include: waste disposal site (SE6-33-20WPM, R.M. of Mountain [South]; general permit for a commercial lot (SW20-26-13WPM – R.M. of Alonsa); forage permits; easement reservations and agreements (MTS); and easements and reservations for linear rights-of-way (Crown Lands and Property Agency, 2010).

Camperville and Pine Creek community members use the local resources extensively, for medicines, community activities, and in some cases as a source of income. Traditional land use activities identified in this section include: high prevalence of berry, tree and plant, and medicinal gathering locations, multiple fish spawning locations, domestic fishing locations, trapping and other extensive resource use areas (including haylands).

Traditional use areas identified by the MMF include the Duck Mountain area, along the southern shore of Lake Dauphin and west of Lake Winnipegosis for large and small animal harvesting, fishing and gathering activities.

Section 9

In Section 9, the 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 Plain First Nation Reserve. The total distance of the preferred route in Section 9 is approximately 168.1 km. The preferred route crosses through the southern half of the R.M. of Alonsa, and through the R.M.s of Lakeview, Westbourne, the western edge of Portage la Prairie, North Norfolk and South Norfolk, entering prime agricultural lands and taking advantage of road allowances and other utility rights-of-way where possible.

The preferred route crosses through a total of 38 parcels of agricultural Crown land for approximately 22.7 km, located in four general areas, between PTH 68 and PTH 50, east of the Alonsa Community Pasture, west of the Sandy Bay Ojibway First Nation Reserve, and south of the Langruth WMA and Lakeview Community Pasture. Designated lands in the vicinity of the preferred route include: the Alonsa Communty 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 (hydro-prohibited lands under the PAI) at the Assiniboine River crossing. Other land use features crossed or in the vicinity of the preferred route consists of a Ducks Unlimited Project Site at Robertson Lake, east of the Alonsa Community Pasture, a radar tower to the west of PTH 50 within the Lakeview Community Pasture southwest of Langruth, and an organic farm located east of Woodside near PTH 50. Seven aggregate deposits are crossed by the preferred route, including: a low quality aggregate deposit south of PR 278, along the edge of a medium-low and medium quality aggregate deposits north of PTH 50, two low quality aggregate deposits west and south of Langruth, and two unclassified aggregate deposits south of Westbourne. The preferred route crosses several linear features, including: two existing transmission lines, the first west of Westbourne and the second west of Edrans; the TransCanada main natural gas pipeline northwest of Edrans; and a designated snowmobile trail located west of the Long Plain First Nation Reserve. Other linear infrastructure crossed by the preferred route consists of the Trans-Canada Highway (PTH 1 W) east of Bagot, PTH 50 east of Alonsa, PR 261 west of Amaranth, and PR 265 west of Langruth. Four railway lines are crossed by the preferred route, a CPR line between Westbourne and Woodside, CNR line east of Katrime from Portage la Prairie, and both the CNR and CPR main lines north and south of the Trans-Canada Highway east of Bagot. One abandoned rail line between Edrans and Rossendale west of the Long Plains First Nation Reserve is also crossed by the preferred route.

A review of Crown land encumbrances in Section 9 indicates that land use activities typically include: forage permits; miscellaneous permits for Ducks Unlimited Canada project sites (NW2-23-12WPM, SW35-22-12WPM, NE26-22-12WPM, and NW18-22-11WPM – R.M. of Alonsa); and easement agreement (MTS) (Crown Lands and Property Agency, 2010).

Long Plain First Nation undertook to gather its own historical, traditional and land use information about the Long Plain Traditional Territory, including: the Long Plain Reserve (IR 6A), in the Lavenham and Westbourne areas, and east of Langruth to Lake Manitoba.

- Land, historic and Traditional use areas identified include: water courses – Assiniboine River (the main source of water for Long Plain and the surrounding area) and 10 other areas with semi-permanent sloughs/creeks running through reserve lands; a current reserve land base of approximately 12,000 acres (and the additional purchase of over 4,000 acres by the Long Plain Trust Company [which are in the process of becoming reserve land]); agricultural use of reserve lands (over 6,000 acres is leased to area farmers who grow a variety of crops [canola, beans, sunflower, corn and wheat] and local community ranchers for growing alfalfa hay and for pasture land for livestock); economic development, housing, educational, recreational, and cultural uses of community lands; and wildlife habitat and restoration areas. Identified historical sites include: the historic Yellowquill Trail (along the Assiniboine River), Round Plain (a historic gathering and traditional site), and several unmarked burial sites and arrowhead discovery sites, and Sundance Ground sites. Members today continue to hold sweat lodges at locations where it is convenient (Long Plains Traditional Knowledge Team, March 2011).

- Traditional use activities identified include: collection of berries (raspberries, strawberries, grapes, plums, rhubarb, crap-apples, saskatoons, chokecherries, cranberries, pin cherries, gooseberries, nana berries, and sand cherries (which were once plentiful on the reserve); collection of red willow bark (dried to make k'nick k'nick for smoking); use of medicinal herbs for smudging, blessing and purifying (i.e., sweetgrass - found along the old Yellowquill Trail, near the powwow grounds and the river flats) and other plants (seneca root, wee-kaa root, sweet clover, little red cherries, bark, skunk grease, and sage used for a variety of purposes); and hunting in the Lavenham area, Rossendale and Carberry Hills areas. Trapping and fishing pursuits were both noted as past activities undertaken by members (Long Plains Traditional Knowledge Team, March 2011).

Swan Lake First Nation documented their own traditional land use and occupancy within the Bipole III study area, particularly in the areas north of Indian Reserve #8 (Indian Gardens) in the Assiniboine River Valley and south of the villages of Treherne and Rathwell in the vicinity of the Swan Lake First Nation reserve outside of the study area (Swan Lake First Nation Traditional Knowledge Preliminary Report, 2011). These areas are noted as being under development pressure and Swan Lake has interests of a historical nature and interests in preserving sacred sites in the area.

- Land use occupancy sites identified within the study area include: burial sites, sundance sites, the village sites for Round Plain, Halfway Bank and Eagle's Nest, and a sacred site within Spruce Woods Provincial Park. Sites in the vicinity of the preferred route of the

Bipole III HVdc transmission line include: Round Plain, a burial site, sundance grounds and ceremonial grounds.

- Several important villages of the Portage Band identified include: Long Plain, Round Plain, Halfway Bank, Eagle's Nest, Gardens, Backfat Lake and Indian Springs. Many other places were of equal importance including Hamilton Crossing, Indian Ford, and 'lunch' creek (used for camping and many other purposes). Round Plain is a historic site where the Portage Band was split up into three bands, namely: Sandy Bay, Long Plain and Swan Lake in 1876. Round Plain now appears to be within a wildlife management area (Crown land).

- Several burial plots are located on the Indian Garden Reserve, which is no longer occupied. In addition to the burial plots, locations of homes, gardens, and other important structures (wells, pathways) are being documented. Families lived on and off this reserve over many years; other people lived here temporarily during various seasons. Agricultural activities (drainage and field expansion), occurred on this reserve.

- Activities undertaken by First Nation peoples included: gathering berries, maple sugar and medicines, hunting for deer and rabbits, muskrats and beaver, and fishing. Ceremonies, including Sundance, medawin, grass dances and give away dances occurred at Indian Gardens.

The Dakota Plains First Nation has documented their traditional resource use activities within the study area and along the preferred route. Community members participate in recreational fishing; harvesting timber; hunting for big and small game (more so than trapping), plant/berry harvesting in the fall season (i.e., cranberry, chokecherries, raspberries, plums, saskatoons, wild onions, wild turnips, wild garlic, cattails and sage and certain other unnamed plants [for medicinal use]); and vegetable gardening. The Whitemud and Assiniboine Rivers are used for domestic and recreational fishing respectively, both of which are crossed by the preferred route. Trapping does occur within the Assiniboine River valley, including the preferred crossing site, for muskrat, beaver and mink.

Dakota Tipi First Nation community members participate in traditional and recreational fishing; hunting for big game (deer, elk and moose), beaver, ducks, geese; trapping for rabbits, mink, weasel; camping (Flee Island); community vegetable gardening; berry harvesting (i.e., chokecherries, plums, saskatoons, cranberries, raspberries, strawberries); medicine collection; firewood collection; and ceremonial sundance grounds.

Traditional use areas identified by the MMF include the Minnedosa/Neepawa area and west of Lake Manitoba in the Ebb and Flow area for large and small animal harvesting, fishing, and some gathering activities.

Section 10

The preferred route continues generally in a straight west to east alignment for approximately 75.7 km in Section 10, south of PTH 2. It is located south of the communities of St. Claude, Haywood, Elm Creek and Fannystelle through the R.M.s of Grey, Dufferin and a small portion of Macdonald. The preferred route crosses numerous linear infrastructure features, including three designated snowmobile trails west and south of St. Claude and south of Elm Creek, a CPR line west of St. Claude, and an abandoned rail line between Carman and Elm Creek. The preferred route also parallels linear features, including a small section of existing transmission line south of Haywood (for 1.0 km) and municipal drains systems for approximately 22.4 km northwest of Brunkild. Other linear features crossed include: PTH 2 and PR 305 west of St. Claude, PR 240 south of St. Claude, PTH 13 south of Elm Creek, and PR 248 south of Fannystelle.

Dakota Tipi First Nation members provided a wide range of local information and knowledge. The importance of the Assiniboine River with regards to transportation, recreation, fishing and environmental health of the area was noted and the locations of particularly good fishing places were identified. Hunting for big game such as deer, elk and moose still occurs by some members of the community but it is no longer a community activity. The gathering of firewood for sale occurs on occasion and several varieties of willow were identified that are used in making crafts. Medicinal plants commonly harvested include ginger root, sage, sweet grass and cedar.

Long Plain First Nation members identified the Assiniboine River as the main source of water for Long Plain and surrounding area. Several semi-permanent slough/creeks running through the reserve were identified. Agricultural use, soil and the land base was elaborated on as was the state of hunting, fishing and trapping by community members. Traditional herbs and plants, wild fruits and berries, and other significant plants were identified by community members as important resources, both for food and for medicinal purposes (Long Plain Traditional Knowledge Team, March 2011).

Traditional use areas identified by the MMF includes east of Portage la Prairie in the Poplar Point and St. Francois-Xavier area for large and small animal harvesting.

Section 11

In Section 11, the preferred route traverses to the north of Brunkild and to the south of Domain to a crossing of the Red River approximately 2 km south of Ste. Agathe. The preferred route in Section 11 is approximately 42.1 km long, crossing through the R.M.s of Macdonald and Ritchot. Of this distance, it crosses through the river lot survey pattern to the west and east of the Red River in the R.M. of Ritchot for approximately 6.2 km. The Red River is also a designated Heritage River under the Canadian Heritage Rivers Program. Other land use features along the preferred route includes: a designated snowmobile trail north of Brunkild, a recreation wayside park/picnic site southwest of the Red River crossing (approximately 1.3 km to the south), four

communication towers, three located northeast of Brunkild approximately 290 m to the southwest of the route, approximately 750 m to the north and approximately 1.0 km south of the route respectively. The fourth is located approximately 1.4 km south of the preferred route at Osborne. Linear infrastructure crossed by the preferred route includes: a short-haul railway between Sanford and Brunkild, the CPR line south of Domain to Osborne, and the CNR line southwest of Ste. Agathe, an existing transmission line southwest of Domain and an oil pipeline west of Ste. Agathe. PR 332 north of Brunkild, PTH 3 northeast of Brunkild, PR 305 east of Brunkild, PR 330 south of Domain, PTH 75 west of the Red River, and PR 246 east of the Red River south of Ste. Agathe are also crossed by the preferred route. Traditional use areas identified by the MMF includes south of the city of Winnipeg for large animal harvesting.

Section 12

East of the Red River the preferred route threads through a more densely populated rural setting that includes a considerable concentration of rural residences and barn complexes. The preferred route in Section 12 crosses for approximately 35.3 km in an easterly and then northerly direction through parts of the R.M.s of Ritchot and Hanover. The preferred route crosses a designated snowmobile trail, the designated Rat River Canoe Route southeast of Ste. Agathe, paralleling on the west side of a road allowance and then crossing a part of the Trans Canada Trail between Otterburne and Ste. Agathe just east of the Rat River for approximately 2.0 km, before paralleling a snowmobile trail on the south side of the route for approximately 3.2 km. Other linear features crossed by the preferred route include: two other north-south oriented designated snowmobile trails on the west and east sides of PTH 59 and PTH 59 itself, southeast of Niverville; a north-south CPR line south of Niverville; a north-south oil pipeline southeast of Niverville; PRs 216, 206 and 311 south and east of New Bothwell; and two stretches of the Manning Canal near Randolf and east of New Bothwell. MMF traditional use areas identified includes east of the Red River in the Ste. Adolphe and Ste. Agathe area for small animal harvesting.

Section 13

In Section 13, the preferred route heads north past the Village of Landmark on the east side, north and east to avoid the community of Dufresne and crosses the TransCanada Highway before heading north to an existing Manitoba Hydro transmission line right-of-way, where it parallels the existing D602F transmission line west into the proposed Riel Converter Station site. The preferred route is approximately 49.9 km in length in Section 13 crossing through the R.M.s of Tache, Ste. Anne and Springfield. The preferred route crosses just to the east of a designated rural residential area at Rosewood in the R.M. of Tache (north of PR 501) and three sections of designated snowmobile trails, east of Landmark and on the northeast and southwest sides of the TransCanada Highway (No. 1 E). Linear infrastructure crossed by the preferred route includes: the main Trans Canada natural gas pipeline northeast of Landmark; the CNR line to Ste. Anne to the southwest of the TransCanada Highway; the GWWD water aqueduct and railway at Millbrook; PR 210 east of Landmark, PR 207 northwest of Ste. Anne, PR 501 at Rosewood, PR 206 south of

Dugald, and PR 207 east of the Riel Converter Station site. The preferred route parallels the Cooks Creek Diversion for approximately 5.8 km in the R.M. of Springfield. In addition, two existing transmission lines are crossed by the preferred route, one a 500 kV ac transmission line southeast of Dugald. It also parallels existing transmission lines at two locations for approximately 19.0 km through the R.M. of Springfield in a southwesterly and westerly direction, including a stretch within a 500 kV ac transmission line right-of-way to the Riel Converter Station site. MMF traditional use areas identified includes east of the city of Winnipeg for small animal harvesting and gathering.

6.2.7.2 230 kV ac Northern Collector Transmission Lines

The 230 kV ac northern collector transmission lines are shown in **Map 4**. Five 230 kV ac transmission collector lines are routed to the northeast in a 310 m wide right-of-way, each for approximately 27 km, between the existing Henday Converter Station and the site of the Keewatinoow Converter Station. The proposed rights-of-way crosses through the municipal boundaries of the Town of Gillam, a portion of TCN's and Fox Lake's RMAs (as well as Fox Lake's intensive land use area), the Cape Churchill WMA and includes a small portion of the WMA identified as an Area of Special Interest (ASI) under Manitoba's Protected Areas Initiative (i.e., candidate area for protection). Otherwise, the proposed 310 m right-of-way crosses an active HBR rail line to Churchill at two points (at Limestone and Avery) and an abandoned portion of rail line extending to the northeast past the Conawapa G.S. site area. One of the 230 kV ac transmission collector lines will extend from an existing 230 kV switchyard at Long Spruce G.S. to the new 230 kV switchyard site to be located at the site of the new Keewatinoow Converter Station for a distance of approximately 55 km. This 230 kV ac collector line will utilize, in part, a 60 m right-of-way on the south side of the Nelson River, where it then crosses the Nelson River and proceeds along the north side of the Nelson River to terminate at Keewatinoow. The southern portion of this route also crosses other linear infrastructure, including PR 290 as well as other existing Manitoba Hydro transmission lines.

Fox Lake Cree Nation elders and resource users and MMF community members provided traditional knowledge information within the study area for the 230 kV ac northern collector transmission lines. Traditional use knowledge provided by Fox Lake members applicable to the collector lines is presented in Section 6.2.7.3 with respect to the discussion on the Keewatinoow Converter Station. Traditional use activities noted by the MMF in the Gillam/Bird area include large animal harvesting and fishing (MMF Interim Report, 2011).

6.2.7.3 Keewatinoow Converter Station and Ground Electrode Site

Keewatinoow Converter Station

The site for the Keewatinoow Converter Station, referred to as site NCS4, is located north of the Conawapa access road, within 5.5 km of the proposed Conawapa G.S. site (**Map 7**). The site

selected meets the transmission and bi-pole line entry requirements for the ultimate Keewatinoow Converter Station configuration and provides flexibility for different line entry options including sufficient space for future generation requirements. The site is flat and is located near the preferred primary granular source material deposit for station development. It is located near Goose Creek offering drainage advantages with easily developed space for staging and laydown areas in close proximity across the Conawapa access road. The preferred site has no major land use conflicts with the proposed Conawapa G.S. Project areas.

Construction Power Line

An existing 138 kV transmission line (KN36) that runs from the Kelsey G.S. to the Limestone construction power substation will be extended for approximately 31 km to the site of the new construction power substation located near Keewatinoow (see **Map 4**). This route extension involves crossing the same land use interests and infrastructure, including a rail line and the Conawapa access road, as the 230 kV ac northern collector transmission lines. The construction power substation is to be located on the west side of the Conawapa access road across from the main construction camp.

Ground Electrode Site

The preferred site for the northern DC land electrode, referred to as NES6, is located north of the Conawapa access road and on the north side of the Nelson River, approximately midway between the existing Henday Converter Station and the preferred Keewatinoow Converter Station site (**Map 7**). The site selected is technically feasible and offered the lowest overall interference effects. No major land use conflicts exist with the preferred northern ground electrode site. It was recommended that alternative site NES7, further to the southwest along the Conawapa access road and on the north side of the Nelson River, be kept for consideration as an alternative option should unforeseen environmental considerations make NES6 prohibitively unfeasible to mitigate. The northern dc ground electrode distribution line connection is located north of the Conawapa access road and the Nelson River. It will be routed on overhead structures along a 40 m wide right-of-way for a distance of approximately 10 km between the converter station and ground electrode site.

Borrow Areas and Excavated Material Placement Areas

Potential borrow source deposits have been identified for proposed infrastructure development in the vicinity of Keewatinoow, essentially on the north side of the Nelson River between the Henday Converter Station and the site of the future Conawapa G.S. Manitoba Hydro is expected to submit quarry leases to the Mines Branch for all, but one, of the source locations, consisting of fifteen granular deposits, two pre-cambrian rock deposits, and one impervious deposit. These source deposits are primarily based on a 1987 exploration program conducted by Manitoba Hydro and will require further inspection to determine viability. Two of the deposits appear to be partially

exploited from construction of the Conawapa G.S. access road. These borrow sites are anticipated to be promising sources for access road improvements and construction of the Keewatinoow electrode access road. Manitoba Hydro has indicated that granular source utilization has not been finalized and will be determined by the construction Contractor.

Six excavated material placement areas, for long-term storage of excess earth and rock materials, have been identified in the vicinity of the Keewatinoow Converter Station site. All are located along the west side of the Conawapa access road (two to the south of the converter station site and four to the north.

Aboriginal ATK

Fox Lake Cree Nation elders and resource users provided expert knowledge and experience about the land within their traditional territory (Fox Lake Cree Nation Traditional Knowledge Interim Report, May 2011).

- The Bird area is used for the picking of berries and plants (i.e., Labrador tea) and includes medicinal plants (i.e., Seneca root) growing around creeks such as Swift Creek, which is in the immediate vicinity of the proposed Keewatinoow Converter Station. Plants and berries gathered include: strawberries, saskatoons, blueberries, raspberries, cloudberries, cranberries, gooseberries, moss berries, Labrador tea, sweet grass, sage, and pitchers plant.

- It was reported that woodland caribou are found in the vicinity of the proposed Keewatinoow Converter Station/Bipole III footprint area throughout the year. There is also a well-known migration route for Pen Island and barren-ground caribou in the area. Fox Lake members hunt all three species of caribou – mostly in the late fall and winter. Fishing is an important cultural activity for many Fox Lake members. Brook trout are known to spawn in little creeks off the Nelson River, including Moose, Swift, CN and Tini creeks.

- Goose hunting is also an important cultural activity. Hunting blinds are built near known landing areas near ponds and marshy areas in the vicinity of the Conawapa Rapids. The goose hunt is typically a three to five day community gathering held at a Limestone Quarry. The community participates in an annual fall (September – freeze up) moose hunt. Moose hunting locations are near Goose Creek and Conawapa Rapids. Moose are also known to feed at Tiny Creek, and Creeks 15 and 16. It was also reported that moose were hunted near the boat launch at the Conawapa camp site (a few kilometres away from the proposed converter station site). Fox Lake community members also take smaller game such as beaver, muskrat and rabbit. Resource users often travel down the Conawapa Road to Goose and Tiny creeks to snare rabbits, hunt spruce grouse (chickens) and trap beaver. Birds sought include ptarmigans, spruce grouse; stick

chickens – all of which are hunted in the bush off the Conawapa Road. In addition to beaver, fur-bearing animals trapped include: marten, muskrat, fox, wolf and lynx.

The MMF identified traditional use activity areas in the vicinity of the Gillam/Bird area for large animal harvesting and fishing (MMF Interim Report, 2011).

6.2.7.4 Riel Converter Station and Ground Electrode Site

Riel Converter Station

The site for the Riel Converter Station involves the development of a parcel of land owned by the Corporation immediately to the east of the Red River Floodway in the R.M. of Springfield (**Map 8**). The "Riel Site" is located to the west of PR 207 north of the City of Winnipeg's Deacon Reservoir in the eastern half of Section 26, Township 10, and Range 4EPM. The site was selected based on previous studies undertaken by Manitoba Hydro with the ultimate development of the southern converter station in mind. Associated infrastructure at the Riel Site includes a rail spur connection from the CNR mainline line to the north, along PTH 15, and a construction power site on the east side of PR 207 (to be disconnected from Riel following completion of construction).

Ground Electrode Site

The preferred site for the southern dc land electrode, referred to as SES1c, is located approximately 5 km north and 5 km west of Anola in the R.M. of Springfield (approximately 17.5 km northeast of the Riel Converter Station site [**Map 8**]). The site, located in 21-11-6EPM, is a technically feasible site that offers the lowest overall interference effects as compared to the other alternative candidate sites. No major land use conflicts were noted at the preferred site for the southern ground electrode. However, it is noted that the preferred site is located in between existing areas of rural residential development, including in 20-11-6EPM and other surrounding land sections, of similar density to that of the existing Dorsey electrode site. Manitoba Hydro reported that the Dorsey electrode site has operated for over 30 years with no reported major effects. It was recommended that site SES3, located in 13-11-7EPM in the R.M. of Springfield, be kept in consideration as an alternative option should pipeline mitigation requirements or unforeseen site specific environmental considerations make SES1c prohibitively unfeasible to mitigate.

7.0 POTENTIAL ENVIRONMENTAL EFFECTS

7.1 OVERVIEW

The potential effects of the proposed project on land and resource use are examined below according to the stage of the project (pre-construction, construction, operations and

maintenance). Based in part on prior project experience in SSEA studies for transmission facilities, potential environmental effects are addressed in the context of established issues and concerns (i.e., VECs). The proposed project components assessed include: the development of the 500 kV HVdc transmission line (Bipole III), five northern collector 230 kV ac transmission lines, one 138 kV construction power line, the Keewatinoow Converter Station near the site of the Conawapa G.S., its associated ground electrode site and line connection, the full development of the Riel Converter Station at the existing Riel Site (in the R.M. of Springfield), and its ground electrode site (the associated feeder line has not yet been determined).

Manitoba Hydro has developed a well-established set of mitigation measures. Manitoba Hydro utilizes a formalized approach to developing mitigation measures, including involving specialists and obtaining information from local residents through public consultation. As such, the implementation of mitigation measures also takes into account site-specific circumstances.

During the pre-construction phase, transmission line activities include acquisition of Crown land reservations and private property easements for the new rights-of-way, engineering and design activities, and surveying of the rights-of-way edges to establish clearing widths. Sensitive areas are typically flagged for protection or special attention during the pre-construction phase. Pre-construction activities are generally non-invasive in terms of effects on people, property and land use. During the construction stage, potential effects are expected to include nuisance effects such as noise, dust and traffic. In general, these effects are addressed through application of Manitoba Hydro's environmental protection measures (Manitoba Hydro, 2011).

Temporary construction access is a potential concern that can be addressed through proper site planning and monitoring of work activities. Manitoba Hydro will use existing highways, municipal and forestry roads, trails and man-made linear features where possible to minimize the need to develop new access routes to the right-of-way. Access along the right-of-way will be restricted to the right-of-way as much as possible. Any deviations required will be limited to natural terrain features (e.g., rock outcrops, steep slopes, difficult stream crossing areas). Access trails on transmission line rights-of-way will also be limited to seasonal use (i.e., winter) to avoid sensitive areas or seasons.

Upon completion of transmission line construction, relevant site decommissioning for the Project can include: temporary right-of-way access trails, marshaling yards, borrow sites, and mobile construction camp locations. Minor deviations from the right-of-way (i.e., in severe terrain conditions) unless required for ongoing maintenance would not be regularly maintained post construction. Marshaling yards typically established near transmission line routes for the storage of construction materials and equipment will be restored to pre-project conditions, including any site remediation required, and will be allowed to regenerate naturally following construction. New borrow locations required for construction will be reclaimed by promoting regrowth of native vegetation and other mitigation measures in accordance with *The Mines and Minerals Act*. In addition, mobile construction camps, which are generally located along the right-of-way in well

drained areas, will be restored to pre-project conditions and allowed to regenerate naturally. Decommissioning and clean-up of temporary Keewatinoow facilities (e.g., those required only for Keewatinoow development [Manitoba Hydro and contractor work areas, borrow areas, and excavated material disposal areas]) will also occur after construction is completed and the converter station and associated facilities are in service (see Chapter 3.0 Project Description - Bipole III EIS).

During the operations and maintenance stage, the HVdc 500 kV transmission line and associated project components will be part of the landscape. Manitoba Hydro's environmental protection practices include measures to reduce the effects of the proposed project components on land use (e.g., replacement of shelterbelts and fence lines, movement of accessory buildings [silos]). Pre-construction consultation with landowners will include examining the extent to which preferences for tower placement in the vicinity of farmsteads or dwellings can be accommodated.

With respect to Project decommissioning, it is not expected to occur for at least 50 years and therefore a detailed assessment of the potential effects has not been conducted. If at a later date it is decided that the facilities would no longer be needed, Manitoba Hydro will adhere to relevant legislation and regulations in place at the time and would review decommissioning plans with regulatory authorities.

7.1.1 Methodology

The purpose of the assessment is to ensure that all expected effects to the land use component of the environment are identified, evaluated and addressed through mitigation. A discussion of the potential effects of the project components on the selected VECs, as noted in Section 5.2, is provided below. Interactions between project activities and land use environmental components were identified and the anticipated effect assessed. Where project-environment interactions are anticipated the interaction was rated according to the following factors and criteria:

- Direction (difference compared to existing conditions): Positive (beneficial or desirable change), negligible (no measurable change), and negative (adverse or undesirable change).
- Magnitude (degree of disturbance the effect has on the component): large (effects are easily discernible), medium (effects could be measured), and small (no measurable effect).
- Geographic extent (spatial boundaries where effect would occur): Project (extends into regional study area), local (effect extends into surrounding areas [within 5.0 km corridor]), and project site/footprint (66 m right-of-way, site-specific).

- Duration (how long the effect would last): long-term (greater than 50 years), medium-term (extends through construction and into the operation phase, up to 50 years), and short-term (effects occurs during the construction phase [zero to five years]).

The assessment approach in each section describes both positive and adverse environmental effects. Mitigation strategies (i.e., design mitigation and effects mitigation) are an important part of the analysis. To minimize adverse effects, mitigation measures are identified for each potential effect to avoid, minimize or remedy, and in some cases compensate for adverse environmental effects.

The assessment then analyses whether or not residual effects remain from the proposed project (after application of mitigation measures). No evaluation of significance of the residual effects is made. Conclusions as to significance of the adverse residual effects are determined in the EIS.

7.2 ENVIRONMENTAL EFFECTS IDENTIFICATION AND MITIGATION

7.2.1 HVdc Transmission and AC Collector Lines

7.2.1.1 Construction

Land Ownership and Tenure

In northern Manitoba, the proposed 500 kV HVdc transmission line (Bipole III) will require a 66 m right-of-way obtained via easement through a Crown land reservation. The proposed right-of-way width for the five 230 kV ac transmission collector lines will be approximately 310 m and will also require Manitoba Hydro to acquire a Crown Land reservation. In southern agro-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). Where the proposed Bipole III line is routed adjacent to the road allowance in southern agro-Manitoba (i.e., south of PTH 16 that roughly corresponds to the intensive agricultural use area), the steel lattice towers will typically be situated greater than 38 m into a property from the road allowance edge.

Two tower types have been selected for use in the Proposed Bipole III Transmission Project. In northern Manitoba and forested/pasture areas in the south, the line conductors will be suspended from guyed lattice steel structures. Guyed structure design and construction was chosen because it can be adjusted to difficult or shifting foundation conditions, and enables periodic adjustment of the guys at their anchors, to accommodate such changes. In the more densely developed areas of southern Manitoba, self-supporting lattice steel structures will be used to reduce the footprint and land acquisition requirement of tower foundations and to minimize potential impact on farming practice.

Potential effects may occur from the proposed transmission lines being located in different land ownership and tenure areas in different regions of the province (i.e., presence), including unorganized Crown lands in the north where aboriginal communities have traditional resource use or Treaty Land Entitlement (TLE) selections, or are involved in co-management of resources within established Resource Management Areas (RMAs). No TLE lands or existing First Nation reserve lands are expected to be affected by either the preferred routes of the 500 kV HVdc transmission line or the 230 kV ac transmission collector lines, although there are parcels located in proximity to and along the preferred route for Bipole III, including a recent selection made by OCN.

Where such lands occur, Manitoba Hydro will review and discuss further with the applicable First Nation. Further discussion of effects on Aborignal Lands and TLE can be found in the Protected Areas and Aboriginal Lands Technical Report (Dave Wotton Consulting, 2011). None of the proposed transmission lines cross through provincial park lands. The remainder of land ownership along the preferred route for the HVdc line consists of private land holdings in southern agro-Manitoba (i.e., principally between Mafeking, in the R.M. of Mountain [North] and the Riel Converter Station site in the R.M. of Springfield).

Residential and Other Developments

Construction-related activities for transmission line structures can potentially have an effect on some rural residences along the proposed route for the Bipole III line. A number of concerns with respect to the potential effects of a transmission line on rural residences were raised during the public consultation program as highlighted below. These concerns are consistent with Manitoba Hydro past experience in SSEA studies and include:

- Proximity to residences and built-up areas and avoidance of residences and 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., viewshed); line placement interfering with image of a property or attractiveness of the landscape.
- Concerns about health and safety: electric and magnetic fields (EMF) effects on humans and animals and other electrical effects (e.g., impacts on television and radio reception and other electrical devices such as GPS).

Each of these potential concerns, with the exception of health and safety, is discussed below. Concerns with respect to EMF and other electrical effects are discussed further in the Electrical Environment Technical Report (E^{x}ponent®, 2011).

Construction-related activities will potentially have short-term construction-related effects (i.e., from increased traffic, noise, dust) on rural residences along the proposed route. One rural residence is located within approximately 100 m from the right-of-way edge of the final preferred route for Bipole III (i.e., SW16-39-24WPM in the R.M. of Mountain). An additional 31 rural dwellings are located within 270 m (approximately) from the route right-of-way edge (J&V Nielsen and Associates Ltd., 2011). The route for the proposed transmission lines generally avoid rural communities and areas of rural residential development, including areas designated for future urban and rural residential development, and was selected to avoid displacing or passing within close proximity to rural dwellings (i.e., within 100 m) to the maximum extent possible. One rural residential area is located within approximately 0.8 km to the west of the final preferred route in the R.M. of Tache at Rosewood (approximately 4.0 km north of the Trans-Canada Highway). The route selection process sought to minimize the effects of the proposed Bipole III line on rural residences and rural residential development. Given the total length of the final preferred route, the potential for adverse effects on rural residences are anticipated to be **negative, small, local, and short-term in duration**.

Manitoba Hydro's environmental protection practices will be applied to eliminate most potential effects (e.g., restoration of removed shelterbelts, adjusting the route where possible to avoid encroachment, or providing compensation for relocation where adjustment is not feasible). Manitoba Hydro's standard environmental protection practices will apply to rural dwellings in close proximity (i.e., within 100 m) of the transmission line right-of-way. A compensation policy of land acquisition will also be considered for those rural dwellings located on properties within 75 m of the transmission line right-of-way edge. The process of consulting with property owners prior to construction (i.e., establishing easements with landowners and planning detailed transmission line design) will be used to address and preclude potential impacts on people and property where possible.

Other property developments on Crown-encumbered land in proximity to the preferred route include: a waste disposal site, in the R.M. of Mountain (South) in SE6-33-20WPM located approximately 633 m northeast to the property edge; and a commercial lot located approximately 273 m northeast to the property edge in SW20-26-13WPM (R.M. of Alonsa). Neither of these sites is expected to be affected by construction activities.

Mitigation Measures

Construction in rural areas has a higher potential for disturbance to private property and public activities. Project scheduling and logistics planning can minimize the effects of construction. Measures to mitigate or minimize the effects of project-related impacts include the following:

- Subject to detailed engineering analysis, tower location (tower "spotting") has been identified as a potential mitigative measure to reduce adverse environmental and aesthetic effects. Location preferences identified in the course of the SSEA process

(including 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 structure placement decision.

- Municipal and local protocols and By-Laws will be observed. Appropriate methods will be applied to comply with regulatory standards during construction of the transmission line, including temporary construction access. In built up areas and other areas where noise and vibration may create undue disturbance, work will be limited to daylight hours in accordance with local noise By-Laws.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.
- Mud, dust and vehicle emissions will be managed in a manner that will ensure safe, continuous public activities in the vicinity of construction sites.
- Construction methods and timing will be designed to minimize traffic disruption. Equipment and materials will be operated and stored in secure designated areas to ensure public safety.
- Care will be taken to ensure that construction activities and equipment do not impact upon neighbouring properties, structures or operation. Appearance and general aesthetics of construction areas will be considered during the construction phase.
- Disturbance to adjacent public green spaces or natural areas will be avoided. When facilities are located adjacent to such sites, measures may be designed to make facilities less obtrusive.

Commercial Resource Use

Resource Harvesting

There is potential for the transmission lines to impact resource harvesting (i.e., fishing, hunting and trapping) and other commercial resources (i.e., wild rice harvesting, bison ranching). Disturbance effects can arise from direct impact on the resource or through undesired access to the resource by other parties. Positive impacts can occur for a group when its access to the resource is improved. Anticipated effects on resource use from clearing and construction activities in any one area are considered **negative, medium, local and short-term in duration**.

The routes for the proposed Bipole III transmission line will cross 45 registered traplines (Joro Consultants Inc., 2011). Clearing and construction activities can temporarily displace wildlife from areas in proximity to the rights-of-way due to sensory disturbance (i.e., construction noise) and may potentially disrupt trapping activity. Depending on the availability of access during the construction phase, the level of hunting activity may increase in the Project area. Winter construction is concentrated in months in which outfitting activity (e.g., big game hunting) is limited by closed hunting seasons. Further discussion of effects on resource use (trapping and hunting), including domestic gathering activities (i.e., berry picking, traditional plants and medicines), can be found in the Resource Use Technical Report (Joro Consultants Inc., 2011).

Concerns were expressed by OCN that the right-of-way will increase the level of access in The Pas area, leading to overharvesting and poaching. Additional concerns identified by OCN included: emissions from construction polluting food sources and site construction (including equipment and waste storage) widening areas of disturbance. TCN expressed similar concerns with respect to the Project, including: the cleared right-of-way affecting animals from an increase in poachers; potential interference with aboriginal rights to hunt and trap; impacts on hunting and fishing; encroachment of outside hunters; and increased traffic on the highway/safety issues. Wuskwi Sipihk First Nation identified concerns during community meetings, open houses and ATK interviews including: fishing, wildlife (hunting) and forestry issues, trapper concerns and impacts on traditional hunting grounds (including whether hunters would receive compensation similar to the trapper notification/compensation policy).

The final preferred route crosses in proximity to two lakes/creeks identified for commercial harvesting of wild rice, ranging from approximately 100 to 300 m distant respectively. An unnamed lake has a development license in Sections 28 and 34, Township 49, Range 25 WPM east of PTH 10 and Plummers Marsh. One other lake, Montreal Lake located southeast of The Pas (Sections 28, 29 and 34, Township 55, Range 25 WPM and Section 23, Township 56, Range 25 WPM) has a production license. The adverse effects on wild rice harvesting operations expected to occur during the period of clearing and construction are associated with the potential for increased access to the resource and may potentially affect the aesthetics of harvesting. Depending on the availability of access, the level of resource harvesting may increase.

A wild bison (buffalo) area was identified between Pulp River and Duck River on private land that has been fenced. There is potential for disturbance of the bison (buffalo) herd from clearing and construction activities. Manitoba Hydro will consult with the landowner with respect to minimizing possible disturbance effects.

The route selection process sought to minimize the effect of the proposed routes on cabins used by trappers. Where available, this use was documented during the ATK interview process. One general area that was noted for trapper's cabins was along a stretch of the Overflowing River west of the community on PTH 10. No specific locations were documented. Another cabin was

referenced in the Clearwater Lake area in the vicinity of an existing rail line and transmission line right-of-way, and PR 287. The preferred route is located to the southeast and parallel to the existing rail and transmission line rights-of-way along this stretch. A third location referenced is the Dyce Lake area, where two trapper cabins were noted south of the existing rail line. The preferred route is located to the north of existing rail and Dyce Lake for these locations. The preferred route for Bipole III also crosses through two quarter-sections of Crown-encumbered land where there are permits for two trapper cabins (NE13-62-19WPM and SW20-58-23WPM - near Dyce and Clearwater Lake respectively). Manitoba Hydro, where feasible, will work to avoid displacing or crossing close to any cabins within the limits of technical (engineering) and cost considerations. Manitoba Hydro has also sought opportunities to route the proposed line parallel, where feasible, to other existing linear features to minimize disturbance effects.

The routes for the proposed 230 kV ac northern collector lines will cross two registered traplines in the Split Lake RTL (TCN RMA) and one registered trapline in the Limestone RTL (Fox Lake RMA). Clearing and construction activities could potentially disturb traplines and temporarily displace wildlife from areas in proximity to the right-of-way. A potential increase in access during the construction phase may increase the level of hunting in the Project area. Anticipated effects on resource use from clearing and construction activities in any one area are considered **negative, small, local, and short-term in duration**.

Mining

The proposed routes cross several commercial mineral leases and mining claims, particularly through the Thompson and Wabowden areas. The preferred route for the HVdc transmission line crosses 5 mining claims, involving two different companies, and nine mineral license areas involving five separate companies. Route selection has minimized the potential effects on mineral interests to the extent practically possible. Potentially affected mineral leases and mineral claim holders will be notified regarding the clearing and construction schedule. Anticipated adverse effects during the period of clearing and construction are **negative, small, limited (footprint), and short-term in duration**.

No known operating mine sites and other properties are crossed by preferred route. One mine property (a quarry site for talc) is located in proximity (approximately 1.0 km) to the north of the preferred route southwest of Ponton (at Iskwasum Lake). An additional mineral prospect property (for copper) was identified in the Farewell Lake/Cormorant Lake area, approximately 1.6 km north of the preferred route. Potential issues relate to disruption and disturbance associated with crossing any existing access roads to a mineral property/site and maintaining adequate clearance distance from the site. Access to these areas by those not associated with Project construction will be limited. Anticipated effects for the period of clearing and construction in any one area are **negligible, small, limited (footprint) and short-term in duration**.

The proposed transmission 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 current or future planned operations of the quarry or aggregate deposit. One of the quarry leases, located to the west of Stephens Lake, is held by Manitoba Hydro. Anticipated effects are considered **negative, small, limited (footprint) and short-term in duration**.

Mitigation Measures

To mitigate effects to resource use and ensure project-related impacts are minimal, Manitoba Hydro's Project Environmental Protection Plan (Manitoba Hydro, 2011) and all applicable legislation, regulations and guidelines will be adhered to. Measures to mitigate or minimize the effects of project-related impacts include the following:

- The interests of local resource users – trappers, fishermen, lodge operators, ranchers, etc. will be considered.
- Manitoba Conservation and local resource users will be notified of clearing and construction schedules and activities, including establishment of temporary access routes. Permission for access onto Crown land will be obtained from the appropriate regulatory authority prior to the commencement of project-related activities.
- Manitoba Hydro will consult further with Fox Lake and Tataskweyak Cree Nations and other First Nations with respect to addressing resource-related interests and concerns.
- Construction personnel will be prohibited from hunting and fishing wildlife (big game, furbearers, birds, fish) on Project sites, including related access routes and borrow areas.
- Trappers will be notified as to the schedule for clearing and construction activities in advance. Manitoba Hydro also has a compensation policy in place which will apply to this project. Their practice is to provide reimbursement to registered trapline holders for fur harvest losses during the periods of clearing and construction. Outfitters operating in the vicinity of the transmission line will also be apprised of clearing and construction activities, including temporary access routes, to minimize disruption to their operations. Similarly, wild rice harvesters will be notified of the schedule for construction activities, including access, in advance.
- Mineral claim and license holders crossed by the preferred route will be provided with information regarding clearing and construction schedules, including temporary access requirements, to minimize potential interference with exploration activities. Manitoba Hydro will work with mining interests and holders to address any outstanding issues.

- In instances where a potential adverse effect exists with quarry or aggregate operations, additional possible mitigation measures include strategic placement of structures to lessen/avoid interference with operation activities (i.e., quarries, pits) at those locations. Manitoba Hydro will consult with the affected stakeholders (operators) as part of the easement negotiation phase of the project to ensure that the proposed transmission lines or temporary access requirements will not adversely interfere with present operations or any future plans. Manitoba Hydro would also work with an operator to ensure no damage occurs to the Bipole III line from any site operations by not allowing blasting within the right-of-way itself and maintaining a 100 buffer parallel to the right-of-way where use of physical protection would be required (i.e., blasting mats). Outside the parallel buffer distance, no restrictions would apply.

- Manitoba Hydro will consult with the bison herd landowner with respect to the project construction schedule in order to minimize possible disturbance effects.

- Right-of-way clearing and construction activities will occur during the winter for northern portions of the route to lessen disturbance to resource use activities (i.e., hunting, trapping, wild rice harvesting).

- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.

- Existing all-weather or winter roads/trails will be utilized whenever possible.

- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Recreation and Tourism

Parks and Conservation Lands

Potential impacts of transmission lines on parks and other conservation lands, such as wildlife management areas and provincial forests are generally associated with disturbance effects, including access, and visual and aesthetic effects. Issues of concern include: noise and traffic associated with construction activities, increased access and intrusion on scenic landscapes, river crossings, and other aesthetic natural areas that are important to local residents, tourist operators and visitors. The route selection process sought to limit proximity to, and avoid or minimize the effects and visual impacts on known areas of importance to government agencies such as Manitoba Conservation and the general public. Provincial Parks were avoided in the alternative route identification and route selection process.

A portion of the route crosses through the Cape Churchill WMA north of Gillam and the Tom Lamb WMA southwest of Cormorant. The proposed transmission line is routed for approximately

14.1 km through the Cape Churchill WMA and 50.2 km through the Tom Lamb WMA respectively. Of the total length through the Tom Lamb WMA, approximately 20.3 km of the proposed route parallels an existing rail line through the WMA. The proposed route for Bipole III also crosses through the Swan-Pelican Provincial Forest for approximately 15.1 km. There is potential that the proposed transmission line will have an adverse effect on the WMA and

Provincial Forest during the construction phase of the project, though it is considered low given the length of the proposed line that follows existing linear infrastructure in the WMA and the short distance crossed through the Provincial Forest. Anticipated effects are considered **negative, medium, localized and short-term in duration**.

The preferred route also crosses through four quarter sections of Crown-encumbered land identified for Ducks Unlimited Canada (i.e., NW2-23-12WPM, SW35-22-12WPM, NE26-22-12WPM, and NW18-22-11WPM in the R.M. of Alonsa, part of the Portia Project). Ducks Unlimited Canada noted the Portia wetland complex area as having important wetlands (C. Smith, pers. comm. to Manitoba Hydro, October 29, 2010). Waterfowl sensitive areas have been identified where the route crosses wetlands likely used by waterfowl. Further discussion of potential effects in these waterfowl sensitive areas (i.e., risk of bird wire collisions) and proposed mitigation measures (i.e., placement of bird diverters, monitoring for bird interactions) is provided in the Bird Technical Report (Wildlife Resource Consulting Services MB Inc., 2011).

Three proposed WMA's by Manitoba Conservation are crossed by the proposed transmission line route southeast of The Pas. The proposed Red Deer WMA (to be protected under the Protected Areas Initiative [PAI]) is crossed by the final preferred route for a distance of approximately 27.2 km. Two portions of the proposed Summerberry WMA are also crossed by the final preferred route. The proposed protected portion (under PAI) is crossed for a distance of approximately 29.3 km, while the unprotected portion of the WMA is crossed for a distance of approximately 17.1 km. Anticipated effects are considered **negative, medium, localized and short-term in duration** during the clearing and construction phase. Further details on protected areas affected by the proposed Bipole III route can be found in a separate technical report (Dave Wotton Consulting, 2011).

The northern 230 kV ac collector lines will also cross through a short distance of the Cape Churchill WMA for approximately 14.5 km. There is potential that the proposed 230 kV collector lines will have an adverse effect on the WMA; it is considered low given short distance involved and the proximity to other existing infrastructure within Manitoba Hydro's Water Power License and Reserve areas. The anticipated effects of the transmission lines on this WMA are considered to be **negative, small, local, and short-term in duration** for the clearing and construction phases of the project.

Lodges, Campgrounds and Recreational Areas

Potential impacts of transmission lines on recreational resources, including recreational cottages and campgrounds, are generally associated with disturbance effects, including access, and visual and aesthetic effects. Issues of concern from construction activities include: increased access and intrusion on scenic landscapes, river crossings, and other aesthetic natural areas that are important to local residents, tourist operators and visitors.

Other potential impacts during construction include public concern for the local environment, public safety and noise impacts.

There are no lodges in immediate proximity to the routes for the proposed HVdc transmission line. The closest lodge to the proposed route is Trapper Don's Lodge & Outfitting Service located in the R.M. of Mountain (South) along PTH 20, approximately 2.3 km east of the final preferred route. Given the distance and the extent of tree cover that the route crosses through, the transmission line should not be readily visible to the lodge operation.

The preferred route for Bipole III crosses through one quarter-section of Crown-encumbered land with a plan of subdivision where one remote cottage and one recreational lot are located (i.e., NW16-45-25WPM) along the Red Deer River. Two other privately-owned recreational lots are also located within this quarter-section (former Crown lands). The preferred route is approximately 455 m to the northeast from this area. The route selection process sought to minimize the effect of the preferred route on recreational developments within the limits of technical (engineering) and cost considerations. The proposed route, where feasible, was selected to avoid displacing or passing within close proximity to cottage subdivisions, remote cottages or recreational lots. Manitoba Hydro will consult with the permittees with respect to minimizing possible disturbance effects identified. Mitigation may be possible through tower placement to minimize visual/aesthetic effects between a site and the proposed transmission line right-of-way.

The proposed route for the HVdc line crosses the Grass River, which is a designated canoe route and transportation route, and is used for domestic fishing. The final preferred route also 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 (part of the Waterhen Country canoe route) in the R.M. of Mossey River; and the Rat River (as part of the Rat River canoe route) in the R.M. of Ritchot. The final preferred route also crosses the Red River between the R.M.s of Macdonald and Ritchot, which is a designated Heritage River under the Canadian Heritage Rivers System. The Red River was nominated for inclusion in the heritage river system based on its historical and recreational attributes. At these crossing locations, there will be new visual impacts as the proposed route will utilize lattice steel structures to cross the rivers.

The proposed route is located adjacent to or crosses numerous designated snowmobile trails in the vicinity of communities, including: west of Ponton at PTH 6; south of The Pas to the junction of PTH 10 and 60, north of Overflowing River and west of Dawson Bay; north of Cowan in the R.M. of Minitonas; southeast of Rossendale in the R.M. of North Norfolk; west and south of St. Claude and south of Elm Creek in the R.M. of Grey; northeast of Brunkild in the R.M. of Macdonald; south and east of Ste. Agathe in the R.M. of Ritchot; southeast of Niverville in the R.M. of Hanover; and east of Landmark and Dufresne in the R.M. of Tache.

The proposed route also parallels for a short distance (approximately 2.0 km) and crosses an established recreational trail (i.e., Trans Canada Trail) between Otterburne and Ste. Agathe east of the Rat River.

Places of interest or tourist landmarks were avoided where possible in routing the transmission line. One historic school site (Cork Cliff) is located within 0.8 km of the final preferred route in NE23-30-18WPM in the R.M. of Mossey River southeast of Winnipegosis.

The adventure travel and eco-tourism (ATE) activities within the Project area are limited. The activities present are primarily focused on various outdoor recreation pursuits, guided canoe trips, wildlife viewing excursions, nature interpretation, Aboriginal traditional experiences, and local festivals and historical trips. 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.

For approximately half of its length, the Bipole III transmission line passes through relatively isolated areas with limited development. Where there is a more prevalent development pattern (i.e., in agro-Manitoba between Mafeking, in the R.M. of Mountain [North], and the Riel Site in the R.M. of Springfield), there will be new visual impacts to the rural landscape associated with crossings of major roads and rail rights-of-way, including recreational trails. In several instances, existing rights-of-way and existing transmission lines, and other linear features such as road allowances and drainage ditches are paralleled lessening the potential for aesthetic impacts.

In general, the construction-related effects are considered to be **negative, small, local, and short-term**. The route selection process sought to limit proximity to, and avoid or minimize the effects and visual impacts where possible on known areas of importance to lodge and tourist operators, outfitters, canoeists and government agencies such as Manitoba Conservation. The proposed transmission lines will be a net addition to the visual landscape.

Mitigation Measures

Measures to mitigate or minimize the effects of project-related impacts include the following:

- Prior to construction activity involving Crown lands, the local regulatory authorities (i.e., NRO) will be advised and their approval first procured in the form of work permits. Work permits from Manitoba Conservation are required on all Crown lands in Manitoba.
- Special land use designations such as Resource Management Areas, Wildlife Management Areas, Provincial Forests, Community Pastures, etc. will be recognized and any boundaries clearly identified. Appropriate agencies will be notified as to the clearing and construction schedules, including requirements for temporary construction access.
- 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, including requirements for temporary construction access. Information signs and the placement of warning markers will be used to identify the new rights-of-way.
- Care will be taken in the vicinity or adjacent to designated areas or conservation lands 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, including temporary construction access, and other disturbed/developed areas (e.g., borrow areas).
- Manitoba Hydro will consider tower placement to address visual/aesthetic effects from presence of crossing towers. The location of the transmission line structures will be optimized so that their visibility in relation to crossings (e.g., the Grass and Nelson rivers) is minimized (i.e., tower spotting will be considered to help minimize potential aesthetic effects).
- Right-of-way clearing and construction activities will occur during the winter for northern portions of the line to lessen disturbance to resource use and conservation areas.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Infrastructure Facilities

The proposed 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, MTS) and other stakeholders have been consulted at various stages of project planning. Results of reviews to date are provided below:

- Review of the Bipole III Project with TransCanada Pipelines Limited (TCPL) occurred at the alternative route option evaluation stage prior to the selection of a preferred route. Feedback was provided in order to assess the risk of mutual interference between a proposed transmission line route and TCPL transmission pipelines. The alternative route options (and consequently the resultant selected preferred route) cross TCPL main lines running east-west as well as two lines running north-south in the study area. Issues raised by TCPL included: 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 CP system (cathodic protection). TCPL indicated that a special study would have to be conducted to determine what mitigation measures would be required to ensure the safe operation of the pipelines. The study would be conducted following the detailed design of the powerline. With respect to the alternative options reviewed, it is expected that the interference would be completely mitigated at all crossings under all options; however, the option with the minimum number of crossings would be provide the minimum mitigation cost (TCPL pers. comm., Dec 4, 2009).

- Discussions took place with Omni-Trax representatives responsible for the Hudson Bay Railway 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 operation and maintenance activities; and access issues affecting their operations. Omni-Trax has a standard accommodation policy for working with utilities on their proposed developments. Their application process for dealing with rail cable crossings of their rights-of-way typically involves approving engineering design drawings. No other approvals are required under legislation. Once approved by the railway company, maintaining communication with Omni-Trax representatives is important with regard to scheduling of activities (i.e., where and when) for clearing, construction and operation and maintenance phases of the project (Omni-Trax Canada Inc., pers. comm., Sept. 24, 2010).

- A review of the proposed 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. No float plane bases were identified in proximity to the final preferred route. One private airstrip was identified on a north-south alignment in

proximity to the final preferred route in the R.M. of Hanover (approximately 2.0 km to the north of the route in SE19-7-4EPM). Due to the proximity and orientation of the final preferred route to the private airstrip, there is potential for interference from the construction and operational phases of the Project. Discussions will occur with the operator of the private airstrip with respect to the potential for adverse effects on his operations. Possible mitigation can include realignment of the airstrip or the installation of aviation markers on the Bipole III line. The other closest private airstrip is the Lyncrest Airfield located within approximately 1.6 km of the route, located in the R.M. of Springfield west of PTH 101 and southwest of the Riel Converter Station site. The operators of these two airfields will be informed regarding clearing and construction schedules for the proposed transmission line.

- There are 13 communication towers within a 5 km corridor along the centre line of the final preferred route. Most of these are concentrated in four different areas along the final preferred route, including near Brunkild, Domain and Osborne (in the R.M. of Macdonald), Ste. Agathe (in the R.M.s of Macdonald and Ritchot) and near the Riel Converter Station site (in the R.M. of Springfield). In addition, there is one radar tower site, one located in the Lakeview Community Pasture just over 100 m from the final preferred route, on the west side of the north-south road allowance, south of Langruth and one northwest of Langruth, approximately 1.2 km west of the route, both in the R.M. of Lakeview. Manitoba Hydro generally does not anticipate there being any potential for adverse effects on communication towers from construction and operational phases of the project.

For Bipole III construction purposes, Manitoba Hydro will use existing highways, municipal and forestry roads, trails and man-made linear features where possible as access points, 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.

Parallel opportunities between the final preferred route for the HVdc line and other existing linear infrastructure (i.e., roads, rail, municipal drains) occur in several areas, including: a 23 km (approximately) stretch of PR 280 between Pukatawakan Lake an Orr Lake; a 33 km (approximately) stretch of PR 280 east between the crossing of the South Moskowot River and Assean River; a 7.5 km (approximately) stretch along PTH 6 south of Ponton; an 80.5 km (approximately) stretch of the HBR line between PTH 6 south of Ponton and Dyce Lake and a second shorter 16 km (approximately) stretch along the northwestern edge of the Tom Lamb WMA between Mawdesley and Clearwater lakes; a municipal drain through the R.M. of Macdonald (Drain 11-A for approximately 25 km); and the Cooks Creek Diversion (for approximately 5.8 km) in the R.M. of Springfield.

Parallel opportunities also occur with several existing transmission lines, including: a 7.5 km (approximately) stretch south of Ponton; a 59 km stretch of the newly constructed Wuskwatim 230 kV transmission line (H75P) between Dyce Lake and Clearwater Lake; a 43 km stretch of 230 kV transmission line F27P south of The Pas to the junction of PTH 10 and 60; a 1.2 km stretch along 230 kV transmission line D14S south of St. Claude in the R.M. of Grey; a 5.8 km stretch along 230 kV transmission line R49R adjacent to the Cooks Creek Diversion in the R.M. of Springfield; and along a 13 km stretch of the existing right-of-way for a 500 kV ac transmission line (D602F) through the R.M. of Springfield to the site for the Riel Converter Station site.

The final preferred route for Bipole III also crosses a 500 kV ac transmission line (D602F) in the R.M. of Springfield. The Bipole III line will be strung over top of D602F and can be effectively mitigated through application of transmission line design measures. The HVdc transmission line will be subject to two general standards (C22.3 No. 1-10 “Overhead Systems” standard and CAN/CSA-C22.3 No. 60826-10 “Design criteria of overhead transmission lines” standard). Necessary clearances for this crossing will be determined by Manitoba Hydro and will exceed the minimum values specified in the CSA standard.

Reviews of potential effects and appropriate mitigation measures involving these types of infrastructure are generally subject to standard Manitoba Hydro procedures for contact and consultation with responsible authorities or other companies and mitigable in all cases. Manitoba Hydro will adhere to its Project Environmental Protection Plan (Manitoba Hydro, 2011) related to clearing and construction activities as well as all applicable design specifications related to infrastructure crossings, including any special requirements or mitigative measures. Anticipated effects from construction **are considered to be negligible.**

The proposed 230 kV ac northern collector line right-of-way crosses an active HBR rail line to Churchill at two points (at Limestone and Avery) and an abandoned portion of rail line extending to the northeast past the Conawapa G.S. site area. One of the 230 kV ac transmission collector lines will extend from an existing 230 kV switchyard at Long Spruce G.S. to the new 230 kV switchyard site to be located at the site of the new Keewatinoow Converter Station for a distance of approximately 55 km. This 230 kV ac collector line commences on the south side of the Nelson River, where it then crosses the Nelson River and proceeds along the north side of the Nelson River to terminate at Keewatinoow. The southern portion of this route crosses other linear infrastructure, including PR 290 as well as other existing Manitoba Hydro transmission lines. Given the presence of other existing infrastructure in the area, including hydro-related (i.e., proximity to other hydro-related works within Manitoba Hydro’s Water Power License and Water Power Reserve areas), the anticipated effects for clearing and construction **are considered to be negligible**.

Mitigation Measures

To the extent practical, the new rights-of-way parallel existing transmission lines and other linear rights-of-way (i.e., roads, rail, and drains) to the extent that system reliability criteria and engineering design are not violated. Measures to mitigate or minimize the effects of project-related impacts include the following:

- Agencies responsible for infrastructure crossed by the transmission line (i.e., HBR, CPR, CNR, GWWD, Trans Canada Pipeline, MIT, MTS) will be consulted. Confirmation of any necessary permits and approvals or design measures for construction will be made during the detailed design stage of the project. These agencies will also be notified with respect to clearing and construction schedules, including requirements for temporary access points off of intersecting linear rights-of-way, for the proposed transmission lines to minimize disruption to operations.
- Municipal authorities responsible for drains will be notified of clearing and construction schedules. Manitoba Hydro's Project environmental protection plan will be adhered to, as well as local protocols and By-Laws, including maintaining an adequate buffer.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

7.2.1.2 Construction Site Decommissioning

Potential project-related effects from transmission construction site decommissioning are associated with activities related to removal/reclamation of temporary right-of-way access trails, marshaling yards; borrow sites, and mobile construction camp locations. Following the application of mitigation measures, anticipated effects are expected to be **positive, small in magnitude, limited to site/footprint and the local area, and medium-term in nature**.

Mitigation Measures

Mitigation measures to address site decommissioning are subject to Manitoba Hydro's standard protocols and guidelines for the Project (Manitoba Hydro, 2011) and include the following:

- Clearing and disturbance outside the project area or worksite will be minimized or avoided.

- Temporary access routes will be decommissioned at the completion of the construction phase under the supervision of a Natural Resources Officer.
- Decommissioned roads will be reclaimed and, after removal of culverts, drainage will be restored and shorelines stabilized.
- Ongoing visual inspection of the worksite will be conducted by the Contractor to ensure adequate restoration and minimal environmental degradation.
- All waste, refuse, structures, material and equipment will be removed from borrow pits and quarries by the Contractor at the end of construction.
- Depending on the planned future use of the site and the size of the excavation, pits and quarries will be backfilled with clean mineral soil or granular material, leveled or sloped, and if necessary, revegetated according to reclamation plans submitted to the Mines and Mineral Branch and Manitoba Conservation.
- Temporary haul roads to permanently abandoned borrow areas will be decommissioned.
- The restored pit will be monitored by the Contractor for a period of time agreed to with Manitoba Hydro to determine if additional restoration activity is required. If appropriate for the site, revegetation will be allowed to occur naturally.
- Hazardous materials, fuel containers and other materials will be removed from marshaling yard sites.
- Infrastructure will be removed from the work site and whenever possible reused or recycled at another project site as appropriate.
- Garbage and debris will be removed from the site and disposed of in a licensed landfill.
- Revegetation may be required in disturbed areas to: stabilize erodible soils; create or restore wildlife habitat; prevent or delay the invasion of unwanted plant species; or enhance or restore the aesthetic appeal of an area. Sites specifically requiring special treatment after construction will be identified during decommissioning or otherwise, natural revegetation will be allowed to occur.
- Pit privies will be backfilled when construction camps are decommissioned.
- All buildings, infrastructure, waste and debris will be removed from the mobile construction camps during decommissioning.

All clean-up and rehabilitation activity for transmission line construction sites will also be subject to the requirements of Project-specific Environmental Protection Plans.

7.2.1.3 Operation and Maintenance

Land Tenure and Property Ownership

Off-reserve Crown lands affected by the Project, and subject to traditional Aboriginal use, are typically within the jurisdiction of the provincial government. The proposed route crosses through the Fox Lake RMA, the Split Lake RMA, the Cormorant RMA, as well as through portions of the OCN Traditional Territory. In two instances, the proposed route for the HVdc transmission line is located on the opposite side of the road allowance to selected TLE or First Nation lands (i.e., within the R.M. of Mountain [North]).

For the majority of their length, the northern 230 kV ac transmission lines pass through relatively isolated areas with limited development. The proposed rights-of-way crosses through the municipal boundaries of the Town of Gillam, the Cape Churchill WMA, and a portion of TCN's and Fox Lake's RMAs (as well as Fox Lake's intensive land use area). Discussions will be required between Manitoba Hydro, the Province and the affected First Nations regarding arrangements for provision of the permanent right to access, use and maintain the transmission line rights-of-way through these areas.

Residential Development

Property Impacts

As with construction-related activities, normal operations and maintenance, as well as the ongoing presence of transmission line structures may potentially have an effect on some rural residences along the proposed route for the Bipole III line.

In portions of southern agro-Manitoba north of PTH 16, the steel lattice towers will typically be situated 30 m into the property from the road allowance edge. Overall, in southern agro-Manitoba and north-central Manitoba (which consists of a short section at Rall's Island at The Pas, the easement required for the Bipole III 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 538 private properties (some of which are in common ownership). Potential effects from line placement (i.e., taking an easement) include crossing through or splitting properties. Of the total number private properties affected, the easement would pass along on the same side as the road allowance of 167 properties and split 371 properties. A total of 153 private properties are located on the opposite of the road allowance. In addition to private properties, the easement for the Bipole III line would affect 115 properties that are Crown lease and five properties that are municipally-owned.

Any physical damages incurred by affected property owners and adjacent landowners during Manitoba Hydro maintenance activity are subject to compensation within Manitoba Hydro's existing policies.

Property Value

The literature review on the topic of land use included a number of studies and reports summarizing perspectives on effects on property value from transmission line development. The conclusions drawn from studies undertaken between 1990 and 2010 suggest that generally the effects on property values from transmission lines were minimal or none at all. With respect to proximity and visibility, there was no statistical effect on property values in residential neighbourhoods. It was further noted that any value effects vary with the location and size of the property (i.e., urban vs. rural, large vs. small), were greater in the short-term but diminished with distance and time, and varied to the extent that the transmission line is visually seen (Bottemiller et al., 2000; Chalmers and Voorvart, 2009; Colwell, 1990; Cowger et al., 1996; Grover et al., 2008; Jackson and Pitts, 2010).

Manitoba Hydro has also undertaken its own research on property values. It has been the position of Manitoba Hydro that the presence of transmission lines does not affect residential property values. Since 2000, a yearly Property Value Monitoring Program has been conducted in the Birds Hill and Lister Rapids areas in the Rural Municipalities of East and West. St. Paul. The monitoring program was initiated in response to property owner concerns regarding the construction of the Dorsey-St. Vital 230 kV Transmission Line Project within an existing right-of-way. Real estate transactions for developed single-family residential properties within the monitoring area have been tracked over the period January 1, 1992 and June 1, 2011 (the latest report end-date). The monitoring area was delineated according to adjacent land (properties backing onto the right-of-way), nearby land (located between the adjacent land and the next property line), or other land (all property lying north of the nearby lands). The 2011 monitoring report noted that housing prices have continued to fluctuate within normal ranges, though the ranges have increased considerably due to the 2006/2008 housing price boom. Since May 1998, the overall average price increased by approximately 49 percent in East St. Paul and by 52 percent in Lister Rapids. The rates of sale transactions for adjacent, nearby and other locations of property continue to be distributed normally throughout (Manitoba Hydro, Property Department, 2011).

Aesthetics

The literature review on the topic of land use included a number of studies and reports summarizing perspectives on effects on aesthetics from transmission line development. The conclusions drawn from the studies reviewed suggest that transmission lines and substations can influence the visual landscape in urban or rural settings or in other sensitive circumstances. Aesthetic impacts, to a certain extent, differ according to a person's values and perspectives. An individual's response to visual changes in the landscape and the magnitude of the concern or sensitivity related to a particular viewscape is a function of the type of views involved, as well as the distance, perspective and duration of the view. Short-term effects are typically associated with the construction phase. Although considered essentially permanent features in the

landscape, application of mitigation measures can serve to minimize potential effects on visual quality, including route adjustment, structure placement, and visual screening (BC Hydro, 2006 and 2008; Minnesota Department of Commerce, 2006; Public Service Commission of Wisconsin, 2010; and Tennessee Valley Authority, 2005).

Apart from an overall aesthetic effect on the areas through which it is routed, the Bipole III line will have an aesthetic impact on a number of residences located at varying distances from the transmission line once operational. Without considering dwelling orientation, shelterbelt screening and other location factors, it is generally acknowledged that the closer one is to a line the more visible it would be. One rural residence is located within approximately 100 m from the preferred route right-of-way edge (in SW16-39-24WPM). An additional 31 rural residences are located within 270 m (approximately) from the route right-of-way edge (J&V Nielsen and Associates Ltd., 2011). A compensation policy of land acquisition will be considered for those rural dwellings located on properties within 75 m from the edge of the transmission line right-of-way. Given the total length of the final preferred route, the overall adverse aesthetic effect on rural residences is anticipated to be **negligible, small, local and medium-term in nature**.

Access

The provision of increased access through cleared rights-of-way or other access points could potentially result in increased development pressures on nearby land through changes in accessibility. These changes could influence development in a localized area adjacent to the project or potentially affect the location of future developments within the region. However, there are many other considerations that would have a stronger influence on development patterns including population, economic conditions, and regulatory and/or municipal development controls. Any increase in access opportunities is unlikely to affect development patterns.

Mitigation Measures

Manitoba Hydro's Project environmental protection practices, including measures specified in the Project EnvPP (Manitoba Hydro, 2011), will be applied to address most potential impacts related to aesthetic changes. Measures to mitigate or minimize the effects of project-related impacts include the following:

- Care will be taken to protect the natural landscape surrounding work activity sites; operation activities will be conducted to prevent any unnecessary damage outside the required rights-of-way and other disturbed/developed areas (e.g., borrow areas).

Commercial Resource Use

After construction, some resource users may benefit from the cleared right-of-way and improved access to their traplines, hunting areas, or wild rice harvesting lakes. The relatively remote

locations of the proposed rights-of-way and the nature of the terrain in some areas (i.e., rock outcrops, extensive fens, difficult river crossings) will serve to limit access, particularly during the spring and summer months. Access for maintenance purposes will utilize existing highways, municipal and forestry roads, trails and other man-made linear features where possible, thereby minimizing the need to develop new access routes to the rights-of-way.

Nevertheless, concerns may remain regarding managing access to these and other areas, including that of a bison ranch identified during the ATK interview process. Participants at the community public open houses frequently asked about trapping, some of whom expressed a concern that snowmobile groups would groom and use the Bipole III right-of-way, opening up undisturbed or traditional areas (without community consultation), affecting local trappers, cabin locations, and disturbing lines and potentially damaging equipment from an increase in outside traffic.

ATK input from First Nations, including TCN, OCN and Wuskwi Sipihk, and other communities identified concerns with respect to: the increase in the level of access leading to overharvesting and poaching; potential interference with aboriginal rights to hunt and trap (including traditional hunting grounds); encroachment of outside hunters; and the increase in traffic related to highway/safety issues. It was also noted that the changed landscape may lure animals to an area. Other potential positive benefits identified were associated with the towers serving as landmarks for people out in the bush to help find their way if they become lost and making trails for people. Some community members stated they had no problems with transmission lines as they would provide new access for trapping. Others suggested that the right-of-way would create a good area for trapping.

The cleared rights-of-way will create some additional opportunities for access and may potentially reduce the aesthetics of trapping and other resource harvesting and result in potential disturbance effects. The routes for the proposed transmission lines also cross through areas which have been allocated for commercial outfitting resulting in potential disturbance effects. Lodge owners and outfitters in the project area potentially affected by the proposed route have been apprised of the project through the public consultation program. A number of outfitters and lodge operators provided feedback on the potential effects of Bipole III on outfitting activity and areas of activity. General concerns from transmission line routing focused on disturbing wildlife populations, removal of habitat, increased access (both positive and negative), disruption of operations and damage to camps and equipment. Manitoba Hydro provided follow-up with individual outfitters/lodge operators to address any remaining project-related concerns. Anticipated adverse effects on resource harvesting are expected to be **negative, small, local, and medium-term in duration**. The route for the 230 kV ac transmission collector lines does not cross any outfitter allocations areas. As such, **there is no potential for any effects**.

During operations, increased access by the presence of the rights-of-way could have an indirect effect of contributing to overharvesting of the resource by other resource users. A positive effect

associated with increase access to the resource is the potential to increase the fur harvest or big game taken for that trapper or hunter which would be desirable (from an income perspective). Increased access may also increase hunting pressures (i.e., illegal poaching), which could potentially contribute to increased competition for resources among resource harvesters. The provision of increased access through cleared rights-of-way or other access points could potentially result in increased pressure on harvesting of the forest resource. However, there are many other considerations that contribute to commercial forestry including the nature of the forest resource itself, market conditions, and the regulatory framework. Any increase in access opportunities is unlikely to affect forestry development.

Operation of the HVdc transmission 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. The effect could potentially extend to the footprint of the right-of-way and beyond (i.e., reported to be from 3 to 10 km depending on the type of EM survey used). Anticipated adverse effects during the period of operation **are negative, small, local, and medium-term in duration** (depending on advancements in technology). Additional liaison with the Mining Association, principally-affected companies and the Mines Branch resulted in the preferred route subsequently being adjusted to avoid crossing numerous mining claims affecting three principal claim areas in the Thompson Nickel Belt area, east of PTH 6 from Halfway Lake to Wabowden, and in the vicinity of Gormley Lake.

The provision of increased access through cleared rights-of-way or other access points could potentially result in increased mineral exploration activity. However, there are many other considerations that would contribute to commercial mineral development including the nature of the mineral resource itself, market conditions, and regulatory controls. Any increase in access opportunities is unlikely to affect mineral development. No adverse effects are expected from operation of the Bipole III transmission line on any existing mine site or property.

Operational limitations could result to a quarry operator in relation to line proximity. Route selection has sought to minimize potential effects on quarry and aggregate deposits to the extent possible. In addition, Manitoba Hydro would have concerns related to quarry blasting and proximity of this activity to the Bipole III transmission line. Manitoba Hydro follows guidelines with respect to blasting and would work with an operator to determine if line outages/blocking or physical protection on the line would be required to ensure no damage occurs to the Bipole III line from any site operations. Applicable guidelines for blasting are as follows: within the transmission line right-of-way – no blasting allowed; outside a 100 m buffer parallel to the right-of-way – no restrictions; and within a 100 m buffer parallel to the right-of-way – blasting allowed, but blasting mats must be used to control debris. Each case reviewed is likely to be different and would be dealt with specifically at the time of any proposed work to determine

mitigative requirements. Anticipated effects from operations are considered **negative, small, limited (footprint) and medium-term in duration**.

Mitigation Measures

Additional measures to mitigate or minimize the effects of project-related impacts include the following:

- Manitoba Hydro will consult with local resource users (i.e., hunters, trappers) and interests (e.g. bison herd rancher, quarry operators) with respect to the schedule for operation and maintenance activities to minimize disturbance effects.
- Where issues of increased access through cleared rights-of-way are of potential concern to a First Nation, community or stakeholders, Manitoba Hydro will consider the development of access management plans to address resource-related interests.

Recreation and Tourism

Parks and Conservation Lands

As noted above, three WMA's proposed by Manitoba Conservation are crossed by the preferred HVdc transmission line route, one of which is to be protected under the PAI. Discussions held with Manitoba Conservation indicated that the 66 m right-of-way for the preferred route for the HVdc line would be excluded from the remainder of the surrounding land set aside for the protected Red Deer WMA. During operational phases of the project anticipated effects on the Red Deer and other proposed WMAs and conservation lands are considered **negligible, small, limited (to the right-of-way), and medium-term in duration**.

One crossing of the Nelson River is involved with the 230 kV ac transmission collector lines, between Henday Converter Station and Long Spruce G.S. The relatively remote location of the crossing site of the Nelson River, the presence of existing road access on one side, the nature of the terrain at the site (i.e., extent of wetlands) will serve to limit access at the crossing, particularly in the spring and summer. The crossing location at the Nelson River will also occur where other existing transmission lines currently exist. As such, any new visual impacts are expected to be incremental in nature. Anticipated effects from the operational phase of the 230 kV collector lines are considered **negligible, small, limited (footprint), and medium-term in duration**.

Lodges, Campgrounds and Recreational Areas

The most direct land use effect during the operations and maintenance phase is the proposed transmission line's permanent physical presence along new rights-of-way. The Bipole III line will be a net addition to the visual landscape and any adverse effect will be incremental in nature, particularly in areas where other infrastructure facilities are present. ATK input from Cormorant

noted that increased accessibility created by Bipole III to the area may be beneficial as it may lead to increased tourism that could bolster the local economy and bring with it excellent snowmobiling opportunities.

During the operation and maintenance stage, concerns can include potential effects related to disturbance (i.e., changes in aesthetics from increased access). These concerns are consistent with Manitoba Hydro's previous experience with other transmission line projects in similar circumstances (e.g., Wuskwatim Transmission Project). Anticipated effects are considered to be **negative, small, local, and medium-term in duration**.

A change in aesthetics as a result of increased access and more resource users could have the potential to indirectly affect a lodge or outfitter client's enjoyment of an area, in particular if the expectation is to experience an excursion in a natural wilderness setting. This in turn could potentially result in a reduction in the number of clientele choosing to use the areas in which the lodge and outfitter operate.

The extent of this effect would also be dependent on the perceptions of the resource users and the extent to which certain areas are used compared to others. Anticipated effects may be considered to be **negative, small, local, and medium-term in duration**.

Mitigation Measures

Application of Manitoba Hydro's standard environmental protection practices are designed to limit impacts on the natural environment, particularly in boreal wilderness areas, as much as possible. Adherence to measures outlined in the Project specific EnvPP (Manitoba Hydro, 2011) will tend to protect the same environmental qualities which are valued for outdoor recreation purposes. Measures to mitigate or minimize the effects of project-related impacts include the following:

- Work permits from Manitoba Conservation will be obtained for all project activities occurring on provincial Crown lands.
- Lodge owners, recreational resource users, and Crown land encumbrance holders will be notified in advance as to the schedule for operation and maintenance phases of the project.
- Special land use designations such as Resource Management Areas, Wildlife Management Areas, Provincial Forests, Community Pastures, etc. will be recognized and any boundaries clearly identified. Appropriate agencies will be notified of the operation and maintenance schedules.
- Care will be taken to avoid any unnecessary disturbance when conducted in the vicinity or adjacent to designated areas or conservation lands, including use of seasonally limited

maintenance times (e.g., waterfowl areas), to protect the natural landscape surrounding work sites and to prevent any unnecessary damage outside the required rights-of-way and other disturbed/developed areas.

- Prior to operation and maintenance activities, the snowmobile associations will be notified of the proposed work schedules. As well, adherence to Manitoba Hydro's standard environmental protection practices will include the use of information signs and the placement of warning markers to identify the new rights-of-way.

Infrastructure Facilities

Manitoba Hydro will use existing highways, municipal and forestry roads, trails and man-made linear features where possible for maintenance purposes, thereby minimizing the need to develop new access routes to the rights-of-way. Operational effects **are expected to be negligible.**

The provision of increased access through cleared rights-of-way or other access points could potentially result in increased development pressures on nearby land through changes in accessibility and result in the requirement for provision of infrastructure and services. These changes could influence infrastructure development in a localized area adjacent to the project or potentially affect the location of future infrastructure developments within the region. However, there are many other considerations that would influence infrastructure development including population, economic conditions, and regulatory and/or municipal development controls. Any increase in access opportunities is unlikely to affect requirements for new infrastructure development.

Mitigation Measures

To the extent practical, the new rights-of-way parallel existing transmission lines and other linear rights-of-way (i.e., roads, rail, and drains) to the extent that system reliability criteria and engineering design are not violated. Additional measures to mitigate or minimize the effects of project-related impacts include the following:

- Agencies responsible for infrastructure crossed by the transmission line (i.e., HBR, CPR, CNR, GWWD, Trans Canada Pipeline, MIT, MTS) will be notified with respect to operation and maintenance schedules for the proposed transmission lines to minimize disruption to operations.

- Municipal authorities responsible for drains will be notified of work schedules. Local protocols and By-Laws, including maintaining an adequate buffer, will be adhered to.

7.2.2 Keewatinoow Converter Station

7.2.2.1 Construction

Land Tenure and Property Ownership

Property Impacts

The proposed sites for the Keewatinoow Converter Station, construction camp, construction power station and construction power line involve land ownership and tenure areas, specifically Crown lands where aboriginal communities have traditional resource use and/or Treaty Land Entitlement (TLE) selections. The proposed sites fall within the Fox Lake RMA. The proposed sites for the construction camp, construction power station and 138 kV construction power line will not affect any existing Reserve lands, or other TLE lands. Fox Lake Cree Nation has selected the site of the proposed Keewatinoow Converter Station as parcel under their TLE. Manitoba Hydro will review further and have discussions with the affected First Nation and the Provincial Government regarding a transfer arrangement in order to provide Manitoba Hydro with the permanent right to access, use, and maintain its facility. Manitoba Hydro will acquire the property rights for the remainder of the proposed developments associated with the Keewatinoow converter station, including the construction camp and the construction power station site from the Crown (excluding mineral rights), as well as an easement via Crown land reservation for a separate 60 m wide right-of-way for the construction power line. **No further effects** on adjacent property are expected as a result.

The relative isolation and limited development of the area and lack of residences surrounding the Keewatinoow Converter Station site and associated facilities effectively means that there is no potential for any adverse nuisance effects (i.e., noise, lighting and dust). Construction equipment noise will be temporary and intermittent in nature. Manitoba Hydro will potentially use implosives for splicing conductors together during construction activities. **No further effects** on surrounding property at Keewatinoow are expected.

Mitigation Measures

Measures to mitigate or minimize project-related effects include the following:

- The converter station site will be watered, as required, to keep dust to a minimum. Construction wastes generated at the converter station site will be stored on-site in suitably secured areas and containers, and will be transported off-site to appropriately licensed disposal facilities.
- The potential use of implosives for splicing conductors will require advance notice being given to stakeholders and local authorities (Manitoba Conservation, the RCMP and the Town of Gillam) at the start of this activity at the converter station site.

- Proper maintenance and inspection procedures of construction equipment will serve to control noise levels.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Commercial Resource Use

Mining

The development of the proposed Keewatinoow Converter Station, construction camp, construction power station and construction power line **will not have an adverse effect** on any mining claims and mineral leases. As such, no mitigation measures are required.

Identified borrow source locations have been identified by Manitoba Hydro as potential granular sources for project use. Manitoba Hydro is expected to submit quarry lease applications to the Mines Branch for all identified source locations.

Resource Harvesting

Minor disruption to resource harvesting activities (i.e., hunting, trapping) could be temporarily experienced in the area of the proposed Keewatinoow Converter Station, construction camp, and construction power station due to noise and dust associated with clearing and construction activities. The large number of workers in the area during the period of construction could also contribute to a potential increase in disturbance to trapping activities from noise and dust due to increased traffic (i.e., Trapline 5 of the Fox Lake RTL). ATK input further identified concerns with respect to impacts from construction (i.e., roads, access routes, transmission lines) on wildlife and noise from construction scaring away fur-bearing animals affecting both hunting and trapping. Concern was also expressed that increased hunting and fishing from outsiders during this period may lead to a decrease in the ability of Fox Lake members to hunt and fish. Anticipated effects on these resource uses from construction are considered **negative, small, limited (site), and short-term in duration**. There will be no adverse effects on other resource uses in the area from site construction activities.

An existing 138 kV transmission line (KN36) runs from the Kelsey G.S. to the Limestone construction power substation. From this point, a new 31 km (approximately) extension will be routed to the site of the new construction power substation located near Keewatinoow. The new extension will cross two registered trap lines, one each within the Split Lake and Limestone RTLs respectively. In addition to Fox Lake, TCN expressed concerns with respect to the Project,

including: right-of-way clearing affecting animals from an increase in poachers; potential interference with aboriginal rights to hunt and trap; impacts on hunting and fishing; encroachment of outside hunters; and increased traffic on the highway/safety issues. Anticipated effects on these resource uses from clearing and construction activities from the extension of the construction power line in any one area are considered **negative, small, local, and short-term in duration**. Winter construction is concentrated in months in which outfitting activity (e.g., big game hunting) is limited by closed hunting seasons. Outfitters in the project area have been apprised of the project through the public consultation program. The new route extension for the 138 kV power construction line does not cross any outfitter allocations areas. As such, there is **no potential for any effects**.

Mitigation Measures

Measures to mitigate or minimize project-related effects include the following:

- Manitoba Conservation will be notified of work activity schedules in advance. Work permits will be obtained for all project activities on provincial Crown lands.
- Manitoba Hydro will consult further with Fox Lake and Tataskweyak Cree Nations with respect to addressing resource-related interests and concerns.
- Construction personnel will be prohibited from hunting and fishing wildlife (big game, furbearers, birds, fish) on Project sites, including related access routes and borrow areas.
- Clearing and construction activities will occur during the winter to lessen disturbance to resource use activities (i.e., hunting, trapping).
- Trappers will be notified as to the schedule for clearing and construction activities in advance.
- Manitoba Hydro's practice is to provide reimbursement to registered trapline holders for fur harvest losses during the periods of clearing and construction based on current trapper compensation policies.
- Activities will be carried out in a manner that is both compatible with designated areas or that takes care to avoid any unnecessary disturbance to the natural landscape or damage outside of required footprints and other disturbed/developed areas (e.g., borrow areas).
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.

- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Recreation and Tourism

Parks and Conservation Lands

Potential impacts are generally associated with disturbance effects, including access, and visual and aesthetic effects. Issues of concern include: noise and traffic associated with construction activities, increased access and intrusion on scenic landscapes, river crossings, and other aesthetic natural areas that are important to local residents, tourist operators and visitors.

The preferred sites for the Keewatinoow Converter Station, construction camp, and construction power station are located within the southwestern edge of the Cape Churchill WMA. Discussions with Manitoba Conservation representatives responsible for wildlife management areas have recognized that the Water Power Reserve area used by Manitoba Hydro was to be excluded from the Churchill WMA as part of further plans for increased protection within the WMA or for new protected lands in this area (D. Wotton, pers. comm. with G Suggett, Manitoba Conservation, November 24, 2010). The construction of the proposed Keewatinoow Converter Station, construction camp, and construction power station **are not expected to adversely affect** this designated WMA given this exclusion.

The 138 kV construction power line will also cross through a short distance of the Cape Churchill WMA (approximately 14.5 km). There is potential that the proposed construction power line will have an adverse effect on the WMA; it is considered low given the short distance involved and the proximity to other existing infrastructure within Manitoba Hydro's Water Power License and Reserve areas. There are limited adventure travel and eco-tourism (ATE) activities within the Project area. Rivers Run Wild offers canoe trips on a number of northern rivers, including the Limestone River. The Limestone River is crossed by the final preferred route for the 138 kV construction power line north of the Limestone G.S. The anticipated effects of the construction power line on the WMA and ATE activities are considered to be **negative, small, local, and short-term in duration** for the clearing and construction phases of the project.

Lodges, Campgrounds and Recreational Areas

Construction activities for the development of the Keewatinoow Converter Station, construction camp, construction power station, and construction power line **are not expected to result in adverse effects** on recreational resources, including lodges and cottages, in the area.

Mitigation Measures

Measures to mitigate or minimize project-related effects include the following:

- Tourism operators and recreational resource users will be notified in advance as to the schedule for clearing and construction, including requirements for temporary construction access. Information signs and the placement of warning markers will be used to identify the new rights-of-way.
- Clearing and construction activities will be carried out in a manner that takes care to avoid any unnecessary disturbance and to protect the natural landscape surrounding work activity sites; activities will be conducted to prevent any unnecessary damage outside the required footprints and other disturbed/developed areas (e.g., borrow areas).
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Infrastructure Facilities

Potential construction-related impacts for the development of the Keewatinoow Converter Station, construction power station, and construction camp on area infrastructure will be principally confined to the area highways/roads and railway systems. Shipping of construction materials by road is expected to originate from Winnipeg, Alberta and Ontario (through Winnipeg) via PTH 6, PTH 10, PTH 39, PR 391, PR 280, PR 290 and the Conawapa access road. All the above roads are rated to RTAC loading (allowing for the heaviest Gross Vehicle Weights [GVW]) with the exception of PR 280 and PR 290 which are rated to A1 loading (B1 routes allow the lightest loads). Trucks can exceed the weight limits set by the Province by applying for and receiving an overweight truck permit (the cost is based on the damage the overweight load is expected to cause). 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. Weight restrictions on the existing access road are likely governed by bridge and culvert loading (MMM Group Limited, 2011b).

Construction material (e.g., aggregate, concrete) and equipment deliveries will be most frequent during site preparation and installation of site foundations over the course of site construction. During this period, trucked granular and other material sources (i.e., concrete aggregate, stone) and equipment deliveries for the converter station will occur on a regular basis. These materials will be hauled and/or placed by semi-truck or rock truck for durations ranging from 1 month to 18

months depending on the type of material (e.g., concrete aggregates hauled over 18 months). The majority of material sources for Keewatinoow will be sourced and shipped from Winnipeg. Raw materials for concrete will be batched on-site using cement shipped directly to the site from out of Province. Other material sources and equipment (i.e., reinforcing steel, electrical systems) will be sourced and shipped from either Winnipeg or out of province/country. Construction traffic noise will involve various pieces of equipment moving and placing soil and the hauling and placing of granular material to the site. Earthmoving equipment is expected to operate 24 hours a day, weather permitting, 7 days a week, for the construction period.

It is expected that rail deliveries of equipment and materials for the Keewatinoow converter station site will be required during the construction period. The items to be shipped by rail over the construction period include: converter transformers (14); station service (3); and dc smoothing reactor coils (7). Weights of materials to be shipped by rail range from approximately 15.8 MT for the station service equipment to 256 MT for the converter transformers (per unit). Some of the electrical system components to be transported by rail for Keewatinoow exceed the weight limits of the CN Rail network (MMM Group Limited, 2011b). Further discussion between Manitoba Hydro, CN Rail, and Omni-Trax (owners of Hudson Bay Railway), suppliers of heavy duty rail cars, and the manufacturers of the identified components will be required on the logistics of transporting these items. The deliveries of all heavy items would be undertaken at low speeds on the HBR main line and would be subject to advance scheduling notice and coordination with Omni-Trax officials to ensure the impact on day-to-day operations, particularly passenger rail operations, are minimized. **No related adverse effects** on usage of the HBR main line are expected.

Construction labour traffic levels will involve a peak workforce of 574 persons during the period of maximum construction activities (Year 3). A Traffic Impact Study related to construction of the converter station and associated facilities was undertaken separately to determine what effects construction traffic will have on the level of service of area roadways. The total daily traffic volumes are expected to be within the acceptable design capacities, as defined by MIT, of PR 280 and PR 290 for the majority of the construction season. During peak construction times, however, it is anticipated that the design capacity of a five to six kilometre section of PR 280 just east of Gillam (determined to be 500 vpd) could be exceeded by just 35 vpd. As these peak volumes are only expected over a relatively short time during the construction period, and as the actual carrying capacity of PR 280 would be well beyond 500 vpd, the increased construction traffic volume resulting from Bipole III is not considered to warrant any significant road upgrades on this section of road, or any other provincial roads in the Keewatinoow study area. With respect to the Conawapa access road, it was primarily designed to cater for large volumes of heavy vehicles, and as such no capacity concerns exist. Monitoring for potential safety and maintenance issues, to obtain actual road trips generated on PR 280, and implementation of appropriate design speeds and traffic signage along the Conawapa access road were recommended (MMM Group

Limited, 2011b). **Any adverse effects are expected to be fully mitigated** through regular monitoring of road and traffic conditions.

The existing 138 kV transmission line (KN36) that runs from the Kelsey G.S. to the Limestone construction power substation and its approximate 31 km extension to the site of the new construction power substation located near Keewatinoow involves crossing the same types of infrastructure, including an existing crossing of PR 280, a new crossing of PR 290, and the existing HBR line to Churchill. Given the presence of other existing infrastructure in the area, including hydro-related (i.e., proximity to other hydro-related works within Manitoba Hydro's Water Power License and Water Power Reserve areas), the anticipated effects for clearing and construction **are considered to be negligible**.

Mitigation Measures

Construction activity and vehicle movement will be subject to Manitoba Hydro's environmental protection practices for station construction (Manitoba Hydro, 2011). 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.
- All related movements will be subject to regulations governing load restrictions and transport of dangerous goods.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

7.2.2.2 Construction Site Decommissioning

Potential project-related effects from construction site decommissioning are associated with activities related to removal/reclamation of Manitoba Hydro and Contractor work areas, borrow areas, and excavated material disposal areas (i.e., earth and rock materials excavated during

borrow area development and site preparation not reused in site construction or borrow area rehabilitation). Following the application of mitigation measures, **anticipated effects are expected to be positive, small, limited to site/footprint and the local area, and medium-term in nature.**

Mitigation Measures

Mitigation measures to address site decommissioning of various Keewatinoow facilities are subject to Manitoba Hydro's standard protocols and guidelines (Manitoba Hydro, 2011). Timing of decommissioning and clean-up up some temporary facilities (e.g., construction camp, construction power station, borrow areas, etc.) may be subject to future development requirements (e.g., Conawapa Generating Station). Mitigation measures include those listed in Section 7.1.1.2 and below:

- Rock filled berms will be placed at the toe of the excavated material disposal area to prevent erosion. At the close of construction, cover the placement area with salvaged organics and soils to provide an erosion resistant surficial layer and to promote re-growth of natural vegetation.

All clean-up and rehabilitation activity for Keewatinoow temporary facilities will also be subject to the requirements of Project-specific Environmental Protection Plans.

7.2.2.3 Operations and Maintenance

Land Tenure and Property Ownership

No adverse effects on acquired property and existing land uses are anticipated from the continued operation and maintenance of the Keewatinoow Converter Station, construction camp, and construction power site as they will all be located within their developed footprints. **No additional effects** from operation and maintenance on adjacent properties are likely beyond the required facility boundaries. Following the completion of construction for the converter station, the sites of the construction power station and camp are likely to be maintained for future development purposes.

As with construction-related concerns, operations and maintenance could potentially involve a variety of nuisance effects, including those associated with traffic, noise, lighting, litter and dust. The potential for adverse effect is low given the lack of nearby residential development. The converter station is expected to include a total staff operating compliment in the order of 42 persons and will likely be manned on a 24 hour basis. The number of staff on-site will be the greatest during the daytime period. Anticipated effects associated with the converter station site **are considered to be negligible**.

For the majority of its length, the 138 kV construction power line will pass through relatively isolated areas with limited development. The proposed right-of-way crosses through the municipal boundaries of the Town of Gillam, a portion of TCN's and Fox Lake's RMAs (as well as Fox Lake's intensive land use area), and the Cape Churchill WMA.

Mitigation Measures

Measures to mitigate or minimize project-related effects include the following:

- Discussion will be required with the Fox Lake Cree Nation and the Provincial government regarding a transfer arrangement in order to provide Manitoba Hydro with the permanent right to access, use and maintain the Keewatinoow converter station, construction camp, construction power station, and construction power line.
- Proper maintenance and inspection procedures of construction equipment will serve to control noise levels.
- Vehicular traffic to the station sites will be limited to normal operations or periods of major maintenance activity.
- Site lighting design will focus onto the site and minimize effects on surrounding lands.
- Dust control measures will continue to be applied as required and all normal domestic waste will be properly collected, transported off-site and disposed of.
- Station sites will be fenced and gated for security and public safety.

Commercial Resource Use

Resource Harvesting

The presence of Keewatinoow infrastructure facilities will alter the landscape as long as they are in operation. The locations selected for development can serve to avoid or reduce adverse visual or aesthetic effects to incremental levels. The converter station and construction camp are both remotely located along the Conawapa access road. The construction power station will be located within a partially cleared footprint for aggregate storage also alongside the Conawapa access road. Site development may potentially reduce the aesthetics of trapping in the area. No additional access is required to these facilities, other than onto the sites, given their proximity to the access road. Any traffic associated with the operation and maintenance of these facilities will be accommodated using the existing provincial road network and access road. Effects on existing resource use are considered to be **negative, small, local, and medium-term in duration** from the operation and maintenance of the Keewatinoow Converter Station, construction camp, and construction power station.

The cleared right-of-way for the 138 kV construction power line may create some additional opportunities for access and may potentially reduce the aesthetics of trapping and other resource harvesting and potentially result in disturbance effects. ATK input from Fox Lake and TCN identified concerns with respect to: right-of-way clearing leading to overharvesting and poaching; potential interference with aboriginal rights to hunt and trap (including traditional hunting grounds); encroachment of outside hunters; and the increase in traffic related to highway/safety issues. Anticipated effects on resource harvesting are expected to be **negative, small, local, and medium-term in duration**. The route for the 138 kV power construction line does not cross any outfitter allocations areas. As such, **there is no potential for any effects**.

Access related to the maintenance of the new construction power line (KN36) will be limited to existing infrastructure and the development of seasonal trails for winter work as much as possible. The access trails on transmission rights-of-way will be limited to seasonal trails. Provision of new access opportunities could potentially result in an improvement in accessibility to two traplines in the area, one in the Split Lake RTL and one in the Fox Lake RTL, north and south of the Nelson River. A positive effect associated with increased access to the resource is the potential to increase the fur harvest or big game taken which would be desirable (from an income perspective). Alternatively, increased access by the presence of the rights-of-way could contribute to overharvesting of the resource by other resource users.

Mitigation Measures

Measures to mitigate or minimize the effects of project-related impacts include the following:

- Manitoba Hydro will consult further with Fox Lake and Tataskweyak Cree Nations with respect to addressing resource-related interests and concerns.
- Trappers will be notified as to the schedule for operation and maintenance activities in advance.
- Activities will be carried out in a manner that is both compatible with designated areas or that takes care to avoid any unnecessary disturbance to the natural landscape or damage outside of required footprints and other disturbed/developed areas (e.g., borrow areas).
- Where issues of increased access through cleared rights-of-way are of potential concern to a First Nation, community or stakeholders, Manitoba Hydro will consider the development of access management plans to address resource-related interests.

Recreation and Tourism

Parks and Conservation Lands

No adverse effects are anticipated from the operation and maintenance of the Keewatinoow Converter Station, construction camp or the construction power station on the Churchill WMA

given their locations and the pending exclusion of WMA lands proposed by Manitoba Conservation from Manitoba Hydro's Water Power Reserve area (see Section 7.1.2.1).

Lodges, Campgrounds and Recreational Areas

In some instances, the physical appearance of a converter station and associated facilities may present visual or aesthetic concerns in natural environmental settings or in other sensitive circumstances. In the case of the proposed Keewatinoow Converter Station, the site is removed just north off of the Conawapa access road. The site of the construction power station is utilizing a previously cleared footprint for an aggregate stockpile. Adverse visual or aesthetic effects anticipated from the operation and maintenance of the converter station site, construction power station, and construction camp on recreational resources are expected to be minimal. The physical presence of the facilities will alter the landscape for as long as they are operational. Siting criteria for station and other facility footprints can help to minimize potential adverse aesthetic effects in sensitive locations and were applied for infrastructure associated with Keewatinoow. Development in relatively isolated areas and proximity to other existing infrastructure and facilities also serves to lessen potential aesthetic concerns. Anticipated effects **are considered to be negligible**.

The proposed station site and construction camp are located in the vicinity of Manitoba Hydro's proposed site for the Conawapa G.S. site, and are in proximity to the Conawapa access road and other existing transmission line rights-of-way within Manitoba Hydro's existing Water Power Reserve area between the Kettle and Limestone generating stations. Given the relatively remote and isolated location, the anticipated effects associated with these developments **are considered to be negligible.**

The Limestone River is crossed by the final preferred route for the 138 kV construction power line north of the Limestone G.S. One ATE operator, Rivers Run Wild, offers canoe trips on the Limestone River. The most direct land use effect during the operations and maintenance phase is the proposed construction power line's permanent physical presence along new right-of-way. The construction power line will be a net addition to the visual landscape and any adverse effect will be incremental in nature, particularly in areas where other infrastructure, including an existing road crossing, is present. Anticipated effects from the operational phase of the extension of an existing 138 kV transmission line (KN36) for construction power are considered **negligible, small, limited (footprint), and medium-term in duration**.

During the operation and maintenance stage, concerns can include potential effects related to disturbance (i.e., changes in aesthetics from increased access). These concerns are consistent with Manitoba Hydro's previous experience with other transmission line projects in similar circumstances (e.g., Wuskwatim Transmission Project). Anticipated effects are considered to be **negative, small, local, and medium-term in duration**.

A change in aesthetics as a result of increased access could have the potential to indirectly affect an operator client's enjoyment of an area, in particular if the expectation is to experience an excursion in a natural wilderness setting. This in turn could potentially result in a reduction in the number of clientele choosing to use the areas in which that operator offers services. The extent of this effect would also be dependent on the perceptions of the tourists and the extent to which certain areas are used compared to others. Anticipated effects may be considered to be **negative, small, local, and medium-term in duration**.

Mitigation Measures

Application of Manitoba Hydro's environmental protection measures are designed to limit impacts on the natural environment, particularly in boreal wilderness areas, as much as possible. Adherence to measures outlined in the Project specific EnvPP (Manitoba Hydro, 2011) will tend to protect the same environmental qualities which are valued for outdoor recreation purposes. Measures to mitigate or minimize the effects of project-related impacts include the following:

- Work permits from Manitoba Conservation will be obtained for all project activities occurring on provincial Crown lands.
- Tourism operators will be notified in advance as to the schedule for operation and maintenance activities.
- Operation and maintenance activities will be carried out in a manner that takes care to avoid any unnecessary disturbance and to protect the natural landscape surrounding work activity sites; activities will be conducted to prevent any unnecessary damage outside the required footprints and other disturbed/developed areas.

Infrastructure Facilities

During operations and maintenance, the Keewatinoow Converter Station will be operated on a 24-hour basis, seven days a week with a workforce of approximately 42 staff. Staff will be required to travel to the site on a regular basis, as is the current practice for other converter stations. Operation and maintenance concerns could potentially involve the area road network and rail system. Following construction, vehicular movements will be limited to periodic routine inspection and maintenance activities once the station is operating. Potential effects from normal operation and maintenance activities **are expected to be negligible**. Following the completion of construction for the converter station, the sites of the construction power station and camp will likely be maintained for future development purposes.

Mitigation Measures

Potential related effects will be mitigated through adherence to Manitoba Hydro's environmental protection practices and standard operating procedures and protocols (Manitoba Hydro, 2011).

Manitoba Hydro intends to meet all safety and operating requirements associated with this project.

7.2.3 Riel Converter Station

7.2.3.1 Construction

Land Tenure and Property Ownership

Property Impacts

The site for the Riel Converter Station involves private land ownership and tenure. The proposed site for the converter station will not affect any existing Reserve lands, or other TLE lands. The property required for the full development of the Riel Converter Station has been obtained by Manitoba Hydro (excluding mineral rights). Other private properties adjacent to or in the immediate vicinity of the Riel Site have been purchased through negotiated agreements as part of a previous project (i.e., the Riel Reliability Improvement Project). In addition to these properties, two parcels of Crown land were acquired from the Province of Manitoba (excluding mineral rights). **No further effects** are expected on property ownership or on adjacent properties in the area and beyond the existing station site boundaries as a result of the Bipole III Project.

Residential Development

Construction-related effects on area residents could potentially involve nuisance effects, including access, noise, lighting and dust. Construction equipment noise will be temporary and intermittent in nature. **No adverse effects** are expected on the surrounding area. The acquisition of properties in the immediate vicinity of the Riel Converter Station by Manitoba Hydro has minimized the potential nuisance effects on neighbouring properties. Manitoba Hydro has indicated that the purchased residences will be removed and the properties offered up for sale.

Manitoba Hydro will potentially use implosives for splicing conductors together during construction activities. Effects on the surrounding areas at Riel are expected to be **negative, small, local, and short-term in duration**.

Mitigation Measures

Wherever possible, these effects are minimized by site planning and design and adherence to Manitoba Hydro's standard environmental protection guidelines related to facility construction practices.

Manitoba Hydro's Project environmental protection plan (Manitoba Hydro, 2011) will also be applied. Mitigation measures include:

- Overall aesthetic appearance of the converter station will be addressed through site design and use of landscaping techniques, including placement of berms and strategic planting of trees where possible.
- Proper maintenance and inspection procedures of construction equipment will serve to control noise levels.
- The site will be watered, as required, to keep dust to a minimum. Construction wastes generated on-site will be stored on-site in suitably secured areas and containers, and will be transported off-site to appropriately licensed disposal facilities.
- The use of implosives for splicing conductors will require advance notice being given to adjacent landowners, local authorities (R.M. of Springfield, Manitoba Conservation, the RCMP and the City of Winnipeg) at the start of this activity on-site. An air horn will be sounded every time a charge is set off as a warning. Manitoba Hydro will also post signs to advise travelers on PR 207 of the construction and noise for the specific periods when using implodes.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.

Recreation and Tourism

Parks and Conservation Lands

The site of the Riel Converter Station will not have any potential for effects on either designated park areas or conservation lands or other Crown lands. The Riel Site falls within the Peguis First Nation Notice Area. Under agreement with the Province of Manitoba, if Crown land is identified and requested for acquisition for project development, the province has agreed to provide that information to Peguis First Nation for their review. The site of the Riel Converter Station is already privately owned by Manitoba Hydro. As such, **no adverse effects** are expected from the construction phase for the Riel Converter Station.

Lodges, Campgrounds and Recreational Areas

The project site was previously in agricultural use and is now under development as part of the previously licensed Riel Reliability Improvement Project, and is adjacent to other existing transmission lines and rights-of-way. Although the adjacent Floodway and associated berm

lands are used for formal and informal recreational activities, construction activities for the converter station are **not expected to have any adverse effects** on recreational resources.

Infrastructure Facilities

Potential construction-related impacts from the development of the Riel Converter Station on area infrastructure will be principally confined to the area highways, municipal road allowances, railway, area drainage systems, and Deacons Reservoir. Construction-related vehicular traffic will be confined effectively to PR 207, PTH 15 and PTH 101 for the converter station, all of which are designed to highway traffic standards and maintained by the Province. All routes between Winnipeg and the Riel Site are suitable for RTAC loading (i.e., routes allowing the heaviest Gross Vehicle Weights [GVW]), with PR 207 having recently been upgraded. This upgrade was funded by Manitoba Hydro to increase the allowable weight limit of vehicles accessing the Riel Site for the Riel Reliability Improvement Project (MMM Group Limited, 2011b).

Over the course of site construction, material (e.g., concrete, building materials) and equipment for Riel and its associated ground electrode will be sourced and shipped from Winnipeg or from out of province/country (in the case of electrical systems). Construction traffic noise will involve semi-trailers moving pieces of equipment to the sites and tracked vehicles operating on the sites.

It is expected that rail deliveries of equipment and materials to the Riel site will be required during the construction period. The items to be shipped by rail over the construction period include: synchronized rotors (4) and stators (4); synchronous unit transformers (4); converter transformers (14); station service (3); and dc smoothing reactor coils (7).

Weights of materials to be shipped by rail range from approximately 15 MT for station service to 256 MT for converter transformers (per unit). Some of the electrical system components to be transported by rail for Riel exceed the weight limits of the CN Rail network (MMM Group Limited, 2011b). Further discussion between Manitoba Hydro and CN Rail, suppliers of heavy duty rail cars, and the manufacturers of the identified components will be required on the logistics of transporting these items. The deliveries of all heavy items would be undertaken at low speeds and would be subject to advance scheduling notice and coordination with CN officials to ensure impacts on day-to-day operations, including passenger rail operations, are minimized. **No related adverse effects** on the usage of the CN main line are expected. The rail spur crossing of PTH 15 to the Riel Converter Station will be decommissioned following construction and will subsequently only be used very infrequently during site operations and maintenance.

Construction labour traffic levels are expected to be within the design capacity of all access routes to the converter station site, involving a peak construction workforce of 304 persons during the period of maximum activity (Year 3). A Traffic Impact Study related to construction of the converter station and associated facilities was conducted to determine what effects construction will have on the levels of service on routes in the area. Construction traffic volumes are expected

to be higher on PR 207 north of the Riel Converter Station site and on PTH 15 west of PR 207. This will result in a higher volume of traffic turning left from PR 207 onto PTH 15. Manitoba Infrastructure and Transportation recently upgraded PTH 15 between PTH 101 and PR 207, including signalization at the PTH 15/PR 207 intersection. Any concerns associated with additional Bipole III traffic, particularly critical left-turn movements from PR 207 and PTH 15 are likely alleviated as a result. Considering these works and anticipated construction traffic volumes, no additional works on the provincial road network are considered necessary (MMM Group Limited, 2011b). Any increase in construction traffic is expected to be accommodated within existing roadway infrastructure.

The development of the proposed converter station is not expected to adversely affect area infrastructure facilities. Site development and access for the converter station will be subject to provincial review and approval with respect to development restrictions affecting the PR 207 control zone. Construction-related effects are expected to be mitigable in all cased and **are considered negligible**.

No adverse effects on the surrounding land drainage systems are anticipated due to the development of the Riel Site, as any 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.

Normal construction-related activities at the Riel site are **not expected to have any adverse effects** on water quality associated with the City of Winnipeg's Deacon Water Supply Reservoir. Contamination issues with respect to dust control, site-related surface drainage, groundwater and wastewater treatment were avoided or mitigated through adherence to standard environmental protection practices for construction and design protocols for operation (e.g., oil spill containment assessment procedures, fire suppression) as part of initial site development under the Riel Reliability Improvement Project.

7.2.3.2 Operation and Maintenance

Land Tenure and Property Ownership

Property Impacts

No adverse effects on acquired property and existing land uses are anticipated from the continued operation and maintenance of the Riel Converter Station site once fully developed. No additional impacts on adjacent properties are likely beyond the required facility boundaries and supporting infrastructure (i.e., rail spur connection, construction power station). Following completion of construction of the Riel Converter Station, the associated rail spur connection will remain for future use when or as required. The construction power site will be disconnected from Riel but will remain in its current location to serve customer load in the Dugald area.

Residential Development

The location of the Riel Site minimizes the requirement for aesthetic enhancements. However, aesthetics relating to the overall appearance of the site from publicly accessed roadways (PR 207) and lands will be addressed through landscaping techniques including placement of earth fill berms and strategic plantings of trees where possible around the perimeter of the site where they do not pose a hazard to transmission lines. These measures will provide a break in sight lines and will serve as a noise barrier. Site design called for the 230 kV and 500 kV switchyards to be set back from PR 207. These measures will improve the aesthetics of the site and will take into consideration the technical and functional requirements of the site. Tree plantings will be maintained at a safe distance from all overhead lines. Earth fill berms will not be constructed where their presence would prove detrimental to the requirements for site drainage. The berms are expected to be flat enough to facilitate grass cutting or, alternatively, planted with native grasses to minimize future maintenance. Site access will be in accordance with MIT design requirements and designated on-site parking and material storage areas will be provided. Aesthetic requirements with respect to the buildings located within the Riel Site will be minimal due to the location and the industrial nature of the site.

The success at which Manitoba Hydro has purchased properties from landowners will minimize the aesthetic effect associated with the Riel Converter Station on rural neighbouring locations. The routing of the 500 kV HVdc transmission line to the Riel site will be net addition to the visual landscape; however, it will be located within an existing right-of-way with another existing transmission line. As such, the aesthetic effect will be incremental in nature. Given the location of the Riel Converter Station and the use of surrounding properties, including the Deacon Reservoir, the City of Winnipeg Water Treatment Plant and the Red River Floodway, and the presence of rural residential development to the north of the site, the aesthetic effect associated with development of the converter station are considered to be **negative, small, local, and medium-term in duration**.

As with construction-related concerns, operations and maintenance potentially will involve a variety of nuisance effects, including those associated with traffic, noise, lighting, litter and dust. The converter station is expected to include a total operating staff compliment of 45 persons and will likely be manned on a 24 hour basis. The number of staff on-site is expected to be the greatest during the daytime period. Any anticipated effects associated with the converter station site on nearby rural residential development are expected to be **negative, small, limited (site), and medium-term in duration**.

Mitigation Measures

Wherever possible, these effects are minimized by site planning and design and adherence to Manitoba Hydro's standard environmental protection guidelines related to facility operating

procedures and the Project environmental protection plan (Manitoba Hydro, 2011). Mitigation measures include the following:

- Overall aesthetic appearance of the converter station will be addressed through site design and use of landscaping techniques, including placement of berms and strategic planting of trees where possible.
- Vehicular traffic to the site will be minimal and no rail service is expected during normal operations.
- Site lighting design will focus onto the site and minimize effects on neighbouring properties.
- Dust control measures will continue to be applied as required and all normal domestic waste will be properly collected, transported off-site and disposed of.
- The site will be fenced and gated for security and public safety.

Recreation and Tourism

Parks and Conservation Lands

The site of the Riel Converter Station will not have any potential for effects on either designated park areas or conservation lands, or other Crown lands. The site of the Riel Converter Station is already privately owned by Manitoba Hydro. As such, **no adverse effects** are expected from operation and maintenance phases for the Riel Converter Station.

Lodges, Campgrounds and Recreational Areas

No additional disturbance effects are expected on recreational resources from operation and maintenance of the Riel Converter Station once fully developed.

Infrastructure Facilities

During operations and maintenance, the Riel Converter Station will be operated on a 24-hour basis, seven days a week. Following construction, a workforce of approximately 45 people from Manitoba Hydro will be on-site on a regular basis, as is the current practice for other converter stations. As with construction, operation and maintenance concerns could potentially involve the area highways, railway and drainage systems and Deacons Reservoir. Potential effects from normal operation and maintenance activities **are expected to be negligible**.

Mitigation Measures

Potential related effects will be mitigated through proper site planning and final design parameters, and through adherence to standard operating procedures and protocols and the

Project environmental protection plan (Manitoba Hydro, 2011). Manitoba Hydro also intends to meet all safety and operating requirements associated with this Project.

- The overall appearance of the Riel Station site during operations from publically accessible roadways will be addressed through landscaping, including placement of earth berms and planting of trees around the perimeter of the site, without creating hazards to existing overhead transmission lines or interfering with site or adjacent drainage works.

7.2.4 Ground Electrodes and Lines

7.2.4.1 Construction

Keewatinoow Ground Electrode and Line

Land Tenure and Property Ownership

Property Impacts

As with other proposed infrastructure for Keewatinoow, the preferred ground electrode site falls within the Fox Lake RMA. The addition of a ground electrode site and, potentially the feeder line connection, will involve the acquisition of the required property from the Crown (excluding mineral rights). The scale of construction for the ground electrode will be substantially smaller than for the converter station site. Manitoba Hydro is planning on routing the feeder line in an existing cleared 30 m right-of-way. A 40 m wide right-of-way will be required for the feeder line, necessitating the acquisition of an additional 10 m. No existing reserve property or TLE lands are affected.

The relative isolation and limited development of the area and lack of residences in the vicinity of the Keewatinoow ground electrode and associated feeder line effectively means that there is no potential for any adverse nuisance effects (i.e., noise, dust). Construction equipment noise will be temporary and intermittent in nature. **No additional effects** on adjacent properties are likely beyond the required site boundary from clearing and construction.

Mitigation Measures

Measures to mitigate or minimize project-related effects include the following:

- Discussion will be required with Fox Lake Cree Nation and the Provincial government regarding a transfer arrangement in order to provide Manitoba Hydro with the permanent right to access, use and maintain the ground electrode and connecting feeder line.
- All related movements of construction materials and equipment deliveries will be subject to regulations governing load restrictions and transport of dangerous goods.

- Dust generated from construction activities will be kept to a minimum through site watering; construction waste will be properly collected, transported off-site and disposed of.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Commercial Resource Use

Mining

The development of the proposed Keewatinoow Converter Station ground electrode and feeder line **will not have an adverse effect** on any mining claims and mineral leases. As such, no mitigation measures are required.

Resource Harvesting

Minor disruption to resource harvesting activities (i.e., trapping, hunting) could be temporarily experienced in the area of the proposed Keewatinoow ground electrode and associated feeder line due to noise and traffic associated with clearing and construction activities. The presence of a larger workforce, at least temporarily in the area, and noise and dust from increased traffic could potentially cause disturbance to trapping activities (i.e., Trapline 5 of the Fox Lake RTL). ATK input further identified concerns with respect to impacts from construction (i.e., roads, access routes, transmission lines) on wildlife and noise from construction scaring away fur-bearing animals affecting both hunting and trapping. Concern was also expressed that increased hunting and fishing from outsiders during this period may lead to a decrease in the ability of Fox Lake members to hunt and fish. Anticipated effects on this resource use from construction are considered **negative, small, limited (site), and short-term in duration**. There will be no adverse effects on other resource uses in the area from site construction activities.

The construction phase for the preferred ground electrode site could also potentially have disturbance effects on the aesthetics of trapping in the area. Given the relative isolation of the selected ground electrode site the potential effects are considered to be **negative, small, limited (site), and short-term in duration**.

Mitigation Measures

Measures to mitigate or minimize project-related effects include the following:

- Manitoba Conservation will be notified of work activity schedule in advance. Work permits will be obtained for all work activities on provincial Crown land.
- Manitoba Hydro will consult further with Fox Lake Cree Nation with respect to addressing resource-related interests and concerns.
- Construction personnel will be prohibited from hunting and fishing wildlife (big game, furbearers, birds, fish) on Project sites, including related access routes.
- Trappers will be notified as to the schedule for clearing and construction activities in advance.
- Manitoba Hydro's practice is to provide reimbursement to registered trapline holders for fur harvest losses during the periods of clearing and construction based on current trapper compensation policies.
- Clearing and construction activities will be carried out in a manner that is either compatible with designated areas or that takes care to avoid any unnecessary disturbance to the natural landscape or unnecessary damage outside of required footprints and other disturbed/developed areas (e.g., borrow areas).
- Right-of-way clearing and construction activities will occur during the winter to lessen disturbance to resource use activities (i.e., hunting, trapping).
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Recreation and Tourism

Parks and Conservation Lands

The preferred ground electrode site and the feeder line are located within Manitoba Hydro's Water Power Reserve area on the north side of the Nelson River in the vicinity of other existing infrastructure facilities. Discussions with Manitoba Conservation representatives responsible for wildlife management areas have recognized that the Water Power Reserve area used by Manitoba Hydro is to be excluded from the Churchill WMA as part of further plans for increased

protection within the WMA or for new protected lands in this area (D. Wotton, pers. comm. with G Suggett, Manitoba Conservation, November 24, 2010). The construction of the preferred ground electrode site and associated feeder line **are not expected to adversely affect** this designated WMA given this exclusion.

Lodges, Campgrounds and Recreational Areas

Construction activities for the development of the Keewatinoow preferred ground electrode site and associated feeder line **are not expected to result in adverse effects** on recreational resources, including lodges and cottages, in the area.

Mitigation Measures

Measures to mitigate or minimize project-related effects related to aesthetic changes include the following:

- Activities will be carried out in a manner that takes care to avoid any unnecessary disturbance to protect the natural landscape surrounding work sites and to prevent any unnecessary damage outside required footprints and other disturbed/developed areas (e.g., borrow areas).
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Infrastructure Facilities

Potential construction-related impacts for the development of the Keewatinoow ground electrode site and the associated feeder line on area infrastructure will be principally confined to the area highways and railway systems. No additional roadwork for the ground electrode site is required for construction, other than some likely on-site gravel access roads.

The development of the proposed ground electrode site is not expected to adversely affect area infrastructure facilities. Access to the proposed ground electrode site will be provided by access from the Conawapa access road. The Conawapa access road was primarily designed to cater to large volumes of heavy vehicles, and as such no capacity concerns exist. Weight restrictions on the existing access road are likely governed by bridge and culvert loading (MMM Group Limited, 2011b). Construction-related effects on other area infrastructure are expected to be mitigatble in all cases and **are considered negligible.**

Mitigation Measures

Construction activity and vehicle movement will be subject to Manitoba Hydro's standard environmental protection practices for station construction and the Project environmental protection plan (Manitoba Hydro, 2011). 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.
- All related movements will be subject to regulations governing load restrictions and transport of dangerous goods.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Riel Ground Electrode

Land Tenure and Property Ownership

Property Impacts

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. The required property will be obtained by negotiated purchase agreement. That portion of the ground electrode site will be permanently removed from the land base. The remainder of the land outside the site of the electrode ring within the section can remain in agricultural production (similar to what presently occurs at the Dorsey Station off-site electrode ring).

The preferred ground electrode site falls within the Peguis First Nation Notice Area. Under agreement with the Province of Manitoba, if Crown land is identified and requested for acquisition, the province is to provide the information to Peguis First Nation for their review. In the case of the ground electrode site, private and/or municipal lands are involved. The scale of construction for the ground electrode will be substantially smaller than for the converter station site. Effects on the acquired property of the ground electrode site are expected to be **negative, small, limited (site), and short-term in duration**.

Mitigation Measures

Measures to mitigate or minimize the effects of project-related impacts include the following:

- Manitoba Hydro will consult with the R.M. of Springfield and will comply with all relevant government regulations and By-Laws applicable to project construction activities.

Residential Development

Construction-related impacts associated with the ground electrode potentially involve nuisance effects, including access, noise, and dust. The preferred ground electrode site is located in an area with dense residential development on neighbouring lands (i.e., an area of rural residential development is located in the section of land just to the west of the site). The preferred ground electrode selected has the potential for adverse effects on adjacent residential development. The adverse effects may result from construction equipment noise and will be temporary and intermittent in nature. Given the pattern of adjacent residential development, effects from construction are considered to be **negative, small, limited (site), and short-term in duration**.

Mitigation Measures

Wherever possible, these effects are minimized by site planning and design and adherence to Manitoba Hydro's standard environmental protection measures related to facility construction practices and the Project environmental protection plan (Manitoba Hydro, 2011).

- Maintain an appropriate buffer distance to minimize ground electrode effects on adjacent residential development.
- All related movements of construction materials and equipment deliveries will be subject to regulations governing load restrictions and transport of dangerous goods.
- Dust generated from construction activities will be kept to a minimum through site watering. Construction waste will be properly collected, transported off-site and disposed of.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Recreation and Tourism

Parks and Conservation Lands

The proposed ground electrode site **will not have any potential for effects** on either designated park areas or conservation lands. Manitoba Conservation's Protected Areas Initiative has been working on acquiring Crown land in the R.M. of Springfield. However, the identified ground electrode site is not in the vicinity of their interest area (Dave Wotton Consulting, 2011). The preferred ground electrode site does fall within the Peguis First Nation Notice Area. Under agreement with the Province of Manitoba, if Crown land is identified and requested for acquisition for project development, the province has agreed to provide that information to Peguis First Nation for their review. In this situation, the site of the Riel Converter Station is already privately owned by Manitoba Hydro and the preferred ground electrode site involves private land acquisition.

Lodges, Campgrounds and Recreational Areas

The construction of the ground electrode site **is not expected to have any adverse effect** on the use of recreation resources in the area.

Mitigation Measures

Measures to mitigate or minimize project-related effects related to aesthetic changes include the following:

- Activities will be carried out in a manner that takes care to avoid any unnecessary disturbance to protect the natural landscape surrounding work sites and to prevent any unnecessary damage outside required footprints and other disturbed/developed areas (e.g., borrow areas).
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

Infrastructure Facilities

Construction-related traffic for the preferred ground electrode site will utilize municipal roads as necessary. No additional roadwork for the ground electrode site is required for construction, other than some likely on-site gravel access roads.

The development of the proposed ground electrode site is not expected to adversely affect area infrastructure facilities. Site development and access for the ground electrode will be subject to review and approval with the R.M. of Springfield and MIT with respect to development restrictions. Similarly, **no adverse effects** on surrounding land drainage systems are anticipated from the development of the ground electrode.

Potential related effects will be mitigated through proper site planning and final design parameters through adherence to standard operating procedures and protocols and Manitoba Hydro's Project environmental protection plan (Manitoba Hydro, 2011). Additional measures to mitigate or minimize the effects of project-related impacts include the following:

- Manitoba Hydro will consult with MIT and the R.M. of Springfield and will comply with all relevant government regulations and By-Laws applicable to project construction activities. Manitoba Hydro will notify the appropriate agencies and infrastructure operators as to the schedule for equipment and material deliveries during the period of construction.
- All related movements will be subject to regulations governing load restrictions and transport of dangerous goods.
- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather or winter roads/trails will be utilized whenever possible.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.

7.2.4.2 Operation and Maintenance

Keewatinoow Ground Electrode and Line

Land Tenure and Property Ownership

Property Impacts

Effects on the acquired property from the operation and maintenance of the ground electrode site are expected to occur only when operation is required and are considered to be **negligible, small, limited (site), and medium-term in duration**. **No additional effects** on adjacent lands are expected from the operation of the ground electrode.

The relative isolation and limited development of the area surrounding the preferred ground electrode site effectively eliminates the potential for any adverse nuisance effects. The addition of a ground electrode site and feeder line connection associated with the Keewatinoow Converter Station will not have any adverse effect on residential development.

Any potential for effects from ground electrode operation is limited and would be only when required. The potential for adverse effects from the operation and maintenance of the ground electrode site **are considered to be negligible**.

Mitigation Measures

Measures to mitigate or minimize project-related effects include the following:

- Operation and maintenance activities will be carried out in a manner that takes care to avoid any unnecessary disturbance and to protect the natural landscape surrounding work activity sites; activities will be conducted to prevent any unnecessary damage outside the required footprints and other disturbed/developed areas.
- An appropriate buffer distance will be maintained to minimize any potential effects from operation on adjacent land uses.

Commercial Resource Use

The ground electrode and associated feeder line are both remotely located. Any potential for effects on existing resource use from the ground electrode is limited as it would only be operated when required. As with other facilities discussed, the aesthetics of trapping could potentially be affected. This effect is considered to be **negligible, small, limited (site), and medium-term in duration**.

The right-of-way for the ground electrode line (including the additional 10 m clearing required) may create some additional opportunities for access although such opportunities already exist in the area (i.e., Conawapa access road, other rights-of-way). As with other Project components, ATK input from Fox Lake identified concerns with respect to: right-of-way clearing leading to overharvesting and poaching; potential interference with aboriginal rights to hunt and trap (including traditional hunting grounds); encroachment of outside hunters; and the increase in traffic related to highway/safety issues.

Access related to the maintenance of the ground electrode and feeder line will be limited to existing infrastructure and the development of seasonal trails for winter work as much as possible. As such, anticipated effects are considered potentially **negligible, small, limited (site) and local, and medium-term in duration**. Provision of a new access road to the ground electrode site could potentially result in an improvement in accessibility to Trapline 5, north of the Nelson River, in the Fox Lake RTL, and could result in an increase in the fur harvest from the trapline. The extent is uncertain as other factors could affect the number of animals taken (i.e., fur prices).

Mitigation Measures

Measures to mitigate or minimize project-related effects include the following:

- Manitoba Hydro will consult further with Fox Lake Cree Nation with respect to addressing resource-related interests and concerns.
- Trappers will be notified as to the schedule for operation and maintenance activities in advance.
- Where issues of increased access through cleared rights-of-way are of a potential concern to a First Nation, community or stakeholders, Manitoba Hydro will consider the development of access management plans to address resource-related interests.

Recreation and Tourism

Parks and Conservation Lands

The effects from the operation and maintenance of the ground electrode and associated feeder line are expected to occur on an infrequent basis, and only when required. Given the pending exclusion of Water Power Reserve lands from the Churchill WMA, **no adverse effects are anticipated**.

Lodges, Campgrounds and Recreational Areas

The proposed ground electrode and associated feeder line connection are located in the vicinity of Manitoba Hydro's proposed site for the Conawapa G.S. site, and are in proximity to the Conawapa access road and other existing transmission line rights-of-way within Manitoba Hydro's existing Water Power Reserve area between the Kettle and Limestone generating stations. Once the ground electrode site is cleared for development, the only remaining visual impact once operational will be the presence of a single feeder line connection on-site and will be located in proximity to other existing infrastructure developments. Given the relatively remote and isolated location, the anticipated effects associated with these developments are considered to be **negligible, small, limited (site), and medium-term in duration**.

Mitigation Measures

Measures to mitigate or minimize project-related effects related to aesthetic changes include the following:

- Operation and maintenance activities will be carried out in a manner that takes care to avoid any unnecessary disturbance and to protect the natural landscape surrounding work activity sites; activities will be conducted to prevent any unnecessary damage outside the required footprints and other disturbed/developed areas (e.g., borrow areas).

Infrastructure Facilities

The workforce compliment for operating the Keewatinoow Converter Station will also be responsible for operation and maintenance of the preferred ground electrode and feeder line. Staff will be required to travel to the site on a regular basis. As with construction, operation and maintenance concerns could potentially involve the area roads and rail systems. Following construction, vehicular movements will be limited to periodic routine inspection and maintenance activities once the ground electrode is in place. Potential effects from normal operation and maintenance activities **are expected to be negligible.**

Mitigation Measures

Potential related effects will be mitigated through adherence to Manitoba Hydro's standard operating procedures and protocols and the Project environmental protection plan (Manitoba Hydro, 2011). Manitoba Hydro intends to meet all safety and operating requirements associated with this project.

- 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.

Riel Ground Electrode

Land Tenure and Property Ownership

Property Impacts

Effects from the operation and maintenance of the Riel ground electrode are expected to occur on an infrequent basis, and only when required. Anticipated effects are considered to be **negligible, small, limited (site), and medium-term in duration**.

Mitigation Measures

Measures to mitigate or minimize the effects of project-related impacts include the following:

- Operation and maintenance activities will be carried out in a manner that takes care to avoid any unnecessary disturbance and to protect the rural landscape surrounding work activity sites; activities will be conducted to prevent any unnecessary damage outside the required footprints and other disturbed/developed areas.

Residential Development

Effects from the operation and maintenance of the ground electrode site are expected to occur on an infrequent basis, and only when required. Anticipated effects are considered to be **negative, small, limited (site/footprint), and medium-term in duration** given the development pattern surrounding the preferred site.

Manitoba Hydro undertook a separate consultation process with respect to the southern ground electrode site. The key concerns raised from the public consultations related to EMF effects. These concerns are very likely to arise for any site chosen. As such, Manitoba Hydro is confident that there are no non-mitigable EMF effects related to operation of the ground electrode.

Manitoba Hydro's operating experience to date with the existing Dorsey Converter Station ground electrode line over a period of 30 years in a similarly dense developed area has resulted in no reported problems. Further details on electrical effects are discussed in the Electrical Environment Technical Report (E^{x}ponent®, 2011).

Mitigation Measures

Measures to mitigate or minimize the effects of project-related effects include the following:

- Maintain an appropriate buffer distance to minimize ground electrode effects on adjacent residential development.

Recreation and Tourism

Parks and Conservation Lands

The operation and maintenance of proposed Riel ground electrode site will not have any potential for effects on either designated park areas or conservation lands. As such, **no adverse effects are expected** on parks or conservation lands from operation and maintenance phases for the ground electrode site.

Lodges, Campgrounds and Recreational Areas

Similarly, aside from clearing the site for ground electrode construction, **no adverse visual or aesthetic effects are expected** with the development of the preferred ground electrode site.

Mitigation Measures

Measures to mitigate or minimize project-related effects related to aesthetic changes include the following:

- Activities will be carried out in a manner that takes care to avoid any unnecessary disturbance to protect the natural landscape surrounding work sites and to prevent any unnecessary damage outside required footprints and other disturbed/developed areas.

Infrastructure Facilities

Effects from the operation and maintenance of the ground electrode site are expected to occur on an infrequent basis, and only when required. Effects for area infrastructure **are considered to be negligible**.

Mitigation Measures

Potential related effects will be mitigated through adherence to standard operating procedures and protocols and the Project environmental protection plan (Manitoba Hydro, 2011). Manitoba Hydro intends to meet all safety and operating requirements associated with this project.

7.2.5 Environmental Effects Summary

The environmental effects caused by the Bipole III Project are described for those identified VECs considered important for the assessment of the land use environment. The SSEA and environmental assessment process sought to avoid adverse effects and enhance positive benefits wherever possible and practical. Mitigation measures to avoid, minimize or potentially compensate for adverse environmental effects have been identified for the Project. An expression of environmental effects, recommended mitigation measures and residual effects remaining for the land use VECs are summarized in Table 3 for Project components related to clearing, construction, including construction site decommissioning where applicable, and operations and maintenance activities.

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
HVdc Transmission Line, 230 kV ac Northern Collector Transmission Lines – Clearing, Construction and Operation and Maintenance						
Land Ownership and Tenure	Property and Residential development	Presence or absence Property values Viewscape	Number affected/ concerns Proximity of residences within 270 m	Disturbance effects from line, station or site presence Impairment of aesthetics	**Construction** - Apply compensation policy in place for property owners directly affected, including for any physical damages incurred. Offer purchase of property for residences within 75 m of the HVdc transmission line route. - Consider tower location (tower "spotting") where possible and practical; consider input from landowners during the easement negotiation phase to minimize visual impacts. - Siting in less intensively developed areas and in proximity to other existing infrastructure and facilities can serve to lessen potential aesthetic concerns. - Municipal and local protocols and By-Laws will be observed. In built up areas and other areas where noise and vibration may create undue disturbance, work will be limited to daylight hours in accordance with local noise By-Laws. - Mud, dust and vehicle emissions will be managed in a manner that will ensure safe, continuous public activities in the vicinity of construction sites. - Construction methods and timing will be designed to minimize traffic disruption; equipment and materials will be operated and stored in secure designated areas to ensure public safety. - Care will be taken to ensure that work activities and equipment do not impact upon neighbouring properties, structures or operations. Appearance and general aesthetics of construction areas will be considered during this phase. - Disturbance to adjacent public green spaces or natural areas will be avoided; when facilities are located adjacent to such sites, measures may be designed to make them less obtrusive. - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites;	Physical presence – alteration of landscape Impairment of aesthetics on rural residences

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing. **Operation and Maintenance** - Care will be taken to ensure that operation activities and equipment do not impact upon neighbouring properties. Appearance and general aesthetics of facility footprints will be maintained. - Any physical damages incurred by affected property owners and adjacent landowners are subject to compensation within Manitoba Hydro's existing policies.	
Resource Use	Commercial Resource Use Mining interests, claims and leases Trap lines, outfitter areas, wild rice areas	Presence or absence Exploration development conflicts Access interactions	Access (positive/ negative) Numbers affected	Disturbance of resource activity from increased access Intrusion effects on aesthetics of resource harvesting and/or outdoor experience Effect on resource harvesting from increased access Effects on visual resources from presence of the line Interference	**Construction** - The interests of local resource users – trappers, outfitters, and other resource harvesters will be considered. - Permission for access onto Crown land will be obtained from the appropriate regulatory authority prior to start-up. - Manitoba Hydro will consult further with Fox Lake and Tataskweyak Cree Nations and other First Nations with respect to addressing resource-related interests and access issues. - Special land use designations such as Resource Management Areas will be recognized and any boundaries clearly identified. - Manitoba Conservation and local resource users and interests, including a bison rancher, will be notified as to the schedule for clearing and construction activities in advance to minimize disruption to operations. - Construction personnel will be prohibited from hunting and fishing wildlife on Project sites, including access routes and borrow areas. - Manitoba Hydro will compensate affected trappers for fur harvest losses based on current compensation policy. - Mineral claim and license holders crossed by the preferred route will be provided with information regarding clearing and construction schedules to minimize potential interference with exploration activities.	Potential for limited increase in access opportunities along cleared right-of-way Impairment of natural aesthetics and potential for new visual impacts Potential increase in resource harvesting/ or increased pressure on the resource Potential for interference with EM exploration

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
				effects with mineral survey technology Operational limits to mining operations	- Manitoba Hydro will work with mining interests to address any outstanding issues or concerns. - Manitoba Hydro will consider strategic placement of structures to lessen/avoid interference with quarry or aggregate operation activities. Manitoba Hydro will consult with affected stakeholders as part of the easement negotiation phase. Maintaining a separation buffer will also be discussed to ensure no damage occurs to the Bipole III line from site operations. - Right-of-way clearing and construction will occur during the winter for northern portions of the routes to lessen disturbance to resource use activities. - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing. **Operation and Maintenance** - Local resource users will be notified of schedule for operation and maintenance activities to minimize disruption. - Where issues of increased access through cleared rights-of-way are of potential concern to a First Nation, community or stakeholders, Manitoba Hydro will consider the development of access management plans to address resource-related interests.	surveys with overlap of 66 m right-of-way Potential for operational limitations on quarry sites
Recreation and Tourism	Parks and conservation lands Recreational areas (lodges, cottages)	Presence or absence Natural aesthetic value Access interactions	Proximity Numbers affected Access (positive/ negative)	Effect on resource harvesting from increased access Disturbance effects from physical presence of the	**Construction** - Work permits will be obtained from Manitoba Conservation for all Project activities occurring on provincial Crown lands. - Special land use designations, such as Resource Management Areas, wildlife management areas, provincial forests, community pastures, etc. will be recognized and boundaries clearly identified. Appropriate agencies will be notified as to the schedule of work activities. - Notify lodge owners and recreational resource users in advance as to the schedule for work activities.	Potential for limited increase in access opportunities along cleared right-of-way Physical presence of the cleared right-of-way

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
				lines Intrusion effects on natural aesthetics from increased access	- Notify holders of recreational use Crown encumbrances in advance as to the schedule for work activities. - Notify snowmobile associations in advance of the schedule of clearing, construction and operation and maintenance activities. - Use information signs and the placement of warning markers to identify the new rights-of-way. - Construction activities will take care to avoid any unnecessary disturbance when conducted in the vicinity or adjacent to such areas, to protect the natural landscape surrounding work activity sites and to prevent any unnecessary damage outside the required rights-of-way and other disturbed/developed areas (e.g., borrow areas). - Manitoba Hydro will consider tower placement to address visual/aesthetic effects from presence of crossing towers. The location of the transmission line structures will be optimized so that their visibility in relation to crossing the Nelson River is minimized (i.e., tower spotting will be considered to help minimize potential aesthetic effects). - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing. **Operation and Maintenance** - Lodge owners and recreational resource users will be notified in advance as to schedule of work activities. - Information signs and the placement of warning markers will be used to identify the new rights-of-way. - Special land use designations will be recognized and any boundaries clearly identified; appropriate agencies will be notified of work activity schedules. - Care will be taken to avoid any unnecessary disturbance when conducted in the vicinity or adjacent to such areas, including use of seasonally limited maintenance times, to protect the natural landscape surrounding work sites and to	Impairment of natural recreational aesthetics (e.g., river crossing) and potential reduction in use and enjoyment

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					prevent any unnecessary damage outside the required rights-of-way and other disturbed/developed areas.	
Infrastructure	Linear and site facilities (aerodromes, comm. towers, transmission lines, roads, rail, pipelines)*	Presence or absence	Numbers affected	Interference with operations	**Construction, Operation and Maintenance** - Agencies responsible for infrastructure crossed by the transmission lines will be consulted. Confirmation of any design measures for construction will be made during the detailed design stage. Agencies will be notified with respect to schedule of work activities to minimize disruption to operations. - Municipal authorities responsible for drains will be notified of work schedules. Local protocols and By-Laws, including maintaining an adequate buffer, will be adhered to. - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.	None
HVdc Transmission Line, 230 kV ac Northern Collector Transmission Lines – Construction Site Decommissioning						
Land Ownership and Tenure	Property	Property value Viewscape	Land area (ha)	Removal/ reclamation of temporary right-of-way access trails, marshalling yards, borrow sites, mobile construction camps	- Clearing and disturbance outside the project area or worksite will be minimized or avoided. - Temporary access routes will be decommissioned at completion of construction phase under supervision of a Natural Resources Officer. - Decommissioned roads will be reclaimed and, after removal of culverts, drainage will be restored and/or shorelines stabilized. - Ongoing visual inspection of the worksite will be conducted by the Contractor to ensure adequate restoration and minimal environmental degradation. - All waste, refuse, structures, material and equipment will be removed from borrow pits and quarries by the Contractor at the end of construction. - Depending on future use, pits and quarries will be backfilled with clean mineral soil or granular material, leveled and sloped, and if necessary, revegetated	None

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					according to submitted reclamation plans. - Temporary haul roads to permanently abandoned borrow areas will be decommissioned. - Restored pits will be monitored for a period of time to determine if additional restoration is required; if appropriate, revegetation will occur naturally. - Hazardous materials, fuel containers and other materials will be removed from marshaling yard sites. - Infrastructure will be removed from the work site and reused or recycled at another project site whenever possible. - Garbage and debris will be removed from the site and disposed of in a licensed landfill. - Revegetation may be required in disturbed areas to: stabilize erodible soils; or to enhance or restore the aesthetic appeal of an area. - Pit privies will be backfilled when construction camps are decommissioned. - All buildings, infrastructure, waste and debris will be removed from mobile construction camps.	
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
Converter Stations, Construction Camp, Construction Power Station and Power Line – Clearing, Construction and Operation and Maintenance						
Land Ownership and Tenure	Property and Residential development	Presence or absence Viewscape	Number affected/ concerns	Rural aesthetic effects	***Keewatinoow*** **Construction** - Station sites will be watered as required to keep dust to a minimum; construction wastes generated will be stored on-site in suitably secured areas and containers, and transported off-site to appropriately licensed disposal facilities. - Potential use of implosives for splicing conductors will require advance notice being given to stakeholders and local authorities at the start of this activity.	Impairment of aesthetics – net addition to the visual landscape

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing. **Operation and Maintenance** - Discussion will be required with Fox Lake Cree Nation and the Provincial government regarding a transfer arrangement in order to provide Manitoba Hydro with the permanent right to access, use and maintain the converter station, construction camp, construction power station and power line. - Vehicular traffic to the sites will be limited to normal operations or periods of major maintenance activity. - Site lighting design will focus onto the site and minimize effects on surrounding lands. - Dust control measures will continue to be applied as required and all normal domestic waste will be properly collected, transported off-site and disposed of. - Station sites will be fenced and gated for security and public safety. ***Riel*** **Construction** - The location of Riel site minimizes requirements for aesthetic enhancements; appearance to be addressed through landscaping techniques including placement of berms and strategic planting of trees where possible, without creating hazards to existing overhead transmission lines or interfering with site or adjacent drainage works. - Station site will be watered as required to keep dust to a minimum; construction wastes generated will be stored on-site in suitably secured areas and containers, and transported off-site to appropriately licensed disposal facilities.	

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					- Potential use of implosives for splicing conductors will require advance notice being given to stakeholders and local authorities at the start of this activity; an air horn will be sounded every time a charge is setoff as a warning and Manitoba Hydro will post signs to advise travelers on PR 207 of the construction and noise for specific periods when using implodes. - Proper maintenance and inspection procedures of construction equipment will serve to control noise levels. - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible. **Operation and Maintenance** - Vehicular traffic to the site will be limited to normal operations or periods of major maintenance activity. - Site lighting design will focus onto the site and minimize effects on surrounding lands. - Dust control measures will continue to be applied as required and all normal domestic waste will be properly collected, transported off-site and disposed of. - Station site will be fenced and gated for security and public safety.	
Resource Use	Commercial resource use Trap lines	Presence or absence Natural aesthetic value Access interactions	Numbers affected Access (positive/ negative)	Disturbance of resource activity from increased access Effect on resource harvesting from increased access Effects on visual	***Keewatinoow and Construction Power Line*** **Construction** - Manitoba Conservation and local resource users will be notified of work activity schedules in advance. - Manitoba Hydro will consult further with Fox Lake and Tataskweyak Cree Nations with respect to addressing resource-related interests and concerns. - Trappers will be notified as to the schedule for work activities in advance; affected trappers will be compensated for fur harvest losses as per current compensation policy. - Activities will be carried out in a manner that is either compatible with designated areas or that takes care to avoid any unnecessary disturbance to protect the natural	Physical presence – alteration of landscape Impairment of natural aesthetics and potential for new visual impacts Potential for

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
				resources from presence of facilities Intrusion effects on aesthetics of resource harvesting	landscape surrounding site facilities and to prevent any unnecessary damage outside of required footprints and other disturbed/developed areas (e.g., borrow areas). - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing. **Operation and Maintenance** - Manitoba Hydro will consult further with Fox Lake Cree Nation with respect to addressing resource-related effects. - Trappers will be notified as to schedule of work activities in advance. - Where issues of increased access through cleared rights-of-way are of potential concern to a First Nation, community or stakeholders, Manitoba Hydro will consider the development of access management plans to address community resource-related interests.	limited increase in access opportunities along cleared right-of-way Potential increase in resource harvesting/or increased pressure on the resource
Recreation and Tourism	Parks and conservation lands Recreational areas (lodges, cottages)	Presence or absence Natural aesthetic value	Proximity Numbers affected	Disturbance from physical presence of facilities Intrusion effects on natural aesthetics	***Keewatinoow and Construction Power Line*** **Construction, Operation and Maintenance** - Work permits from Manitoba Conservation will be obtained for all project activities occurring on provincial Crown land. - Tourism operators and recreational resource users will be notified in advance for project-related activities, including temporary construction access; information signs and placement of warning markers will be used to identify new rights-of-way. - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.	Physical presence – alteration of landscape Impairment of natural aesthetics (trapping)

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					- Care will be taken to protect the natural landscape surrounding work activity sites; activities will be conducted to prevent any unnecessary damage outside the required rights-of-way and other disturbed/developed areas (e.g., borrow areas).	
Infrastructure	Linear and site facilities*	Presence or absence	Numbers affected	Interference with operations	***Keewatinoow and Riel*** **Construction** - Manitoba Hydro will consult with appropriate agencies and will comply with all relevant government regulations and By-Laws applicable to project construction activities. - Agencies responsible for infrastructure crossed by the transmission lines will be consulted. Confirmation of any design measures for construction will be made during the detailed design stage. Agencies will be notified with respect to schedule of work activities to minimize disruption to operations. - Appropriate notice will be provided to local authorities and area landowners in the immediate vicinity (in the case of the Riel site) to address nuisance effects related to construction activities (i.e., use of implodes). - Manitoba Hydro will notify the appropriate agencies and operators as to the schedule for equipment and material deliveries during the period of construction. - Level railway crossing safety will be ensured through the presence of flagpersons and appropriate warning devices. - All related movements will be subject to regulations governing load restrictions and transport of dangerous goods. - Deliveries of equipment on-site by rail and road will be subject to issuing advance notice to adjacent landowners and consultation with responsible authorities and agencies (i.e., MIT and CNR). - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.	None

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					Operation and Maintenance - Manitoba Hydro will meet all safety and operating requirements associated with the Project. - The overall appearance of the Riel Station site during operations from publically accessible roadways will be addressed through landscaping, including placement of earth berms and planting of trees around the perimeter of the site, without creating hazards to existing overhead transmission lines or interfering with site or adjacent drainage works.	
Converter Stations, Construction Camp, Construction Power Station and Power Line – Construction Site Decommissioning						
Land Ownership and Tenure	Property	Property value Viewscape	Land area (ha)	Removal/ reclamation of Manitoba Hydro and Contractor work areas, borrow areas, and excavated material disposal areas	- Clearing and disturbance outside the project area or worksite will be minimized or avoided - Temporary access routes will be decommissioned at completion of construction phase under supervision of a Natural Resources Officer. - Decommissioned roads will be reclaimed and, after removal of culverts, drainage will be restored and/or shorelines stabilized. - Ongoing visual inspection of the worksite will be conducted by the Contractor to ensure adequate restoration and minimal environmental degradation. - All waste, refuse, structures, material and equipment will be removed from borrow pits and quarries by the Contractor at the end of construction. - Depending on future use, pits and quarries will be backfilled with clean mineral soil or granular material, leveled and sloped, and if necessary, revegetated according to submitted reclamation plans. - Temporary haul roads to permanently abandoned borrow areas will be decommissioned. - Restored pits will be monitored for a period of time to determine if additional restoration is required; if appropriate, revegetation will occur naturally.	None

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					- At the close of construction excavated material placement areas will be covered with salvaged organics and soils to provide an erosion resistant surficial layer and to promote re-growth of natural vegetation. - Hazardous materials, fuel containers and other materials will be removed from marshaling yard sites. - Infrastructure will be removed from the work site and reused or recycled at another project site whenever possible. - Garbage and debris will be removed from the site and disposed of in a licensed landfill. - Revegetation may be required in disturbed areas to: stabilize erodible soils; or to enhance or restore the aesthetic appeal of an area. - Pit privies will be backfilled when construction camps are decommissioned. - All buildings, infrastructure, waste and debris will be removed from mobile construction camps.	
Ground Electrode Sites and Feeder Lines – Clearing, Construction and Operation and Maintenance						
Land ownership and tenure	Property and residential development	Viewscape Change in land tenure	Proximity Number affected/ concerns Land area (ha)	Disturbance effects from station or site presence Aesthetics associated with nuisance effects Permanent removal from land base	***Keewatinoow*** **Construction** - Discussion will be required with Fox Lake Cree Nation and the Provincial government regarding a transfer arrangement in order to provide Manitoba Hydro with the permanent right to access, use and maintain the ground electrode and connecting feeder line. - All related movements of construction materials and equipment deliveries will be subject to regulations governing load restrictions and transport of dangerous goods. - Dust generated from construction activities will be kept to a minimum through site watering; construction waste will be properly collected, transported off-site and disposed of. - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized	Physical presence of facilities – alteration of landscape Impairment of aesthetics from nuisance effects Potential loss of a section of land

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing. **Operation and Maintenance** - Activities will be carried out in a manner that takes care to avoid any unnecessary disturbance to protect the rural landscape surrounding work sites and will be conducted to prevent any unnecessary damage outside of required footprints and other disturbed/developed areas. - An appropriate buffer distance will be maintained to minimize any potential effects from operation of feeder line on adjacent land uses. ***Riel*** **Construction** - Manitoba Hydro will maintain an appropriate buffer distance to minimize any potential for adverse effects on adjacent residential land use - Discussion will be required with the R.M. of Springfield and the Province (i.e., MIT) regarding arrangements to route the feeder line using road allowances as part of the easement *negotiation* phase. - All related movements of construction materials and equipment deliveries will be subject to regulations governing load restrictions and transport of dangerous goods. - Dust generated from construction activities will be kept to a minimum through site watering; construction waste will be properly collected, transported off-site and disposed of. - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing. **Operation and Maintenance** - Activities will be carried out in a manner that takes care to avoid any unnecessary disturbance to protect the rural	

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					landscape surrounding work sites and will be conducted to prevent any unnecessary damage outside of required footprints and other disturbed/developed areas.	
Resource Use	Commercial resource use Trap lines	Presence or absence Natural aesthetic value Access interactions	Numbers affected Access (positive/ negative)	Disturbance effects from site presence Intrusion effects on aesthetics of resource harvesting Effect on resource harvesting from increased access	***Keewatinoow*** **Construction** - Manitoba Conservation will be notified of work activity schedules in advance. - Manitoba Hydro will consult with Fox Lake Cree Nation with respect to addressing resource-related interests and concerns. - Construction personnel will be prohibited from hunting and fishing wildlife on Project sites, including access routes. - Trappers will be notified as to schedule of work activities in advance. - Affected trappers will be compensated for fur harvest losses as per current compensation policy. - Activities will be carried out in a manner that is either compatible with designated areas or that takes care to avoid any unnecessary disturbance to protect the natural landscape or unnecessary damage outside of required footprints and other disturbed/developed areas (e.g., borrow areas). - Right-of-way clearing and construction will occur during the winter to lessen disturbance to resource use activities. - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing. **Operation and Maintenance** - Manitoba Hydro will consult with Fox Lake Cree Nation with respect to addressing resource-related interests and concerns. - Trappers will be notified as to schedule of work activities in advance.	Impairment of natural aesthetics – potential for new visual impacts Potential for limited increase in access from access road and cleared right-of-way; potential increase in resource harvesting

Table 3: Bipole III Transmission Line Project Valued Environmental Component – Environmental Effects Summary						
Category	**Valued Environmental Component**	**Environmental Indicator**	**Measurable Parameter/ Variable**	**Environmental Effect**	**Mitigation Measures**	**Residual Environmental Effect**
					- Where issues of increased access through cleared rights-of-way are of potential concern to a First Nation, community or stakeholders, Manitoba Hydro will consider the development of access management plans to address community resource-related interests.	
Recreation and Tourism	Recreational areas (lodges, cottages)	Presence or absence Natural aesthetic value Access interactions	Proximity Numbers affected Access (positive/ negative)	Disturbance effects aesthetics from site presence	***Keewatinoow and Riel*** **Construction, Operation and Maintenance** - Activities will be carried out in a manner that takes care to avoid any unnecessary disturbance to protect the natural landscape surrounding work sites and to prevent any unnecessary damage outside required footprints and other disturbed/developed areas (e.g., borrow areas). - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.	Impairment of natural aesthetics from presence of facility
Infrastructure	Linear and site facilities*	Presence or absence	Numbers affected	Interference with operations	***Keewatinoow and Riel*** **Construction, Operation and Maintenance** - Manitoba Hydro will consult with appropriate agencies and government authorities (e.g., MIT, HBR, Town of Gillam, and R.M. of Springfield) and will comply with all relevant government regulations and By-Laws. Appropriate agencies and infrastructure operators will be notified as to the schedule for equipment and material deliveries during the period of construction. - All related movements will be subject to regulations governing load restrictions and transport of dangerous goods. - Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites; existing all weather or winter roads/trails will be utilized whenever possible; right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.	None

7.3 RESIDUAL EFFECTS ASSESSMENT

The nature and extent of any residual environmental effects were determined on the basis of a criteria ratings framework. The approach describes both positive and adverse predicted residual environmental effects of the Project that remain after the implementation of mitigation measures. The residual environmental effects were assessed using eight evaluation factors as listed below. No evaluation of significance of the residual effects is made. Conclusions as to significance of the adverse residual effects are determined in the EIS.

- Direction (difference or trend compared with existing conditions – positive, negligible, negative).
- Ecological Value (rarity, uniqueness, fragility, importance within ecosystems and to science).
- Societal Value (value of components necessary for economic, social and cultural well-being).
- Magnitude (degree of disturbance – small, medium, large).
- Geographic Extent (spatial boundaries – project area, local area, project site/footprint).
- Duration (how long – short-, medium-, long-term).
- Frequency (how often – once, sporadic/intermittent, regular/continuous).
- Reversibility (potential for recovery from an effect – irreversible/permanent, reversible).

Table 4 identifies the residual environmental effects (after mitigation) and criteria ratings for all project components. Residual effects for land use are expected and are described generally in the following:

Physical Presence of Facilities and Impairment of Aesthetics

There will be an unavoidable residual impairment (i.e., aesthetic effect) on properties in the immediate vicinity of the HVdc transmission line. Residual effects are expected to be associated with perceived changes in aesthetics on rural residences with respect to the visibility of the high voltage transmission line once it is operational. The residual effects may be mitigated to the extent possible through application of measures and/or landowner discussions related to structure placement for the HVdc transmission line.

Residual effects on parks and conservation lands are principally related to disturbance of the natural environmental setting, and associated with physical presence of the HVdc transmission line and the 230 kV ac collector lines (i.e., potential to reduce natural aesthetics). The potential

exists for the creation of new visual impacts at certain locations (e.g., Nelson River crossing of the 230 kV ac collector lines) and a resultant incremental net addition to the visual landscape from new infrastructure development. The transmission lines will alter the landscape for as long as the facilities are in operation. Routing the proposed transmission lines in the vicinity of, adjacent to or parallel to other existing linear infrastructure (i.e., roads, other transmission lines) can serve to reduce visual and aesthetic effects to incremental levels. Similarly, residual effects on commercial resource use are associated with the potential for reduction and/or impairment of commercial resource use (i.e., trapping).

The physical appearance of the Keewatinoow Converter Station, construction camp, and construction power station has the potential to create visual or aesthetic concerns in natural environmental settings (i.e., reduction of natural aesthetic values). The infrastructure facilities will alter the landscape for as long as they are in operation. Residual effects are also associated with physical presence of the 138 kV construction power line (i.e., potential to reduce natural aesthetics). The construction power line will also alter the landscape for as long as the facility is in operation. Routing the proposed construction power line in the vicinity of, adjacent to or parallel to other existing linear infrastructure (i.e., roads, other transmission lines) will serve to reduce visual and aesthetic effects to incremental levels.

Residual effects on commercial resource use from site development of the Keewatinoow converter station, construction camp, and construction power are associated with the potential for reduction and/or impairment of aesthetics on resource harvesting (i.e., trapping).

The physical presence of the Riel Converter Station will alter the landscape on rural neighbouring locations for as long as it is in operation resulting in an unavoidable residual impairment (i.e., aesthetic effect) on properties in the immediate vicinity. Similarly, the 500 kV HVdc transmission line to the Riel site will be a net addition to the visual landscape. Converter station operations and maintenance has the potential to involve a variety of nuisance effects, including those associated with traffic, noise, lighting, litter and dust on nearby rural residential development. The acquisition of properties in the immediate vicinity of the Riel site has minimized the potential for nuisance effects.

The effect of the Keewatinoow and Riel ground electrode on property and residential development is expected to be infrequent but will remain for as long as the electrodes are in operation. The ground electrode site for the Riel Converter Station will effectively remove a portion of a section of land (259 ha) from the agricultural resource base (although that portion outside of the ground ring can be returned to agricultural use). Site development of the Keewatinoow ground electrode and associated feeder line may potentially reduce the aesthetics of trapping in the area. The physical appearance of both ground electrodes and associated feeder lines has the potential to create visual or aesthetic concerns in natural and rural environmental settings (i.e., reduction of natural aesthetic values). The infrastructure facilities will alter the landscape for as long as they are in operation.

Access

The cleared rights-of-way will potentially create additional opportunities for limited increased access along cleared rights-of-way and access roads, particularly the 500 kV HVdc transmission line, 230 kV ac collector lines, construction power line and Keewatinoow ground electrode.

Residual effects on commercial resource use are associated with increased access opportunities from the cleared transmission lines rights-of-way and construction power line right-of-way. An increase in access points to the resource could result in a positive effect on the fur harvest or big game taken for that trapper or hunter which would be desirable (from an income perspective). On the other hand, increased access by the presence of the rights-of-way could have an indirect effect of contributing to overharvesting of the resource by other resource users.

Residual effects on parks and conservation lands from the HVdc transmission line and the 230 kV ac collector lines also include the potential for increased access opportunities affecting recreational resources.

Indirectly related access effects include the potential for an increase in resource harvesting and/or potential for increased pressure on resource harvesting (i.e., overhunting). Potential also exists for the impairment of natural recreational aesthetics (i.e., river crossings) and reduction in use and enjoyment of certain areas (i.e., recreational pursuits, outfitting) from increased access associated with the HVdc transmission line, 230 kV ac collector lines and the 138 kV construction power line.

Mining Interference

The cleared right-of-way for the 500 kV HVdc transmission line has the potential to create interference with electromagnetic (EM) mineral exploration surveys regularly undertaken by mining companies for their mineral leases and mining claims, particularly for holdings in the Thompson Nickel Belt affected by the Bipole III transmission line. In addition, there is potential for interference conflicts with quarry lease operators, by limiting the operation within adjacent quarry areas (i.e., blasting) from the routing of the Bipole III transmission line, as well as potential concerns from Manitoba Hydro's perspective with the integrity of the transmission line from operating activities. Manitoba Hydro will work mining interests to address any outstanding issues.

Table 4: Residual Environmental Effect Assessment Summary								
Bipole III Residual Environmental Effect Assessment (After Mitigation)								
Residual Environmental Effect	**Direction**	**Ecological Importance**	**Societal Importance**	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**
HVdc Transmission Line, Northern 230 kV ac Collector Lines								
Physical Presence/Aesthetics	Negative	N/A	Moderate	Small	Footprint, Local	Medium	Regular	Reversible
Rationale: Mitigation will serve to minimize adverse visual and aesthetic effects to incremental or negligible levels. The residual environmental effect from the physical presence of facilities and associated impairment of aesthetics is negative with moderate value for societal importance, small in magnitude, footprint and local in geographic extent, medium-term in duration, regular in occurrence and reversible upon project decommissioning.								
Increased Access	Negative	N/A	Moderate	Small	Footprint, Local	Medium	Intermittent	Reversible
Rationale: Mitigation will serve to minimize increased opportunities for access. The residual environmental effects on resource use and enjoyment of recreational pursuits is negative with moderate value for societal importance, small in magnitude, footprint and local in geographic extent, medium-term in duration, intermittent in occurrence and reversible upon project decommissioning.								
Mining Interference	Negative	N/A	Moderate	Small	Footprint, Local	Medium	Intermittent	Reversible
Rationale: Mitigation will serve to minimize interference effects on mineral exploration and quarry operation. The residual environmental effect from operational interference is negative with moderate value for societal importance, small in magnitude, footprint and local in geographic extent, medium-term in duration, intermittent in occurrence and reversible upon project decommissioning.								
Keewatinoow Converter Station, Construction Camp, Construction Power Station, Construction Power Line								
Physical Presence/Aesthetics	Negative	N/A	Moderate	Small	Site, Local	Medium	Regular	Reversible
Rationale: Mitigation will serve to minimize adverse visual and aesthetic effects to negligible levels. The residual environmental effect from the physical presence of facilities and associated impairment of aesthetics is negative with moderate value for societal importance, small in magnitude, site and local in geographic extent, medium-term in duration, regular in occurrence and reversible upon project decommissioning.								
Increased Access	Negative	N/A	Moderate	Small	Local	Medium	Intermittent	Reversible
Rationale: Mitigation will serve to minimize increased opportunities for access. The residual environmental effects on resource use is negative with moderate value for societal importance, small in magnitude, local in geographic extent, medium-term in duration, intermittent in occurrence and reversible upon project decommissioning.								
Riel Converter Station								
Physical Presence/Aesthetics	Negative	N/A	Low	Small	Site, Local	Medium	Regular	Reversible
Rationale: Mitigation will serve to minimize adverse visual and aesthetic effects to negligible levels. The residual environmental effect from the physical presence of facilities and associated impairment of aesthetics is negative with low value for societal importance, small in magnitude, site and local in geographic extent, medium-term in duration, regular in occurrence and reversible upon project decommissioning.								
Ground Electrode Sites and Feeder Lines (Keewatinoow / Riel)*								
Physical Presence/Aesthetics	Negligible	N/A	Moderate / low*	Small	Site, Local	Medium	Regular	Reversible

Table 4: Residual Environmental Effect Assessment Summary								
Bipole III Residual Environmental Effect Assessment (After Mitigation)								
Residual Environmental Effect	**Direction**	**Ecological Importance**	**Societal Importance**	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**
Rationale: Mitigation will serve to minimize adverse visual and aesthetic effects to negligible levels. The residual environmental effect from the physical presence of facilities and associated impairment of aesthetics is negligible with moderate / low value for societal importance, small in magnitude, site and local in geographic extent, medium-term in duration, regular in occurrence and reversible upon project decommissioning.								
Increased Access	Negligible	N/A	Moderate / low*	Small	Site, Local	Medium	Intermittent	Reversible
Rationale: Mitigation will serve to minimize increased opportunities for access. The residual environmental effect on resource use is negligible with moderate / low value for societal importance, small in magnitude, site and local in geographic extent, medium-term in duration, intermittent in occurrence and reversible upon project decommissioning.								

Note: Under the Societal Importance factor, Moderate/low indicates Moderate for Keewatinoow and low for Riel.*

7.4 FOLLOW-UP AND MONITORING

Manitoba Hydro has a set of standard environmental protection measures that are applied to all project construction, operation and maintenance, and eventual decommissioning. These general practices, where applicable, will be applied to the Bipole III project components. The environmental assessment study conducted for the Bipole III Project identified site-specific land use situations where mitigative measures (i.e., in addition to Manitoba Hydro's General Environmental Protection Measures are likely to be required. Environmentally Sensitive Sites (ESS) associated with the Bipole III project, including a description of the ESS, the potential environmental effect and proposed mitigation measures to be followed at these areas/sites have been identified for the Project. 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 include: designated/conservation lands, rural residential, cottage and cabin areas/sites, recreational areas/features and infrastructure facilities (i.e., waste disposal site).

Site-specific situations are included in a Draft Environmental Protection Plan (EnvPP), prepared specifically to assist in the construction of the Bipole III Transmission Project. The implementation of the EnvPP will follow the receipt of an Environment Act Licence and completion of property acquisition. The EnvPP will identify and describe environmental protection measures for sites or features of importance to local communities or individuals. Prior to the initiation of clearing and construction activities, a field reconnaissance of the project rights-of-way and development sites will be undertaken. Based on the studies conducted to date, the known environmentally sensitive sites requiring site-specific mitigation have been documented. If additional issues and mitigative measures are identified after final project planning and design are completed or in the course of easement negotiations with affected landowners, these will be incorporated into the EnvPP prior to commencement of construction.

It is expected that environmental effects monitoring will be incorporated into the construction, operation and maintenance phases of the Bipole III project. Additional follow-up may be undertaken with respect to property value/aesthetic issues and concerns due to proximity of transmission lines as identified by individuals during the consultation program at site-specific locations along the final preferred route. The nature of the follow-up required would likely be determined during the landowner easement negotiation phase of project development. Monitoring (i.e., EMF testing) may also be considered to address any remaining perceived negative concerns regarding EMF levels at site specific residential locations in proximity and/or along the final preferred route for Bipole III. Existing procedures for such testing and reporting have already been established by Manitoba Hydro based on previous transmission line development experience and are expected to be implemented for this Project.

Where concerns have been raised that the proposed transmission line right-of-way may lead to increased access for recreational purposes to the detriment of another use (e.g., snowmobile

groups grooming the cleared right-of-way affecting local trap lines), Manitoba Hydro may consider the development of access management plans as a mitigative response to address and manage the creation of additional access opportunities where such concerns have been expressed. Access management plans would be prepared by Manitoba Hydro with assistance from sub-consultants as required. Subsequent post-construction monitoring to verify the effectiveness of the access management plans should follow after implementation to quantify any increased access and evaluate any related effects. The protocol and procedures governing the length of time of the monitoring requirement and schedule of reporting (e.g., on an annual basis) should be determined in discussions between Manitoba Hydro and the affected community and/or stakeholder group. Access management plans implemented for the Wuskwatim Transmission Project are pertinent examples and should be reviewed for addressing issues of access management associated with the Bipole III Transmission Project.

7.5 POTENTIAL CUMULATIVE EFFECTS

Cumulative effects assessment involves the assessment of effects of the proposed activities in combination with any past, present or future activities. The cumulative effects assessment process undertaken for the Bipole III Project commenced with scoping to identify regional issues of environmental concern within the study area. Assessment of cumulative effects was undertaken from the perspective of the VECs identified in Section 5.2. In order to examine regional issues with potentially overlapping effects on the selected VECs for land use, an initial cumulative effects assessment area was identified consisting of the regional study area and an additional 25 km in some sections along the eastern most portion of the regional study area.

Other projects (past/existing), activities (i.e., actions) with footprints, and natural events within the initial assessment area (i.e., using spatial and temporal selection criteria) were then identified. Past and future natural events were also considered, including: fire, floods, and wind/tornadoes. To determine which projects and activities may result in a cumulative effect on the land use environment component a review of the literature (past EIS studies) and public registries was conducted. The projects and activities considered include those that are certain and reasonably foreseeable future actions up to a 20-year planning horizon. Table B.1 in Appendix B provides a summary of other project activities considered with identified land use VECs for the purpose of assessing cumulative effects.

7.5.1 Projects and Activities (Actions)

Past/existing projects that may contribute effects that would be cumulative to the proposed activities are:

- Wuskwatim Generating Station Project

- Wuskwatim Transmission Project (230 kV transmission lines, Thompson-Birchtree Station)
- Northern Transmission Projects associated with Henday and Radisson Converter Stations
- Dorsey-Forbes 500 kV Transmission Line
- Riel Sectionalization Project
- Floodway Expansion Project
- St. Joseph's Wind Farm Project
- Forestry operations and road development (Tolko, Louisiana Pacific)
- Mineral license area exploration, mineral lease, mining claim, and quarry lease developments (holders within the Thompson Nickel Belt and Flin Flon Greenstone Belts, quarry lease areas in unorganized territory and R.M.s of Mountain [North], Mossey River and Alonsa) and mining sites (Vale Inco Limited with Thompson and Birchtree Mines and Hudson Bay Mining and Smelting Co. Limited with Mine 777 and Trout Lake Mine in Flin Flon and Chisel North Mine in Snow Lake)
- Provincial Highways and Roads, Winter road development
- Resource Use (trapping and outfitting)

Reasonably foreseeable future actions/activities which may contribute to cumulative effects include the following:

- Keeyask/Conawapa Generating Station Projects
- U.S. 500 kV Tie Line Project
- Dorsey to Portage 230 kV Transmission Line Project
- Dorsey to Riel 500 kV Transmission Line Project (south loop)
- St. Vital-LaVerendrye 230 kV Transmission Line Project (south loop)
- Wind energy developments (Dacotah Wind Energy Project; Yellowhead Wind Energy Project; Mountain Wind Energy Project; Meridian Wind Energy Project)
- Forestry operations including road development (Tolko, Louisiana Pacific)

- Mineral license area exploration, mineral lease, mining claims, and quarry lease developments (holders within the Thompson Nickel Belt and Flin Flon Greenstone Belts, quarry lease areas in unorganized territory and R.M.s of Mountain [North], Mossey River and Alonsa) and mining sites (Lalor Lake Mine, Bucko Lake Mine)
- Provincial Highways and Roads (new construction [all-weather gravel road as part of Keeyask Infrastructure Project] and upgrading [PR 280]), Winter Road development (new road development)
- Urban residential development (Town of Gillam, Town of Snow Lake)
- Recreational development related to Floodway Expansion
- Resource Use (trapping and outfitting)
- Natural events (forest fires, floods, wind events)

Manitoba Hydro Infrastructure Projects

The proposed Bipole III Transmission Project is anticipated to yield some similar effects when considered in combination with other project and activities (i.e., actions). Anticipated environmental effects that may result from the proposed Bipole III Project in combination with existing and future actions primarily involve the residual effects associated with the presence of the lines and station sites and the cleared rights-of-way and site footprints. Such effects could also conceivably relate to other disturbance effects (i.e., nuisance, aesthetics), disruption (interference) effects, and intrusion effects (i.e., increased access). As some of the effects considered (i.e., aesthetics) are effectively limited to the immediate rights-of-way and footprint sites, the only real prospect of a related cumulative effect would be in the event of further transmission line development on or adjacent to the rights-of-way for the HVdc transmission line, 230 kV ac northern collector lines, and ground electrode feeder lines.

Development of the Wuskwatim transmission lines associated with the Wuskwatim G.S. and an associated transformer station (near Thompson) has been completed or is expected to be completed in 2011. There is some prospect of an incremental additive interaction from the transmission lines routed between Herblet Lake Station at Snow Lake and Rall's Island Station at The Pas. No additive interaction would be expected from the new transformer station.

There is the prospect of the further development of new transmission lines in southern Manitoba, principally around the city of Winnipeg and south to the U.S. border, based on Manitoba Hydro's Ten Year Development Plan (2009). The proposed Dorsey-Portage 230 kV transmission line is not expected to be in-service until 2013 at the earliest. Given its location, it is not anticipated that this development would represent an additive interaction in the context of the Bipole III Project. Other transmission line concepts have in-service dates of 2019 or are uncertain (i.e., 500 kV Tie

Line, Dorsey-Riel 500 kV transmission line and St. Vital-La Verendrye 230 kV transmission line) and would not occur without comprehensive route selection and environmental impact assessment, extensive public consultation and approval and licensing by the relevant regulatory authorities.

Development of either the Keeyask or Conawapa Generating Station sites, and their associated site infrastructure and facilities, has the potential to occur concurrently with the Bipole III Transmission Project. In at least some areas, the environmental effects of the Bipole III Project will overlap with some environmental effects of the generating station projects, particularly Conawapa, throughout the construction and operation phases. Impacts from the construction of the generating station (including infrastructure activities, camp, road, borrow pits, converter station) will result in additional site clearing. This development is not expected to occur until late 2014 at the earliest. There will be some potential for cumulative effects from these developments. Development of a generating station at the Keeyask site is expected to commence with the construction of infrastructure (i.e., road, bridge, camp) in mid-2011. The development of the required footprints for Keeyask would affect a localized area and be short-term in duration. Generating station construction is not expected to occur until mid-2014 at the earliest. The potential for transmission line requirements associated with either facility are uncertain at this time but an incremental additive interaction related to aesthetics is considered a possibility. In any event, development of either Conawapa or Keeyask will not occur without comprehensive site selection and environmental impact assessment, extensive public consultation, and approval and licensing by the relevant regulatory authorities.

The sectionalisation of the 500 kV D602F international transmission line at the Riel Site (as part of the Riel Reliability Improvement Initiative Project) began in 2009 and is expected to continue until 2014. Site development includes construction of one 230 kV switchyard and one 500 kV switchyard and associated facilities. Site development will include the ultimate configuration of the Riel Converter Station and the terminating point for Bipole III. The ingress point for Bipole III will not require any additional right-of-way requirements at the station site as it will be located within an existing right-of-way parallel to an existing 500 kV transmission line. The potential for a cumulative effect of the ultimate combination of developing the Riel Converter Station and the HVdc transmission line may generate other residual effects, including disturbance (i.e., lighting, noise and traffic) and aesthetic effects on rural residences in the vicinity. The combination of these effects relating to the additional physical presence of these project components may represent a cumulative effect in terms of perception held by area residents, although the potential for additive interaction effects are considered incremental and minor in nature.

Road Infrastructure Projects

With respect to road development, construction activities associated with PR 280 may be viewed as an induced action as a result of ongoing and proposed hydroelectric developments along the Nelson River.

Provincial Road construction activities (i.e., crushing and stockpiling, rock cuts and spot grading) was to have commenced in late 2010 with a completion date of late 2011. Construction activities associated with construction of an all-weather gravel road from PR 280 to the site of a camp location for the development of the Keeyask G.S. are expected to be fully mitigated and would have negligible additive interaction.

Resource Use (Trapping/Outfitting)

In the case of the issue of increased access related to commercial resource use, effects considered (i.e., aesthetics) are effectively limited to the immediate environs of the rights-of-way and sites. The prospect of potential cumulative effects may be of a concern in the surrounding local area (trapping/outfitting) and at the broader regional level (mining, forestry). The effects of development of increased access would be subject to granting of provincial permits related to operations for activities conducted on Crown land. Such activities would be expected to follow permit conditions and development guidelines to mitigate any project-related effects, or they would not occur. No additive interaction would be anticipated.

Forestry Operations

In terms of forestry activity, timber harvesting is dependent on numerous variables, including, in the near-term, the logistics of accessing timber in the regional study area. Over the longer term, any increase would be driven by global demand, and more efficient means of harvesting and /or manufacturing technologies. Regional timber harvesting areas are governed primarily by timber maturity and economic feasibility. Overall, effects from forestry activities are mobile within management areas and are limited to 10-year time frames followed-up by regeneration surveys and forest renewal activities once harvesting is complete. Access roads are designed and built to meet management/planning objectives including time horizons. Roads that are no longer needed are retired and rehabilitated, thereby eliminating access. Any potential for cumulative effects would relate to the amount of productive forested land removed by development of Bipole III within the region. Given the renewable nature of the resource and the short-term transitory nature of the effects, these activities would have limited additive interaction. Operations are implemented to limit interaction with other projects through annual operating plans for activities on Crown land. Activities would also be expected to follow environmental review and development guidelines to mitigate project-related effects, or the activities would not occur. Forest losses can be offset through the application of Manitoba Conservation's Forest Damage Appraisal and Valuation Policy and other programs that promote and support planting of trees in other areas (e.g., Manitoba Hydro's Forest Enhancement Program).

Mineral Exploration and Mining Operations

Considering the concerns expressed by the mining industry, particularly related to transmission line rights-of-way potentially affecting electromagnetic and other geo-physical surveys used in

mining exploration, these activities were considered initially in the cumulative effects assessment. Most of the industry concerns focused on existing mineral leases and mining claims, including properties, within the Thompson Nickel Belt and the Flin Flon Greenstone Belt in northern Manitoba. However, route adjustment to where the HVdc transmission line is now located outside of these areas, has effectively served to mitigate the majority of concerns and the potential for cumulative effects. Potential remains for interactions with quarrying operations. Quarry extraction activities are subject to regulatory control and development guidelines and any potential effects would be mitigated or they would not occur. As such, the additive interaction would be considered negligible.

Mines in operation within the project area include: Vale Inco Limited at Thompson and Birchtree Mines, HudBay Minerals Inc. operated by the Hudson Bay Mining and Smelting Co. Limited at Mine 777 and Trout Lake Mines in Flin Flon and Chisel North Mine in Snow Lake. There are also numerous past producing properties in the project area. HudBay Minerals Inc. has also recently identified a new mining site near Lalor Lake with the potential of 15-20 years' worth of gold and copper mining resources. This mine would be located near the community of Snow Lake. Further resumption of ongoing mining activity as of April 2011 was also identified at the Bucko Lake Mine south of Wabowden. Mining activity is subject to regulatory control and development guidelines. The spatial footprints are site-specific and depend on the type of mineral being extracted, methods utilized for extraction and processing, including the use of tailing ponds. Potential effects would be mitigated or they would not occur. No additive interaction is expected with the Bipole III Project.

Residential Developments

Specific plans for residential development in the Project area include the potential for new housing within the Town of Gillam and the Town of Snow Lake. It is expected that approximately 160 new units will be added over a 10-year period for Gillam. This development is limited to the urban town limits of Gillam and is expected to utilize available land set aside for that purpose. The planned town expansion in Snow Lake is proposed to occur over the next 20 years within the town boundary. The recommended development plan proposes 84 new single-family dwellings and an industrial/commercial reserve site and also identifies potential townhouse and apartment construction. These developments would be expected to follow municipal and/or provincial development guidelines which would serve to limit interactions with other projects and mitigate any project-related effects. No additive interaction is anticipated in the context of the Bipole III Project.

Regional Rural/Agricultural Developments

The cumulative effects of other approved and potential developments and possible related requirements for additional infrastructure may ultimately result in a further shift in the rural/agricultural portion of the regional study area. This includes the Manitoba Floodway

Authority's plans to develop recreational opportunities within the expanded Floodway channel. Expansion activities, although not yet totally complete for the length of the floodway, was undertaken adjacent to the Riel Station component of the Bipole III Project, and is considered to represent a negligible additive interaction. The construction of recreational facilities and provision of increased recreational opportunities within the expanded floodway would represent a negligible additive interaction.

The current development of the St. Joseph Wind Farm near Letellier is not expected to have any additive interaction with the Bipole III Project. Similarly, the prospects of additional wind farm development in southern agro-Manitoba and the potential to overlap with construction of the Bipole III Project have an uncertain timeframe; as such, no additive interaction is anticipated.

Other planned regional infrastructure developments planned for, or to be considered include: the completion of PTH 59/101 Interchange; the twinning of PTH 15; the Winnipeg – Oakbank Transportation Corridor; and PTH 75 Improvements (i.e., Morris to Aubigny, St. Jean to Letellier). As a component of the approval process, mitigative measures would already be in place to address potential effects of current project activities. Planned and possible future projects will be subject to their own environmental review and approval processes. Mitigative measures will be applied for these planned and reasonably foreseeable future projects as they proceed. This will further serve to mitigate the potential for cumulative effects to occur.

Natural Events

Natural events (i.e., forest fires, floods, wind downbursts or tornadoes) may have the potential for adverse effects on land use in the regional study area. In the case of past natural events these are considered part of the existing condition on the landscape. Future natural events in the regional study area may have the potential to overlap in time and space with the Bipole III Project, but are unknown as the timing and occurrence are dependent on numerous other factors.

Climate change has the potential to affect the operational phase of the Bipole III Project, particularly as a result of longer-term increase in the number, frequency and intensity of extreme weather events (i.e., severe and extended periods of droughts, heat waves, more intensive and frequent thunderstorms, and floods), greater variability in temperature including winter cold and summer heat, and stronger, more frequent wind events such as downbursts and tornadoes (MMM Group Limited, 2011c).

Although these potential effects on both the local and regional areas of the Province are uncertain, the Province of Manitoba (2008) projects that average summer temperatures could be 3-4 $^{\circ}$C higher by the year 2080, with average winter temperatures rising by 5-8 $^{\circ}$C. It is expected that climate change will affect weather patterns, bringing changes in precipitation, evaporation, humidity, and wind patterns. The Province of Manitoba (2008) anticipates that spring will arrive

earlier and be wetter, followed by warmer and drier summers with milder winters and a diminished snowpack.

A review of the literature on climate change suggests major changes in climate are expected in the Prairies, the east and west coasts and the Great Lakes basin, affecting communities and climate-sensitive industries, including forestry, agriculture, marine transportation, fishing and oil and gas development (Environment Canada, 2005). In addition to extreme weather conditions, including flooding and severe droughts, that are likely to increase in the Prairies, the most serious climate change risk in Manitoba is perhaps the increase in water scarcity. Although increases in rainfall are projected in some areas, these may be offset by higher temperatures, which would result in increased evaporation and transpiration from plants (Natural Resources Canada, 2007). Further research suggests that in southern Manitoba, changes in precipitation and temperature may cause groundwater levels in some parts of the Red River basin to decline faster than others. This could affect flow in the aquifer beneath the Red River valley and possibly shift the saline-freshwater boundary so that groundwater in some areas may no longer be drinkable (Chen and Grasby, 2001).

It is possible that the impact of climate change and its potential effects may result in an increase in infrastructure maintenance and repair requirements due to potentially more frequent or extreme weather events during the life cycle for the HVdc transmission line and associated facilities of the Bipole III Project. The potential exists that more extreme temperatures, wind speeds and more frequent extreme events may affect the longevity of materials chosen for project construction (MMM Group Limited, 2011c). Although there may be an increase in the number of natural events that could affect the Project, it is unlikely to lead to any substantial effects on Project operation based on implementation of effective design mitigation and proper monitoring/inspection to address potential risks of adverse climate effects.

Anticipating and adapting to the increased pace of climate change is difficult. It is made more complicated in that the resultant impacts of climate change are generally present on a regional basis and are not experienced in all regions in the same way. Due to the unpredictability of natural events, the potential cumulative effects that may occur are difficult to determine and mitigate for. For utilities like Manitoba Hydro, planning for system reliability, which includes the consideration of climate change, will involve a process of identifying and managing associated risks and minimizing any potential service disruptions to Manitoba Hydro customers.

The potential for future natural events to have an additive interaction for cumulative effects in the context of the Bipole III Project, while possible, is unknown given the uncertainties and timeframes involved.

Conclusion

The effects of development of the Bipole III transmission facilities are likely to be minor to negligible in relation to other new developments (including those for proposed wind energy and potential forestry activity). The residual project effects in combination with the cumulative effects of other projects and activities are likely manageable through proper planning. Application of mitigation measures for other projects and activities will further serve to minimize the potential for interaction effects to occur.

7.6 ENVIRONMENTAL EFFECTS ON THE PROJECT

During the construction phase of the project, potential effects of the environment on the project can occur from weather events that could cause work schedule delays. For example, earthmoving might have to be halted during heavy rain periods, or other weather events such as intense rain/lighting may halt other site work (i.e., equipment installation). Manitoba Hydro will monitor project delivery and will assess on an ongoing basis the degree to which unforeseen weather events are affecting the project activities and make adjustments accordingly. During the operational phase of the Bipole III Project potential effects of the environment on the project can occur as a result of ice storms, high wind events and flooding.

Manitoba Hydro designs its facilities to meet or exceed current Canada Standards Association (CSA) standards for transmission and terminal facilities. Current design practice involves the review of atmospheric weather data (e.g., wind, ice, wind/ice combination, etc.). Review of these weather factors was considered in the design criteria used in determining equipment operating specifications and line strength requirements (i.e., structures, conductors, hardware, and insulators). Buildings are designed in accordance with the National Building Code and the Manitoba Building Code. The designs for the Bipole III Project will meet or exceed typical standard requirements.

At some point, a forest fire could have an impact on transmission line structures. The potential likelihood of structure failure is somewhat remote, particularly with steel construction and towers located within cleared transmission line rights-of-way. It is possible, however, that transmission line outages might be caused by insulator flashover as a result of ionization of the surrounding air due to smoke and ash from an intense forest fire. To limit fire potential, line damage or breaks and power outages, Manitoba Hydro will develop site-specific prevention programs and implement emergency response plans.

Potential flooding effects are considered in the final design of transmission line structures and terminal facilities, where applicable. Flooding is considered only in circumstances where a transmission line is routed through a flood prone area. In such areas, structures can be erected on pile foundations to provide structural stability in the event of a flood. In the case of the Riel Converter Station site, the design grade for the property is proposed to be the 1:700 year-return

period flood event with a dyke proposed around the site perimeter. The dyke is to protect against potential higher levels for extreme floods exceeding the conditions for which Floodway operation could be maintained to prevent additional flooding to the city. With this level of flood protection, potential effects of flooding on the site are considered to be negligible.

7.7 SUMMARY AND CONCLUSIONS

This report provides an assessment of effects from the Bipole III Project on valued environmental components of land use for incorporation into the preparation of the project EIS as described in Manitoba Hydro's June 2010 Environmental Assessment Scoping Document. The process of documenting existing land use and potential impacts relied on information provided by government and industry sources. Correspondence with government officials and searches of government databases provided additional information with regard to land use activities as did field drive-by survey. The scope of the assessment consisted of a description of current conditions focusing on the general regional study area as well as specific corridor/rights-of-way (i.e., HVdc transmission line, collector lines, electrode lines) and site areas (i.e., converter station and ground electrode sites).

The process of identification and comparison of preliminary alternatives emphasized avoiding, to the extent possible, areas of environmental sensitivity or public concern. Alternative corridors were established on the basis of a 5 km width, within which alternative routes could be identified based on a 66 m wide right-of-way. The corridors facilitated identification and lateral adjustment of alternative route options within the corridors, and allowed for the interconnection of numerous routing options between the main route segments (i.e., Alternatives A, B, and C). The initially identified alternative corridors and routes were further refined leading to the identification of a preliminary preferred and selection of a final preferred route through review with the Manitoba Hydro study team and on the basis of feedback received during the course of public consultation.

Route evaluation was undertaken on the planning corridor identified for the 230 kV ac northern transmission collector lines. Alternative converter station and ground electrode site evaluation for the northern (including the construction power substation and electrode feeder line) and southern project components was also conducted and an overview provided of the selected preferred converter station sites and the preferred northern (including feeder line) and southern ground electrode sites.

The potential effects of the proposed Project on land use were identified and assessed, focusing on activities associated with land ownership/tenure (property and residential development), commercial resource use, recreation and tourism and infrastructure facilities. The assessment also considered Manitoba Hydro's past experience from environmental assessment studies on major transmission line projects, professional judgment, public and stakeholder consultations and local knowledge from Aboriginal and First Nation input (i.e., Traditional Knowledge). Effects on land use VECs were evaluated and assessed according to the stage of Project development

activities (construction phase and operations and maintenance phase). Mitigation measures are presented to avoid or minimize adverse effects. Remaining residual environmental effects after mitigation are identified. Requirements for environmental effects monitoring and follow-up are provided. The potential for cumulative effects for the proposed Bipole III Project and other identified projects and activities (i.e., actions) within the regional study area is assessed. Finally, the effects of the environment on the project are identified and discussed.

It is recognized that there are some information gaps in the assessment of project-related environmental effects. These include the following:

- Review of the southern ground electrode feeder line was not possible at this time as the route (and any alternatives) have not yet been identified by Manitoba Hydro.
- Status of agricultural Crown land encumbrances and wild rice lakes – Identification of Crown land encumbrances along the preferred route is current to August 2010; wild rice lakes are current to February 2011. Maintaining these records is an ongoing process managed by the provincial Crown Lands and Property Agency. As such, there is a possibility of additional unknown Crown land encumbrances being identified along the final preferred route before the EIS is finalized.

Based on the review of the valued environmental components for land use, assessment of anticipated effects and application of identified mitigation measures, the proposed Bipole III Project is not anticipated to result in any unacceptable adverse effects. Anticipated residual effects associated with the project, those effects remaining after the application of mitigation measures, could conceivably relate to the physical presence of the facilities and impairment of aesthetics, increased access and operational interference associated with mineral resource exploration and extraction.

Identified follow-up and monitoring requirements include: follow-up of property value/aesthetic issues and concerns, due to the proximity of transmission lines for site-specific situations identified during public consultation, as determined during the landowner easement negotiation phase of project development; and consideration of follow-up to address the issue of increased access as a result of project construction through the development of access management plans (e.g., potential for the cleared rights-of-way to lead to increased access for recreational purposes to the detriment of other resource users).

Monitoring to verify the effectiveness of the access management plans should follow. The protocol and procedures for this monitoring (i.e., timing, reporting) should be determined in discussions between Manitoba Hydro and the affected community and/or stakeholder group. Additional monitoring (i.e., EMF testing) could also be considered to address perceived negative concerns regarding EMF levels at site-specific residential locations along the final preferred route

for Bipole III. Existing procedures for testing and reporting are well established through Manitoba Hydro's Property Department.

Potential cumulative effects that may result from the proposed Project in combination with existing and future actions primarily involve effects associated with the presence of the lines and station sites and the cleared rights-of-way and site footprints. Such effects could also conceivably relate to other disturbance effects (i.e., nuisance, aesthetics), disruption (interference) effects, and intrusion effects (i.e., increased access). As some of the effects considered (i.e., aesthetics) are effectively limited to the immediate rights-of-way and footprint sites, the only real prospect of a related cumulative effect would be in the event of further transmission line development on or adjacent to the rights-of-way for the HVdc transmission line, 230 kV ac northern collector lines, and ground electrode feeder lines. The effects of development of the Bipole III transmission facilities are likely to be minor to negligible in relation to other new developments (including those for proposed wind energy and potential forestry activity). The residual project effects, in combination with the cumulative effects of other projects and activities, are likely manageable through proper planning. Application of mitigation measures for other projects and activities will further serve to minimize the potential for interaction effects to occur.

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APPENDIX A – (1:750,000 AND 1:250,000 SCALE MAPS)

Map Series A100 - Alternative Route Segment Land Use Constraint Maps

Map Series A200 - Additional Alternative Route Segment Land Use Constraint Maps

Maps A1 to A3 - Preliminary Preferred Route Segments (P1 to P4) Land Use Constraint Maps

Map Series A300 - Final Preferred Route Segment Land Use Constraint Maps

APPENDIX B – CUMULATIVE EFFECTS ASSESSMENT SUMMARY TABLE

Table B.1 – Bipole III Transmission Project – CEA – Other Actions Summary Table					
Other Actions by Category	**Other Action Description**	**VEC**	**Measurable Parameter/Variable**	**Environmental Effects**	**Comments**
Hydro-electric projects					
Existing/Future projects					
Generating Stations	Keeyask G.S.	Recreational Areas	Proximity	Effects associated with construction and presence; impairment of aesthetics	Potential overlap in time and space (ISD 2018); no overlap with project footprint; no additive interaction anticipated
	Conawapa G.S.	Recreational Areas	Proximity	Effects associated with construction and presence; impairment of aesthetics	Potential overlap in time and space (ISD 2024); no direct overlap with project footprint; incremental additive interaction
	Wuskwatim G.S.	Recreational Areas	Proximity	Effects associated with construction and presence; impairment of aesthetics	Potential overlap in time and space (ISD 2012); no overlap with project footprint; no additive interaction anticipated
Transmission Lines	U.S. 500 kV Tie Line	Residential Development Recreational Areas	Number affected/ concerns; Proximity of residences to line; Access (positive/ negative)	Effects associated with construction and disturbance from presence; impairment of aesthetics, intrusion from increased access	Potential overlap in space (ISD 2019); project design and route selection to address potential interference issues associated with crossing one transmission line with another; incremental additive interaction
	Dorsey-Portage 230 kV Transmission line	Residential Development Recreational Areas	Number affected/ concerns; Proximity of residences to line; Access (positive/ negative)	Effects associated with construction and disturbance from presence; impairment of aesthetics, intrusion from increased access	Potential overlap in time and space (ISD 2013); no overlap with project footprint; no additive interaction
	Dorsey-Riel 500 kV Transmission line (south loop)	Residential Development Recreational Areas	Number affected/ concerns; Proximity of residences to line; Access (positive/ negative)	Effects associated with construction and disturbance from presence; impairment of aesthetics, intrusion from increased access	Potential overlap in space (ISD 2019); potential for some overlap with project footprint; incremental additive interaction

Table B.1 – Bipole III Transmission Project – CEA – Other Actions Summary Table					
Other Actions by Category	**Other Action Description**	**VEC**	**Measurable Parameter/Variable**	**Environmental Effects**	**Comments**
Transmission Lines	St. Vital-LaVerendrye 230 kV Transmission lines (south loop)	Residential Development Recreational Areas	Number affected/ concerns; Proximity to residences; Access (positive/ negative)	Effects associated with construction and disturbance from presence; impairment of aesthetics, intrusion from increased access	Potential overlap in time and space (ISD uncertain); potential for some overlap with project footprint; incremental additive interaction
	Dorsey-Forbes 500 kV Transmission line	Residential Development Infrastructure Facilities	Numbers affected/concerns; Proximity to residences	Effects associated with impairment of aesthetics; operational interference	Overlap in space; overlap in project footprint; part of existing condition for aesthetics; no additive interaction given implementation of infrastructure design measures
	Wuskwatim 230 kV Transmission Lines	Commercial Resource Use (mining, trapping, outfitting) Recreational Areas Infrastructure Facilities	Numbers affected; Proximity; Access (positive/ negative)	Effects associated with construction and disturbance from presence; impairment of aesthetics, intrusion from increased access; operational interference	Overlap in space; no overlap with project footprint, although adjacent in one area; part of existing condition; incremental additive interaction
	Other Northern Transmission Lines (Henday, Radisson, Thompson)	Commercial Resource Use (mining, trapping, outfitting) Recreational Areas	Proximity; Numbers affected; Access (positive/ negative)	Effects associated with presence; impairment of aesthetics, intrusion from increased access	Overlap in space; some overlap with project footprint (rights-of-way); part of existing condition for aesthetics; incremental additive interaction
Stations/Sub-stations	Riel Sectionalization	Residential Development	Number affected/ concerns; Proximity to site	Effects associated with construction and disturbance from presence; impairment of aesthetics	Potential overlap in time and space (ISD 2014); incremental and minor additive interaction
	Thompson-Birchtree Sub-station	Commercial Resource Use (mining)	Proximity; Access (positive/ negative)	Effects associated with operational interference	Potential overlap in space (ISD 2011); no overlap in project footprint; no additive interaction anticipated
Stations/Sub-stations	Transcona East Sub-station	Residential Development	Number affected/ concerns;	Effects associated with construction and	Overlap in space (regional study area); no

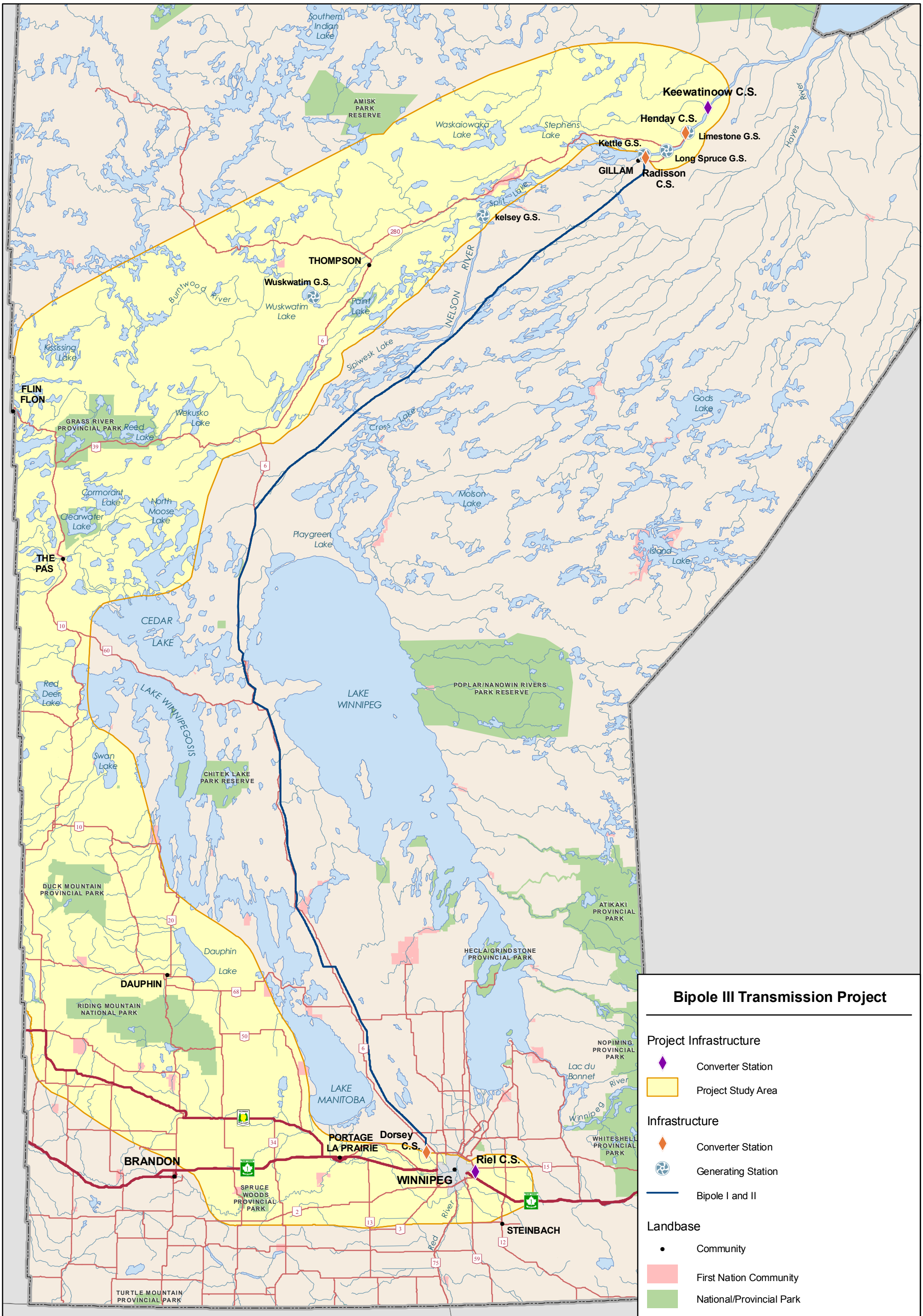
Table B.1 – Bipole III Transmission Project – CEA – Other Actions Summary Table					
Other Actions by Category	**Other Action Description**	**VEC**	**Measurable Parameter/Variable**	**Environmental Effects**	**Comments**
			Proximity to site	disturbance from presence; impairment of aesthetics	overlap in project footprint; part of existing condition; no additive interaction expected
	Gillam Transformer Station	Residential Development	Number affected/ concerns; Proximity to site	Effects associated with construction and disturbance from presence; impairment of aesthetics	Overlap in space (regional study area); no overlap in project footprint; part of existing condition; no additive interaction anticipated
Highway and Road Development projects					
Existing/Future projects					
Highways and Roads (including winter roads)	PR 280 Construction (crushing, stockpiling, rock cuts, spot grading)	Commercial Resource Use (mining, trapping, outfitting)	Proximity; Numbers affected; Access (positive/ negative)	Effects associated with construction and disturbance from road upgrade	Overlap in space (ISD – late 2011), confined to existing road right-of-way footprint; any potential effects from road construction activities are expected to be mitigated; negligible additive interaction
	Keeyask Infrastructure Project – all weather gravel road from PR 280 to camp location	Commercial Resource Use (trapping)	Proximity; Numbers affected; Access (positive/ negative)	Effects associated with construction and presence; disturbance on aesthetics of resource harvesting; intrusion from increased access	Overlap in time and space (ISD – May 2012); no overlap with project footprint; any potential effects from road construction are expected to be mitigated; negligible additive interaction
Mineral Development projects					
Existing/Future projects					
Mineral Exploration	Bucko Lake Mine near Wabowden Lalor Lake Mine near Snow Lake	Commercial Resource Use (mining)	Proximity; Access (positive/ negative)	Effects associated with construction of the mine facilities at Bucko and Lalor Lake and ongoing resource extraction activities	Overlap in space, no overlap with project footprint (66 m right-of-way); no additive interaction

Table B.1 – Bipole III Transmission Project – CEA – Other Actions Summary Table					
Other Actions by Category	**Other Action Description**	**VEC**	**Measurable Parameter/Variable**	**Environmental Effects**	**Comments**
Mineral Exploration	Thompson Nickel Belt and Flin Flon Greenstone Belt – mineral lease and mining claim areas	Commercial Resource Use (mining)	Proximity; Number affected; Access (positive/ negative)	Effects associated with existing and future mineral exploration activities (clearing, increased access)	Potential overlap in time and space though future plans are unknown; exploration and mining development is subject to Manitoba's Mines and Minerals Act; potential effects mitigated using development guidelines, or activities would not occur; negligible additive interaction
	Unorganized territory, R.M.s of Mountain (North and South), R.M. of Mossey River, and R.M. of Alonsa – quarry lease areas	Commercial Resource Use (mining)	Proximity; Number affected; Access (positive/ negative)	Effects associated with existing and future resource extraction activities (clearing, increased access, quarrying)	Potential overlap in time and space, though future plans are unknown; resource extraction activity is subject to Manitoba's Mines and Minerals Act; potential effects mitigated using development guidelines, or activities would not occur; negligible additive interaction
Forest Development projects					
Existing/Future projects					
Forestry Operations	Tolko Industries Ltd. Operations – FML No. 2 and Louisiana-Pacific Operations – FML No. 3	Commercial Resource Use (forest harvesting / road building)	Proximity; Number of access interactions	Effects associated with existing and future forestry operations, including harvesting forests and silvicultural practices (clearing, increased access)	Potential overlap in time and space, though future activities are unknown; operations are implemented to limit interaction with other projects through annual operating plans for activities on Crown land; activities are expected to follow environmental review and development guidelines to mitigate project-related effects, or would not occur; limited

Table B.1 – Bipole III Transmission Project – CEA – Other Actions Summary Table					
Other Actions by Category	**Other Action Description**	**VEC**	**Measurable Parameter/Variable**	**Environmental Effects**	**Comments**
					additive interaction
Renewable Energy projects					
Existing/Future projects					
Wind Energy Production	St. Joseph Wind Energy Project – R.M.s of Rhineland and Montcalm	Residential Development Recreational Areas	Number affected/concerns; Proximity to towers	Effects associated with construction and presence of the project; impairment of aesthetics	No overlap with project footprint (66 m right-of-way) due to distance; no additive interaction
	Dacotah Wind Energy Project – R.M. of Cartier	Residential Development Recreational Areas	Number affected/concerns; Proximity to towers	Effects associated with construction and presence of the project; impairment of aesthetics	No overlap with project footprint due to distance; no additive interaction due to uncertain timeframe associated with the project which may not overlap with construction of Bipole III
	Yellowhead Wind Energy Project – R.M. of Minto	Residential Development Recreational Areas	Number affected/concerns; Proximity to towers	Effects associated with construction and presence of the project; impairment of aesthetics	No overlap with project footprint due to distance; no additive interaction due to uncertain timeframe associated with the project which may not overlap with construction of Bipole III
	Mountain Wind Energy Project – R.M.s of Lorne and South Norfolk	Residential Development Recreational Areas	Number affected/concerns; Proximity to towers	Effects associated with construction and presence of the project; impairment of aesthetics	No overlap with project footprint due to distance; no additive interaction due to uncertain timeframe associated with the project which may not overlap with construction of Bipole III
	Meridian Wind Energy Project – R.M.s of Rhineland, Morris and Montcalm	Residential Development Recreational Areas	Number affected/concerns; Proximity to towers	Effects associated with construction and presence of the project; impairment of aesthetics	No overlap with project footprint due to distance; no additive interaction due to uncertain timeframe associated with the project which may not overlap with construction of Bipole III

Table B.1 – Bipole III Transmission Project – CEA – Other Actions Summary Table					
Other Actions by Category	**Other Action Description**	**VEC**	**Measurable Parameter/Variable**	**Environmental Effects**	**Comments**
Water Diversion projects					
Existing/Future projects					
	Red River Floodway Expansion	Recreation Areas	Proximity	Effects associated with construction and presence of the project; impairment of aesthetics	Expansion occurred within existing floodway footprint, work activity not yet completed; no overlap with project footprint (Riel Station, 66 m right-of-way) but adjacent; negligible additive interaction
Recreational projects					
Existing/Future projects					
	Red River Floodway Recreational Opportunities Project	Recreation Areas	Proximity; access (positive/ negative)	Effects associated with construction of recreational facilities (increased access opportunities)	Recreational developments to occur within existing footprint, no overlap with project footprint; negligible additive interaction
Residential projects					
Existing/Future projects					
	Housing development within the Town of Gillam (160 units over a 10 years to be added) Housing development within the Town of Snow Lake (84 units over 20 years to be added, including townhouse and apartment construction)	Residential Development	Land area (ha)	Effects associated with existing and future residential areas, including conflicting land use activity (physical presence, proximity, aesthetics)	Future residential development limited to urban town limits of Gillam and Snow Lake and are expected to follow municipal and/or provincial development guidelines to limit interactions with other projects and mitigate project-related effects; no overlap with project footprint, therefore, no additive interaction anticipated

Table B.1 – Bipole III Transmission Project – CEA – Other Actions Summary Table					
Other Actions by Category	**Other Action Description**	**VEC**	**Measurable Parameter/Variable**	**Environmental Effects**	**Comments**
Activities					
Existing/Future activities					
Resource Use	Outfitter Allocation Areas/ GHAs Registered Trap lines	Commercial Resource Use (outfitting, trapping)	Proximity Numbers affected; Access (positive/ negative)	Effects associated with existing and future resource use (hunting, fisheries) and access	Potential overlap in time and space, though future activities are unknown; operations are implemented subject to provincial permit for activities on Crown land; activities are expected to follow permit conditions and development guidelines to mitigate project-related effects, or activities would not occur; no additive interaction anticipated
Natural Events					
Past and Future events					
Forest Fires	Forest Fires caused by lightning or man-made	Commercial Resource Use (mining, outfitting, trapping)	Land area (ha); Numbers affected	Effects from alteration of the landscape (removal of forest/ vegetation cover); impairment of aesthetics	Potential overlap in time and space, although future events are unknown; part of existing condition; unknown additive interaction
Floods	Flooding events	Residential Development Recreation Areas	Numbers affected; Land area (ha)	Effects associated with disruption/disturbance and damage; impairment of aesthetics	Potential overlap in time and space, although future events are unknown; part of existing condition; unknown additive interaction
Wind events	Wind downbursts or tornadoes	Residential Development Infrastructure Facilities	Numbers affected	Effects associated with disruption and damage	Potential overlap in time and space, although future events are unknown; part of existing condition; unknown additive interaction



Manitoba Hydro

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 12, 2011

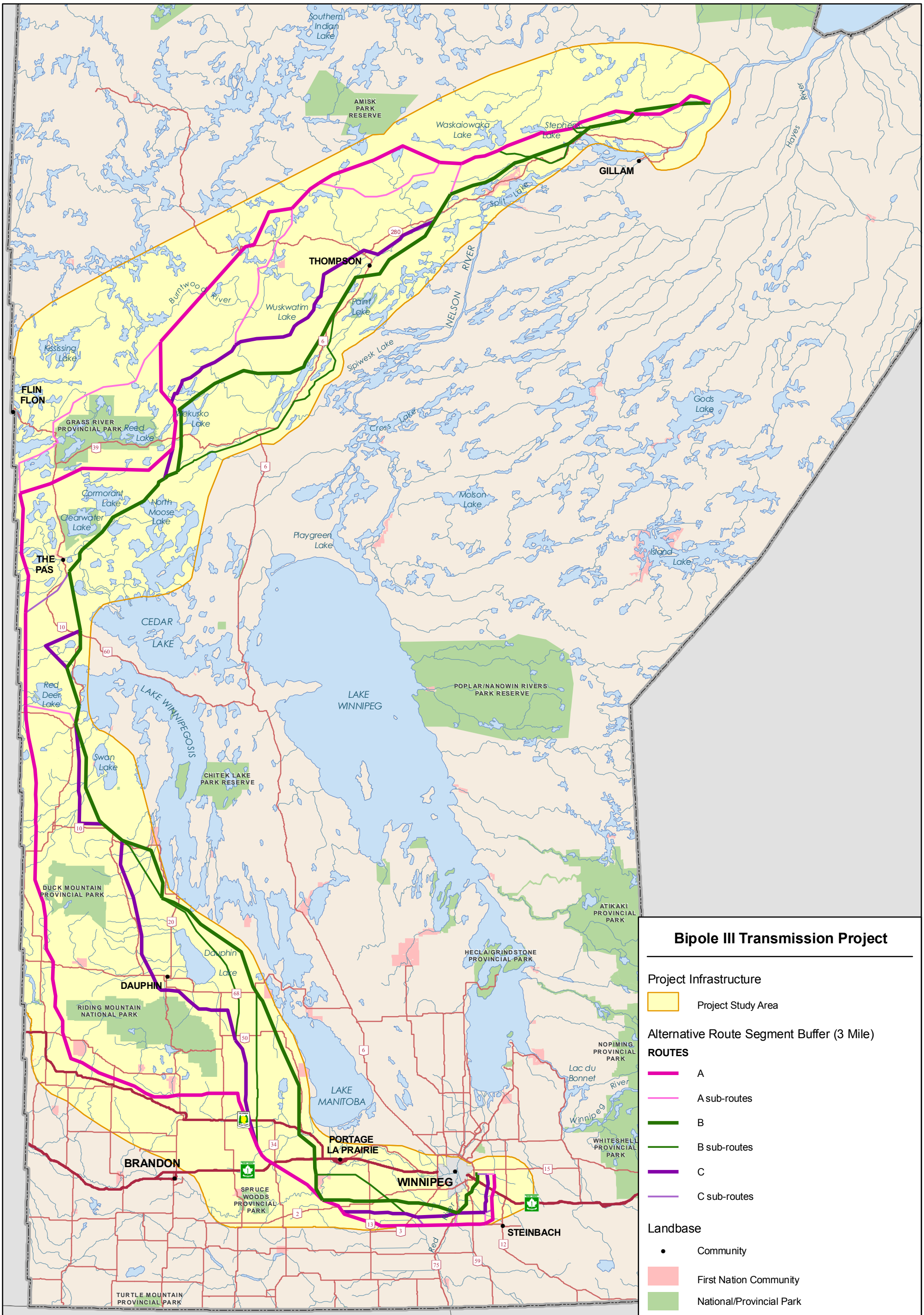
0 25 50 Kilometres
0 25 50 Miles

N

1:2,500,000

Bipole III Project Study Area

Map 1



Manitoba Hydro

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 12, 2011

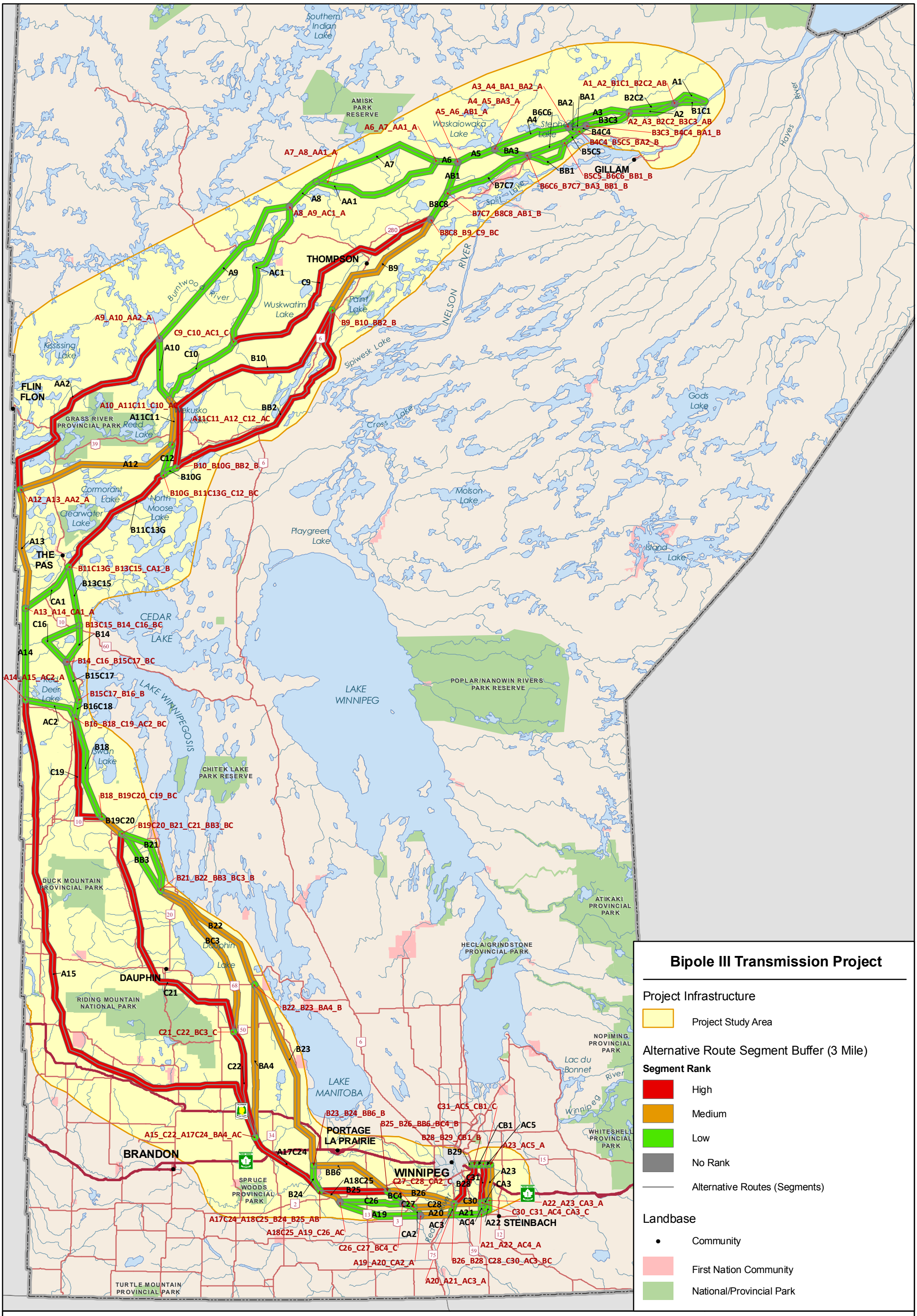
0 25 50 Kilometres
0 25 50 Miles

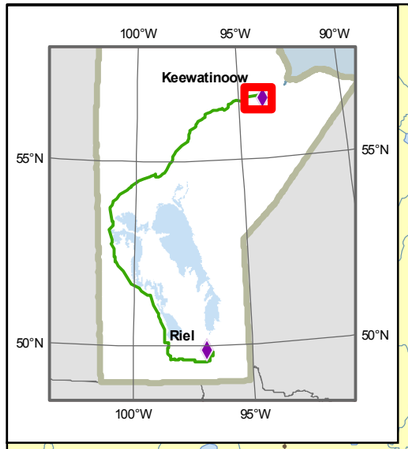
N

1:2,500,000

Bipole III Project Study Area (Alternative Route Corridors and Segments)

Map 2


Southern Indian Lake
AMISK PARK RESERVE
Waskaiowaka Lake
Stephens Lake
Hayes River
A1_A2_B1C1_B2C2_AB
A3_A4_BA1_BA2_A
A4_A5_BA3_A
A5_A6_AB1_A
A6_A7_AA1_A
A7_A8_AA1_A
A1
B1C1
A2
A3
A4
A5
A6
A7
A8
AA1
AB1
BA1
BA2
BA3
B2C2
B3C3
B4C4
B5C5
BB1
B6C6
B7C7
B8C8
A2_A3_B2C2_B3C3_AB
B3C3_B4C4_BA1_B
B4C4_B5C5_BA2_B
B5C5_B6C6_BB1_B
B6C6_B7C7_BA3_BB1_B
B7C7_B8C8_AB1_B
B8C8_B9_C9_BC
GILLAM
Split Lake
THOMPSON
B9
C9
AC1
A9
A8_A9_AC1_A
B9_B10_BB2_B
Burntwood River
Wuskwatim Lake
Paint Lake
NELSON RIVER
Sipiwesk Lake
A9_A10_AA2_A
C9_C10_AC1_C
A10
C10
B10
Kississing Lake
FLIN FLON
AA2
A10_A11C11_C10_AC
A11C11
A11C11_A12_C12_AC
BB2
Wekusko Lake
Reed Lake
Cross Lake
GRASS RIVER PROVINCIAL PARK
Gods Lake
A12
C12
B10_B10G_BB2_B
B10G
B10G_B11C13G_C12_BC
A12_A13_AA2_A
Cormorant Lake
North Moose Lake
Clearwater Lake
B11C13G
Molson Lake
Playgreen Lake
Island Lake
A13
THE PAS
B11C13G_B13C15_CA1_B
B13C15
CA1
A13_A14_CA1_A
C16
B13C15_B14_C16_BC
B14
CEDAR LAKE
A14
B14_C16_B15C17_BC
A14_A15_AC2_A
B15C17
Red Deer Lake
B15C17_B16_B
B16C18
AC2
B16_B18_C19_AC2_BC
LAKE WINNIPEGOSIS
LAKE WINNIPEG
POPLAR/NANOWIN RIVERS PARK RESERVE
B18
Swan Lake
C19
CHITEK LAKE PARK RESERVE
B18_B19C20_C19_BC
B19C20
B19C20_B21_C21_BB3_BC
B21
BB3
DUCK MOUNTAIN PROVINCIAL PARK
B21_B22_BB3_BC3_B
ATIKAKI PROVINCIAL PARK
B22
BC3
Dauphin Lake
HECLA/GRINDSTONE PROVINCIAL PARK
A15
DAUPHIN
C21
RIDING MOUNTAIN NATIONAL PARK
C21_C22_BC3_C
B22_B23_BA4_B
B23
C22
BA4
NOPIMING PROVINCIAL PARK
Lac du Bonnet
Winnipeg River
LAKE MANITOBA
B23_B24_BB6_B
B25_B26_BB6_BC4_B
C31_AC5_CB1_C
B28_B29_CB1_B
A15_C22_A17C24_BA4_AC
PORTAGE LA PRAIRIE
CB1
AC5
A23_AC5_A
WHITESHELL PROVINCIAL PARK
BRANDON
A17C24
B29
BB6
WINNIPEG
A23
C31
CA3
A18C25
C27_C28_CA2_C
B25
B24
SPRUCE WOODS PROVINCIAL PARK
BC4
B26
B28
C26
C27
C28
C30
A22_A23_CA3_A
C30_C31_AC4_CA3_C
A19
A20
A21
AC3
AC4
A22 STEINBACH
A17C24_A18C25_B24_B25_AB
A18C25_A19_C26_AC
CA2
A21_A22_AC4_A
C26_C27_BC4_C
A19_A20_CA2_A
B26_B28_C28_C30_AC3_BC
A20_A21_AC3_A
TURTLE MOUNTAIN PROVINCIAL PARK
Bipole III Transmission Project
Project Infrastructure
Project Study Area
Alternative Route Segment Buffer (3 Mile)
Segment Rank
High
Medium
Low
No Rank
Alternative Routes (Segments)
Landbase
Community
First Nation Community
National/Provincial Park
Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 12, 2011
0 25 50 Kilometres
0 25 50 Miles
N
1:2,500,000
Alternative Route Corridor Segment/Nodes and Rankings
Map 3



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure
- Final Preferred Route
- AC Collector Line
- Preliminary Converter Station Site
- Preliminary Ground Electrode Site
- Local Study Area
- Project Study Area

Infrastructure
- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Landbase
- Community
- City / Town
- First Nation
- National/Provincial Park
- Wildlife Management Area

NES11
NES10
CHURCHILL WMA
NELSON RIVER
Broten Lake
Jackfish Island
NCS 2
NCS 1A
NCS 1B
NCS 3
NCS 4A
NCS 4B
NES1
NES2
NES3
NES4
NES5
NES6
NES7
NES8
NES9
Amery
NES13
Goose Creek
Tiny Creek
Swift Creek
Sundance Creek
Three Mile Creek
Lower Limestone Rapids
Merrick Lake
Angling River
Angling Lake
Fifer Lake
Moondance Creek
Limestone River
Twelve Mile Creek
Nine Mile Creek
McMillan Creek
Weir River
Sky Pilot Creek
Leslie Creek
Boots Creek
Brooks Creek
North Angling River
Swampy Road
Henday C.S.
FOX LAKE CREE NATION (BIRD)
Limestone G.S.
Town of Gillam
NES18
NES14
NES21
NES20
NES19
NES16
NES15
NES17
HES3a
HES3b
Long Spruce Rapids
Long Spruce G.S.
Kettle Rapids
Kettle G.S.
STEPHENS LAKE
Radisson C.S.
280
290

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 19, 2011

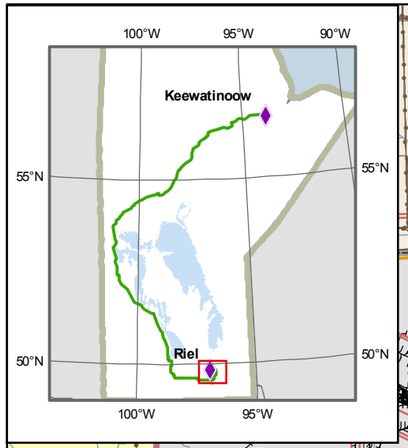
N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Alternative Northern Project Component Sites

Map 4



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Preliminary Ground Electrode Site
- Potential Ground Electrode Site
- Converter Station Site
- Local Study Area
- Project Study Area

Infrastructure

- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 14, 2011

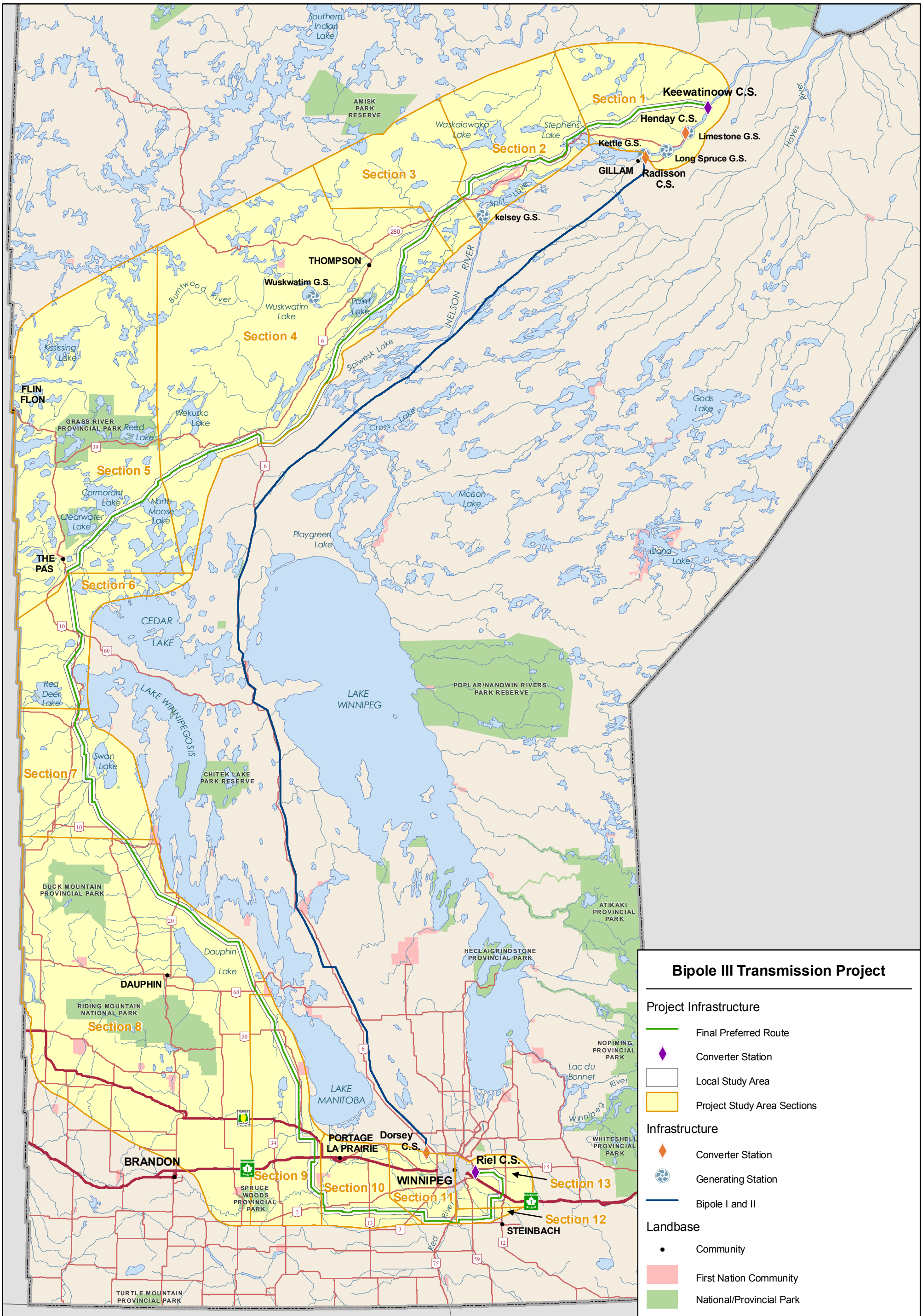
N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Alternative Southern Ground Electrode Sites

Map 5


Southern Indian Lake
AMISK PARK RESERVE
Waskaiowaka Lake
Stephens Lake
Section 1
Keewatinoow C.S.
Henday C.S.
Limestone G.S.
Kettle G.S.
Long Spruce G.S.
GILLAM
Radisson C.S.
Hayes River
Section 2
Section 3
Split Lake
kelsey G.S.
280
THOMPSON
Wuskwatim G.S.
Burntwood River
Wuskwatim Lake
Paint Lake
NELSON RIVER
Section 4
6
Kississing Lake
Sipiwesk Lake
FLIN FLON
GRASS RIVER PROVINCIAL PARK
Reed Lake
Wekusko Lake
39
Cross Lake
Gods Lake
Section 5
Cormorant Lake
North Moose Lake
Clearwater Lake
Molson Lake
Playgreen Lake
Island Lake
THE PAS
Section 6
CEDAR LAKE
10
60
LAKE WINNIPEG
POPLAR/NANOWIN RIVERS PARK RESERVE
Red Deer Lake
LAKE WINNIPEGOSIS
Swan Lake
Section 7
CHITEK LAKE PARK RESERVE
DUCK MOUNTAIN PROVINCIAL PARK
20
ATIKAKI PROVINCIAL PARK
Dauphin Lake
HECLA/GRINDSTONE PROVINCIAL PARK
DAUPHIN
68
RIDING MOUNTAIN NATIONAL PARK
Section 8
50
NOPIMING PROVINCIAL PARK
Lac du Bonnet
Winnipeg River
LAKE MANITOBA
PORTAGE LA PRAIRIE
Dorsey C.S.
Riel C.S.
BRANDON
34
Section 9
Section 10
WINNIPEG
Section 11
Section 13
WHITESHELL PROVINCIAL PARK
SPRUCE WOODS PROVINCIAL PARK
2
13
3
Red River
Section 12
STEINBACH
12
75
59
TURTLE MOUNTAIN PROVINCIAL PARK
Bipole III Transmission Project
Project Infrastructure
Final Preferred Route
Converter Station
Local Study Area
Project Study Area Sections
Infrastructure
Converter Station
Generating Station
Bipole I and II
Landbase
Community
First Nation Community
National/Provincial Park
Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 4, 2011
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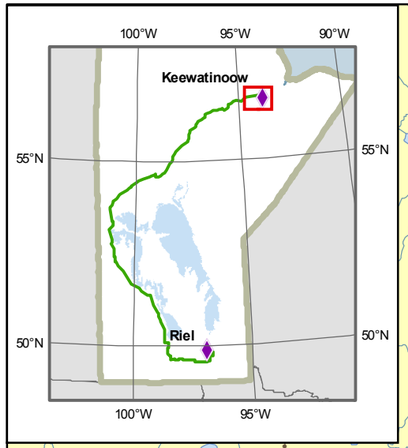
0 25 50 Miles
1:2,500,000
N
Manitoba Hydro
Final Preferred Route (Sections)
Map 6



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Construction Power (KN36)
- Ground Electrode Line
- Ground Electrode Site
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Landbase

- Community
- City / Town
- First Nation
- National/Provincial Park
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 04, 2011

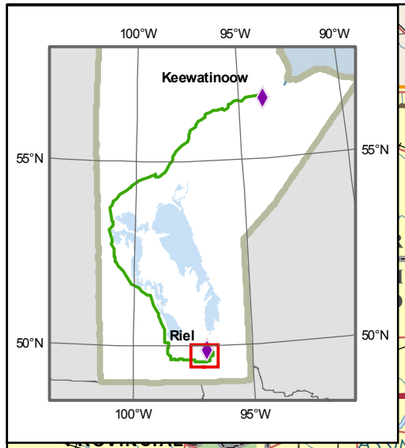
N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Preferred Keewatinoow Converter Station and Ground Electrode Site

Map 7



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- Ground Electrode Site
- Local Study Area
- Project Study Area

Infrastructure

- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 04, 2011

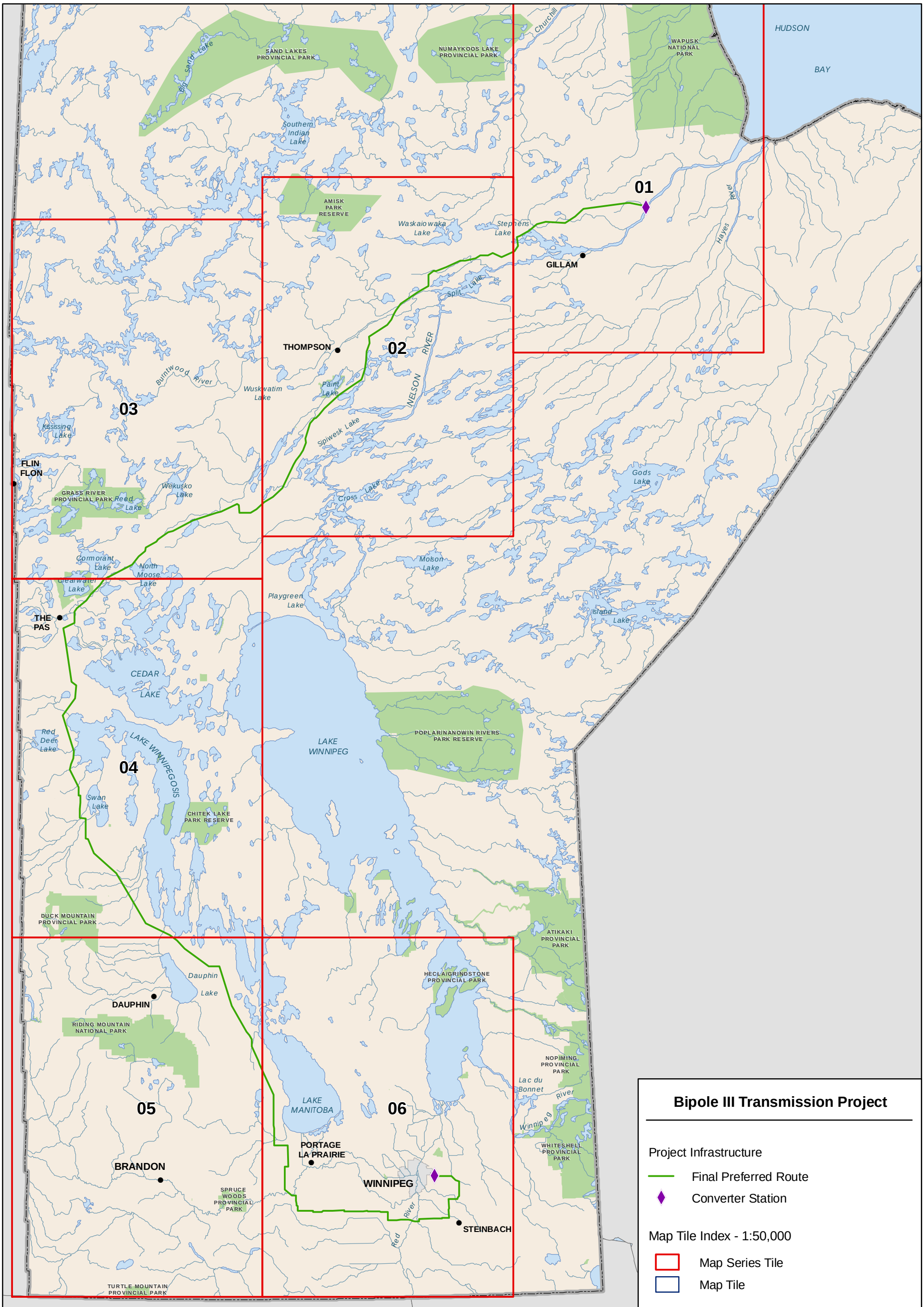
N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Riel Converter Station and Preferred Ground Electrode

Map 8



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Map Tile Index - 1:50,000

- Map Series Tile
- Map Tile

Manitoba Hydro

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB
Date Created: July 20, 2011

0 25 50 Kilometres

0 25 50 Miles

N

1:2,750,000

Index of Map Series A100

Alternative Route Segments
Land Use Constraints

Bipole III Transmission Project

Project Infrastructure

- BPIII Alternative Routes
- Converter Station
- Project Study Area
- Alternative Routes (Segments/Nodes)

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

- High
- High to Medium
- Medium to High
- Medium
- Medium to Low
- Low to Medium
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

River

Churchill

NUMAYKOOS LAKE
PROVINCIAL PARK

WAPUSK
NATIONAL
PARK

CHURCHILL WMA

NELSON RIVER

BA1

A3

B2C2

A1

B1C1

Keewatinoow C.S.

A2

FOX LAKE
FIRST NATION

Limestone G.S.

Henday C.S.

B5C5

B3C3

B4C4

BA2

Kettle G.S.

Long Spruce G.S.

Stephens Lake

Gillam

Radisson C.S.

Hayes River

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: July 20, 2011
0 6 12 Kilometres
0 6 12 Miles

N

1:750,000

Manitoba Hydro

Alternative Route Segments

Land Use Constraints

Map A 100 - 01

Bipole III Transmission Project

Project Infrastructure

- BPIII Alternative Routes
- Converter Station
- Project Study Area
- Alternative Routes (Segments/Nodes)

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

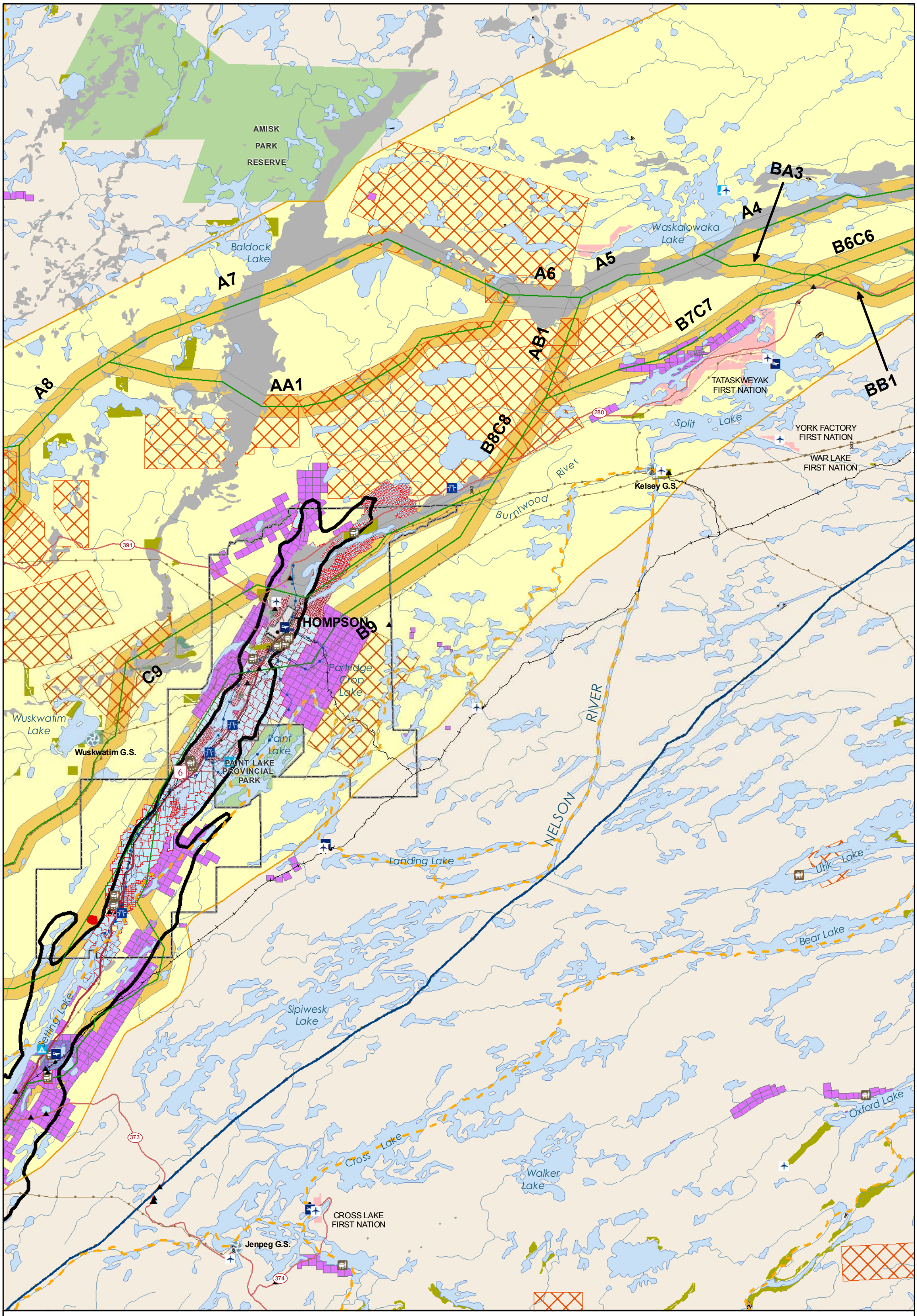
- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

- High
- High to Medium
- Medium to High
- Medium
- Medium to Low
- Low to Medium
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area


AMISK
PARK
RESERVE
Baldock
Lake
Waskaiowaka
Lake
BA3
A4
A5
A6
A7
A8
B6C6
B7C7
AB1
AA1
BB1
B8C8
TATASKWEYAK
FIRST NATION
280
Split
Lake
YORK FACTORY
FIRST NATION
WAR LAKE
FIRST NATION
River
Burntwood
Kelsey G.S.
391
THOMPSON
B9
C9
Partridge
Crop
Lake
Wuskwatim
Lake
Wuskwatim G.S.
Paint
Lake
PAINT LAKE
PROVINCIAL
PARK
6
RIVER
NELSON
Landing Lake
Utik Lake
Bear Lake
Sipiwesk
Lake
Oxford Lake
Cross Lake
373
Walker
Lake
CROSS LAKE
FIRST NATION
Jenpeg G.S.
374
N
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Date Created: July 20, 2011
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0 6 12 Miles
1:750,000
Manitoba Hydro
Alternative Route Segments
Land Use Constraints
Map A 100 - 02

Bipole III Transmission Project

Project Infrastructure

- BPIII Alternative Routes
- Converter Station
- Project Study Area
- Alternative Routes (Segments/Nodes)

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

- High
- High to Medium
- Medium to High
- Medium
- Medium to Low
- Low to Medium
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Leaf Rapids
Granville Lake
Rat Lake
Sisipuk Lake
Churchill River
MATHIAS COLOMB FIRST NATION
Highrock Lake
Nelson Lake
NISICHAWAYASIHK CREE NATION
A9
Burntwood River
AC1
Burntwood Lake
A
Kipahigan Lake
Kissising Lake
C
C10
B10
A10
B
Snow Lake
FLIN FLON
AA2
Wekusko Lake
GRASS RIVER PROVINCIAL PARK
Reed Lake
A11C11
Athapapuskow Lake
A12
Goose Lake
C12
BB2
B10G
Cormorant Forest Reserve
Cormorant Lake
Rocky Lake
CLEARWATER LAKE PROVINCIAL PARK
B11G13G
North Moose Lake

Manitoba Hydro

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: July 20, 2011
0 6 12 Kilometres
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Alternative Route Segments

Land Use Constraints

Map A 100 - 03

Bipole III Transmission Project

Project Infrastructure

- BPIII Alternative Routes
- Converter Station
- Project Study Area
- Alternative Routes (Segments/Nodes)

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
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- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

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- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
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- Mining Claims 2010
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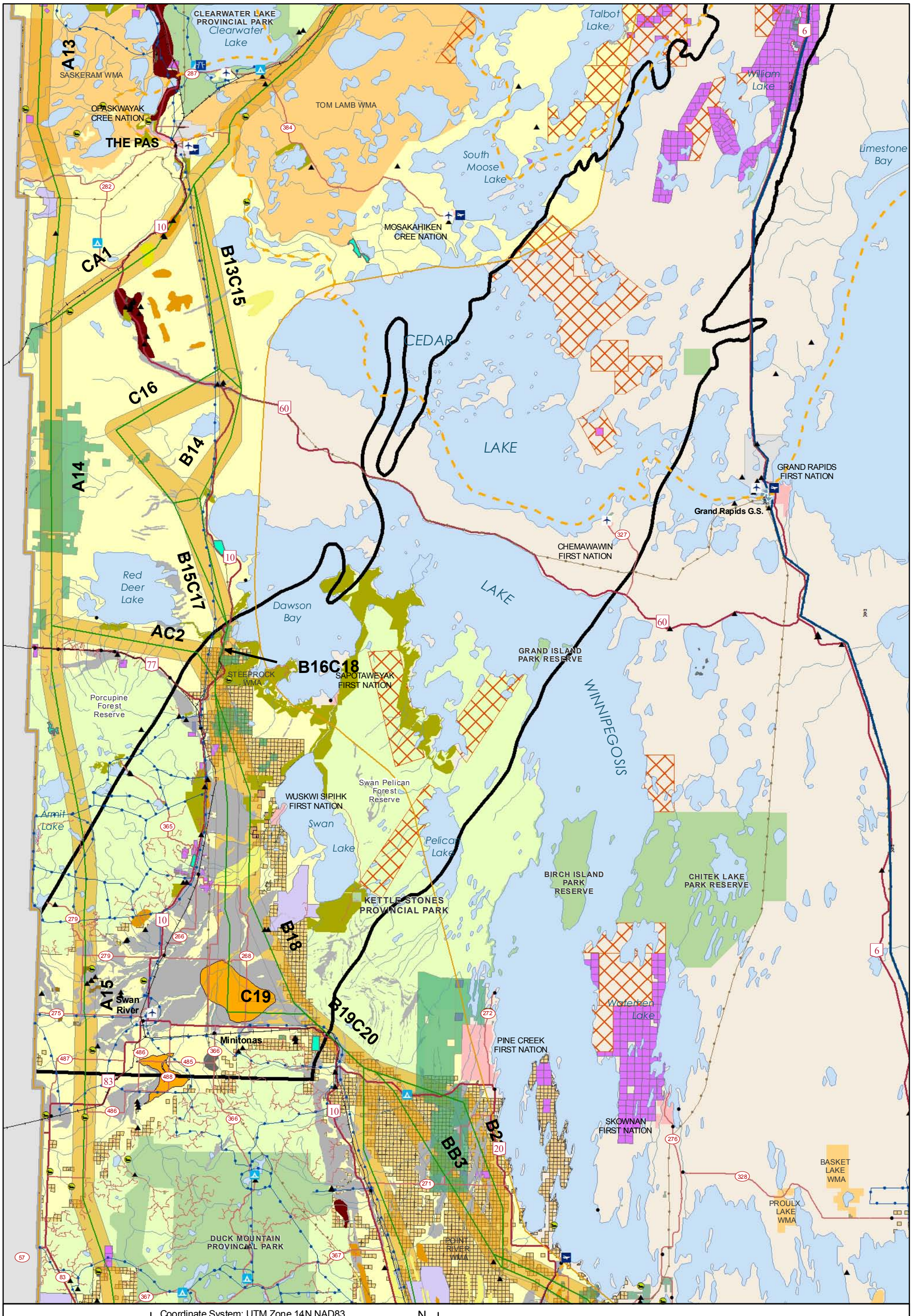
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area


CLEARWATER LAKE PROVINCIAL PARK
Clearwater Lake
Talbot Lake
William Lake
Limestone Bay
South Moose Lake
SASKERAM WMA
OPASKWAYAK CREE NATION
THE PAS
TOM LAMB WMA
MOSAKAHIKEN CREE NATION
CEDAR LAKE
GRAND RAPIDS FIRST NATION
Grand Rapids G.S.
CHEMAWAWIN FIRST NATION
Red Deer Lake
Dawson Bay
LAKE
GRAND ISLAND PARK RESERVE
WINNIPEGOSIS
STEEPROCK WMA
SAPOTAWEYAK FIRST NATION
Porcupine Forest Reserve
WUSKWI SIPIHK FIRST NATION
Swan Pelican Forest Reserve
Armit Lake
Swan Lake
Pelican Lake
BIRCH ISLAND PARK RESERVE
CHITEK LAKE PARK RESERVE
KETTLE STONES PROVINCIAL PARK
Waterhen Lake
PINE CREEK FIRST NATION
SKOWNAN FIRST NATION
BASKET LAKE WMA
PROULX LAKE WMA
DUCK MOUNTAIN PROVINCIAL PARK
POINT RIVER WMA
Swan River
Minitonas
A13
A14
A15
CA1
AC2
B13C15
B14
B15C17
B16C18
B18
B19C20
B21
BB3
C16
C19
6
10
20
57
60
77
83
266
268
272
275
276
279
282
287
328
365
366
367
384
485
486
487
488
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1:750,000
Manitoba Hydro
Alternative Route Segments
Land Use Constraints
Map A 100 - 04

Bipole III Transmission Project

Project Infrastructure

- BPIII Alternative Routes
- Converter Station
- Project Study Area
- Alternative Routes (Segments/Nodes)

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

- High
- High to Medium
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- Medium to Low
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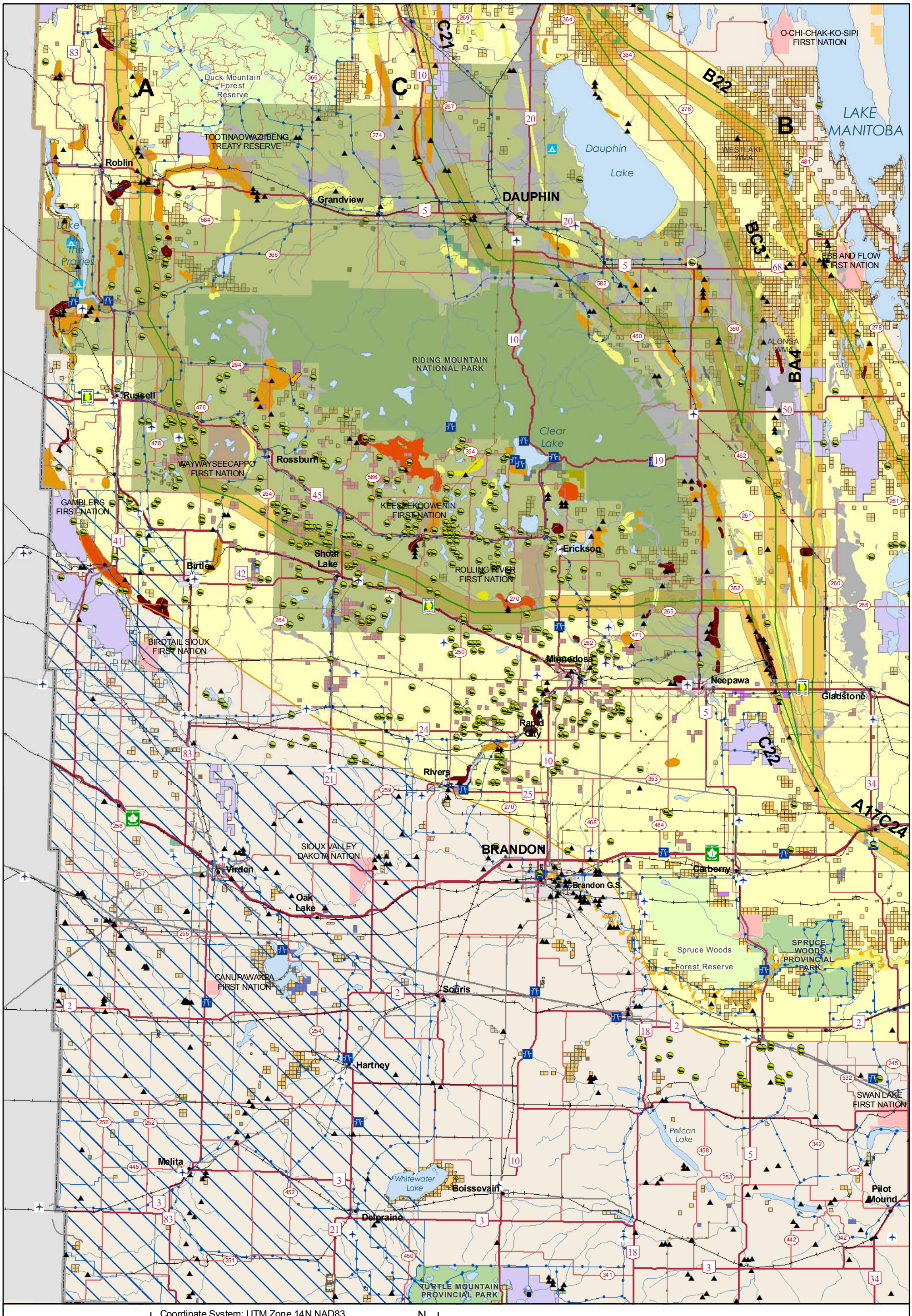
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area



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0 6 12 Miles

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Manitoba Hydro

Alternative Route Segments

Land Use Constraints

Map A 100 - 05

Bipole III Transmission Project

Project Infrastructure

- BPIII Alternative Routes
- Converter Station
- Project Study Area
- Alternative Routes (Segments/Nodes)

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

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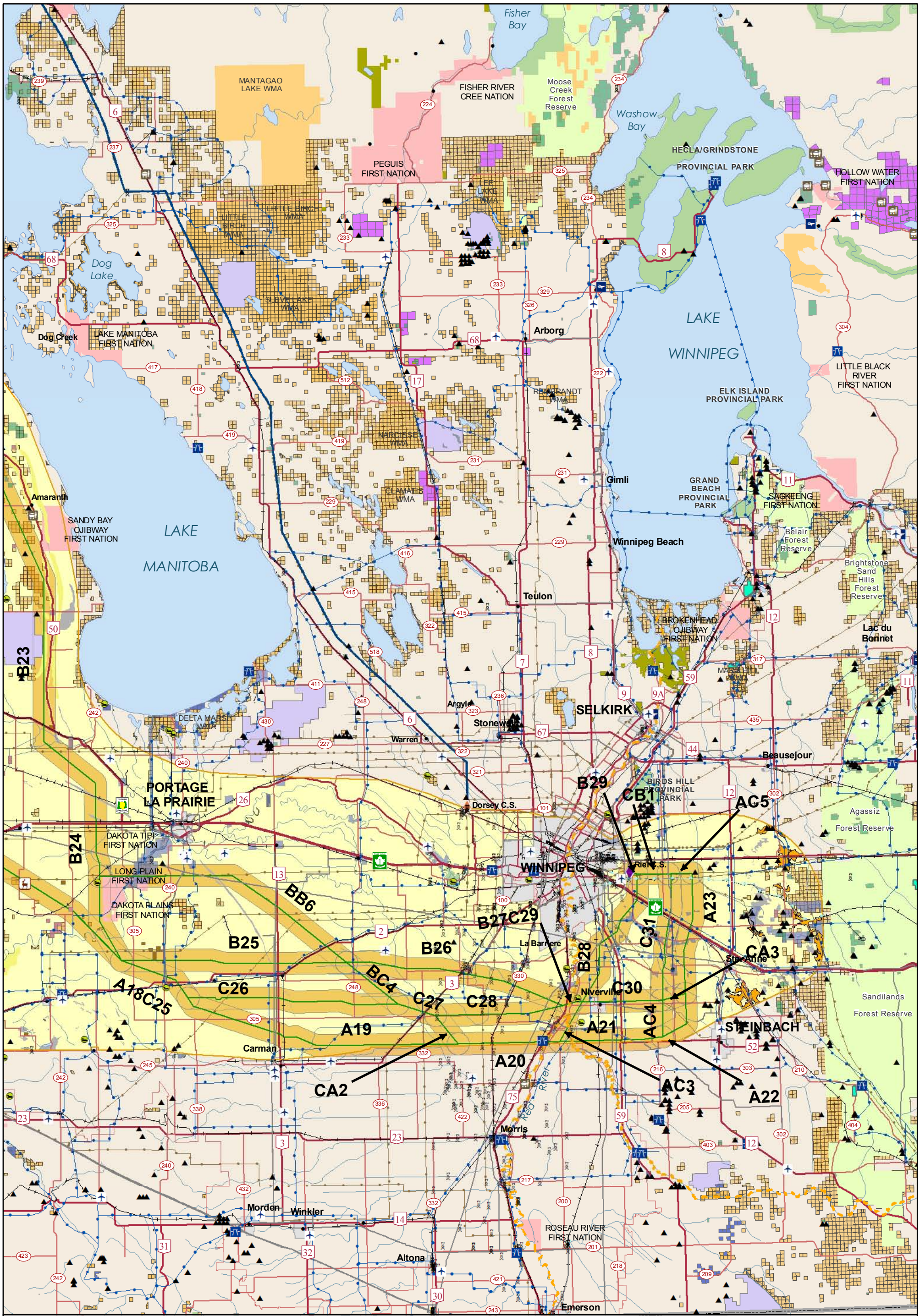
- High to Medium
- Medium to High
- Medium
- Medium to Low
- Low to Medium
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area



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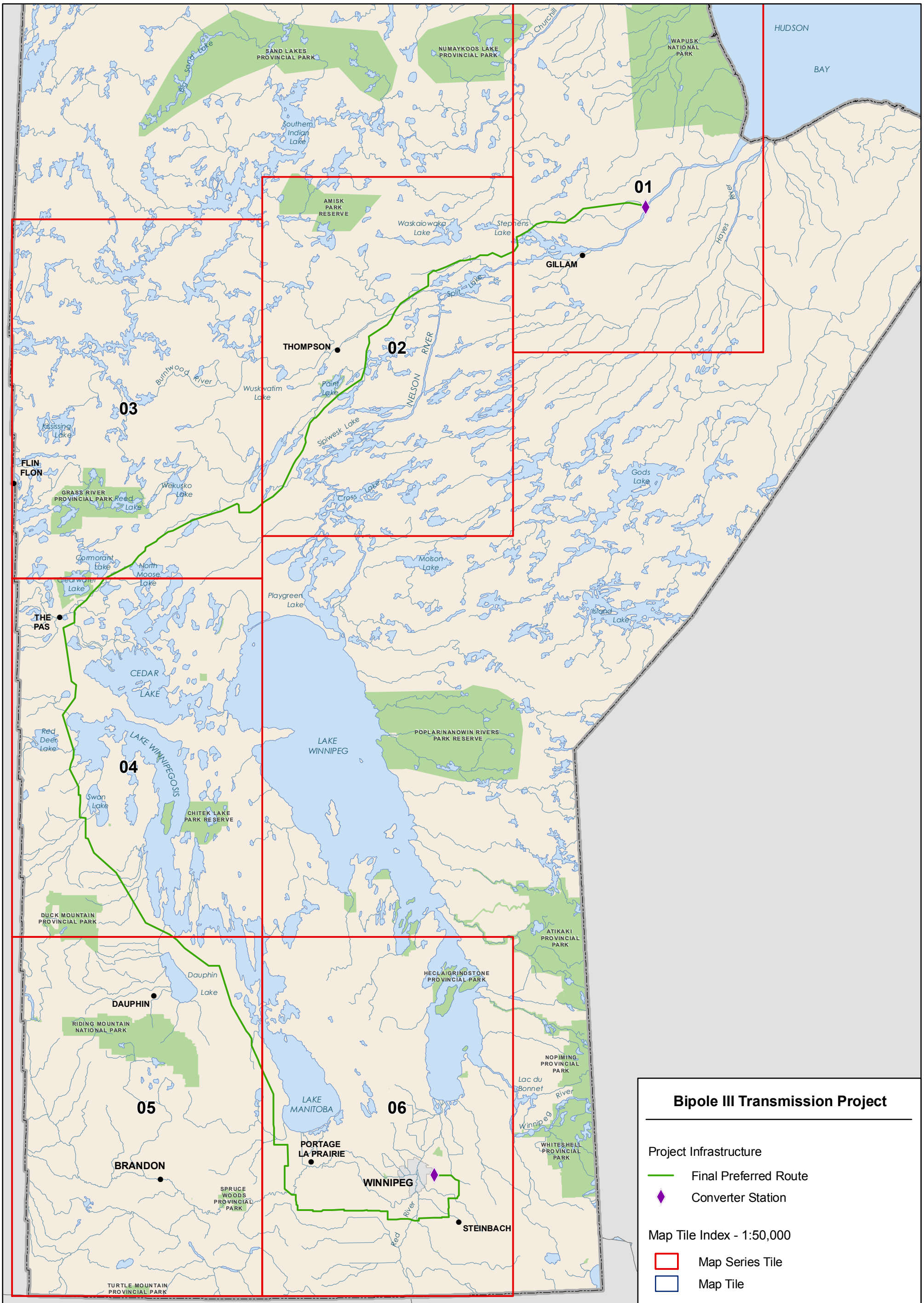
Manitoba Hydro

Alternative Route Segments

Land Use Constraints

Map A 100 - 06



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Map Tile Index - 1:50,000

- Map Series Tile
- Map Tile

Manitoba Hydro

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB
Date Created: July 20, 2011

0 25 50 Kilometres
0 25 50 Miles

N

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Index of Map Series A200

Additional Alternative Route Segments
Land Use Constraints

Bipole III Transmission Project

Project Infrastructure

- Additional Alternative Route Segments
- BPIII Alternative Routes
- Converter Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

- High
- High to Medium
- Medium to High
- Medium
- Medium to Low
- Low to Medium
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

River
Churchill
NUMAYKOOS LAKE
PROVINCIAL PARK
WAPUSK
NATIONAL
PARK
CHURCHILL WMA
NELSON RIVER
River
Hayes
Keewatinoow C.S.
FOX LAKE
FIRST NATION
Limestone G.S.
Henday C.S.
280
Kettle G.S.
Long Spruce G.S.
Stephens Lake
Gillam
Radisson C.S.
Town of Gillam

Manitoba Hydro

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: July 20, 2011
0 6 12 Kilometres
0 6 12 Miles

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Additional Alternative Route Segments

Land Use Constraints

Map A 200 - 01

Bipole III Transmission Project

Project Infrastructure

- Additional Alternative Route Segments
- BPIII Alternative Routes
- Converter Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
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- Ecological Reserve
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- Crown Lands

Aggregate Deposit Levels

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- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

AMISK PARK RESERVE
Baldock Lake
Waskaiowaka Lake
B7C7-1
TATASKWEYAK FIRST NATION
280
Split Lake
YORK FACTORY FIRST NATION
WAR LAKE FIRST NATION
B9-2
Kelsey G.S.
River
Burntwood
L.G.D of Mystery Lake
391
THOMPSON
Partridge Crop Lake
B10-1
Wuskwatim Lake
Wuskwatim G.S.
Paint Lake
PAINT LAKE PROVINCIAL PARK
6
NELSON RIVER
Landing Lake
Utik Lake
Bear Lake
Sipiwesk Lake
Oxford Lake
373
Cross Lake
Walker Lake
CROSS LAKE FIRST NATION
Jenpeg G.S.
374

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Date Created: July 20, 2011
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Manitoba Hydro

Additional Alternative Route Segments

Land Use Constraints

Map A 200 - 02

Bipole III Transmission Project

Project Infrastructure

- Additional Alternative Route Segments
- BPIII Alternative Routes
- Converter Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
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- Organic Farm Producer
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- TLE Lands
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- Ecological Reserve
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- Crown Lands

Aggregate Deposit Levels

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- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Leaf Rapids
L.G.D. of Leaf Rapids
Granville Lake
Rat Lake
Sisipuk Lake
Churchill River
MATHIAS COLOMB FIRST NATION
Highrock Lake
Nelson Lake
NISICHAWAYASIHK CREE NATION
Burntwood River
Burntwood Lake
Kipahigan Lake
Kississing Lake
Town of Snow Lake
Snow Lake
FLIN FLON
Wekusko Lake
GRASS RIVER PROVINCIAL PARK
Reed Lake
Athapapuskow Lake
Goose Lake
Cormorant Forest Reserve
Cormorant Lake
Rocky Lake
CLEARWATER LAKE PROVINCIAL PARK
North Moose Lake
B10-1
391
393
395
392
596
287
10
39
6

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1:750,000

Manitoba Hydro

Additional Alternative Route Segments

Land Use Constraints

Map A 200 - 03

Bipole III Transmission Project

Project Infrastructure

- Additional Alternative Route Segments
- BPIII Alternative Routes
- Converter Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
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- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

CLEARWATER LAKE PROVINCIAL PARK
Clearwater Lake
SASKERAM WMA
OPASKWAYAK CREE NATION
THE PAS
TOM LAMB WMA
Talbot Lake
William Lake
South Moose Lake
Limestone Bay
MOSAKAHIKEN CREE NATION
CEDAR
LAKE
WALTER COOK CAVES PARK RESERVE
L.G.D. of Grand Rapids
GRAND RAPIDS FIRST NATION
Grand Rapids G.S.
CHEMAWAWIN FIRST NATION
Red Deer Lake
Dawson Bay
LAKE
GRAND ISLAND PARK RESERVE
STEEPROCK WMA
SAPOTAWEYAK FIRST NATION
Porcupine Forest Reserve
WINNIPEGOSIS
Swan Pelican Forest Reserve
WUSKWI SIPIHK FIRST NATION
Armit Lake
Swan Lake
Pelican Lake
BIRCH ISLAND PARK RESERVE
CHITEK LAKE PARK RESERVE
KETTLESTONES PROVINCIAL PARK
Swan River
Minitonas
Waterhen Lake
PINE CREEK FIRST NATION
SKOWNAN FIRST NATION
BASKET LAKE WMA
PROULX LAKE WMA
DUCK MOUNTAIN PROVINCIAL PARK
POINT RIVER WMA
B21
B22-1

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Manitoba Hydro

Additional Alternative Route Segments

Land Use Constraints

Map A 200 - 04

Bipole III Transmission Project

Project Infrastructure

- Additional Alternative Route Segments
- BPIII Alternative Routes
- Converter Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
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- Airports/Airfields
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- Manitoba Habitat Heritage Corporation
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Aggregate Deposit Levels

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- Aggregate Deposits
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- Mining Potash 2010
- Mining Claims 2010
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- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
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Landbase

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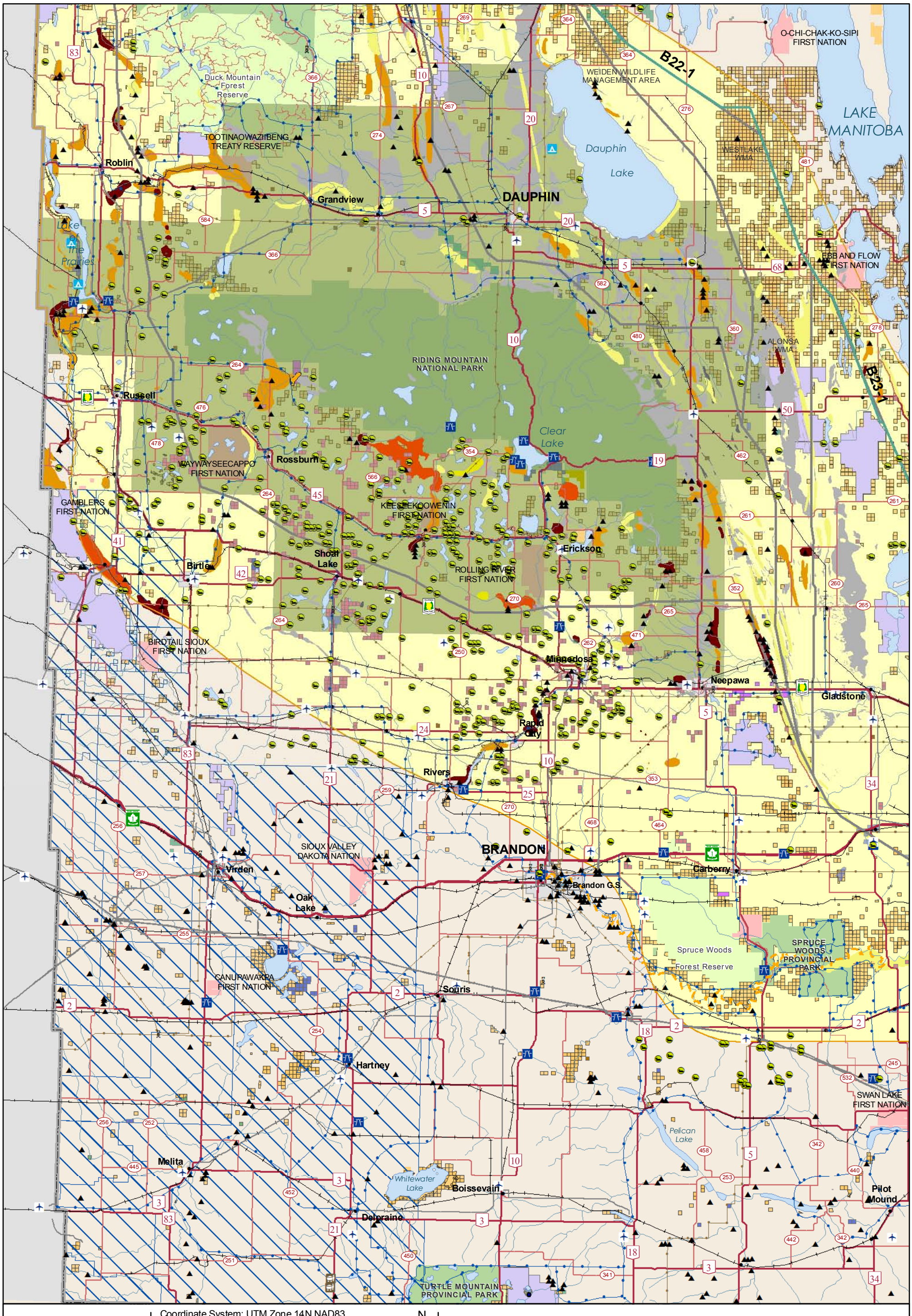

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Manitoba Hydro

Additional Alternative Route Segments

Land Use Constraints

Map A 200 - 05

Bipole III Transmission Project

Project Infrastructure

- Additional Alternative Route Segments
- BPIII Alternative Routes
- Converter Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
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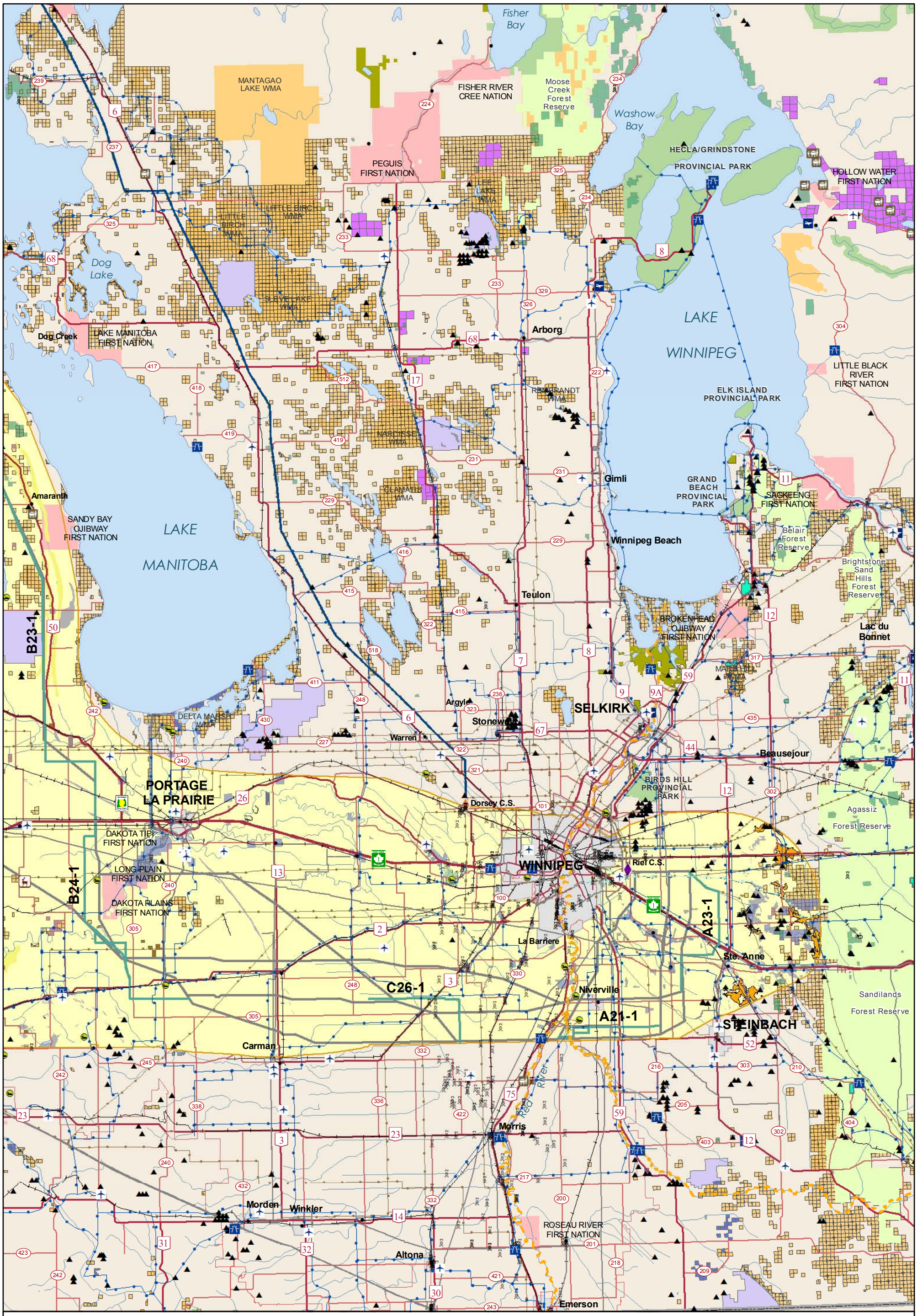

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Date Created: July 20, 2011
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0 6 12 Miles
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1:750,000

Manitoba Hydro

Additional Alternative Route Segments

Land Use Constraints

Map A 200 - 06

Bipole III Transmission Project

Project Infrastructure

- Preliminary Preferred Route Segment
- Preliminary Preferred Route
- Converter Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

- High
- High to Medium
- Medium to High
- Medium
- Medium to Low
- Low to Medium
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Wildlife Management Area

CREE NATION

AMISK PARK RESERVE

Baldock Lake

Waskaiowaka Lake

TATASKW FIRST N

Split Lake

280

Burntwood River

Kelsey G.S.

L.S.D. of Mystery Lake

391

HOMPSON

NISICHAWAYASIHK CREE NATION

Partridge Crop Lake

Wuskwatim Lake

Wuskwatim G.S.

Paint Lake

PAINT LAKE PROVINCIAL PARK

6

P1

RIVER

NELSON

Landing Lake

Setting Lake

Sipiwesk Lake

P2

373

Cross Lake

Walker Lake

CROSS LAKE FIRST NATION

Jenpeg G.S.

374

Kiskitto

Manitoba Hydro

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: July 20, 2011

0 6 12 Kilometres

0 6 12 Miles

N

1:750,000

Preliminary Preferred Route Segments P1 & P2

Land Use Constraints

Map A 1

Bipole III Transmission Project

Project Infrastructure

- Preliminary Preferred Route Segment
- Preliminary Preferred Route
- Converter Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

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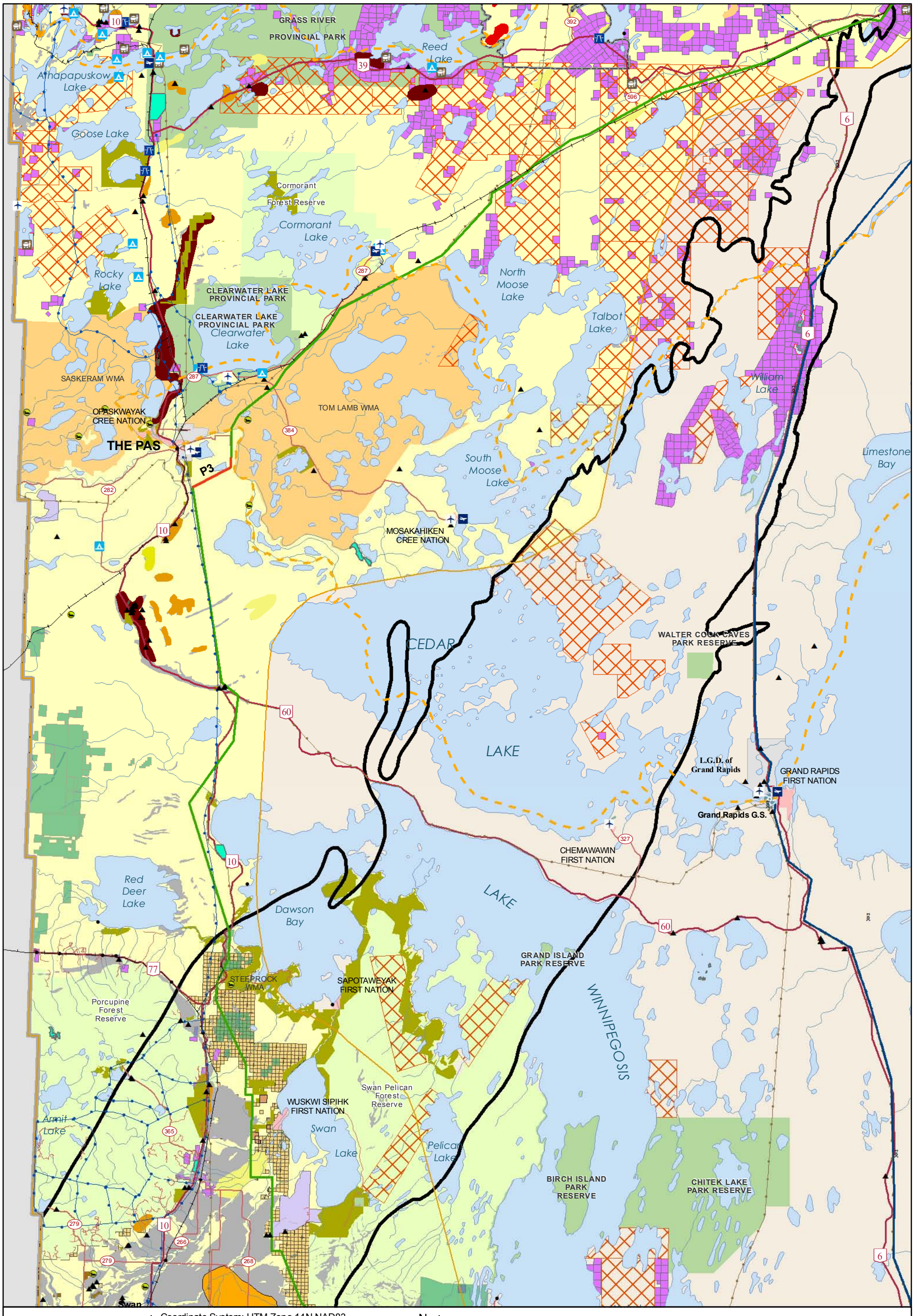
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Wildlife Management Area



Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: July 20, 2011
0 6 12 Kilometres
0 6 12 Miles

N

Manitoba Hydro

Preliminary Preferred Route Segment P3

Land Use Constraints

Map A 2

Bipole III Transmission Project

Project Infrastructure

- Preliminary Preferred Route Segment
- Preliminary Preferred Route
- Converter Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas
- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

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- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Landbase

- City / Town
- First Nation
- National/Provincial Park
- Wildlife Management Area

River
Churchill
NUMAYKOOS LAKE
PROVINCIAL PARK
WAPUSK
NATIONAL
PARK
CHURCHILL WMA
NELSON RIVER
P4
Keewatinoow C.S.
FOX LAKE
FIRST NATION
Limestone G.S.
Henday C.S.
Kettle G.S.
Long Spruce G.S.
Stephens Lake
Gillam
Radisson C.S.
Town of Gillam
Hayes River
280

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: July 20, 2011
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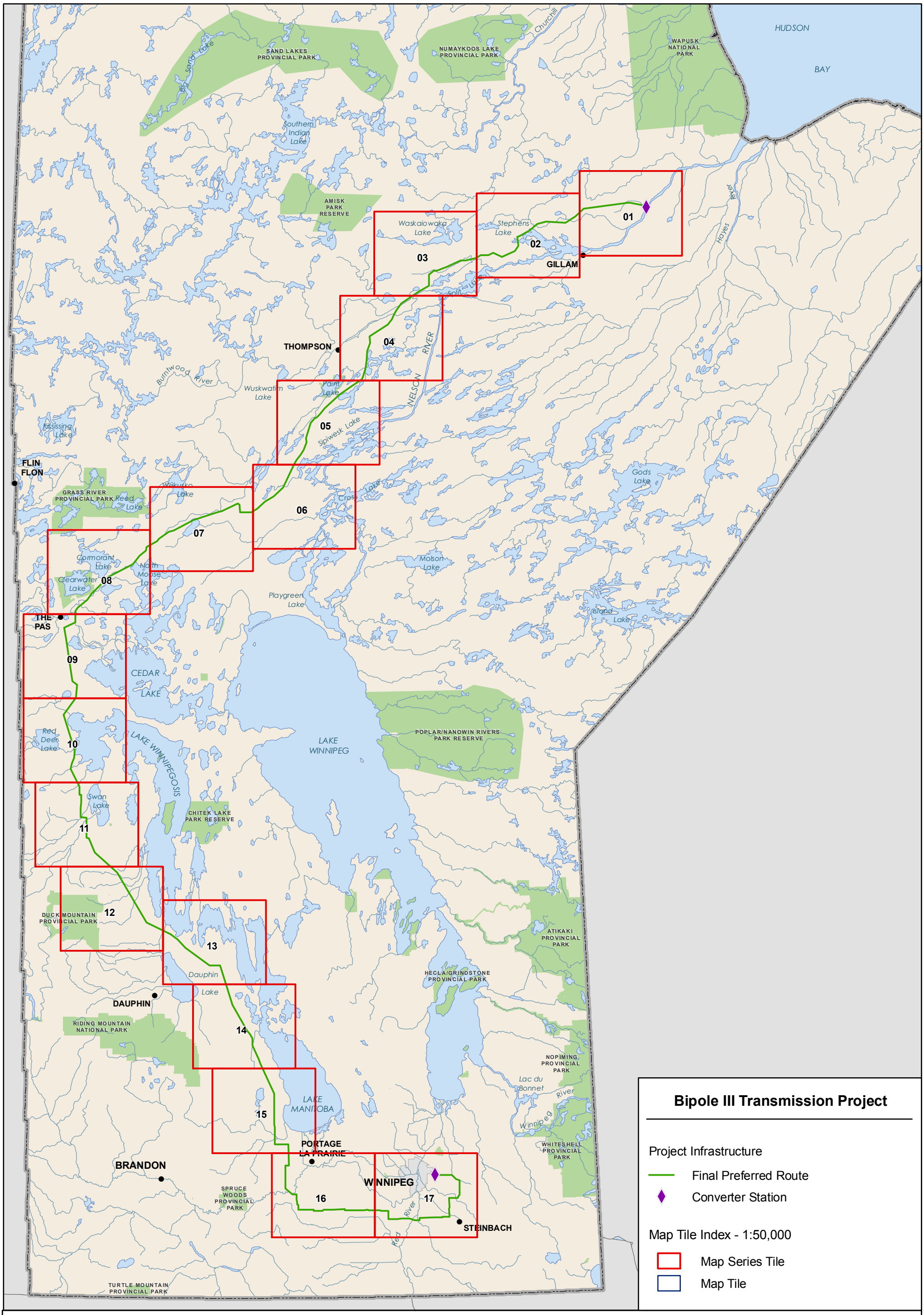
0 6 12 Miles
N

Manitoba Hydro

Preliminary Preferred Route Segment P4

Land Use Constraints

Map A 3



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Map Tile Index - 1:50,000

- Map Series Tile
- Map Tile

Manitoba Hydro

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB
Date Created: July 20, 2011

0 25 50 Kilometres

0 25 50 Miles

N

1:2,750,000

Index of Map Series A300

Final Preferred Route
Land Use Constraints

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
- Wildlife Management Area/Protected Area

- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

- High
- High to Medium
- Medium to High
- Medium
- Medium to Low
- Low to Medium
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site

Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 01

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
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- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

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- Medium to Low
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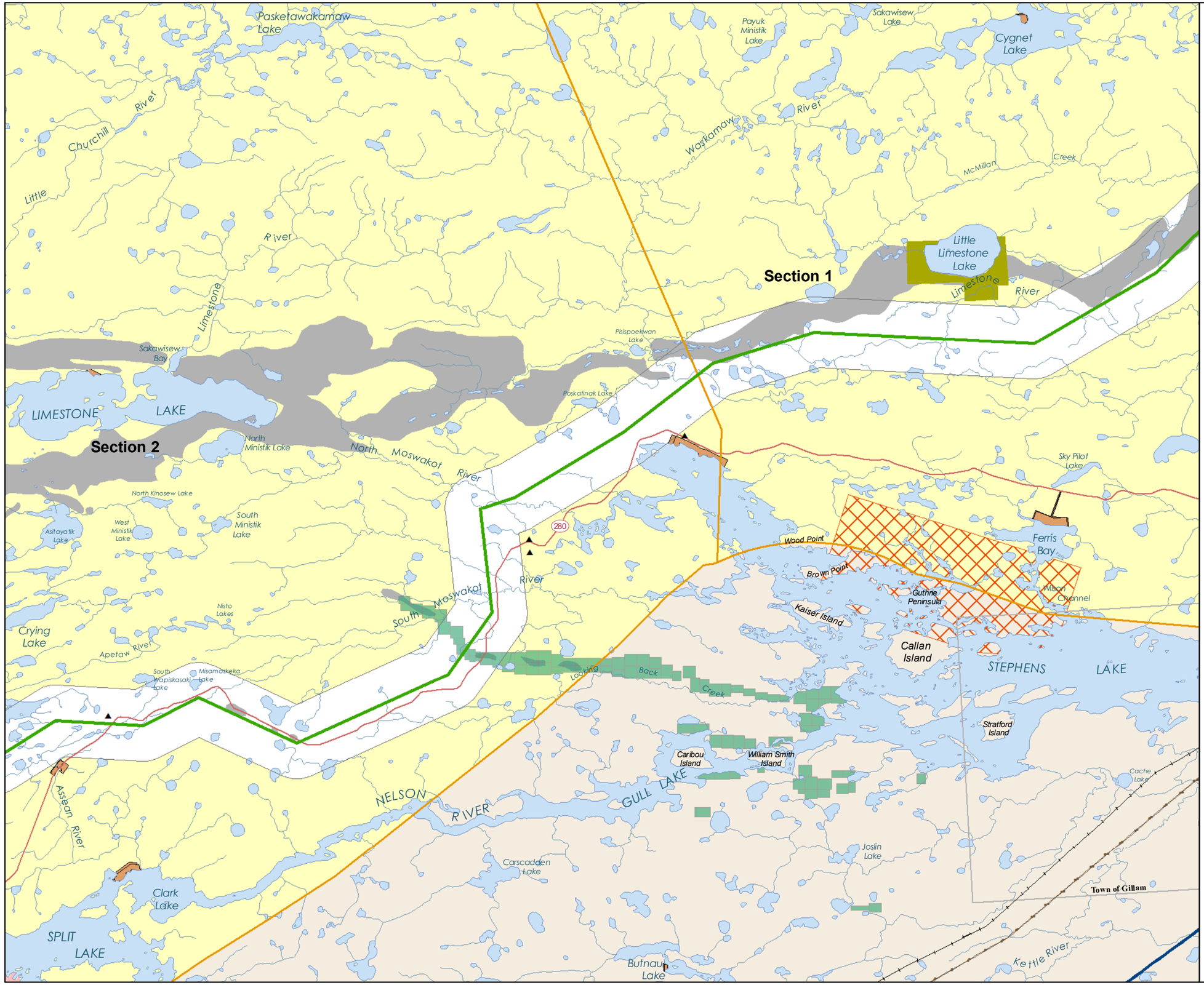
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 02

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
- Wildlife Management Area/Protected Area

- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

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- Unknown value
- Sand Deposits
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- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site

Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 03

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
- Wildlife Management Area/Protected Area

- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

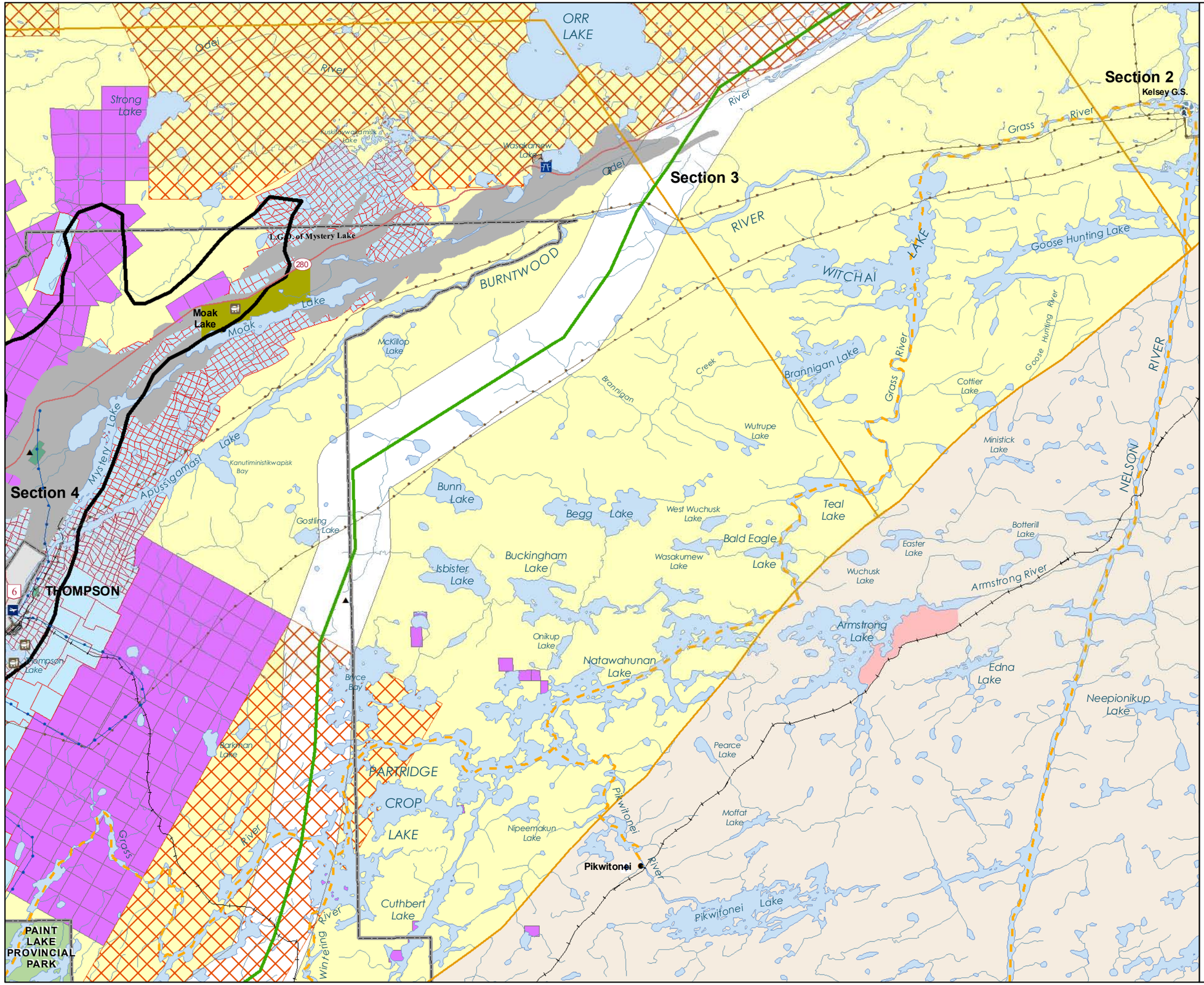
Aggregate Deposit Levels

- High
- High to Medium
- Medium to High
- Medium
- Medium to Low
- Low to Medium
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure
- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure
- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 04

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
- Wildlife Management Area/Protected Area

- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

- High
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- Aggregate Deposits
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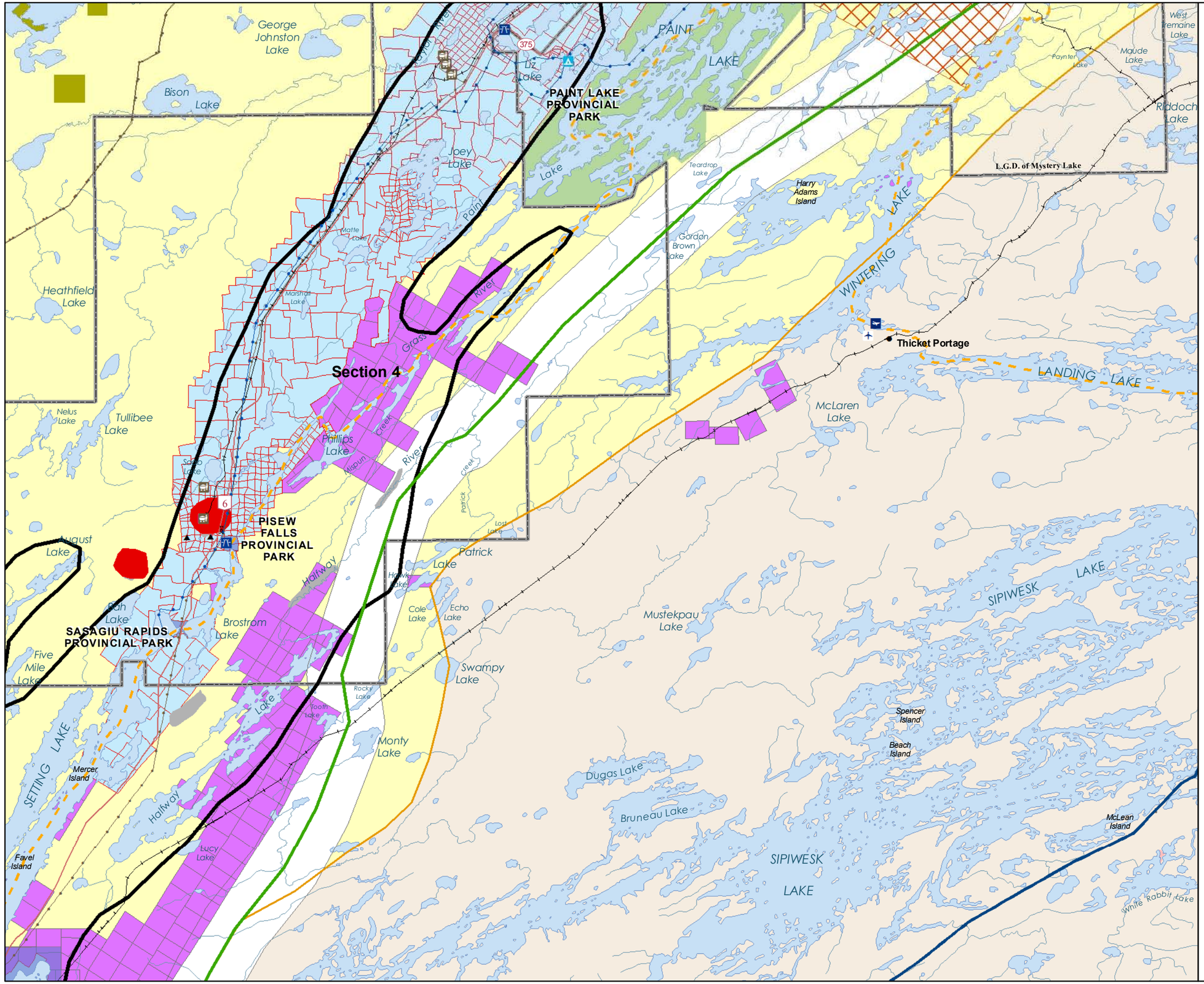
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure
- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure
- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles
1:250,000

Final Preferred Route
Land Use Constraints

Map A 300 - 05

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
- Wildlife Management Area/Protected Area

- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

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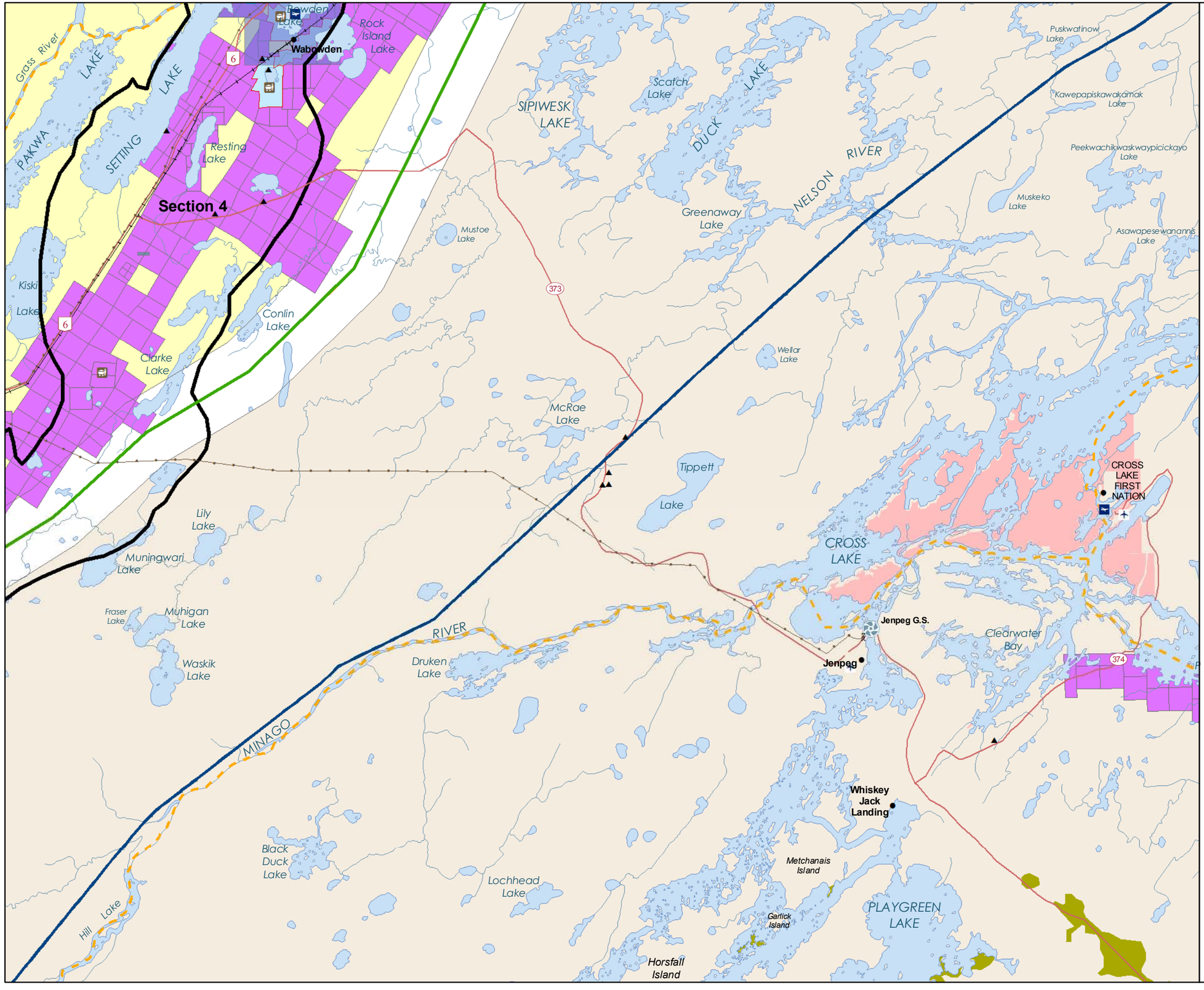
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 06

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
- Wildlife Management Area/Protected Area

- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
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- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

Aggregate Deposit Levels

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- Aggregate Deposits
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- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site

Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

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Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 07

Section 4

Section 5

GRASS RIVER PROVINCIAL PARK

L.G.D. of Snow Lake

WEKUSKO LAKE

HARGRAVE LAKE

NORTH MOOSE LAKE

Herb Lake Landing

Weskusko

Dyce

Grass River

Tramping Lake

Monet Lake

Burnt Lake

Watch Lake

Watts River

Buzz Lake

Hubick Lake

Walters Lake

Lindsay Lake

Langton Lake

Farwell Lake

Pattmarche Lake

Norski Lake

Hargrave River

Saruk Lake

Dyce Lake

Okatakunusk Lake

Limestone Bay

Wolverine Island

Muskeg Lake

Gladish Lake

392

39

7

596

6

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
- Wildlife Management Area/Protected Area

- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
- Community Pasture
- Crown Lands

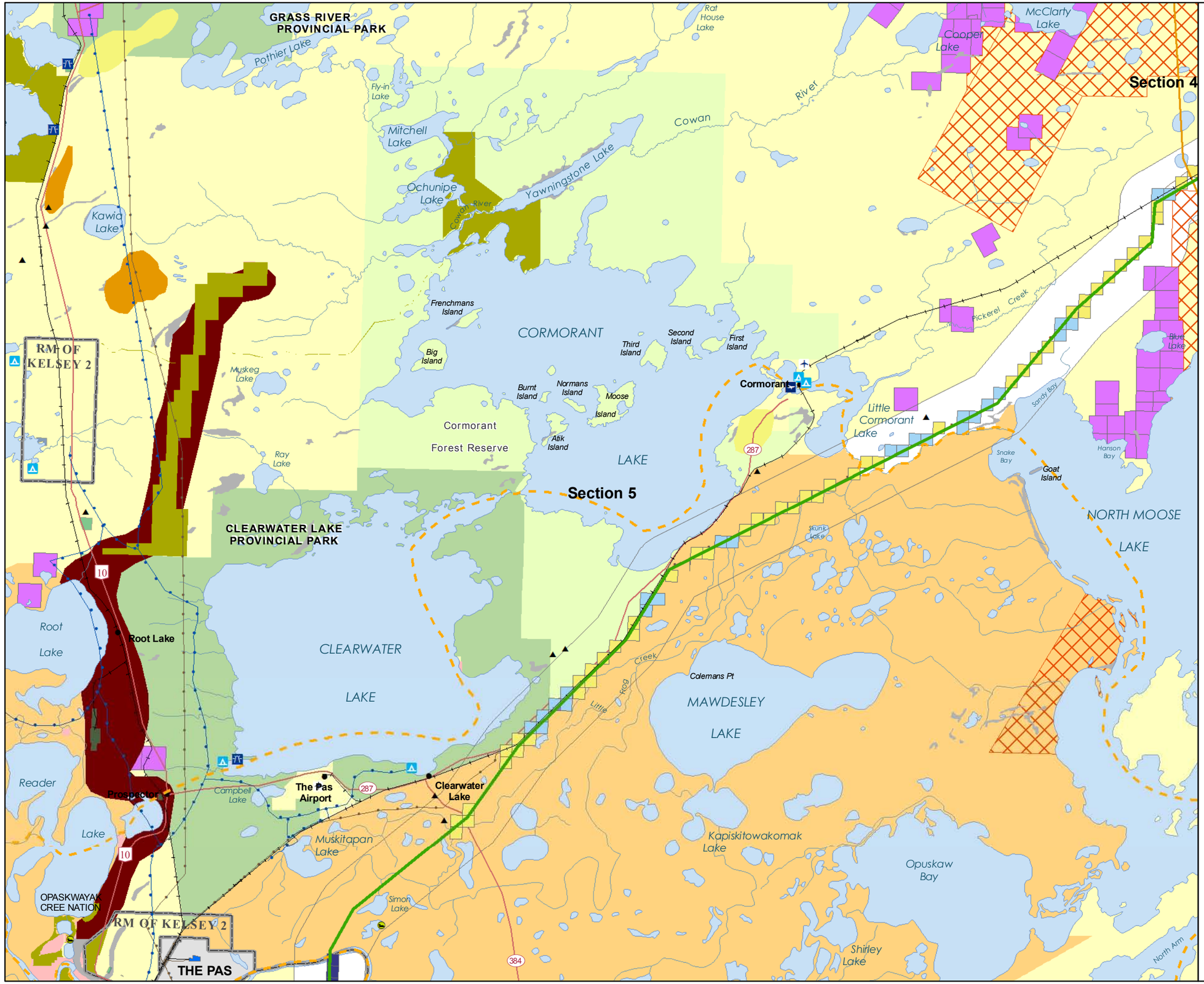
Aggregate Deposit Levels

- High
- High to Medium
- Medium to High
- Medium
- Medium to Low
- Low to Medium
- Low
- Unknown value
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 08

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
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- Ecological Reserve
- Community Pasture
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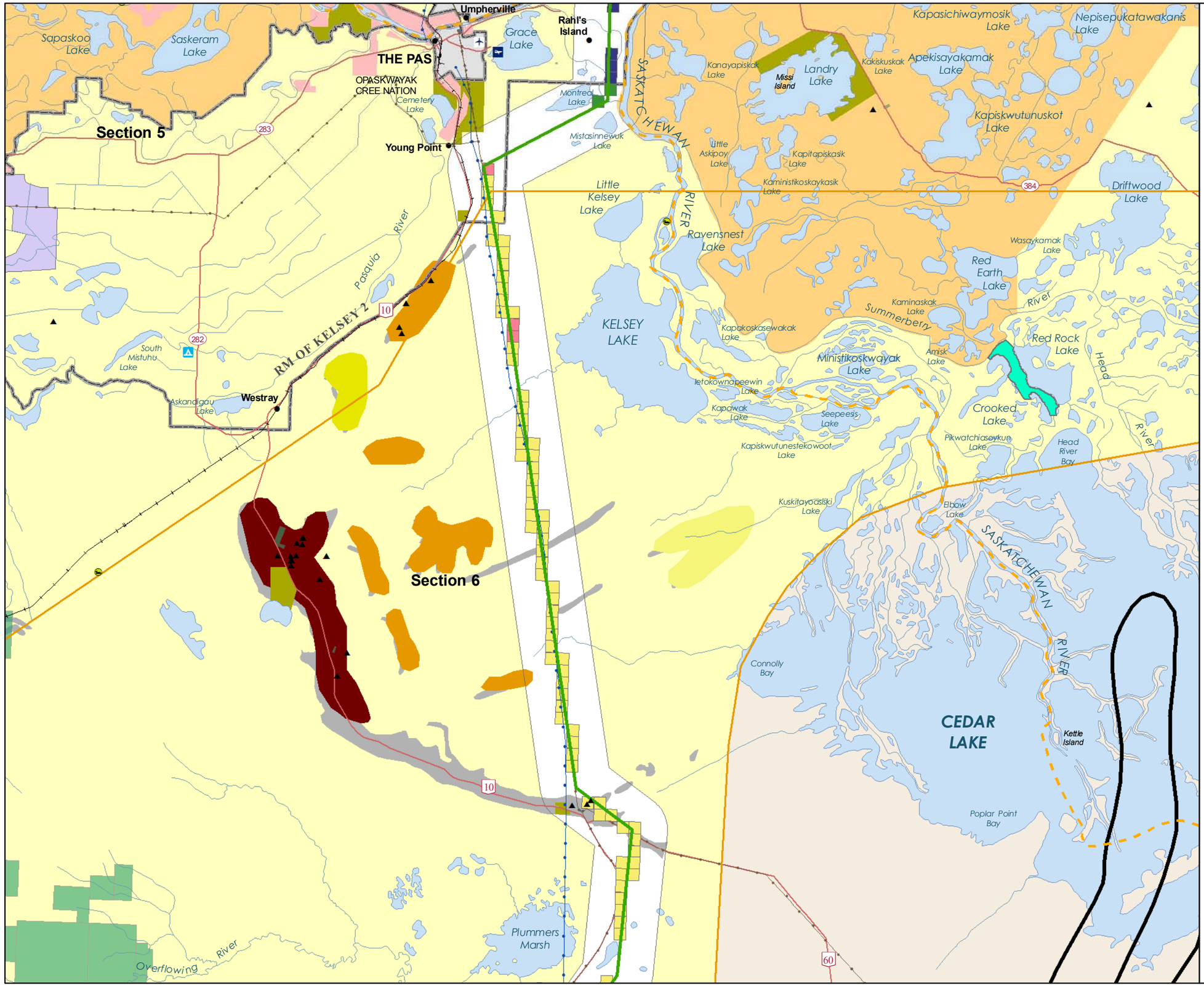
- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 09

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
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- Wildlife Management Area/Protected Area

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- Other Conservation Lands
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- TLE Lands
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Aggregate Deposit Levels

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- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site

Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 10

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
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- Hay and Grazing
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- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

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- Remote Cottage
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- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

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- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site

Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
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- First Nation
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Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 11

Section 7

NORTH STEEPROCK LAKE PROVINCIAL PARK
BELL LAKE PROVINCIAL PARK
PRIMROSE PROVINCIAL PARK
SWAN RIVER PROVINCIAL PARK
KETTLE STONES PROVINCIAL PARK
Porcupine Forest Reserve
Swan-Pelican Forest Reserve
SAPOTAWEYAK CREE NATION
WUSKWI SIPIHK FIRST NATION
RM OF SWAN RIVER
RM OF MOUNTAIN NORTH
RM OF MINITONAS
RM OF MOUNTAIN SOUTH
Bellsite
Indian Birch
Birch River
Lenswood
Bowsman
Renwer
MINITONAS
SWAN RIVER
Briggs Spur
SWAN LAKE
PELICAN LAKE
North Steeprock Lake
South Steeprock Lake
Bell Lake
Fishtown Creek
Indian River
Plum Lake
Poplar Creek
Duck Lake
Pelican River
Dunoya Island
Rush Lake
Broken Stove Lake
Hughes Lake
Spence Lake
Drake River
Bowsman River
Birch River
Woody River
Swan River
Roaring River
Sinclair River
West Fork River
East Fork River
10
365
268
266
279
275
83
486
488
366

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
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- Mining Quarry Leases 2010
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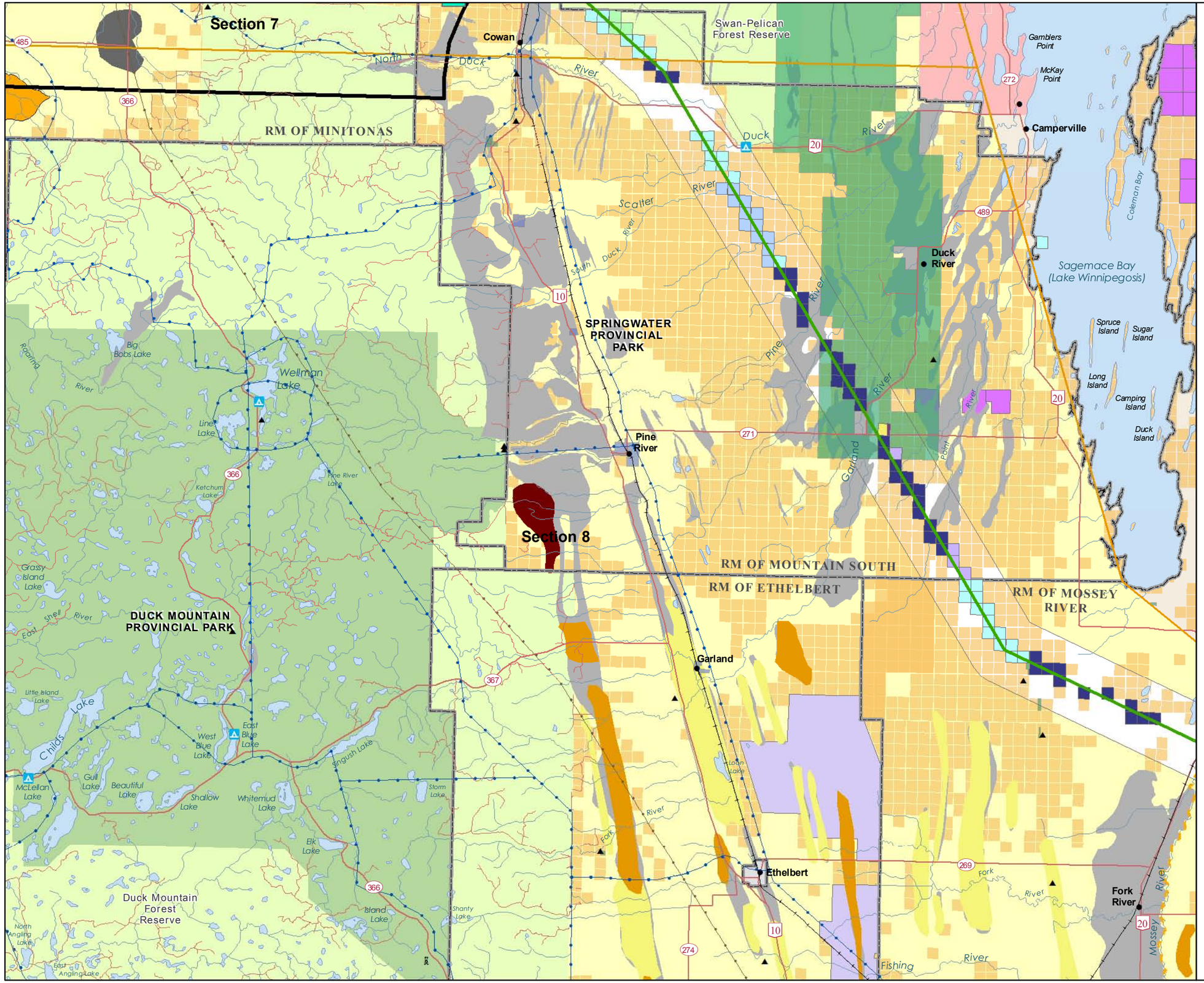
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure
- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure
- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route
Land Use Constraints

Map A 300 - 12

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
- Forest Management/Mineral Extraction/ Wildlife/Fisheries/Hay and Grazing
- Forest Management/Provincial Forest
- Hay and Grazing
- Water Management
- Wildlife/Natural Lands
- Wildlife Management Area/Protected Area

- Organic Farm Producer
- Other Conservation Lands
- Municipal Development Area
- TLE Lands
- Manitoba Habitat Heritage Corporation
- Riding Mountain Biosphere Reserve
- Ecological Reserve
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Aggregate Deposit Levels

- High
- High to Medium
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- Medium to Low
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- Sand Deposits
- Aggregate Deposits
- Mining Patent Claims 2010
- Mining Potash 2010
- Mining Claims 2010
- Mining Quarry Leases 2010
- Mining Mineral Leases 2010
- Mineral Exploration Licenses 2010
- Thompson Nickel Belt Boundary

Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
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- Trappers Cabin
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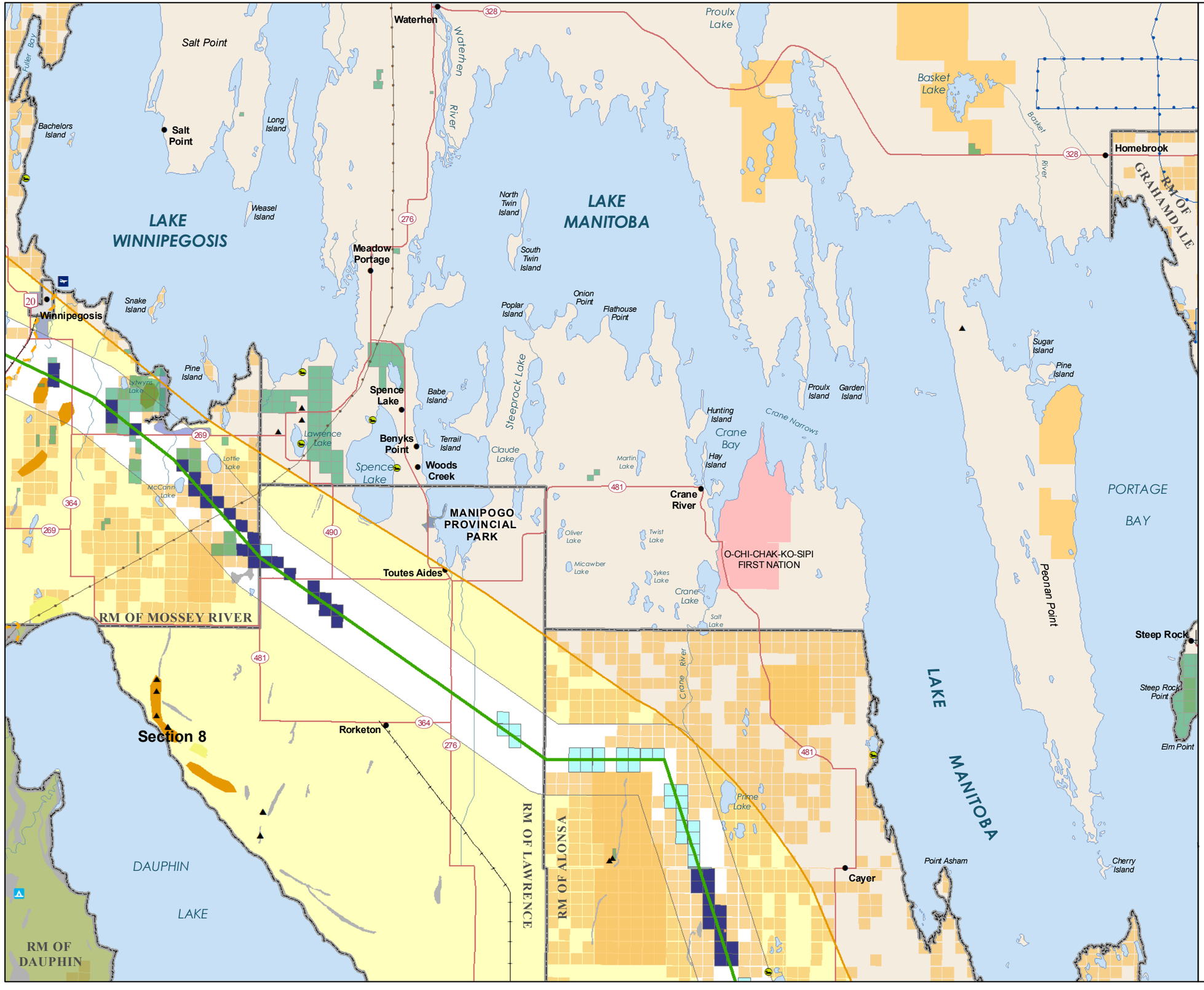

Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure
- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure
- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

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Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles
1:250,000

Final Preferred Route
Land Use Constraints

Map A 300 - 13

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
- Railway
- Aquaduct
- TransCanada Trail
- Snowmobile Trail
- Canoe Trail
- Fee Simple Lands
- Recreation Park Space / Cultural Areas

Crown Land Designation

- Community Pasture/ Agriculture Crown Lands Leased
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- Mineral Exploration Licenses 2010
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Crown Land Encumbrance

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- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
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Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

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Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles
1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 14

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
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Crown Land Encumbrance

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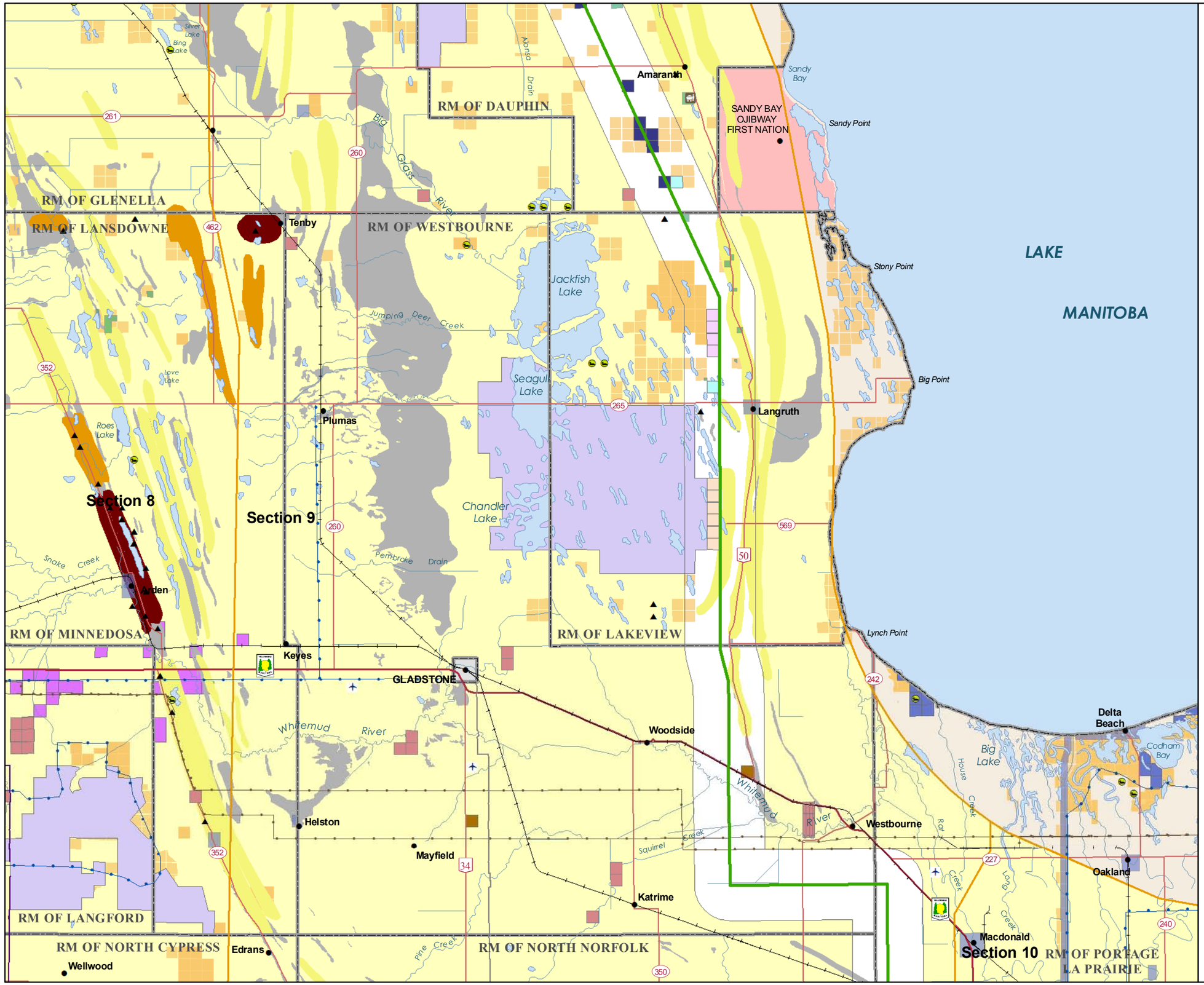

Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

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Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 15

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
- Ducks Unlimited Projects
- Pipeline
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Crown Land Encumbrance

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- Trappers Cabin
- Waste Disposal Site

Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
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- Ground Electrode Line
- Ground Electrode Site
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- Construction Power Site
- Construction Camp Site
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- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

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- Rural Municipality
- First Nation
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Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 16

Bipole III Transmission Project

Land Use Constraints

- Recreation Heritage Parks
- Communication Towers
- Mining Sites/Properties
- Quarries and Pit Locations
- Manitoba Wildlife Federation Habitat
- Lodges and Outcamps
- Seaplane Base
- Picnic Sites
- Airports/Airfields
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- Mineral Exploration Licenses 2010
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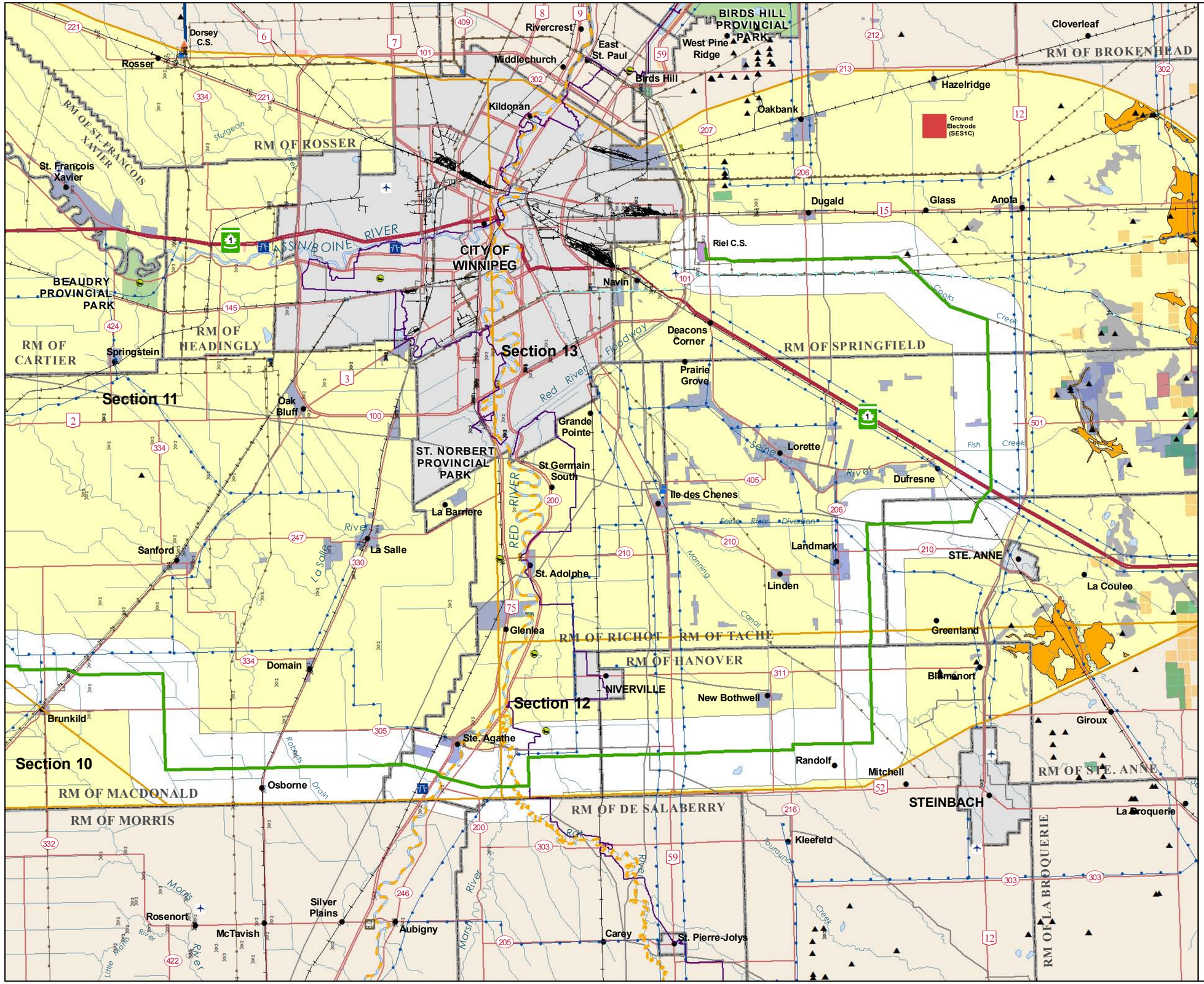
Crown Land Encumbrance

- Recreational Lot / Special Recreational Lot
- Remote Cottage
- Commercial Lot
- Ducks Unlimited Canada Project
- Forage
- Recreational Trails

- Renewable Grazing
- Right Of Way or Easement
- Transmission Line
- Trappers Cabin
- Waste Disposal Site



Manitoba Hydro

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park
- Provincial Forest
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN, MGS, DU, JORO, CPAWS
Date Created: November 7, 2011

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Final Preferred Route

Land Use Constraints

Map A 300 - 17