Keeyask Infrastructure Project
Environmental Assessment Report

Keeyask Hydropower Limited Partnership

JULY 2009

5900345 MANITOBA LTD.

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0221-A-91-110

July 31, 2009

Ms. Tracey Braun
Director of Environmental Approvals
Environmental Assessment and Licensing Branch
Manitoba Conservation
160-123 Main Street
Winnipeg, MB R3C 1A5

Dear Ms. Braun

RE: KEEYASK INFRASTRUCTURE PROJECT – ENVIRONMENT ACT PROPOSAL FORM (EAPF)

The Keeyask Hydropower Limited Partnership, by its General Partner 5900345 Manitoba Ltd., submits this Environment Act Proposal Form for environmental approval for the Keeyask Infrastructure Project. The Partnership is a legal entity established by Manitoba Hydro and its Keeyask Cree Nation partners, who are:

- Tataskweyak Cree Nation (TCN) and War Lake First Nation (WLFN), acting together as the Cree Nation Partners (CNP);
- York Factory First Nation (YFFN); and
- Fox Lake Cree Nation (FLCN).

The Keeyask Infrastructure Project is being undertaken at this time to achieve the following objectives:

- To provide early business opportunities for the Keeyask Cree Nations.
- To provide early and more employment opportunities for First Nation members, northern Aboriginal people and other northern and Manitoba workers.
- To provide more time for Cree Nation businesses to develop their management capacities.
- To respond to present economic conditions to complete these works on a more cost-effective basis.
- To accelerate investment to support the promotion of sustainable growth in the Province of Manitoba.
- To provide for timely and efficient construction of the Keeyask Generating Station, should the Partnership decide to proceed with that project, and if and when an application is made and received for regulatory approval to construct and operate that project.

It is the Partnership's understanding that the proposed Project constitutes the following Class 2 developments under the Manitoba *Environment Act*:

- A 25-km all-weather gravel road in a new location (Manitoba Regulation 164/88).
- A wastewater treatment facility for a start-up construction camp with wastewater flows in excess of 10,000 L/d (Manitoba Regulation 164/88 and Manitoba Regulation 83/2003).

The Partnership further believes the *Canadian Environmental Assessment Act* (CEAA) does not apply to the Project. Formal confirmation of this premise is being determined with the appropriate federal departments.

We attach the following to support our application:

- A completed EAPF.
- An EA Report, including a description of the Project and the environmental assessment, as well as an Executive Summary and Access Management Plan
- A preliminary Environmental Protection Plan.
- Payment for Class 2 Development Review Fee ($5,000)

Because consultation with potentially affected parties, a heritage study of the camp area, and field tests related to the wastewater treatment facility are currently ongoing, we anticipate that a Supplemental Filing of the results these activities will be provided to you in the next month.

We trust this submission provides the necessary information for you to proceed with the environmental review of this proposed project.

Yours truly

5900345 Manitoba Ltd.
as general partner of the
Keeyask Hydropower Limited Partnership

Per:

K.R.F. Adams
President

Attachments

Environment Act Proposal Form

Manitoba Conservation

Name of the development: Keeyask Infrastructure Project	
Type of development per Classes of Development Regulation (Manitoba Regulation 164/88): All-Weather Road (Class 2); Sewage-Treatment Plant (Class 2)	
Legal name of the proponent of the development: Keeyask Hydropower Limited Partnership, represented by the General Partner, 5900345 Manitoba Ltd.	
Location (street address, city, town, municipality, legal description) of the development: Located on Crown Lands approximately 180 km northeast of Thompson and approximately 40 km southwest of Gillam. It is expected the land required for the Project will be converted to private ownership.	
Name of proponent contact person for purposes of the environmental assessment: Ryan Kustra	
Phone: (204) 360-4334 Fax: (204) 360-6131	Mailing address: 360 Portage Avenue (15) Winnipeg, MB R3C 0G8
Email address: rkustra@hydro.mb.ca	
Webpage address:	
Date: July 31, 2009	Signature of proponent, or corporate principal of corporate proponent: Printed name: KRF Adams

A complete **Environment Act Proposal (EAP)** consists of the following components:

- **Cover letter**
- **Environment Act Proposal Form**
- **Reports/plans supporting the EAP** (see "Information Bulletin - Environment Act Proposal Report Guidelines" for required information and number of copies)
- **Application fee** (Cheque, payable to Minister of Finance, for the appropriate fee)

Per Environment Act Fees Regulation (Manitoba Regulation 168/96):

Class 1 Developments $500
Class 2 Developments $5,000
Class 3 Developments:
Transportation and Transmission Lines.....$5,000
Water Developments $50,000
Energy and Mining.....$100,000

Submit the complete EAP to:

Director
Environmental Assessment and Licensing Branch
Manitoba Conservation
Suite 160, 123 Main Street
Winnipeg, Manitoba R3C 1A5

For more information:
Phone: (204) 945-7100
Fax: (204) 945-5229
Toll Free: 1-800-282-8069, ext. 7100
http://www.gov.mb.ca/conservation/eal

1.0 SUMMARY DESCRIPTION OF THE DEVELOPMENT AND ENVIRONMENT

1.1 CERTIFICATE OF TITLE

The lands involved in this Project are all provincial Crown lands. The intent of the proponent is to have these lands purchased and converted to private ownership.

1.2 MINERAL RIGHTS

The Province of Manitoba is the owner of the mineral rights.

1.3 DESCRIPTION OF EXISTING LAND USE

The proposed Project is located in the boreal forest region of northern Manitoba. The area involved is part of the Split Lake Resource Management Area. The Project area involved includes a portion of Trapline #15. There are several trapper cabins in the general area. The area is otherwise uninhabited and used mainly for the exercise of Aboriginal and Treaty rights. There are numerous trails that cross the Project footprint area that are used for snowmobiling access and resource harvesting activities. An existing winter trail generally follows the proposed road alignment on an existing esker.

1.4 THE PROPOSED DEVELOPMENT

The proposed Keeyask Infrastructure Project consists of the construction of a start-up camp capable of accommodating approximately 125 people, construction of an approximately 25-kilometre two-lane gravel road, and construction of a 500-person camp (the first phase of a main camp) on the north side of Gull Rapids. With the exception of the start-up camp, the proposed Project does not include the operation of the infrastructure. Limited maintenance will be performed on the facilities. There may be occasions where access to the facilities would be used on a limited basis for engineering and environmental studies. The start-up camp will be decommissioned at the end of the Project and most of the buildings will be removed. Selected buildings will remain to become a part of a maintenance yard upon completion of the road.

In summary, the three main components of the proposed Keeyask Infrastructure Project are the following:

- A temporary start-up camp, with associated wastewater treatment facility, to accommodate about 125 people (construction workers and staff).
- A 25-km two-lane all-weather gravel road from Kilometre 174 on PR 280 (about 185 km east-northeast from Thompson), extending to the north shore of Gull Lake.
- Phase One of a main camp where pre-engineered buildings, including prefabricated bunkhouses for future workforce accommodations, along with associated utilities and a fuel tank farm for future use. These facilities will not be operated.

It is the Partnership's understanding that the proposed Project constitutes the following Class 2 developments under *The Environment Act* (Manitoba):

- A 25-km all-weather gravel road in a new location (Manitoba Regulation 164/88).
- A wastewater treatment facility for a start-up construction camp with wastewater flows in excess of 10,000 L/d (Manitoba Regulation 164/88 and Manitoba Regulation 83/2003).

1.5 DESCRIPTION OF POTENTIAL EFFECTS

The Keeyask Hydropower Limited Partnership has conducted an Environmental Assessment (EA) of the proposed Project.
The attached EA contains the following:

Executive Summary
1.0 Introduction
- 1.1 Overview
- 1.2 Project Need And Purpose
- 1.3 Scope Of The Project
- 1.4 Scope Of The Asessment

2.0 Project Description
- 2.1 Overview
- 2.2 Project Components
- 2.3 Construction Activities
- 2.4 Operation And Maintenance
- 2.5 Contracts
- 2.6 Reclamation
- 2.7 Decommissioning

3.0 Environmental Setting
- 3.1 Overview
- 3.2 Physical Environment
- 3.3 Aquatic Habitat And Biota
- 3.4 Terrestrial Environment
- 3.5 Socio-Economic Environment
- 3.6 Heritage Resources

4.0 Public Involvement Program
- 4.1 Public Involvement

5.0 Potential Environmental Effects And Mitigation
- 5.1 Assessment Approach
- 5.2 Environmental Effects And Migitation
- 5.3 Analysis Of Alternatives
- 5.4 Physical Effects And Mitigation

As noted in our cover letter, the public consultation program, a heritage study, and field tests for the wastewater treatment facility are ongoing and a supplemental filing will be made to report on these results.

1.6 SCHEDULE

Depending on the timing of regulatory approvals, the Limited Partnership plans to initiate construction activities for the Infrastructure Project at the beginning of November, 2009. The early start to winter construction is important to allow construction of a coarse roadway to facilitate the construction of the proposed Looking Back Creek clear span bridge during winter conditions (to minimize environmental effects). With this construction start, it is expected that construction will be complete in 2012

1.7 FUNDING

Manitoba Hydro will fund this Infrastructure Project and will recover costs from the Keeyask Hydropower Limited Partnership.

KEEYASK INFRASTRUCTURE PROJECT

ENVIRONMENTAL ASSESSMENT REPORT

July 2009

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EXECUTIVE SUMMARY

INTRODUCTION

This Environmental Assessment Report is in support of an application for regulatory approval to construct the proposed Keeyask Infrastructure Project (the Project). The Project proponent is the Keeyask Hydropower Limited Partnership (the Partnership), a legal entity established by Manitoba Hydro and its four First Nation partners: Tataskweyak Cree Nation; War Lake First Nation; York Factory First Nation; and Fox Lake Cree Nation. The Limited Partnership would also be the proponent for the Keeyask Generating Station, if in the future the Partnership decides to propose the Keeyask Generating Station (GS) Project for regulatory approval.

The scope of the proposed Keeyask Infrastructure Project includes construction and operation of a 125-person start-up camp with wastewater treatment, construction of a 25 km, two-lane gravel road, and construction of a 500-person main camp (phase one). Other than the start up camp and some post-construction maintenance activities, the Project involves only the construction, and not operation of the road and main camp. Construction of the proposed Project is planned to commence in early November 2009, with completion of construction of the facilities and services by May 2012. At this time no application has been made or is being made for regulatory review of the Keeyask GS project. If the Limited Partnership makes a decision not to proceed with the GS project, or if regulatory approval is not received, the Partnership will decommission the Project and reclaim the site.

PUBLIC INVOLVEMENT PROGRAM

The public involvement program for the proposed Project includes community and band member meetings with KCN First Nations in Split Lake, Ilford, Gillam, Bird, Churchill, Thompson, Winnipeg and York Landing. These meetings have all taken place except in York Landing where concerns regarding the H1N1 virus required rescheduling to early August. Public open houses are planned for August in Thompson and Gillam along with meetings in Winnipeg with environmental organizations. Results of the public involvement process will be incorporated in a supplemental submission.

ASSESSMENT SUMMARY

The Project is assessed as a Class II project under *The Environment Act, Classes of Development Regulation* and this report was prepared following Manitoba Conservation's Environment Act Proposal Report Guidelines. Potential environmental effects are identified, assessed and mitigated for site preparation, construction and initial maintenance of the road and associated infrastructure.

One of the primary methods of dealing with effects is mitigation and selecting alternatives for main infrastructure components based on a balance of feasibility, social and environmental factors. One of the primary aspects incorporating this process was the access road. A route selection committee was established in 2005 with participants including Manitoba Hydro and its consultants, First Nations in the vicinity of the road in their role as potential partners, and Manitoba Transportation and Government Services. Technical specialists in areas such as vegetation, wildlife, fisheries and

biodiversity cooperated with design engineers and local First Nation representatives to select a preferred route.

Another key method of addressing potential Project effects was through the development of a Preliminary Construction Environmental Protection Plan (EnvPP) for the construction phase of the Project, provided as a separate document. The EnvPP reflects the Partnership's commitment to environmental protection and implementing effective environmental protection and minimizing adverse effects associated with the Project. The Plan will be finalized after inclusion of Environment Act License terms and conditions. In recognition of the concerns regarding access issues, a Preliminary Access Management Plan (AMP) has also been developed to guide the Partnership in taking measures to manage access during Project construction.

In addition to the development of key reference documents that address primary potential Project effects, an assessment was undertaken on the various physical, biological and socio-economic environments, heritage resources and resource use. Assessment factors include the nature of effect, geographic extent, magnitude, frequency, duration and reversibility.

The assessment of the physical environment includes atmosphere, physiography, soils and permafrost, surface water and groundwater. Effects such as increased equipment and vehicle emissions and increased fugitive dust are considered to be small and not detectable outside of the local area, especially when dust control measures are applied. The Gull Esker will be affected, but efforts were made to minimize effects through the routing process. No residual effects are expected to the surface water regime after application of various protection guidelines. Elevated levels of suspended sediment and hydrocarbons in surface water, increased erosion in disturbed areas, and contamination of soils, surface water and groundwater from accidental spills are also not expected due to EnvPP measures.

No effects are anticipated on aquatic habitat and biota since the larger of two streams is being crossed by a clear span bridge and the smaller stream is assessed as having low sensitivity habitat with no potential to support large-bodied fish. Measures described in key Department of Fisheries and Oceans reference documents will be followed to avoid negative effects.

In terms of terrestrial ecosystems, after the road routing process it was estimated that there would be no substantial changes to vegetation composition, ecosystem diversity, wetland function or plant species of conservation concern. Less than 1% of all habitat types in the regional study area would be altered or lost. Measures described in the EnvPP, such as establishment of fire guards and avoidance of designated areas, serve to minimize negative effects on important habitat types to acceptable levels.

The EnvPP and AMP also address potential environmental effects on wildlife. Effects such as the removal/impairment of habitat, or fragmentation of breeding/over-wintering habitats, are expected to be small in comparison to available habitat in the region and were avoided where possible, through the routing process. Other measures, such as limiting clearing, establishing buffers, and revegetating disturbed areas are described in the EnvPP. This document also addresses avoidance of potential effects from the contamination of breeding ponds, through prescriptive erosion control and fuel storage measures. Potential effects on wildlife including modified movements and increased

stress, is addressed through the establishment of appropriate buffers for borrow sites, and if blasting activities occur, especially during sensitive periods such as spring breeding. Issues such as increased mortality from vehicle collisions are addressed in both the EnvPP and AMP through a commitment to educating drivers and posting and enforcing speed limits. The EnvPP also provides measures to deal with problem/nuisance wildlife, through proper garbage handling/disposal measures, and worker education on topics such as feeding wildlife. Potential increases in wildlife mortality from hunting or trapping is addressed in both the AMP and EnvPP, with measures including limiting road access and posting no hunting signs.

The assessment of the socio-economic environment includes local and regional employment and business opportunities, regional services, resource use, individual and community health, safety and wellness, traffic and access. The ability of residents and businesses in the four First Nation communities located in the vicinity of the Project to realize employment and business opportunities is likely to be the most important socio-economic effect. The majority of the construction employment opportunities and as many as 11 construction and support contracts could accrue to the four communities because of a combination of pre-project training programs delivered through these communities, preferential hiring provisions in the collective agreement and provisions of direct negotiated contracts to these First Nations under the Joint Keeyask Development Agreement. The high level of community participation on these opportunities would serve to reduce unemployment levels in these high unemployment communities, enhance the income and self esteem of job recipients and strengthen the capacity of local contractors. These opportunities would be accompanied by the challenges of Project workers having to be away from their home and community for extended periods, creating demands on family and community life and other social stresses.

Unwanted incidents could result from the inappropriate interaction of Project workers with community members, especially young women, during off-hours visits to Gillam and Thompson. A variety of measures including on site counselling, worker education and maintaining communication with surrounding communities will lessen these effects. Traffic levels are projected to increase up to 15% along PR 280 at various times during construction; however, an increase in the overall accident rate would not likely be detectable. Although there will be the potential for interference with local use of resources in the immediate vicinity of the infrastructure, these disruptions are expected to be offset by implementation of replacement resource use programs and agreements to be negotiated with directly affected commercial resource users. A major issue relating to the potential for unauthorized access to the area and the possible restriction of access to traditional area users will be addressed through access control measures set out in the AMP.

No heritage resources were discovered during field investigations in the area where the proposed infrastructure will be located; however, there is potential for heritage resources to exist as the road corridor may have been a pre-historic travel route for Aboriginal people. Potential effects of the Project on heritage resources are addressed through mitigation measures incorporated into the EnvPP. A pedestrian survey is currently being conducted at the site of the proposed main camp. Results of this survey will be presented in a supplemental filing.

CONCLUSION

Based on the information presented in the Environmental Assessment Report, the proposed Project is not likely to result in any substantial adverse effects with the implementation of proposed mitigation measures and follow-up actions contained in the EnvPP and AMP.

ACKNOWLEDGEMENTS

We would like to thank the numerous individuals and representatives of private and government organizations who have provided their time and knowledge to assist with the preparation of this document.

GOVERNANCE

The Partners' Regulatory and Licensing Committee (PRLC) is responsible for governance of environmental and regulatory matters for the Keeyask Hydropower Limited Partnership. The committee consists of three members of Tataskweyak Cree Nation, two members of each of War Lake First Nation, York Factory First Nation, and Fox Lake Cree Nation, and three employees of Manitoba Hydro. The EIS Coordination Team, reporting to the PRLC, is responsible for the coordination of the environmental assessment. Members of the EIS Coordination Team, along with advisers at the invitation of the Co-chairs, attend meetings of the PRLC. A study team with management and specialists in relevant disciplines works closely with the EIS Coordination Team in undertaking the environmental studies and assessment.

Partners' Regulatory and Licensing Committee:

- Tataskweyak Cree Nation: Tony Mayham (co-chair); Victor Spence, TCN Manager of Future Development; and Douglas Kitchekeesik; and advisers Joe Keeper and William Kennedy, P.Eng.
- War Lake First Nation: Chief Betsy Kennedy and Phillip Morris.
- York Factory First Nation: Roy Redhead and Flora Beardy.
- Fox Lake Cree Nation: Michael Lawrenchuk and Wesley Neepin.
- Manitoba Hydro: Ed Wojczynski (co-chair), Ryan Kustra and Shawna Pachal.

EIS Coordination Team:

- Tataskweyak Cree Nation and War Lake First Nation: John Whitaker, M.A., and Ian Dickson.
- York Factory First Nation: Jim Thomas, M.L.Arc.
- Fox Lake Cree Nation: Lorne Hanks, LL.B.
- Manitoba Hydro: Nick Barnes (chair), M.Sc., and Dick Stephens, B.A.

STUDY TEAM

Manitoba Hydro:	
Ryan Kustra, B.A.	Assessment Manager
Nick Barnes, M.Sc.	Assessment Coordinator
Glen Schick, P. Eng.	Project Engineer
Bryan Beyak, P. Eng.	Civil Engineer
Lindsay Zaborniak, C.E.T.	Project Technologist
Tetr*ES* Consultants Inc.:	
George Rempel, P.Eng.	Study Manager
Blair McMahon, M.Sc.	Study Coordinator
Roger Rempel, P.Eng.	Project Description
Mike Sweet, B.Sc.	Birds
Leane Wyenberg, M.Sc.	Birds
Angèle Watrin Prodaehl, B.Sc.	Amphibians
Shirley Bartz, M.Sc.	Invertebrates
George Kroupa, RFT	GIS
Jocelyn Hiebert, RFT	GIS
DFS Consultants:	
Dale Stewart, M.Sc.	Terrestrial Coordinator
ECOSTEM Ltd.:	
James Ehnes, Ph.D.	Physiography, Habitat, Plants and Ecosystems
Brock Epp, M.Sc.	Habitat and Ecosystems
Alanna Sutton, M.Sc.	Plants
Alex Snitowski, B.Sc.	GIS
Wildlife Resource Consultants:	
Robert Berger, M.N.R.M.	Mammals
Jason Kelly, M.N.R.M.	Mammals
Plus4 Consultants Inc.:	
John Dyck	Forestry
Calyx:	
Jackie Krindle, B.Sc.	Plants
North/South Consultants Inc.:	
Friederike Shneider-Viera, Ph.D.	Aquatics
Richard Remnant, M.N.R.M.	Aquatics
Kurt Mazur, M.Sc.	Aquatics

InterGroup Consultants Ltd.:

John Osler, MBA	Public Involvement
Denis De Pape, M.A.	Socio-economics
Nancy LeBlond, M.A.	Socio-economics
Andrew Mclaren, M.N.R.M.	Socio-economics

Northern Lights Heritage Services:

Virginia Petch, Ph.D.	Heritage

Falk Environmental Inc.:

Mel Falk, M.Sc.	Senior Editor

1.0 INTRODUCTION

1.1 OVERVIEW

This Environmental Assessment (EA) Report is for the proposed Keeyask Infrastructure Project (the Project) located in northern Manitoba (Figure 1.1-1). It is submitted in application for a Class 2 Development under *The Environment Act, Classes of Development Regulation*, specifically for a proposed all-weather road and wastewater disposal system for a temporary start-up camp used during Project construction. This EA report provides a description of the proposed Project and the existing environment, an assessment of the anticipated environmental effects, and measures identified to mitigate adverse effects.

The EA report is submitted by the Keeyask Hydropower Limited Partnership (the Partnership), represented by the General Partner, 59000345 Manitoba Ltd. The Partnership established by Manitoba Hydro and the Keeyask Cree Nations (KCN), consisting of Tataskweyak Cree Nation and War Lake First Nation (operating together as the Cree Nation Partners, or CNP); York Factory First Nation (YFFN); and Fox Lake Cree Nation (FLCN).

Throughout the EA Report, terms contained in the Glossary are in bolded text.

1.2 PROJECT NEED AND PURPOSE

The proposed Project is being undertaken at this time to achieve the following objectives:

- To provide early business opportunities for the Keeyask Cree Nations (KCN);
- To provide early, and potentially more, employment opportunities for First Nation members, northern Aboriginal people, and other northern and Manitoba workers;
- To provide more time for First Nation businesses to develop their management capacities;
- To provide more time for First Nation members and other northern Aboriginal people to develop their skills and capacities;
- To respond to present economic conditions and complete these works on a more cost-effective basis;
- To accelerate investment to support sustainable economic growth in the Province of Manitoba; and
- To provide for timely and efficient construction of the Keeyask Generating Station (GS) project, should the Partnership in the future decide to propose that project, and if and when an application is made and regulatory approvals are received to construct and operate that project.

1.3 SCOPE OF THE PROJECT

The proposed Project consists of construction and operation of a 125-person start-up camp (including wastewater treatment), construction of a 25 km all-weather gravel road from Provincial Road (PR) 280 to Gull Rapids, and construction of the first phase of a main camp (Figure 1.3-1). The scoping process to define the Project involved an analysis of a number of alternatives

(Appendix A-1). It is proposed to commence construction of the road in early November 2009 and complete the main camp (phase one) facilities by May 2012. Except for minor maintenance of the road and main camp (phase one), the Project scope does not include operation of these facilities, although there may be occasions when the facilities are used on a limited basis to provide access to the area for engineering and environmental studies. It should also be noted that at this time no decision has been or is being made to propose the GS project or to apply for regulatory review and approval. If the Limited Partnership decides in the future not to proceed with the GS project, or if regulatory approval is not received, the Partnership will decommission the Infrastructure Project and restore the site. Should this occur, a decommissioning plan will be submitted for regulatory approval.

1.4 SCOPE OF THE ASSESSMENT

1.4.1 Overview

The scope of the assessment covers all of the physical works and activities described in the scope of the Project, namely construction and operation of a start up camp with an engineered wastewater treatment plant, and construction of a road and main camp (phase one).

It is anticipated that regulatory approval will be in the form an Environment Act Licence for the Class 2 Development issued by the Director, Environmental Assessment and Licensing Branch of Manitoba Conservation. The Project is not expected to trigger the *Canadian Environmental Assessment Act* due to the nature and design of the Project as well as the mitigation measures and follow-up actions proposed.

1.4.2 Spatial and Temporal Scope

1.4.2.1 Spatial Scope

The proposed Keeyask Infrastructure Project is located in northern Manitoba, approximately 180 km northeast of Thompson and approximately 40 km southwest of Gillam (Figure 1.1-1). In order to conduct the assessment in an organized way, a number of Project study areas were established. Several were established for the biophysical environment and several for the socioeconomic environment. It was determined that the regional and local areas of influence for biophysical and socio-economic effects differ from one another in several ways and could not be accurately analyzed or portrayed utilizing the same boundaries. Therefore, the following five study area boundaries were established:

- Northern Manitoba Study Area (socioeconomics);
- KCN Community Study Area (socioeconomics);
- Regional Study Area (biophysical);
- Local Study Area (biophysical); and
- Project Footprint.

Northern Manitoba Study Area (Socio-economic)

The broadest spatial scope used for this assessment (other than very occasional references to provincial and broader regions) is the **Northern Manitoba Study Area**. This area was determined to be unnecessary for the more quantitative biophysical assessments. For the purposes of the socio-economic assessment, this area is defined as Statistics Canada Census Divisions 22 and 23 (Figure 1.4-1). The key focus of the assessment is on Thompson and Gillam as they are the major service centers within the Northern Manitoba Study Area.

KCN Community Study Area (Socio-economic)

The **KCN Community Study Area** includes the four First Nation communities in the vicinity of the proposed Project: Tataskweyak Cree Nation at Split Lake; York Factory First Nation at York Landing; War Lake First Nation at Ilford; and Fox Lake Cree Nation at Bird and Gillam (Figure 1.4-2). These First Nation communities were included in this study area for the following reasons:

- They have areas used for traditional activities such as hunting or trapping that could be affected by the proposed Project facilities;
- They have populations who will be eligible for employment under **Directly Negotiated Contracts** (DNCs) during the construction; and
- They are parties to the **Joint Keeyask Development Agreement** (JKDA) and will be partners in the proposed Project.

Regional Study Area (Biophysical)

The ecologically appropriate area to assess the effects of the proposed Project on habitat composition is one that is large enough to capture natural variability in habitat composition over time and is referred to as the **Regional Study Area** (Figure 1.4-3). One of the causes of large scale natural variability is fire, and an analysis of fire history data indicated that an area of approximately 14,000 km^2 would therefore be needed to capture natural variability. Terrestrial habitat was described and priority habitats were identified from habitat mapping developed for the central 1,502 km^2 (referred to as the **Habitat Mapping Area**) of the Regional Study Area (see Appendix B2-1 for methods).

Local Study Area (Biophysical)

A 7,870-ha (78.7-km^2) **Local Study Area** was established to include the spatial area immediately adjacent to the proposed Project where some direct and indirect environmental effects may occur. The Local Study Area includes the Project Footprint as well as a 1.15-km buffer around these areas (Figure 1.4-3). Potential local effects on biophysical components are captured by the Local Study Area.

Project Footprint

The **Project Footprint** includes the physical works and associated activities where direct physical environmental effects are expected to occur (Figure 1.4-3). This 2,597-ha (26-km^2) area includes the proposed road, **borrow area zone**s, camp areas and associated infrastructure footprints (Figure 1.4-3).

1.4.2.2 Temporal Scope

Subject to regulatory approval, construction of the proposed Project is anticipated to commence in November of 2009, with completion of construction of the facilities and services by May 2012. Clearing for the start-up camp would be the initial Project activity in November 2009, ending in March 2010, with start-up camp construction completion scheduled for July 2010. Road construction is also scheduled to start in November 2009 with clearing activities and establishment of a bridge crossing prior to April 2010. Road construction would continue until October 2010, with the main camp then starting in that month and finishing in May 2012.

1.4.3 Assessment Approach

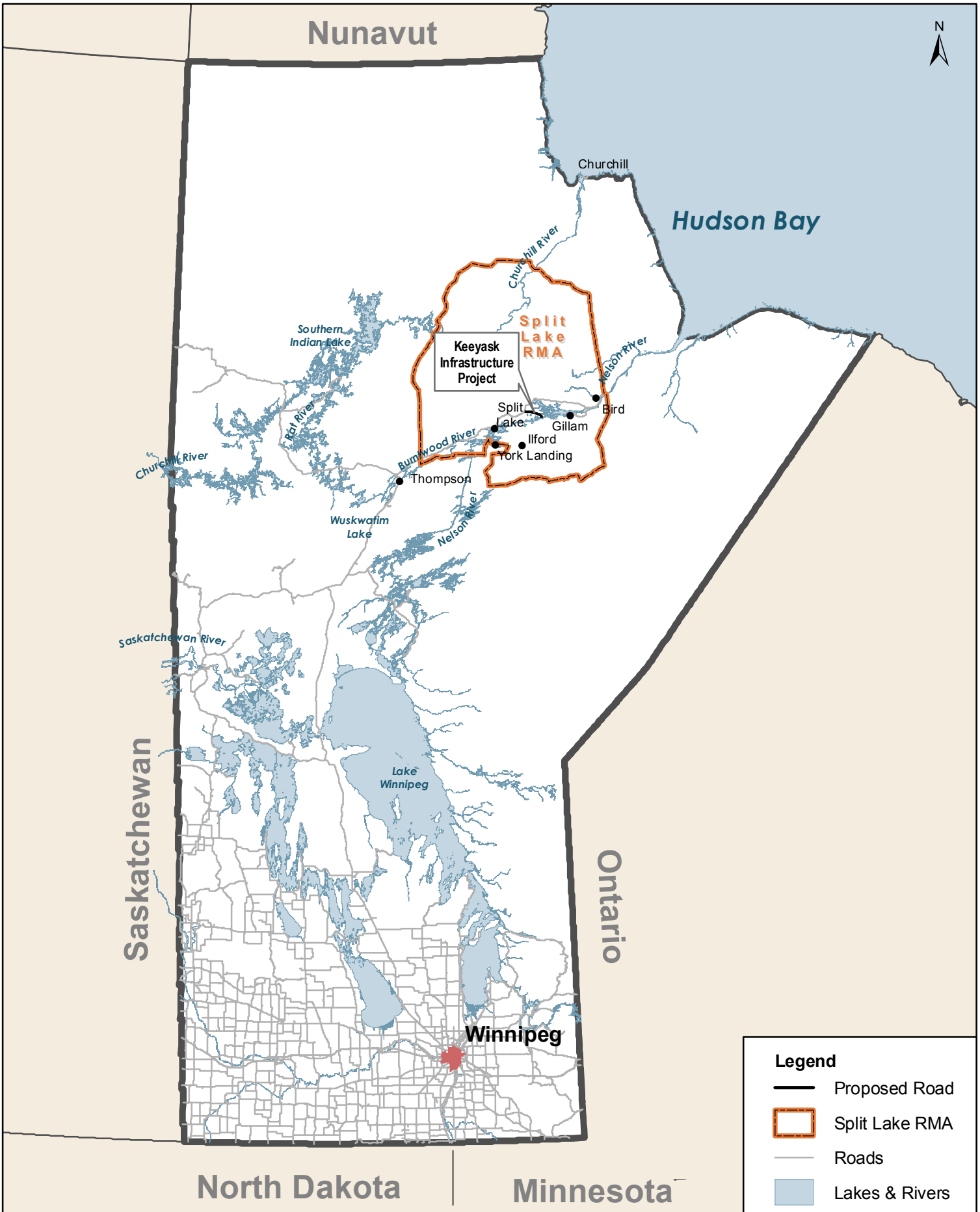
Both provincial and federal environmental assessment guidance documents were followed for this EA. The Guidelines for an Environment Act Proposal Report (Manitoba Conservation 2009) were followed. Canadian Environmental Assessment Agency (CEAA) reference documents included: How to Determine if the Act Applies; Addressing Need For, Alternatives To, and Alternative Means; and Follow-up Programs under the *Canadian Environmental Assessment Act* (CEAA 1994). Key Department of Fisheries and Oceans Canada (DFO) reference documents included the Practitioners Guide to the Risk Management Framework for DFO Habitat Management Staff, Version 1 (Fisheries and Oceans Canada 2007a), Operational Statement for Clear-Span Bridges, Version 3 Fisheries and Oceans Canada (2007b), and Operational Statement for Temporary Stream Crossing (Fisheries and Oceans Canada 2007c). The Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (Fisheries and Oceans Canada and Manitoba Natural Resources 1996) was a key document assisting in the design and mitigation of stream crossings.

In addition to Manitoba Hydro's Corporate Environmental Management Policy (Appendix C1), key guidance to avoid or reduce adverse effects in the design of the project was obtained through the Keeyask Cree Nations Principles Regarding Respect for the Land and measures that would comply with these principles (Appendix C2).

The scoping process for the proposed Project was used to identify environmental issues as well as First Nation and stakeholder issues and concerns. The process also facilitated the delineation of spatial and temporal boundaries for the assessment of the environmental effects. Potentially affected environmental components were then identified for the physical, aquatic, terrestrial, and socio-economic environments and for heritage resources.

Potential environmental effects (adverse and beneficial) of the proposed Project were identified and assessed, and mitigation to avoid or minimize adverse effects was proposed using available scientific studies, professional judgement, expert and local knowledge, stakeholder consultation and First

Nation input. Both direct and indirect environmental effects of the proposed Project were considered. Follow-up requirements were identified where appropriate and residual environmental effects were evaluated using predetermined factors and criteria. Further information on the assessment approach including an explanation of the factors and criteria used to evaluate the residual environmental effects are provided in Section 5.1.



KEEYASK

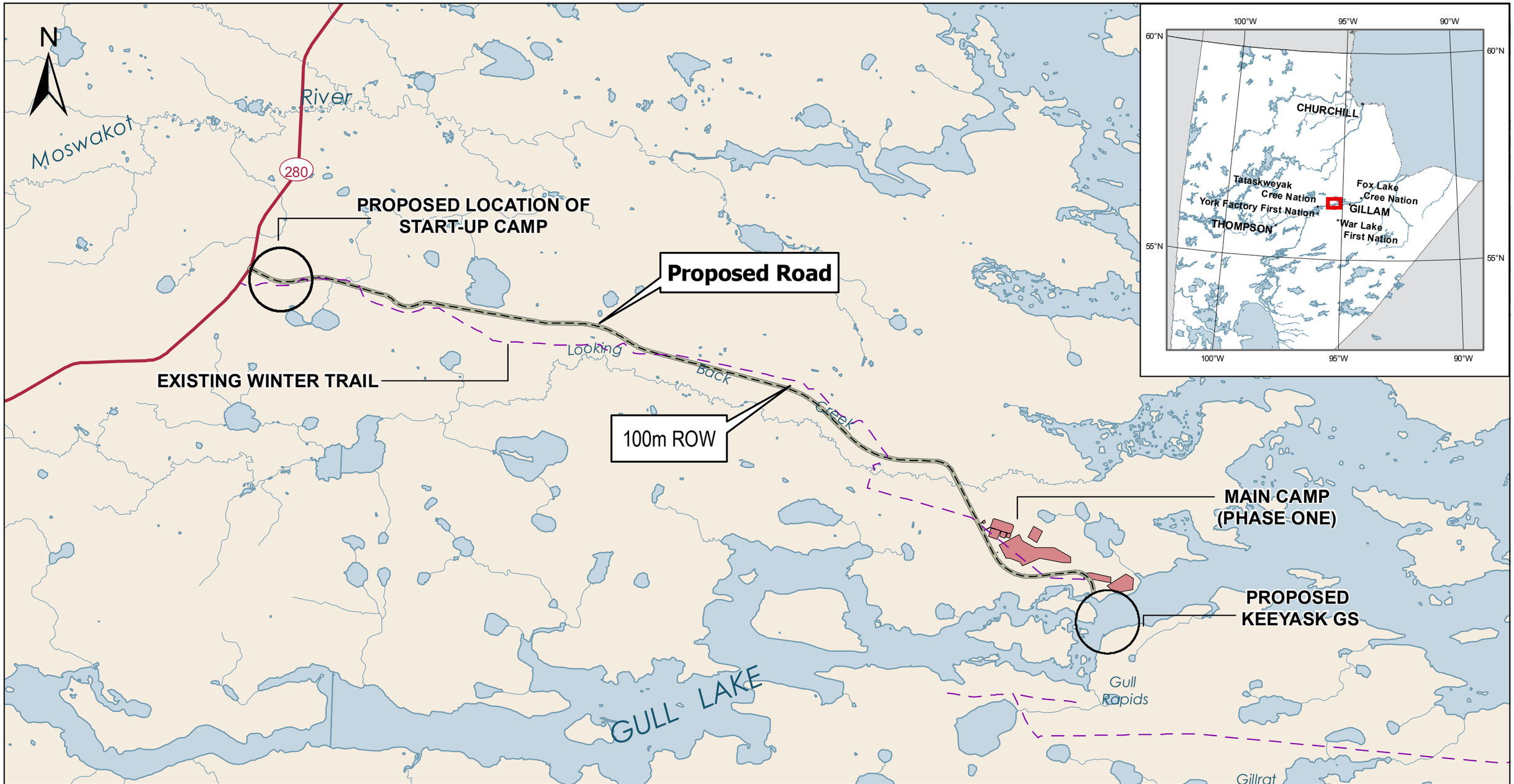
0 50 100 200 km
0 30 60 120 mi

Projection: NAD83, UTM Zn 15N
Data Source: Province of Manitoba, Government of Canada, Manitoba Hydro
Created by: TetrES Consultants Inc.
Date Created: July 22, 2009

Project Area Location in Manitoba

G:_GIS_Project_Folder\0221-Hydro\63_Keeyask_Road\ArcMaps\SE_SplitLk_RMA_220709_letter.mxd

Figure 1.1-1



KEEYASK

Scale

0 1.25 2.5 5 km

0 1.25 2.5 5 mi

Projection: UTM NAD83, Zone 15N
Data Source: Manitoba Hydro and Government of Canada
Created By: TetrES Consultants INC.
Date Created: July 24, 2009

LEGEND

- Main Camp (Phase One)
- 100m ROW
- Winter Trail

Keeyask Infrastructure Project Site

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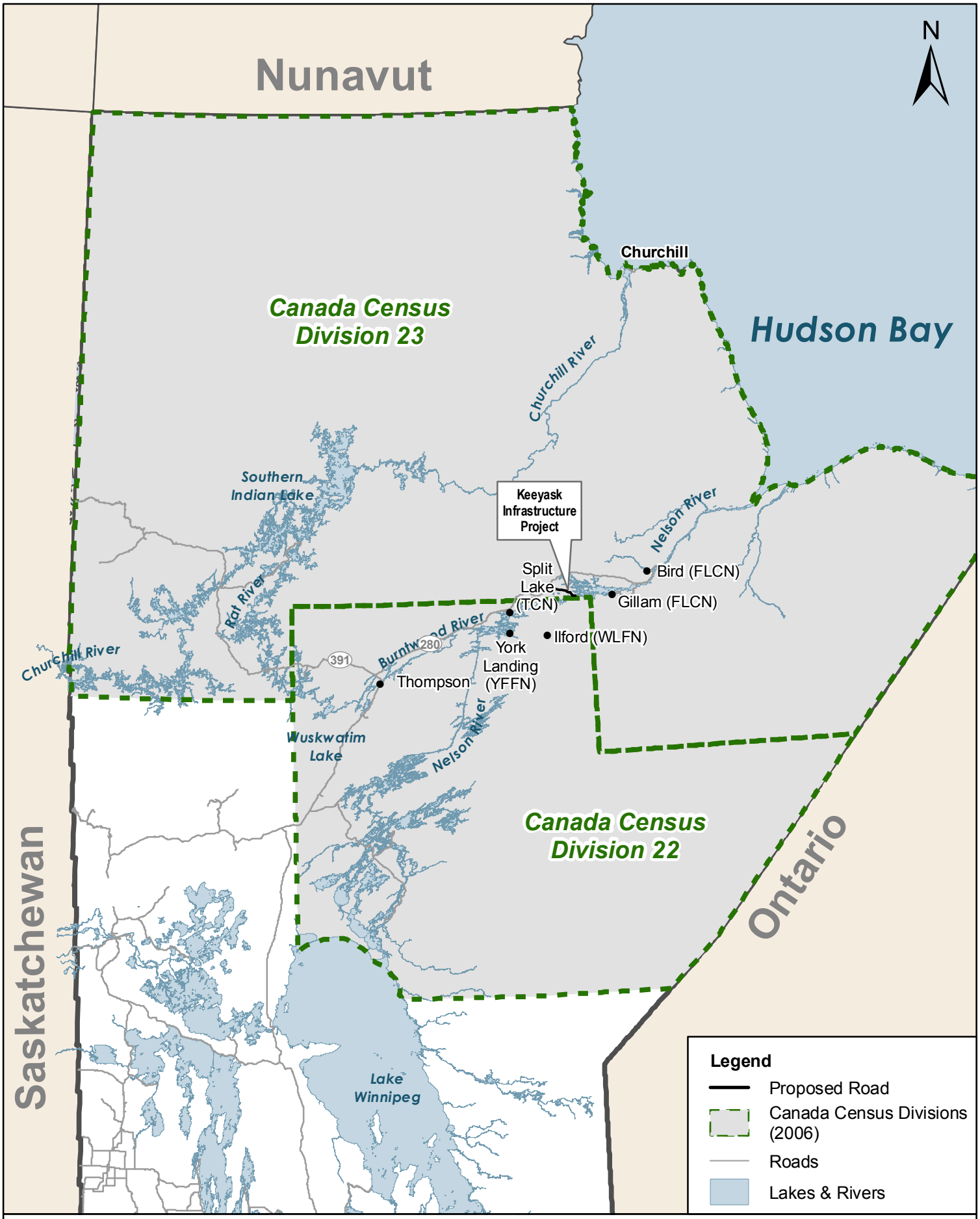
Figure 1.3-1



KEEYASK

0 25 50 100 km
0 20 40 80 mi

Projection: NAD83, UTM Zn 15N
Data Source: Province of Manitoba, Government of Canada, Manitoba Hydro
Created by: TetrES Consultants Inc.
Date Created: July 23, 2009

Northern Manitoba Study Area

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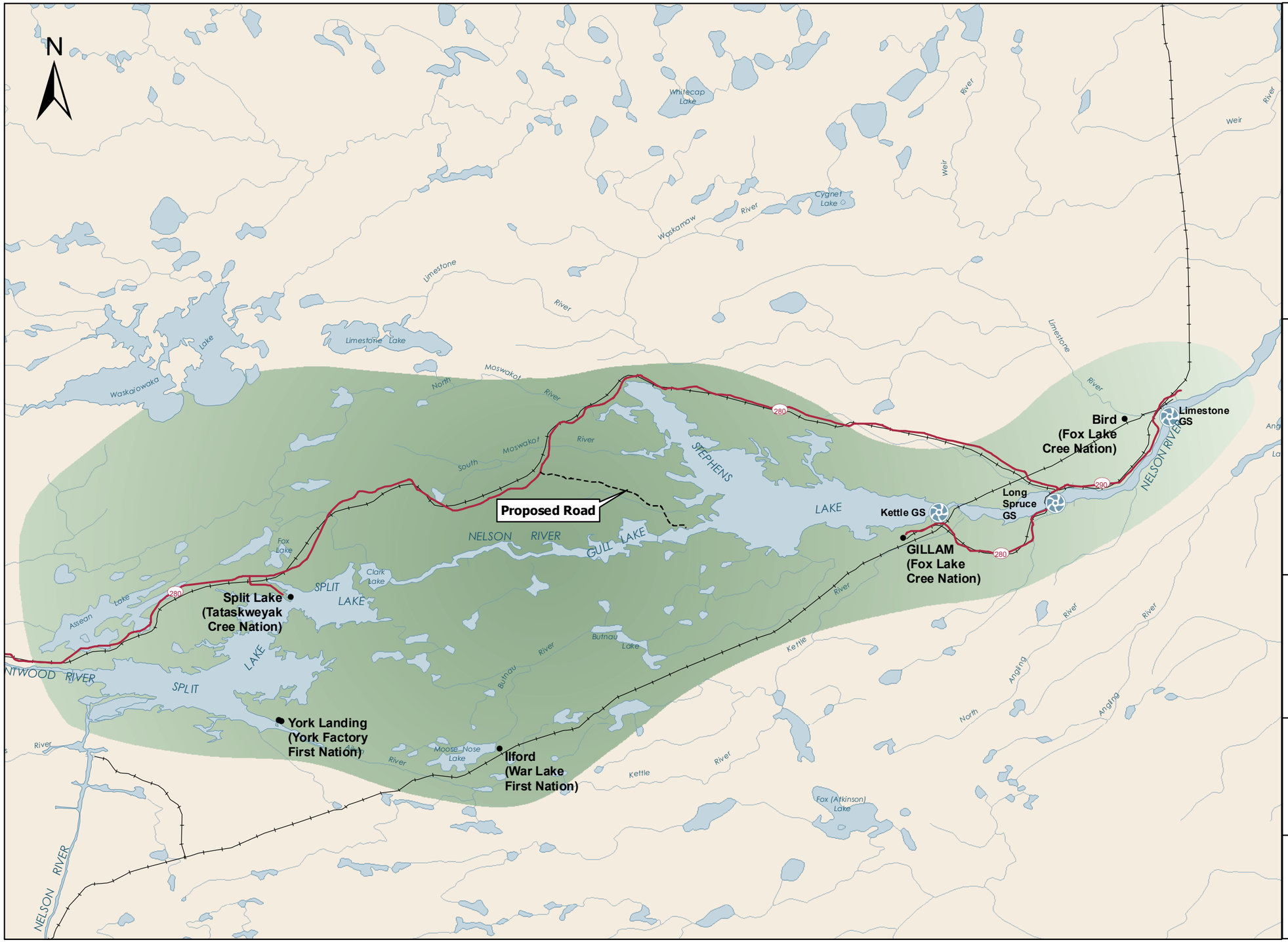
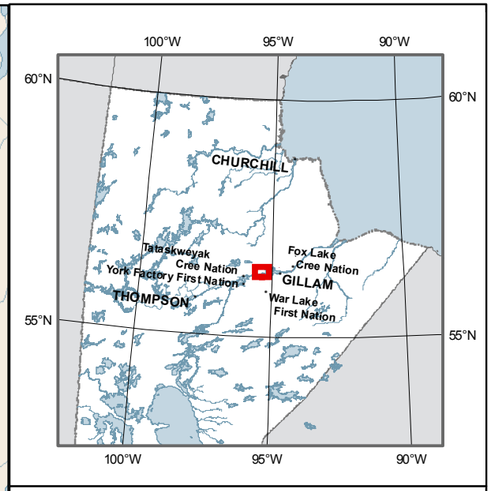
Figure 1.4-1





Legend

Generalized Boundary of KCN Community Study Area

Existing Generating Stations

Transportation

Roads

Rail Line

Projection: NAD 83, UTM Zn15N
Data Source: Government of Canada, Manitoba Hydro, TetrES Consultants Inc.
Created By: TetrES Consultants Inc.
Date: July 24, 2009

0 5 10 20 km
0 5 10 20 mi

KCN Community Study Area

KEEYASK

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Figure 1.4-2

2.0 PROJECT DESCRIPTION

2.1 OVERVIEW

The proposed Keeyask Infrastructure Project (the Project) consists of construction and operation of a start-up camp capable of accommodating approximately 125 people with an engineered wastewater treatment plant, construction of a 25-km two-lane, all-weather gravel road and construction of a 500-person main camp (phase one) on the north side of Gull Rapids in northern Manitoba (Figure 2.1-1). The area to be developed currently consists entirely of Provincial Crown Lands, which would be purchased and converted to private ownership. With the exception of the start-up camp, the proposed Project does not include the operation of the infrastructure and only limited maintenance activities will be required. There may be occasions where access to the facilities will be required on a limited basis for engineering and environmental studies. The temporary start-up camp will be decommissioned at the end of the Project and the buildings will be removed.

The three main components of the Project are the start-up camp, the road, and the main camp (phase one). Each Project component consists of a number of sub-components, including facilities, supporting services, construction activities and workforce requirements.

The start-up camp will accommodate approximately 125 construction workers and staff. The camp will be equipped with the following facilities and utilities:

- Fire truck and storage facility;
- First-aid vehicle;
- Potable water supply;
- Wastewater treatment;
- Solid-waste collection and haulage;
- Power supply;
- Pre-engineered buildings;
- Trailers;
- Fuelling facilities and equipment;
- Communication system;
- Accommodations and offices; and
- Kitchen and dining hall.

The two-lane gravel road will be designed and built to provincial road (PR) standards starting at Kilometre 174 on PR 280, approximately 185 km east-northeast from Thompson, extending approximately 25 km east from PR 280 to the north shore of Gull Rapids. The proposed road will include the following facilities and utilities:

- A security gatehouse equipped with space for vehicle turnaround;
- A by-pass on PR 280 at the intersection of the proposed road;
- A 12-m communication tower;

- Approximately 25 km of two-lane gravel road;
- A clear-span bridge crossing at Looking Back Creek;
- Temporary 10-person camp at Looking Back Creek for bridge construction;
- A culvert crossing at an unnamed tributary;
- Approximately 12 through-grade culverts for overland drainage;
- Snowmobile crossings at selected, established snowmobile trails;
- Road signage;
- Borrow areas; and
- Portable diesel generator set (2 MW).

The main camp (phase one) will be equipped with the following facilities and services:

- Potable water supply;
- Wastewater treatment;
- Power supply;
- Pad for a future power transformer station;
- Helicopter pad;
- Accommodations for up to 500 people;
- Kitchen facilities;
- Dining hall;
- Offices;
- Borrow areas;
- Contractor work areas;
- Manitoba Hydro work area;
- Recreational facility; and
- Fire and first-aid vehicle garage structures.

Table 2.1-1 summarizes the various activities associated with the Project components.

Table 2.1-1: Project Components and Related Activities

Project Component	Project Activities
1. Start-up Camp	• Clearing and grubbing
	• Preparing (establish drainage)
	• Controlling erosion and sediment
	• Constructing pads (excavation, backfilling, grading)
	• Gravelling pads
	• Installing trailers (accommodations, office, kitchen, dining facilities)
	• Installing utilities and services (potable water, wastewater treatment, power supply)
	• Operating potable water supply
	• Operating wastewater treatment

Table 2.1-1: Project Components and Related Activities	
Project Component	**Project Activities**
	• Operating power supply: 2-MW diesel set
	• Decommissioning
2. Road	• Clearing and grubbing
	• Controlling erosion and sediment
	• Constructing security gatehouse and communication tower
	• Establishing drainage and start embankments
	• Continuing embankment construction
	• Gravelling for roadbed surface
	• Trimming slopes
	• Constructing clear-span crossing at Looking Back Creek
	• Constructing culvert crossing at an unnamed tributary
	• Installing through-grade culverts for local overland drainage
	• Cleaning up of construction waste
	• Managing access (security, signage, etc.)
3. Main Camp (phase one)	• Clearing and grubbing for camp (250 ha) and three main work areas
	• Controlling erosion and sediment
	• Constructing pads (excavation, backfilling, grading)
	• Gravelling
	• Installing pre-engineered bunkhouses, kitchen/dining facilities and trailers (recreation facility, fire, first aid, vehicle garage)
	• Trenching for utilidors (with potential for controlled blasting)
	• Installing utilities and services, including service to water wells and installing package wastewater treatment plant

2.2 PROJECT COMPONENTS

2.2.1 Start-up Camp

A temporary start-up camp will be established to support construction of the proposed road and the main camp (phase one). The start-up camp will be sized to accommodate approximately 125 workers and will be located in approximately 400 m from PR 280 at its junction with the road (Figure 2.1-1) The camp will consist of facilities and utilities as described below and will require construction materials to be hauled in or extracted from local borrow areas.

2.2.1.1 Facilities

The start-up camp will require specific services to support the construction and management workforce. Accommodations for approximately 125 workers will be provided by self-contained trailers brought to the site. Trailers will also be used to house the kitchen services, dining hall and site offices. Pre-engineered buildings will be used to store equipment and some construction materials. A fuelling facility consisting of a small tank farm containing fuels for construction power,

vehicles and equipment, and propane for cooking and heating will be established. Tankage will consist of approximately three 25,000 L tanks for diesel, one 10,000 L for gasoline, and one 85,000 L tank for propane. Petroleum products will be transported and stored in accordance with *The Dangerous Goods Handling and Transportation Act* (Manitoba).

2.2.1.2 Utilities

Camp utilities will include a potable water supply, wastewater disposal, solid waste disposal, communications and power supply. Utility corridors (**utilidors**) will carry utility lines such as electricity, sewer, water and communications.

Potable Water

The camp's domestic-use water demand is expected to be approximately 43,000 L per day at full capacity. Two wells (Figure 2.2-1) will be established near the start-up camp for potable water. One well will serve as the camp's primary supply. The other well will serve as a backup water source to ensure adequate potable water supply to the camp in the event of a malfunction.

Wastewater Disposal

Options are being examined for the management of wastewater (combined grey water and sanitary waste) at the camp (Appendix A1). The preferred option is to collect the wastewater in a holding tank and discharge it to a septic field. The field will be located near the camp and will be partially within the right-of-way of the access road, as shown in Appendix A1. The design of the preferred system is based on criteria outlined in Manitoba Regulation 83/203 (Onsite Wastewater Management Systems), as described in Appendix A-1. Septage solids from the holding tank will be removed and hauled to an approved treatment facility. In the event that *in-situ* soils testing (currently underway) do not support the use of a septic field, one of two alternative methods will be used: i) a mechanical wastewater treatment plant discharging to an absorption field, or ii) a wastewater holding tank with haulage to the wastewater treatment facility at Gillam.

Solid Waste Disposal

Solid wastes (camp garbage) will be taken to a collection site (secured from wildlife) on-site and will be hauled to an approved disposal facility.

Communications and Power Supply

Communications infrastructure for data, video and voice services will be established at the start-up camp. It will consist of a 12-m wooden pole equipped with a communications dish. The dish-antenna will be tied into Manitoba Hydro's existing microwave system.

With the exception of propane, which will be used for kitchen and heating needs, diesel generators will provide all power for the start-up camp. A 2-MW generator set will be installed at the start-up camp to provide backup in the power supply.

2.2.1.3 Material Sources

The materials required for constructing the road and the other infrastructure will include impervious fill, granular fill/crushed rock, rock fill, riprap and concrete aggregates. Materials for the start-up camp will come from borrow sites within the 100-m road ROW and may be supplemented from established sources known as the G-1 and G-5 deposits (Figure 2.1-1).

2.2.2 Road and Stream Crossing

The proposed Project includes construction of a two-lane all-weather gravel road starting at Kilometre 174 on PR 280, approximately 185 km east-northeast from Thompson, and extending approximately 25 km east to the north shore of Gull Rapids. The proposed road required the establishment of design criteria, including appropriate cross-sections. The road will also involve construction of a clear span bridge across Looking Back Creek, establishment of associated facilities and use of borrow materials.

2.2.2.1 Design Criteria

Road

A fully-developed by-pass intersection will be designed and built at the intersection of PR 280 and the proposed road to provide safety to local road users. The design of the intersection will exceed the Manitoba Infrastructure and Transportation intersection treatments as required by their warrant process.

A 100-m ROW will be established for the proposed road and the centreline of the road will vary within the ROW (Figure 2.1-1). This alignment allows for borrow material to be obtained from deposits identified within the ROW as well as from sites G-1 and G-5.

The gravel roadway will be designed and constructed to maintain existing drainage patterns. The road will conform to current Manitoba Infrastructure and Transportation Geometric Design Criteria for Secondary Arterial Roadways (Manitoba Transportation and Government Services 1998) (Table 2.2-1).

Table 2.2-1: Current Manitoba Infrastructure and Transportation Geometric Design Criteria for Secondary Arterial Roadways

Criteria Description	Secondary Arterial
Number of lanes	Two lanes
Design speed	100 km/h
Gradient (maximum percent)	6%
Minimum stopping sight distance	200 m
Minimum passing sight distance	680 m
Minimum vertical curve	Sag = 50, Crest = 70
Minimum curvature (radius)	440 m
Lane width	3.7 and 5.7 m

Table 2.2-1: Current Manitoba Infrastructure and Transportation Geometric Design Criteria for Secondary Arterial Roadways	
Criteria Description	**Secondary Arterial**
Shoulder width	1.0 m gravel
Shoulder edge treatment	0.25 m
Right-of-way width	100 m

There will be two typical cross-sections used in the construction of the proposed road (Figure 2.3-1):

1. Typical Cross Section 1 will extend from km zero (0) at the junction of PR 280 to approximately Kilometre 18 and will consist of a 9.5-m-wide finished road top; and
2. Typical Cross-Section 2 will extend from Kilometre 18 to 24.5 and will consist of a 13.5-m-wide finished road top.

Stream Crossings

A hydraulic analysis was conducted for the two crossing locations on the proposed road to determine water regime conditions at each of the crossing locations. The design parameters for the hydraulic sizing of the crossings were determined by:

- Collecting spot readings of water surface levels and stream discharge;
- Measuring the channel characteristics and computing channel slope and bed roughness;
- Defining a relationship between stream stage and discharge for each crossing;
- Estimating design velocity and water surface elevations at the crossing locations;
- Computing an appropriate design discharge for hydraulic sizing of the crossings;
- Assessing additional design considerations for ice effects, particularly the Looking Back Creek crossing (see Section 3.2.3.1 for ice details); and
- Assessing fish habitat conditions (see Section 3.3.1).

2.2.2.2 Road Facilities

Additional road facilities will include a security gatehouse, communication tower, clear-span bridge and signage.

Security Gatehouse

The security gatehouse will be constructed at the junction of PR 280 and the proposed road. The gatehouse will be staffed by a security contractor on a full-time basis. It will be equipped with a turnaround apron for larger vehicles to exit back on to PR 280 if declined entry at the gatehouse. A 12-m communications tower will be installed adjacent to the gatehouse. Snowmobile crossings will be developed at intersections of the proposed road and established snowmobile trails to facilitate the safe crossing by local resource users. Road signage will be erected as appropriate along the road.

Bridge Crossing

A clear-span bridge crossing will be built across Looking Back Creek with all structures built entirely above the ordinary high water mark (Figure 2.3-2). The bridge structure will be designed and constructed in accordance with the Operational Statement for Clear Span Bridges (version 3.0) (Fisheries and Oceans Canada 2007a), the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (Fisheries and Oceans Canada and Manitoba Natural Resources 1996), and Manitoba Infrastructure and Transportation's Standard Construction Specifications (Manitoba Infrastructure and Transportation 2008). Roadway ditches will be graded away from the bridge structure to an outfall with erosion protection.

Culvert Crossings

A culvert crossing will be established on a small unnamed intermittent tributary to the South Moswakot River (Figure 2.3-3). The culvert crossing will be designed in accordance with the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (Fisheries and Oceans Canada and Manitoba Natural Resources 1996). Approximately 12 other culvert crossings will be required for localized overland drainage. All culverts will be constructed using a through-grade design with sizing to follow Manitoba Infrastructure and Transportation standards (MIT 2008). The return period of peak flow for these culverts will be 3% and the minimum culvert size will be 750 mm in diameter. Inlet and outlet protection will be designed for the through-grade culvert to minimize potential erosion (Figure 2.3-3).

2.2.2.3 Material Sources

The materials required for constructing the road will include impervious fill, granular fill/crushed rock, rock fill, riprap and concrete aggregates. Materials for the roadway will be taken from borrow sites within the 100-m ROW with supplements from sources known as the G-1, located approximately two-thirds of the way down the road, and G-5 deposits (Figure 2.1-1). Short-term temporary access trails may be required into the deposits.

2.2.3 Main Camp (Phase One)

The 500-person main camp (phase one) will be constructed in a 129 ha area located north of the Gull Rapids on the Nelson River (Figure 2.1-1). Pre-engineered bunkhouses for workforce accommodations, a recreation hall, bays for fire and first-aid vehicles, and kitchen and dining facilities will be erected on the cleared area. In addition to accommodation facilities, there will also be work areas, offices and a helicopter pad.

2.2.3.1 Facilities

The main camp (phase one) will consist of prefabricated trailers, pre-engineered buildings and possible stick frame buildings. All camp accommodations will be in prefabricated trailers. Pre-engineered buildings will be used for ambulance/fire emergency vehicle bays. The contractor may erect additional temporary structures in the contractor work area.

The camp will include two contractor work areas, identified as Areas A and C, and a work area for Manitoba Hydro (Figure 2.1-1). The work areas will consist of granular pads for staging areas. Offices for Manitoba Hydro and contractor staff will be established using prefabricated trailers. A helicopter pad will be constructed near the main camp (phase one).

A fuel tank farm for storage of propane and diesel will be constructed at the camp site. Propane will be used for kitchen services and heating while diesel will be used for construction equipment and vehicles.

2.2.3.2 Utilities

Main camp (phase one) utilities will include a potable water supply, wastewater disposal, solid waste disposal, and power supply (2-MW diesel generator set). Utility services provided at the main camp will include a combination of shallow and deep buried utility corridors and utilidors for electricity, sewer and water.

Potable Water

Wells for potable water will be established at the main camp (phase one). A network of four observation wells and one production well has been established at locations illustrated in Figure 2.2-1. Using 48 hour pumping test results, the well yield was calculated at 1,350 L/min per m down (350 USgpm/min) in a 200 mm diameter pumping well. Based on the available drawdown of 12.3 m from the static water table to the top of the well screen the yield could possibly range as high as 11,400 L/min (3000 USgpm).

Waste Treatment

A package mechanical plant will be installed at the main camp (phase one) to collect and treat wastewater. The outfall pipe will not be constructed since the plant will not be operated as part of the Project. Solid wastes associated with construction of the main camp will be hauled to an approved facility or burned under permit.

Power Supply

Two diesel generator sets rated at 2 MW will be installed to provide power for the main camp. A pad will be constructed for future installation of a construction power transformer station.

2.2.3.3 Material Sources

Like the road, the materials required for constructing the main camp (phase one) infrastructure will include impervious fill, granular fill/crushed rock, rock fill, riprap and concrete aggregates. Materials for the camp will come from borrow sources within the 100-m road ROW (primarily from the area known as G-1) and may be supplemented from established sources known as the G-5 deposit source near the intersection of PR 280 and the proposed road.

2.3 CONSTRUCTION ACTIVITIES

Construction activities are described for the start-up camp, road and stream crossings, and main camp (phase one). The construction schedule is also presented.

2.3.1 Start-up Camp

Construction activities for establishing the start-up camp will include the following:

- Clearing and grubbing;
- Preparing site (establish drainage);
- Applying erosion and sediment control measures;
- Constructing pad (excavation, backfilling, grading);
- Gravelling;
- Installing trailers;
- Trenching for utilidors;
- Installing utilities and services; and
- Decommissioning.

It is proposed to commence construction of the start-up camp in early November 2009 and to develop the camp facilities during the spring of 2010. During the clearing and grubbing activity workers will be accommodated in a self-contained camp or will commute to and from Split Lake (Figure 1.1-1).

Site preparation will involve clearing and grubbing. Clearing involves removal of brush through mechanical clearing, except near streams where manual clearing is preferred. Mechanical clearing will typically include equipment such as scrapers, bulldozers, motor graders and front-end loaders. Grubbing is the removal of the roots of vegetation and is only undertaken where necessary in accordance with the Preliminary Construction Environmental Protection Plan (EnvPP). Cleared matter will be burned or mulched. Mulch material will be collected and used for camp walkways and for erosion and sedimentation control.

After completion of clearing and grubbing, topographic surveys will establish appropriate drainage elevations, which will be followed by excavating, backfilling and grading. Equipment will typically include scrapers, bulldozers, backhoe excavators, motor graders and front-end loaders. Construction will then begin on granular pads for facilities in the camp. Sub-base and traffic gravel will be applied next. Erosion and sedimentation-control measures and drainage culverts will be installed. Trailers will then be installed at the start-up camp site. Utility hook-ups will be established using shallow and deep bury utilidors, including a fire-protection system consisting of fire hydrants and extensions. Installation of parking barriers and parking lot electrification will also occur.

After completion of the infrastructure, the start-up camp will be decommissioned. The process will include removal of the temporary trailers and utilidors and a cleanup of the site. Once decommissioning is complete, the site will be redeveloped into a storage yard for the road.

2.3.2 Road

Road construction activities will include the following:

- Clearing and grubbing;
- Applying erosion and sediment control measures;
- Constructing security gatehouse and communications tower;
- Establishing drainage and start embankments;
- Continuing embankment construction;
- Gravelling for roadbed surface;
- Trimming slopes;
- Constructing clear-span crossing at Looking Back Creek;
- Installing culvert crossing at the unnamed tributary;
- Installing culverts for local drainage; and
- Cleaning up.

It is proposed to commence construction of the road in early November 2009 and to complete roadwork by October 2011.

Clearing and grubbing will involve removal of brush through mechanical clearing, except near streams, where manual clearing will occur. Equipment will typically include scrapers, bulldozers, backhoe excavators, motor graders and front-end loaders. Grubbing will remove the roots of vegetation and will only be undertaken as necessary. Topographic surveys will be conducted on the cleared and grubbed route for design purposes. Cleared matter will be burned or mulched, with mulch material retained for walkways, and erosion and sedimentation control. The area to be cleared for the road will be confined to the 100-m ROW, with 50 m reserved for the roadbed. A buffer of approximately 25 m will remain on each side of the road, with vegetation left *in situ*. Some areas will undergo mulch application as appropriate. Mulch will provide an organic layer for reseeding and will also offer some erosion control.

Construction of a security gatehouse and erecting a 12 m communications tower will begin the road construction process in the summer of 2010 and will serve to manage access to the road construction site. The gatehouse will be equipped with a granular turnaround apron for vehicles that are not cleared to enter the construction area.

Following establishment of the centreline, a preliminary roadway grade line will be designed based on the surveyed profile (Figure 2.3-1). The limits of the ROW clearing will be flagged by measuring from the established centreline. Clearing width will be determined by the material requirements for the new grade construction. In accordance with Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (Fisheries and Oceans Canada and Manitoba Natural Resources 1996), clearing will be restricted to hand methods adjacent to watercourses, around sensitive areas and in terrain too rugged to permit the use of mechanical clearing. Vegetation buffers near watercourses will be observed according to established guidelines.

Establishing drainage and starting embankment construction will immediately follow clearing and grubbing. During this phase, ditches will be excavated, road drainage will be established and fill will be placed based on the roadway's preliminary elevation first grades. The construction process will proceed with embankment construction, where crews will continue to build the road embankments based on cut and fill requirements for the second and third grades.

Upon completion of the road embankments, gravel will be applied to finish the road-top surface. Slopes will then be trimmed and cleaned as a finishing step for the constructed road cross-section along the length of the road. Lastly, cleanup of construction debris and material along the ROW will be completed in preparation for future use of the road.

2.3.2.1 Stream Crossings

Looking Back Creek

A clear-span bridge crossing will be constructed at Looking Back Creek. The general arrangement for the stream crossing is shown in Figure 2.3-2. Construction of the crossing will require heavy equipment such as excavators, a truck-mounted drilling rig equipped with solid-stem auger and air hammer, pile driver, front-end loader and scraper. Construction is planned to start in November 2009 and be completed in April 2010.

To allow a quick start of construction, a temporary, self-contained 10-person camp may be established at the crossing site by the contractor. The camp will consist of trailer-based accommodations for sleeping quarters, kitchen power and waste-handling facilities. The trailers will be equipped with holding tanks for water, wastewater and sanitary wastes. All wastes will be collected and hauled to an approved facility.

Construction of the clear-span crossing will involve installation of steel **HP piles** driven to the point at which they can no longer be pushed deeper into the ground (refusal). A minimum amount of excavation will be conducted for the integral abutments and all excavations will be shored. Sheet pile cofferdams may be required for the abutment excavations. Forming will take place once the excavation is complete. Reinforcing steel will be installed and then concrete will be poured. Girders will be installed once abutment concrete is in place. The superstructure will consist of pre-cast, pre-stressed concrete box girders shipped to the site. The box girders will be launched over the abutments using a launching truss in combination with two small cranes, with one parked at each side of the creek. Alternatively, girders may be erected using one large crane which would install the girders from the west abutment. The final construction steps will include installation of concrete barriers, high-performance concrete overlay, approach slabs at each end of the bridge, and approved guardrails at each end of the bridge.

Reinforcing steel, stone, sand, cement and other construction materials will be stored in temporary stockpiles at the site. Construction of the crossing is planned for the winter season to avoid in-stream disturbance and minimize runoff and potential erosion. In addition, a number of temporary and permanent erosion control and sedimentation control measures will be implemented. Best management practices for temporary erosion and sedimentation control will involve the following:

- Winter construction;
- Minimal disturbance of existing vegetation cover;
- Measures to prevent soils or construction materials from entering creek; and
- Silt fencing upslope of the creek bank.

In addition, a number of permanent management practices will be applied, including the following:

- Riprap blankets adjacent to and extending from abutments, but above the ordinary high water mark;
- Riprap ditch liner on creek slopes;
- Rock ditch checks incorporated into the ditch liners; and
- Revegetation of disturbed areas.

Unnamed Tributary

Construction techniques for the crossing of the unnamed tributary will be similar to those required for the establishment of through-grade culverts in low-lying areas to deal with local drainage. The main difference will be additional measures, if required, to manage erosion and sediments, although all will be planned appropriately during times of low surface runoff.

The construction timeline for each culvert site is estimated at 2 to 3 days. Construction equipment and materials will be mobilized at the culvert location. If necessary, the crossing site will be de-watered prior to the start of construction by temporarily routing the flow of water around the culvert location. A trench for the culvert will then be excavated and the foundation for the culvert will be prepared by placing and compacting the bedding material along the full length of the culvert. A 750 mm diameter corrugated metal culvert will be laid on the foundation. Fill material will be placed in uniform layers adjacent to and over the culvert and compacted after each lift. Once in place, geotextile fabric and stone riprap for erosion control will be placed at the culvert inlet and outlet. Construction equipment and materials will then be demobilized and temporary water detour, if needed, will be restored. The construction timeline for each culvert is estimated to be from 2 to 3 days which will be planned to be carried out during times of low surface runoff.

2.3.3 Main Camp (Phase One) Construction

Main camp (phase one) construction activities will include the following:

- Clearing and grubbing for camp (250 ha) and three main work areas;
- Applying erosion and sediment control measures;
- Constructing pad (excavation, backfilling, grading);
- Gravelling;
- Installing pre-engineered bunkhouses, kitchen/dining facilities and trailers;
- Installing utilities and services, including service to water wells and installing package wastewater treatment plant; and
- Trenching for utilidors (potential for controlled blasting).

It is proposed to complete construction of the main camp (phase one) facilities by May 2012. Construction equipment will typically consist of scrapers, bulldozers, backhoe excavators, motor graders, front-end loaders and material-haulage trucks. Construction will begin with mobilization of equipment, followed by clearing and grubbing for identified work areas A, B, C and required yards, parking lots and sport fields (Figure 2.1-1). Once clearing is complete, excavation backfill and grading will be conducted to establish drainage and start granular pad construction. Sub-base and traffic gravel will then be applied and buildings for accommodations, facilities and utilities will be installed. Utilities will then be established, including wastewater lines, sewer lines, drying beds, potable water lines and fire hydrants/extensions via utilidors. Amenities such as parking barriers, boat ramps, parking lot electrical services and security fencing for the camp will be installed.

2.3.4 Construction Schedule

The construction schedule is dependent upon the timing of regulatory approvals, but it is anticipated that the main Project components would be constructed according to the schedule in Table 2.3-1.

Table 2.3-1: Project Construction Schedule

Timeframe	Construction Activities
Nov 2009 - Mar 2010	• Clearing and grubbing contract
Nov 2009 - Apr 2010	• Clear-span bridge at Looking Back Creek
Feb 2010 – Oct 2011	• Road construction
May 2010 – July 2010	• Start-up camp
Oct 2010 – May 2012	• Main camp (phase one)

2.4 OPERATION AND MAINTENANCE

The majority of activities associated with the proposed Project relate to construction. The only operational activities are associated with the use of the start-up camp while construction of the Project is underway. Once construction is complete, the start up camp will be decommissioned and only minor maintenance of the road and camp will be required. There may be occasions when the facilities may be used on a limited basis to access the area for engineering and environmental studies.

2.4.1 Start-up Camp Operation

Approximately 125 workers will be living in the start-up camp during construction of the road and associated infrastructure. In addition to sleeping and eating (using propane for cooking and heating), operational activities will include the storage of equipment and some materials, fuelling vehicles and equipment, and using the tank farm. Diesel generator sets will provide power for the start-up camp. Activities will also include use of the one well for water supply with domestic-use water demand expected to be approximately 43,000 L per day at peak camp occupancy. The current preferred option to manage wastewater at the start-up camp is to collect the wastewater in a holding tank and discharge it to a septic field. Septage from the holding tank will be removed and hauled out to an approved facility (Appendix A1). Solid wastes will be taken to a collection site (secured from wildlife) on-site and will be hauled to an approved facility.

2.4.2 Access Management

A Preliminary Access Management Plan has been developed to minimize site access and to accommodate local resource users (Appendix E). Access to the road construction area will be managed by a security contractor. The entrance to the road construction area will be gated and it will not be open to the public. The security gate will be staffed by a security services contractor on a full-time basis. Construction contractors, their employees, authorized subcontractors and authorized resource users will be required to follow pre-defined identification and access procedures to gain access to the road for the duration of the Project.

2.4.3 Camp Maintenance

Camp maintenance activities will include heating of facilities, winterizing as required and ongoing security at each camp area.

2.4.4 Vegetation Management

Vegetation management will be undertaken by the contractors using mechanical means as the preferred method of vegetation control. Temporarily cleared areas will be graded and stockpiled organic material will be spread to control erosion, encourage regrowth of native vegetation and reduce the risk of invasive plant species.

All cleared areas such as ditches that require revegetation will be seeded with a grass mixture only containing native and/or non-invasive introduced grasses (i.e., it will not contain sweet clover or other herbs). The restored areas will be monitored to evaluate revegetation efforts and to determine if additional actions are required.

2.4.5 Stream Crossing Protection

Stream crossing protection is described in the EnvPP and will include several safeguards to minimize effects on stream flow and water quality. Aggregate material will not be removed from any stream or waterway. Flow from ditches will be directed into either vegetated buffer areas or dissipated, but never directly into a stream. All maintenance vehicle traffic and associated machinery will only cross waterways at constructed road crossings.

2.5 CONTRACTS AND WORKFORCE REQUIREMENTS

The Project will provide an estimated 184 person-years of employment over a proposed 2.75 year period between the last quarter of 2009 through the second quarter of 2012. The work will be carried out through 11 separate work packages undertaken by construction and construction support contractors. Manitoba Hydro will also have staff onsite. As proposed in the Joint Keeyask Development Agreement (JKDA) and the tentative Keeyask Infrastructure Agreement, the first ten of the work packages will be undertaken as direct negotiated contracts DNCs by businesses and

joint ventures that are at least 50% owned by one or more of the Keeyask Cree Nations. The DNCs consist of the following packages:

- Catering (FLCN and YFFN);
- Camp Maintenance and Operations Services (CNP);
- Security Services (FLCN and YFFN);
- Employee Retention Support Services (FLCN and YFFN);
- First Aid Services (CNP);
- Start-Up Camp Site Development and Installation (CNP);
- Main Camp Site Development (CNP);
- Main Camp Sewer and Water Services (CNP);
- North Access Road Construction (CNP); and
- Clearing and Grubbing (CNP).

The contract for construction of the clear-span bridge at Looking Back Creek will be competitively bid, while the remaining work will consist of Manitoba Hydro's site staff to oversee the Project.

Figure 2.5-1 presents estimated peak Project workforce requirements for the proposed Project by quarter and by occupational category. A more detailed breakdown by occupation is contained in Appendix A2. These estimates could change when the construction work is implemented, depending on how the contractors choose to perform their work. Figure 2.5-1 and Appendix A2 illustrate the following:

- The highest level of employment occurs in the third quarter of 2011 when the number of job opportunities reaches 126. In the period of high employment between the third quarter of 2010 and the first quarter of 2012, peak quarterly employment ranges from 80 to 126 jobs;
- Total employment opportunities will increase until the fourth quarter of 2010, and then remain at high levels for the next five quarters until the first quarter of 2012, followed by a decline in the second quarter of 2012; and
- A sizable portion of the workforce requirements occurs in trades that are available among KCN members, namely the following:
  - Construction support occupations, such as catering and janitorial, security, first aid and employee retention support;
  - Non-designated trades occupations, such as construction labourer, heavy equipment operator and teamster; and
  - Some designated trades occupations such as carpenter, electrician and plumber.

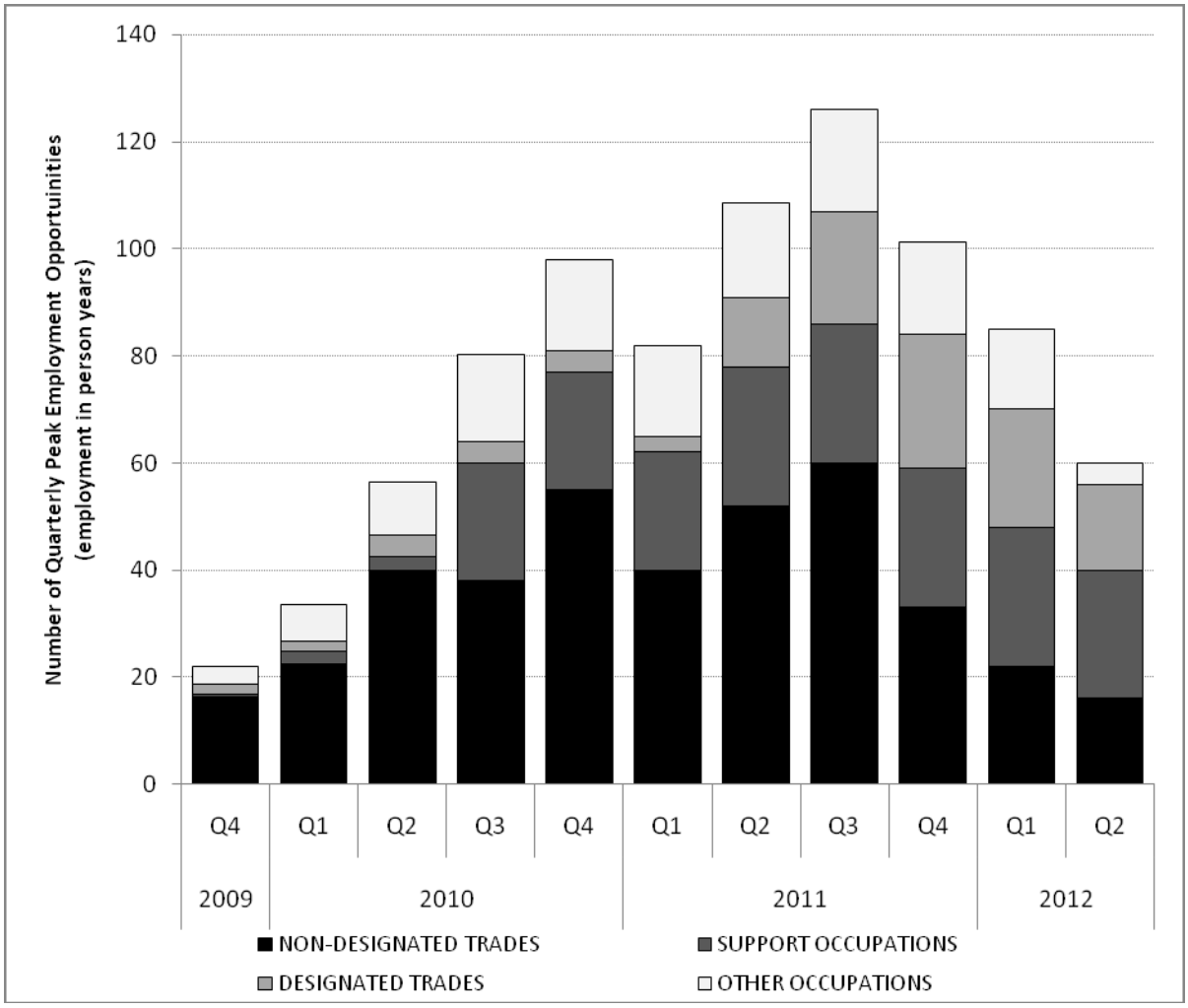


Figure 2.5-1: Estimated Peak Quarterly Workforce Requirements by Occupational Categories for the Project

Non-designated trades, construction support and identified designated trades positions dominate the workforce required for the construction period of Q4 2009 to Q2 2011. In the remaining construction period of Q3 2011 to Q2 2012, more than two-thirds of the workforce requirements are in these trades.[1]

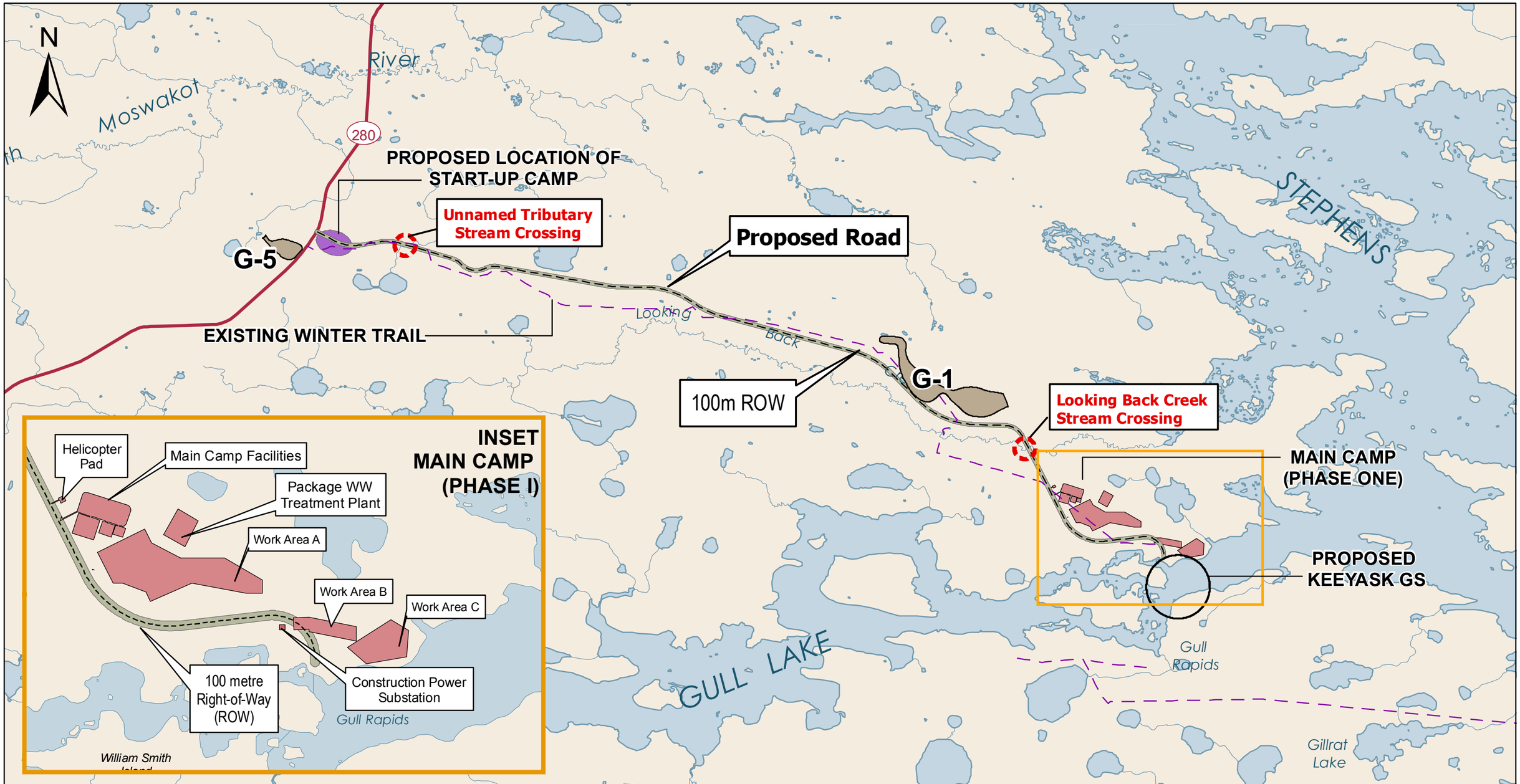
[1] The designated trade positions have apprenticeship programs typically requiring four years of technical training and work experience leading to a journeyperson certification. Based on the current Burntwood/Nelson River Agreement (BNA), it is anticipated that apprentices will account for at least 20% of the Project's designated trades positions. The construction support, and non-designated trades positions have trainee positions but do not have apprenticeships, and most of these positions require less than three years of related work experience, with about 45% requiring one year or less of related work experience or training. The BNA provision would also allow for entry level workers to account for at least 20% of these positions[0].

2.6 RECLAMATION

Disturbed areas requiring reclamation will include borrow areas, quarry sites, work areas, temporary haul roads, settling ponds and spoil deposition sites will be disturbed during construction activities. Reclamation measures based on best management practices, guidelines and regulations, and KCN principles (Appendix C) will be used to stabilize soils and prevent erosion. The Preliminary EnvPP provides a description of the standard methods for disturbed site reclamation. Specific plans will be developed for reclamation activities that are outside of the ROW or camp footprint areas. Reclamation will commence upon completion of the Project construction.

2.7 DECOMMISSIONING

In the event that the Keeyask GS project does not proceed in the future, the proposed infrastructure would not be required and would be decommissioned. It is intended that decommissioning would return the environment to the pre-construction conditions to the extent reasonable and practicable. Decommissioning activities would include removal of the roadbed, clear-span bridge, culvert crossing and through-grade drains, and camp buildings and utilities. The roadbed and camp site would be regraded and revegetated. A decommissioning plan would be prepared and submitted to the appropriate regulatory authorities for approval prior to implementation. Public notification of decommissioning and associated activities would also take place.



KEEYASK

Scale

0 1.25 2.5 5 km

0 1.25 2.5 5 mi

Projection: UTM NAD83, Zone 15N
Data Source: Manitoba Hydro and Government of Canada
Created By: TetrES Consultants INC.
Date Created: July 24, 2009

LEGEND

- Borrow Areas
- Start-Up Camp
- Main Camp (Phase One)
- 100m ROW
- Winter Trail

Location of Borrow Sources and Infrastructure

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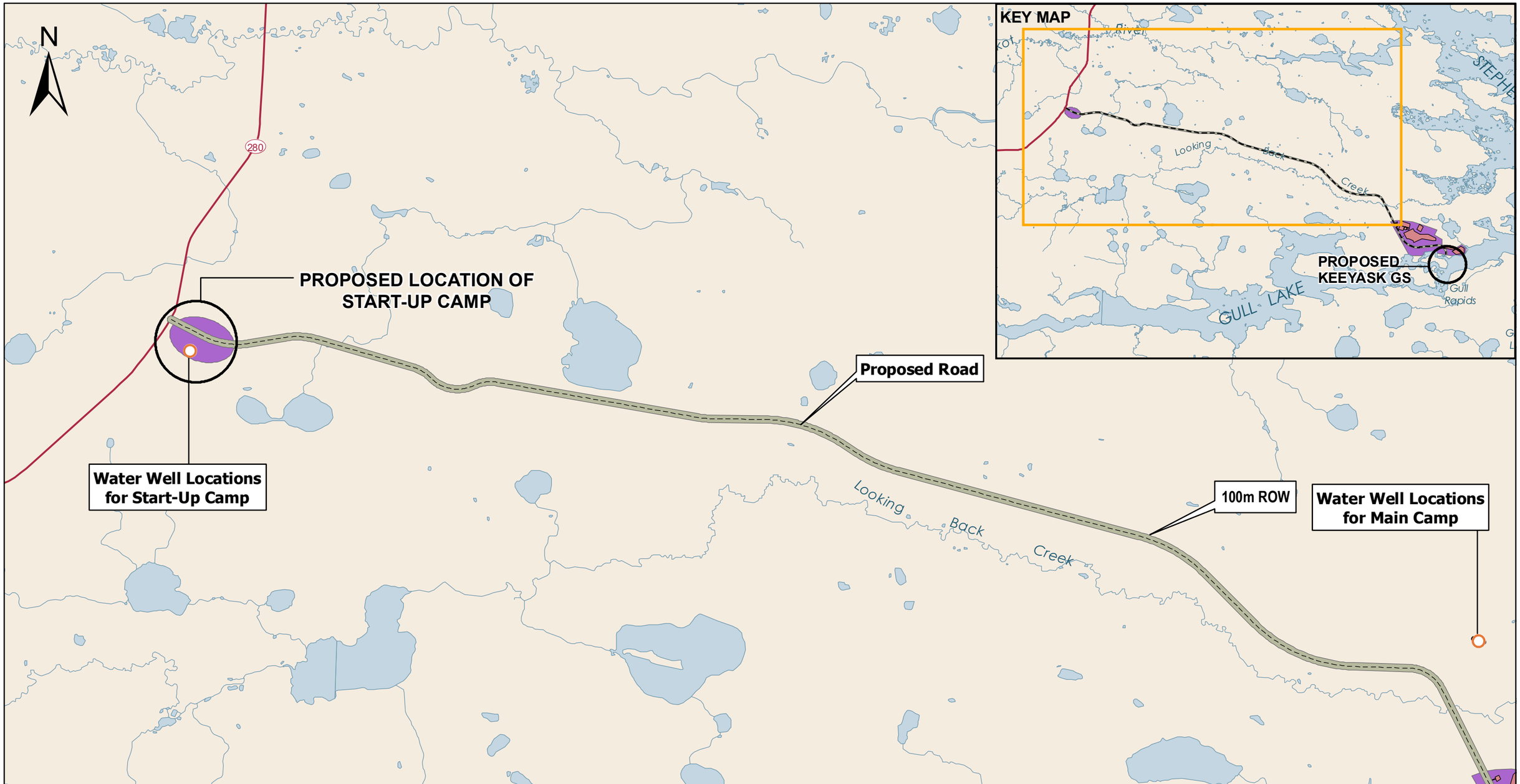
Figure 2.1-1



KEEYASK

Scale

0 1 2 4 km

0 0.5 1 2 mi

Projection: UTM NAD83 Zone15N
Data Source: Manitoba Hydro and Government of Canada
Created By: TetrES Consultants INC.
Date Created: July 23, 2009

LEGEND

- Infrastructure (Footprint)
- Water Well
- 100m ROW

Water Well Locations in the Study Area

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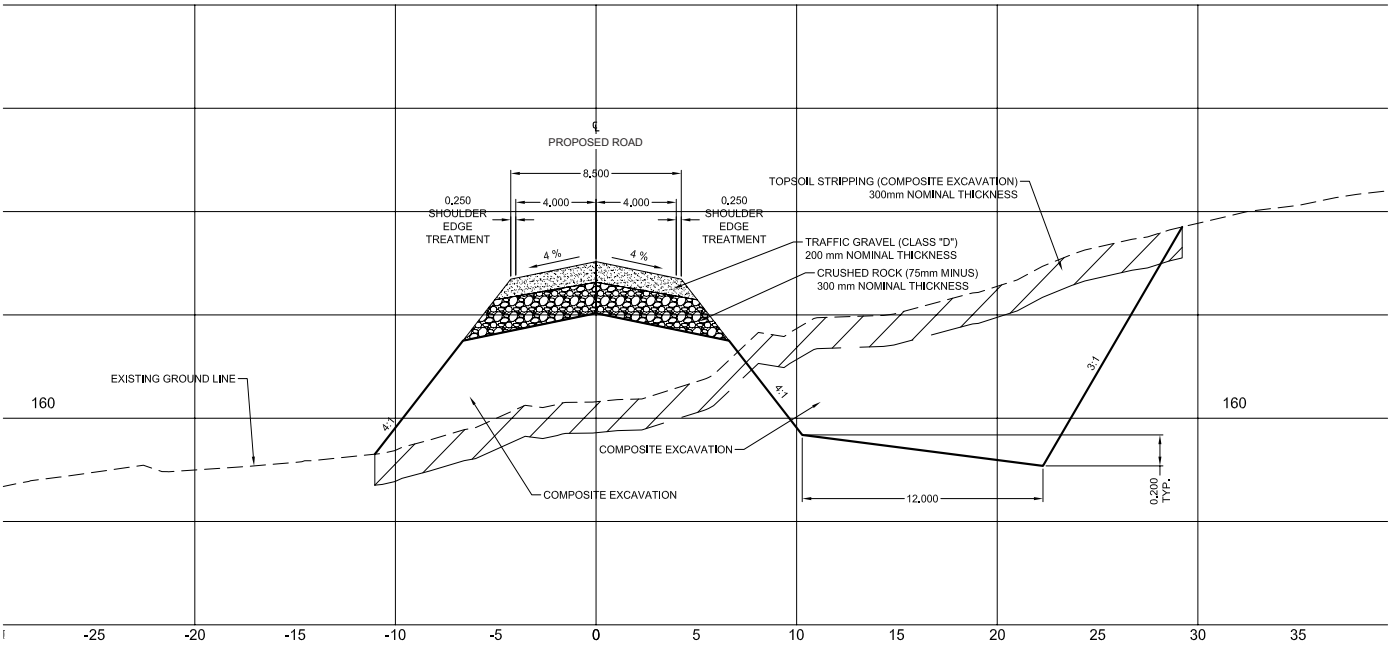
Figure 2.2-1



SECTION AT STA. 6+700

GRADE CONSTRUCTION

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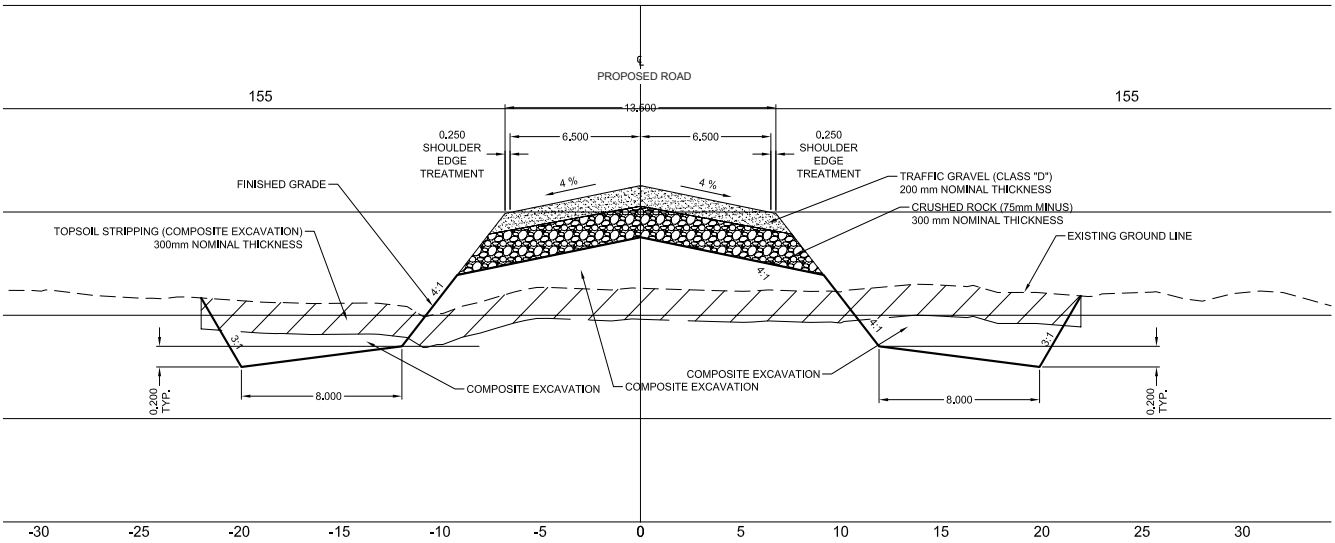
H=1:150



SECTION AT STA. 15+000

GRADE CONSTRUCTION

V=1:50
H=1:250

Road Cross Sections
Figure 2.3-1