

Appendix B  
Project Description

N.B.

*Please note that the following Project Description was issued in August 2011 to federal and provincial regulators for the purposes of introducing the project and initiating discussion at the start of the EA planning process. For the reader's convenience, the Project Description is included as an appendix to this Environmental Report as a reference for the initial scope of the project and to ensure that all relevant project information is presented.*

*The main Environmental Report represents the most up-to-date document, and its contents supersede what was presented in the Project Description.*



## **Project Description**

# **Marter Township (Blanche River) Hydroelectric Generating Station**

**Distribution:**

Canadian Environmental Assessment Agency

**Federal Agencies to be contacted by the Federal Environmental Assessment Coordinator:**

Environment Canada (EC)

Fisheries and Oceans Canada (DFO)

Health Canada (HC)

Aboriginal Affairs and Northern Development Canada (AANDC)

Infrastructure Canada (IC)

Transport Canada (TC)

**Provincial Agencies:**

Ministry of Aboriginal Affairs

Ministry of Tourism and Culture

Ministry of Energy

Ministry of the Environment – Northern Region, Thunder Bay

Ministry of Municipal Affairs and Housing

Ministry of Natural Resources - Kirkland Lake District

Ministry of Transportation

Ministry of Northern Development, Mines and Forestry

Ontario Waterpower Association

**Municipal:**

Town of Englehart

Township of Marter

**First Nations:**

Beaverhouse First Nation

Matachewan First Nation

Metis Nation of Ontario

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## **1. General Information**

### **1.1 General**

This Project Description has been prepared by the proponent, Xeneca Power Development Inc. (Xeneca), based on the current conceptual designs for the Marter Township Hydroelectric Generating Station (GS). The document was prepared to meet the requirements of the Federal *Canadian Environmental Assessment Act* (CEAA) as well as the provincial Class Environmental Assessment for Waterpower Projects (Ontario Waterpower Association, OWA, 2008, Revised March 2011). The conceptual design is subject to change subsequent to the results of studies in support of the proposed undertaking, comment by regulatory agencies, First Nation and Aboriginal Communities and other stakeholders.

#### **1.1.1 Name and Proposed Location of Project**

The name of the project is the Marter Township Hydroelectric Generating Station (GS) Project. The proposed project is located on the Blanche River, approximately 9 km north of the Town of Englehart (Figure 1). The proposed dam and powerhouse locations are located on Lot 12, Concession V in the Township of Marter.

#### **1.1.2 Nature of the Project**

Xeneca submitted the Waterpower Site Release Application (No. WSR-2008-02) to the Ministry of Natural Resources (MNR) on December 3, 2008 for Site ID Numbers 2JC16 and 2JC17. The MNR released this site as part of the Non-Competitive Site Release Package (NCPR) MNR acknowledged receipt of the application on May 15, 2009. MNR has yet to submit a Site Description Package and award Applicant of Record Status to Xeneca Power Development for the Marter Township site.

Xeneca was awarded a Feed-in Tariff (FIT) contract for this site by the Ontario Power Authority (OPA) on April 29, 2010.

Xeneca Power is proposing to construct a hydroelectric facility at Marter Township. The facility will have a generating capacity of 2.1 MW. The structure's components will include a water control structure (spillway dam), penstock and powerhouse. Road upgrades as well as new road construction will be required to access the site. An approximate 500 m long, 44kV connection to Feeder 9M5, west of the site, will be installed in order to connect the generation facility to the Kirkland Lake Transformer Station.

Project design information presented herein is based on preliminary investigations and analysis. Design optimization and finalization will be conducted pending the results of feasibility studies, field investigations as well as public and agency consultation. The description of the components of the project will be updated throughout the environmental assessment process as detailed design information becomes available.

### 1.1.3 Purpose of the Project

The purposes of the project are to:

- Meet government and energy regulatory goals and objectives to generate environmentally sustainable hydroelectric green energy in a reliable manner; and
- sell this power under a Feed In Tariff (FIT) Contract from the Ontario Power Authority (OPA).

In order to meet these objectives, Xeneca will try to maximize utilization of existing infrastructure to deliver power generated by the proposed project to the provincial power grid.

### 1.1.4 Economic Benefits

The proposed Marter Twp generating station will have a total installed capacity of approximately 2.1 MW.

**Waterpower creates jobs, generates revenue to the taxpayers of Ontario and is the longest lived and most reliable source of clean, renewable electricity.**

- Approximate economic activity (direct) to build in Ontario is \$5 million per megawatt, about half of which is spent locally procuring everything from consulting and legal services to concrete, steel, trucking and other services such as hotels, restaurant and fuel.
- Direct job creation (construction only) 10,000 person hours per MW. Indirect jobs multiply by 1.5.
- Local/Regional economic boost of \$2.5 million per MW – about \$5.25 million.
- First Nations and non aboriginal community participation incentives. For overview see the Xeneca Website ([www.Xeneca.com](http://www.Xeneca.com)).
- Significant return to the people of Ontario with approximately \$5 million per MW (\$10.5 million over the 40 year lifespan of the project) paid through Gross Revenue Charges (GRC) and Provincial and Federal Income taxes.
- May assist mining companies or local industry by providing more reliable power with some potential cost savings.
- Waterpower lasts... Many power plants built in the early 1900s are still in operation and with regular maintenance and upgrades can last for generations to come. In comparison the life span for other sources of clean power are: Nuclear 40 years, Wind 20 years, Solar 20 years.

### 1.1.5 Parties Who Received the Project Description

This Project Description has been submitted to the Canadian Environmental Assessment Agency (CEAA) in Toronto for distribution to relevant federal agencies including:

- Environment Canada (EC)
- Fisheries and Oceans Canada (DFO)
- Health Canada (HC)
- Aboriginal Affairs and Northern Development Canada (AANDC)
- Infrastructure Canada (IC)

- Transport Canada (TC)
- Other departments as identified by CEAA

The Project Description will also be submitted to the following Provincial Ministries, Municipalities and Aboriginal communities:

**Provincial Agencies**

- Ministry of Aboriginal Affairs
- Ministry of Tourism and Culture
- Ministry of Energy
- Ministry of the Environment – Northern Region, Thunder Bay
- Ministry of Municipal Affairs and Housing
- Ministry of Natural Resources - Kirkland Lake District
- Ministry of Transportation
- Ministry of Northern Development, Mines and Forestry
- Ontario Waterpower Association

**Municipal Governments**

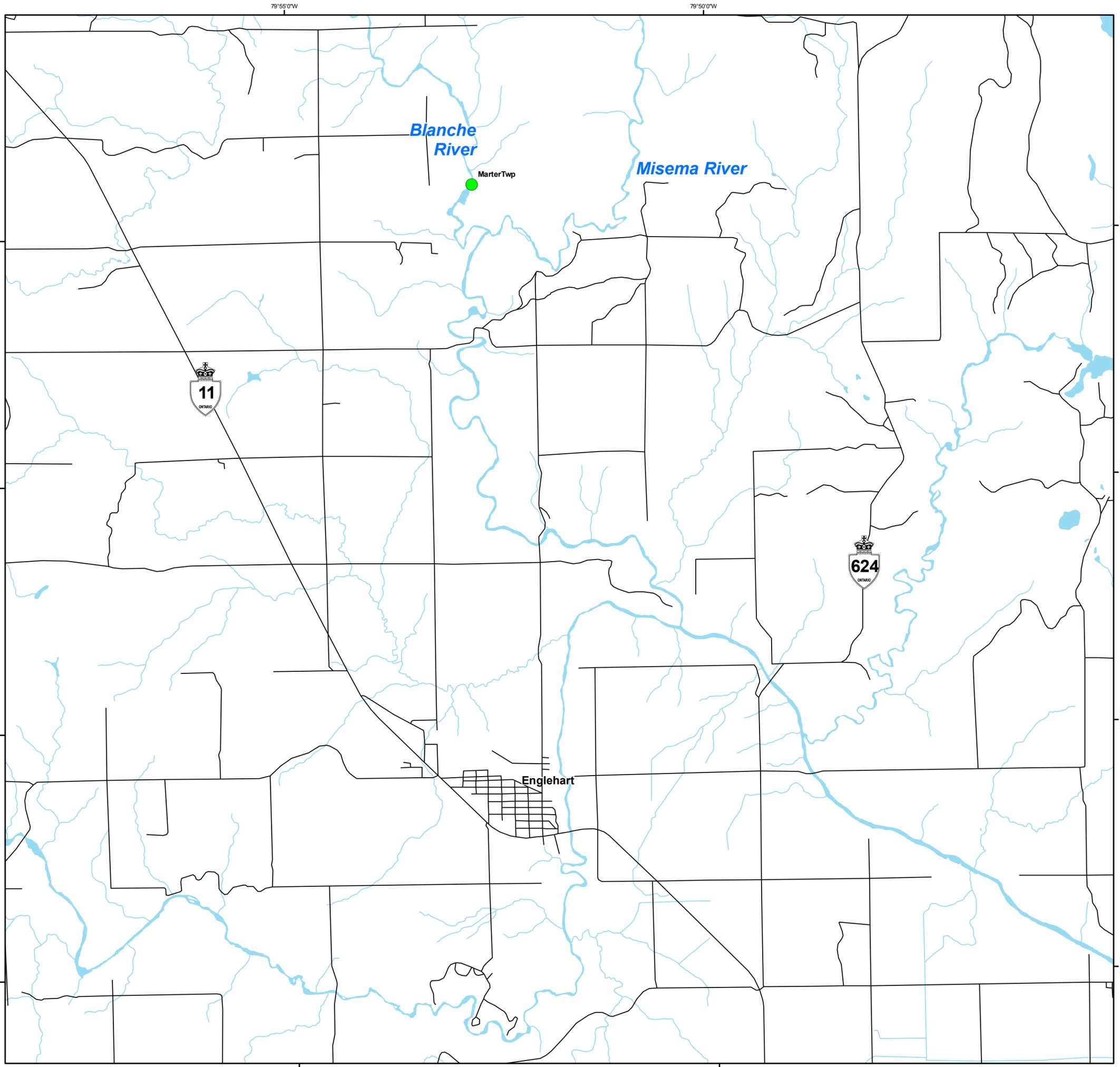
- Town of Englehart
- Township of Marter

**First Nations**

- Beaverhouse First Nation
- Matachewan First Nation
- Metis Nation of Ontario

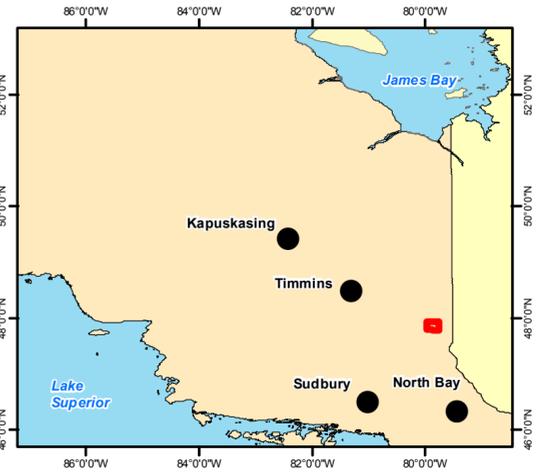
**1.1.6 Federal, Provincial and Municipal Agency and Stakeholder Class EA Consultations**

The agencies and organizations shown in Table 1.1 will be engaged and consulted through the environmental screening process. These organizations and any additional stakeholders identified subsequent to the issuance of this Project Description have or will receive an introductory letter and copy of the Notice of Commencement.



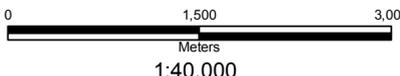
**LEGEND**

- Site Locations
- Road
- Water Features



**REFERENCE**

Note: MNR & Geogratis Data Services (2010)  
UTM Zone 17



**PROJECT**  
MARTER TWP GS

**TITLE**  
SITE LOCATION MAP

PROJECT No.		
DESIGN	KC	06/10/2010
GIS	KC	06/10/2010
CHECK	TS	06/10/2010
REVIEW	KF	06/10/2010

**FIGURE**  
**1**

**Table 1.1: Government Agencies and Organizations to Be Contacted**

<p><b>Federal Government</b>          Canadian Environmental Assessment Agency (CEAA)          Environment Canada (EC)          Fisheries and Oceans Canada (DFO)          Health Canada (HC)          Aboriginal Affairs and Northern Development Canada (AANDC)          Infrastructure Canada (IC)          Transport Canada (TC)</p>
<p><b>Provincial Government</b>          Ministry of Aboriginal Affairs          Ministry of Tourism and Culture          Ministry of Energy          Ministry of the Environment (MOE)          Ministry of Municipal Affairs and Housing          Ministry of Natural Resources (MNR)          Ministry of Transportation          Ministry of Northern Development, Mines and Forestry</p>
<p><b>Municipal Government</b>          Town of Englehart          Township of Marter</p>
<p><b>First Nations</b>          Beaverhouse First Nation          Matachewan First Nation          Metis Nation of Ontario</p>
<p><b>Industry/Commercial Stakeholders</b>          Kirkland Lake District Game and Fish Protective Association          Kirkland Lake District Trapper’s Council          Timiskaming Forest Alliance          Timiskaming Environmental Action Committee          Ontario Fur Managers Federation          Ontario Waterpower Association</p>

**1.1.7 Environmental Assessment Processes**

As a new development with a nameplate capacity less than 200MW, this project is subject to the Class Environmental Assessment for Waterpower Projects (OWA, 2008, Revised 2011), which is an approved Class EA under the *Ontario Environmental Assessment Act*. The proponent has categorized this undertaking as a ‘new project on a managed waterway’ in accordance with the definition for ‘managed waterway’ provided in the Class Environmental Assessment for Waterpower Projects. Confirmation that this categorization is accurate will be provided subsequent to a review of this project description by applicable regulatory bodies (MNR and MOE) and the OWA.

An authorization from DFO under the *Fisheries Act* and approval from Transport Canada under the *Navigable Waters Protection Act* (NWPA) will be required. Each triggers the need for an environmental assessment under the *Canadian Environmental Assessment Act* (CEAA). Since the proposed project is less than 200 MW, a screening level environmental assessment would be completed in accordance with the CEAA and all applicable guidelines.

EA provisions of other provincial Class EAs will be identified at the proponent-agency coordination meeting. Where necessary a coordinated approach will be sought during this meeting.

No federal funding is involved in this project.

## **1.2 Contacts**

### **1.2.1 Proponent and Contact Information**

The project proponent is Xeneca Power Development Inc. At the time of this submission, there were no co-proponents involved in this project. Xeneca is presently pursuing the possibility of partnering with interested Aboriginal communities. Contact information for Xeneca is:

Patrick Gillette  
President  
Xeneca Power Development Inc  
5160 Yonge Street #520  
North York, ON M2N 6L9  
Phone: 416-590-9362  
Fax: 416-590-9955  
Email: [pgillette@xeneca.com](mailto:pgillette@xeneca.com)

### **1.2.2 Proponent's Consultant**

Ontario Resource Management Group Inc. (ORMG) has been retained to conduct the field study program for this project. Contact information for ORMG is:

Kristi Beatty  
Ontario Resource Management Group Inc  
P.O. Box 1234  
Pembroke, ON K8A 6Y6  
Phone: 613-638-0283  
Email: [ormgkb@ormg.org](mailto:ormgkb@ormg.org)

OEL-HydroSys Inc. has been retained to conduct the Class EA for this project. Contact information for OEL-HydroSys Inc. is:

Tami Sugarman  
OEL-HydroSys Inc.  
3108 Carp Road  
P.O. Box 430, Carp ON K0A 1L0  
Phone: 613-839-1453 x229  
Fax: 613-839-5376  
Email: [eainfo@oel-hydrosys.ca](mailto:eainfo@oel-hydrosys.ca)

### **1.3 Land Ownership**

The project footprint and potential area of impact (i.e. for the generating station, headpond, switchyard, control structure, access road and transmission line corridor) are located on both provincial and private lands.

### **1.4 Authorizations Required**

Table 1.2 outlines a list of potential regulatory approvals (federal, provincial and municipal) that may be required during the construction or operation of this project. The list below is not meant to be comprehensive: site specific permitting requirements will be confirmed through the EA planning process and once a detailed design and construction plan is available.

**Table 1.2: Federal, Provincial and Municipal Approvals**

<b>Permit and Legislative Requirement</b>	<b>Agency</b>
<b>Federal</b>	
Authorization for Works and Undertakings Affecting Fish Habitat - <i>Fisheries Act</i> [Section 35(2)]	Department of Fisheries and Oceans
Authorization for Destruction of Fish by Means other than Fishing - <i>Fisheries Act</i> (Section 32)	Department of Fisheries and Oceans
<i>Species at Risk Act</i> (SARA) – authorizations, as applicable	Department of Fisheries and Oceans; Environment Canada
Approval for Construction in Navigable Waters - <i>Navigable Waters Protection Act</i> (Section 5)	Transport Canada (Marine)
<i>Explosives Act</i> - Temporary Magazine Licence	Natural Resource Canada (NRCan)
<b>Provincial</b>	
<i>Lakes and Rivers Improvement Act</i> (LRIA) – Location Approval and Plans and Specifications Approval	Ministry of Natural Resources
<i>Lakes and Rivers Improvement Act</i> (LRIA) – Water Management Plan	Ministry of Natural Resources
<i>Lakes and Rivers Improvement Act</i> (LRIA) – Work Permits (Parts 1-5, as required).	Ministry of Natural Resources
<i>Public Lands Act</i> (PLA) – Licence of Occupation	Ministry of Natural Resources
<i>Endangered Species Act</i> (ESA) – permits and agreements, as applicable	Ministry of Natural Resources
<i>Crown Forest and Sustainability Act</i> (CFSA) - Forest Resource Licence and Overlapping Licence Agreement	Ministry of Natural Resources
<i>Forest Fires Prevention Act</i> (FFPA) - Burn permit on Crown Land	Ministry of Natural Resources
<i>Conservation Authority Act</i> (CAA) - (Section 28 regulations)	Conservation Ontario
<i>Ontario Heritage Act</i> and the <i>Ontario Heritage Amendment Act</i> (OHA and OHAA)- Cultural Heritage Clearances	Ministry of Tourism and Culture
Permit to Take Water – <i>Ontario Water Resources Act</i> (Section 34)	Ministry of the Environment
Certificate of Approval (Industrial Sewage) – <i>Ontario Water Resources Act</i> (Section 53)	Ministry of the Environment
Certificate of Approval (Air and Noise) – <i>Environmental Protection Act</i> (Section 9)	Ministry of the Environment
Waste Generator Registration – <i>Environmental Protection Act</i> [Section 18(1)], Ontario Regulation 347	Ministry of the Environment
Notice of Project and Registration of Contractors – Construction Regulation 213/91	Ministry of Labour
<i>Electricity Act</i> (EA) - Electricity Generation Licence	Ontario Energy Board
<b>Municipal</b>	
Permit for Noise (from Construction)	Municipality
Road Use Agreement	Municipality
Building Permit	Municipality
<i>Fire Protection and Prevention Act</i> (FFAPA) - Burn Permit	Municipality

## 2. Project Information

### 2.1 Description of Proposed Project

#### 2.1.1 General

Xeneca Power is proposing to construct a hydroelectric generating facility at Marter Township on the Blanche River. There are presently two development options being examined by Xeneca for the proposed project. Option 1 would capture a surveyed gross head of 17.5 m and Option 2 would capture a surveyed gross head of 12.5 m. The two proposed dam locations are separated by a distance of 80 m. The FIT contracted installed capacity of the project is 2.1 MW.

The conceptual development for both options would incorporate the use of a spillway dam, however Option 1 would have a higher dam. In both options, a penstock situated on the west shore of the river will conduct flows from the river to an intake before directing them through a single Pit/Bulb Kaplan turbine with a nameplate capacity rating of 2.1 MW.

The general arrangement and details of the power facilities and access roads are presented on plates found in Appendix A. The extent of the lands involved in the development is also shown on the plates. The proposed site development is described in more detail in the following sections.

The proposed design of the project could be subject to change subsequent to the results of field investigation, regulatory agency input, First Nation and Aboriginal Community involvement, and comments received from other stakeholders. Project design changes may therefore be implemented based on the valued ecosystem components within the project area, including environmental, social or economic factors.

#### 2.1.2 Summary of Hydraulic Characteristics

Estimated existing water levels and flows for Option 1:

- Normal operating headwater level el 201 m
- Normal tailwater level downstream of powerhouse el 183.5 m
- Normal operating gross head 17.5 m
- Design turbine flow  $16.0 \text{ m}^3/\text{s}$
- 1:100 year return period flood flow  $166 \text{ m}^3/\text{s}$
- 1:10 year return period dry flow  $1.54 \text{ m}^3/\text{s}$
- Long-term average flow  $12.5 \text{ m}^3/\text{s}$

Estimated existing water levels and flows for Option 2:

- Normal operating headwater level el 196 m
- Normal tailwater level downstream of powerhouse el 183.5 m
- Normal operating gross head 12.5 m
- Design turbine flow  $16.0 \text{ m}^3/\text{s}$

- 1:100 year return period flood flow 166 m<sup>3</sup>/s
- 7-days Average 1:10 year low flow (7Q<sub>10</sub>) 1.54 m<sup>3</sup>/s
- Long-term average flow 12.5 m<sup>3</sup>/s

### 2.1.3 Installed Capacity

The FIT contracted installed capacity at this site will be 2.1 MW provided by a single turbine unit.

### 2.1.4 Site Access

The proposed site access will require a new road to be constructed from an existing local road to the powerhouse (approximately 0.5 km) and to the spillway dam (approximately 130 m) (Appendix A).

### 2.1.5 Headworks Structures

The Plates provided in Appendix A show the layout and details of the proposed headworks structures of both options. The headworks will consist of a dam with a 30 m long spillway.

### 2.1.6 Conveyance System

A plan of the conveyance system is shown in Appendix A. A 2.5 m diameter penstock will be used to convey water from the intake structure to the turbine/generator set in the powerhouse. In Option 1, the penstock length is 200 m, compared to 120 m for Option 2.

### 2.1.7 Powerhouse

The powerhouse footprint for both options would be similar, approximately 16 m x 7.5 m. Its intake will be approximately 6.25 m wide and 7.5 m deep. Details for the powerhouse are provided in Appendix A.

The powerhouse will be constructed with reinforced concrete floors and walls to a level above the historical flood level and existing ground levels. Construction above this defined line can be reinforced concrete, insulated steel panels or a combination of the two based on existing physical needs and constraints. The water passage within the powerhouse will be constructed from a combination of concrete and steel conduits.

The dam and weir may be constructed from any or all of the following materials within the engineering constraints for the same; concrete, RCC – rolled and compacted concrete, earthen/stone, clay and ‘rubber’ (impermeable barriers). Typical construction will feature a broad overflow weir topped by a control feature. (ie: an Obermeyer or similar, pneumatically operated dam). Headgate structures may be either included in the dam design or built as a separate riverside structure dependent upon penstock routing. In most cases, a cofferdam is required for temporary diversion of river flows around the intake/dam/weir construction areas.

### **2.1.8 Transmission**

An approximate 500 m long, 44 kV connection to Feeder 9M5, west of the site, will be installed in order to connect the generation facility to the Kirkland Lake Transformer Station (Appendix A). This new line will be supported by wooden poles along its total length and require a right-of-way of between 10m-30m, depending on site conditions. A single, pad mounted transformer will be located at the project site.

### **2.1.9 Area of Inundation**

Based on preliminary hydrological information, the proposed project would flood riparian lands up to 2.4 km for Option 1 and 1.68 km for Option 2 upstream of the spillway dam. The total inundation area of the project will be 21.7 ha and 7.9 ha respectively in Option 1 and Option 2. (Appendix A).

## **2.2 Operating Strategy for Project**

### **2.2.1 Type of Proposed Project**

Xeneca proposes to operate the facility based on the natural run of water upstream of the plant with some daily flow modifications.

The OPA FIT program encourages power to be produced during daytime hours when Ontario households use power most. To this end, and where circumstances permit, some electricity production may be shifted from night time and weekend hours to daytime hours on weekdays. No long term storage of water is proposed. The Ministry of Energy and Infrastructure refers to this operation mode as “run-of-river with modified peaking.” Most of the year production will occur round the clock. Production shifting will occur during periods of low flow when the natural run in the river drops below the plant capacity. These conditions occur predominantly in late summer and late winter. The amount of water that can be stored is limited by the amount of natural storage available and based on acceptable fluctuation of water levels upstream and minimum flow requirements downstream of the plant. Details of the operation will be determined during the Waterpower Class Environmental Assessment based on environmental, stakeholder and economic constraints specific to the project.

### **2.2.2 Operating Strategy**

The Marter Twp facility has effects on upstream water levels and downstream flows on the Blanche River. This operating plan considers these effects and sets operating objectives and parameters that minimize potential impacts on the environment and recreational uses.

The facility design involves a bypassed reach consisting of a smooth rock channel with no significant habitat in the falls or at the base. The site location is not passable for fish. Lake sturgeon, walleye, pike and other sport fish exist in the river with a significant spawning area 4 km downstream.

The facility will operate as a “modified run-of-river” facility. In this mode of operation, the amount of water passed through the facility over a period of several days is equal to the natural run of the river flows. However, on a short term basis, flows are reduced (i.e. modified) at night and on weekends to allow more electricity to be produced during weekdays when electricity demand is high.

The ability to modify flow is directly dependent on the available storage. However, the available storage and generator size have been limited in the project design to minimize the environmental footprint. Due to this constraint, modified operation of the facility is typically constrained to moderate and low flow periods, when the inflow rate is slow and the amount of available storage is useable.

Most of the year, the facility will operate continuously; however, when natural flows fall below the minimum turbine capacity, operation becomes intermittent. Low flow conditions occur primarily during the winter and late summer. Intermittent operation creates the greatest potential for impacts on downstream uses.

Key operating objectives and parameters in this operating plan relate to the following:

1. The project creates limited headpond inundation. The headpond will be operated in a narrow range to mitigate shoreline impacts during modified operation.
2. Slope Stability: A clay erosion site exists upstream in the headpond area. The area will be stabilized as part of construction and monitored long term.
3. Bypass Reach: Due to the lack of habitat in the bypass reach or at its base, no compensatory flow is required. However, any excess flows will pass during spring freshet and other high flow events.
4. 2 km Downstream Reach: The downstream reach consists of a pool at the base of the site followed by a 2 km flat section of river to the confluence with the Misema River. Variable flow due to intermittent operation is not a significant issue. However to retain flows for spawning at 4 km downstream, the following operations objectives will apply:
  - a) Spring Operation: No intermittent operation will occur during this period to protect spawning and other habitat considerations.
  - b) Summer Operation: Possible intermittent operation. Minimum flows set at a level that reflects limited impacts downstream. Ramp rates are set to minimize sudden changes of flows.
  - c) Fall Operation: Possible intermittent operation. Minimum flows are set at a level that reflects reduced habitat activity and limited risk of channel dewatering. Ramp rates are set to minimize sudden changes in flows.

- d) Winter Operation: Minimum flows are set at a level that reflects minimal habitat activity and limited risk of channel dewatering. Ramp rates were set to minimize sudden changes in flow.

### **2.2.3 Water Management Plan**

Currently, Kapawong Power operates the 1 MW Charlton GS in accordance with the Charlton Water Management Plan (WMP) for the Blanche River. The construction and operation of the proposed Marter Township facility will require an amendment to the WMP before the facility commences operation.

## **2.3 Project Activities**

### **2.3.1 Construction Schedule and Activities**

Site preparation activity will commence in August 2012. Construction of the proposed facilities is scheduled to take place between 2012 and 2014 with in-service status expected by October 2014.

### **2.3.2 Operation**

The facility will operate as a run-of-the-river facility with modified peaking. The facility will be designed with the capacity to be remotely operated in addition to having on-site controls. Typically, hydroelectric projects are designed for a 50 to 100 year lifespan. Upgrades and rehabilitation activities may extend their useful life.

### **2.3.3 Decommissioning**

At present, there are no plans being developed for decommissioning the facility. The decision to decommission the facility or alternatively upgrade or rehabilitate the facility to extend its operational life at the time will depend on the structure, operational history of the facility as well as economic and other considerations. Responsibility for decommissioning the facility will be borne by the facility owner at such time as the facility is deemed no longer useful; at which point the decommissioning will be completed according to applicable legal requirements.

## **2.4 Resource Material Requirements**

### **2.4.1 Energy and Water Requirements and Sources**

On-site energy requirements during construction will likely be provided by portable diesel generators. Once operational, the outside energy requirements for the facility will be supplied via a metered station service transformer. A back-up diesel generator will likely be installed on site to provide emergency power to the facility during area-wide power outages and to enable black-start capability.

On-site water requirements for construction are not known at the present time, although it is likely the water will be required during the construction process (i.e. wash water, etc). This water may be supplied from the Blanche River via portable pumps. The quantities required are anticipated to be small and will not likely require a Permit to Take Water

(PTTW) from MOE as the taking will be much less than the 50,000 L/d threshold. Construction process water might also be trucked in from outside sources if required. A PTTW may be required for dewatering behind any cofferdam required by the project.

Operational water requirements for the facility are not known at this time. Small amounts of cooling water may be withdrawn from the Blanche River to cool powerhouse components. A PTTW will be obtained if the amount required exceeds the PTTW threshold. There will not likely be any requirement for potable water at the facility. Operational water requirements will be determined during the detailed design process.

#### **2.4.2 Excavation and Quantity of Fill**

Excavation will be required for the construction of the dam, penstock, powerhouse and tailrace. The expected quantity of excavated material is unknown at this time. Excavated material will include topsoil, underlying soils and bedrock in terrestrial areas, and substrate material and bedrock within the watercourse. Excavated substrate material will be reused to the greatest extent possible to re-line the excavated portions of the channel downstream from the facility. Excess aggregate material will be stored for future use on roadways and other areas requiring fill or material. Any excess or unusable material will be disposed of in accordance with applicable local regulations. Solid waste materials requiring off-site disposal will be chemically tested for waste classification purposes in accordance with the *Ontario Waste Management Regulation* (O. Reg. 347), as amended by Regulation 558/00, and then disposed of accordingly.

Some fill materials may be required from approved commercial sources, but quantities are unknown at this time.

#### **2.4.3 Toxic/Hazardous Materials**

Fuels, hydraulic fluids and lubricants will be used in equipment during construction and operation of the facilities. Storage of these materials will comply with all current regulations and guidelines (e.g. *Ontario Fire Code*, O. Reg 347, Occupational Health and Safety Act). The storage of small amounts of hydraulic fluids and lubricants will be in a contained area, well away from the watercourse. It is not anticipated that any explosives will be manufactured on site for this project. It is unknown whether explosives magazines will be required for this undertaking. Should explosives be stored on site, the proponent will seek appropriate approvals for usage and storage of explosives in a manner compliant with NRCan requirements and applicable industry standards. Transport of explosives will be completed in accordance with federal legislative requirements (e.g. *Transportation of Dangerous Goods Act*).

#### **2.4.4 Waste Disposal**

Solid nonhazardous construction waste (e.g. material packaging) generated during the construction process will be removed from the site to an approved disposal location (likely the municipal landfill) or a recycling/composting facility available. Waste debris from clearing activities (e.g. grubbing, non-merchantable timber) will be disposed of in accordance with regulatory requirements. No gaseous wastes other than construction equipment emissions are anticipated. Industrial liquids such as paints, sealants, fuels and

lubricating fluids will be stored in a secure containment area and disposed of in accordance with provincial liquid waste disposal regulations (e.g. *Environmental Protection Act* and O. Reg. 347).

### 3. Project Site Information

#### 3.1 Project Location

Figure 1 show shows the project location. Table 3.1 below provides the geographic coordinates of the site.

**Table 3.1 Geographic Coordinates of Site**

Site Name	MNR Site No.	Geographic Coordinates (latitude, longitude)		Drainage Area (km <sup>2</sup> )
Marter Township	2JC-16-2JC17	47.906°	-79.880°	961

The proposed project is located on the Blanche River, approximately 9 km north of the Town of Englehart (Figure 1). The proposed dam and powerhouse locations are located on Lot 12, Concession V in the Township of Marter.

#### 3.2 Natural Environmental Features

##### 3.2.1 Physical Environment

###### Geology and Soils

The project study area is located within the Abitibi greenstone belt of the Canadian Shield (Ayer and Trowell 2000). Bedrock consists of felsic to intermediate intrusive tonalite and granodiorite as well as mafic to intermediate metavolcanic flows. Geological mapping indicates that there are gold and copper occurrences within approximately 3 km of the project study area. There is no information on the surficial geology of the region publically available from the Ontario Geological Survey.

###### Surface Water Resources

The drainage area at Marter Township is 961 km<sup>2</sup>. The mean annual average flow at Marter Township is 12.5 m<sup>3</sup>/s. Monthly mean flows at each site are summarized below in Table 3.2.

**Table 3.2: Monthly Mean Water Flows**

Month	Mean Monthly Flows (m <sup>3</sup> /s)
January	4.57
February	3.50
March	4.78
April	36.03
May	36.88
June	14.14
July	7.92
August	4.77
September	4.94
October	9.78
November	12.64
December	8.46

High and low flow return periods are summarized below in Table 3.3

**Table 3.3: High and Low Flow Return Period**

Return Period (Years)	Flood Flows (m <sup>3</sup> /s)	Extreme Low Flows (m <sup>3</sup> /s)
1.25	67.6	2.87
2	94	2.30
5	105.4	1.70
10	119.8	1.40
20	133.6	1.16
50	151.4	0.90
100	166	0.75

### **3.2.2 Biological Environment**

As a responsible developer of waterpower resources, the principles of the aquatic ecosystems guidelines within the *Water Management Planning Guidelines for Waterpower* as well as the *MNR Class Environmental Assessment for MNR Resource Stewardship and Facility Development Projects* and *Federal Requirements for Waterpower Development Environmental Assessment Process in Ontario – Practitioner’s Guide* are recognized and embraced. The operating plan for this site has been developed to address the natural flow regime of the Blanche River as well as several other environmental factors. The following natural environment features have been identified to be examined within the project area:

- habitat of endangered or threatened species
- fish habitat
- terrestrial and aquatic flora and fauna
- water quality
- trapping and bait fishing activities
- fish movement

A review of background information concerning the aforementioned natural features was conducted prior to any field surveys to ensure that any potential species occurrences were noted, and, in the case of species of concern, appropriate survey methodologies can be incorporated into the field portion of the EA.

#### Habitat of Species at Risk

By legislation, species listed as Endangered (END), Threatened (THR) or Extirpated (EXP) under the Federal Species at Risk Act (SARA) and/or Provincial Endangered Species Act (ESA) receive protection under these Acts, and recovery strategies and habitat protection for listed species is mandated. Where a species is listed on both Acts, the protection afforded the species is determined by the more stringent legislation. If any species at risk are found to utilize the project site, additional surveys and considerations may be required. Consultation with Kirkland Lake Ministry of Natural Resources staff, the Natural Heritage Information Centre (NHIC) website, and other published documentation (COSEWIC status reports, Ontario Breeding Bird Atlas (OBBA), previous survey results, etc.) will assist in drafting a list of potential SAR for this site prior to drafting field survey schedules or methodologies.

The Lake Sturgeon (*Acipenser fulvescens*) is known within the Blanche River system. Designated as a Threatened (THR) species under the provincial *Endangered Species Act* as part of the Upper Great Lakes/St. Lawrence population, this fish is afforded complete protection to individuals and habitat under ESA legislation.

Potential habitat exists in and around the project area for several other provincially and/or federally listed “at risk” species, including: Eastern Cougar (*Puma concolor*) (END), Golden Eagle (*Aquila chrysaetos*) (END), Peregrine Falcon (*Falco peregrinus*) (THR), Olive-Sided Flycatcher (*Contopus cooperi*), Canada Warbler (*Wilsonia canadensis*), Bobolink (*Dolichonyx oryzivorus*), Rusty Blackbird (*Euphagus carolinus*), Yellow Rail (*Coturnicops noveboracensis*), and Whip-poor-will (*Caprimulgus vociferous*) (THR). Care will be taken during all surveys to note any invertebrate species, both aquatic and terrestrial. Habitat for species considered to inhabit broad terrestrial regimes (e.g. Cougar) would be less immediately impacted by construction, provided a complete survey of potential building footprint areas is completed prior to development.

Additional conversations with MNR staff will determine whether other species of conservation concern potentially occur within the projected impact area of the proposed site.

### Fisheries

Background research as part of the overall information gathering for this site will provide evidence of fish species presence. However, MNR Kirkland Lake has informed the proponent that this information will be provided upon award of Applicant of Record status for the site. Additional information will be collected via in-water sampling under approved procedures, as determined by Kirkland Lake MNR.

The Blanche River, which incorporates the proposed project site, is a warm thermal regime river, and is known to contain White Sucker (*Catostomus commersoni*), Northern Pike (*Esox lucius*), Yellow Perch (*Perca flavescens*), and Walleye (*Stizostedion vitreum*).

Numerous minnows (*Cyprinidae* spp.) are also anticipated throughout the Blanche River system.

As noted above, Lake Sturgeon, an “at risk” species, are confirmed within the Blanche River below the proposed project site.

### Terrestrial and Aquatic Flora/Fauna

A preliminary assessment of the terrestrial and aquatic habitats in the immediate area of the proposed facility site is required in order to describe the habitats, assess the true potential for species at risk as well as all other species to be found in the area, and to assist in the component site selection and design process.

The requirements specifically related to aquatic species, fisheries habitat and navigable waters are specifically the mandate of the Federal Department of Fisheries and Oceans and Transport Canada (Navigable Waters Protection Branch). Detailed information pertaining to these issues is addressed in Section 4.0 of this project description.

Overall, indigenous fauna is typical of the surrounding area, and is expected to include a wide variety of mammals, insects, reptiles, amphibians and avian species. Of note, there is a known Moose (*Alces alces*) Calving Area within the surrounding area, and potential for Moose Aquatic Feeding Area (MAFA) habitat exists. Raptor nests are also likely in the surrounding forest, and an assessment of the forested areas on and around the project site is required to determine what species are present, and if any active nesting sites exist which may need to be considered during the planning process. All other species encountered during field surveys will be recorded.

## **3.3 Socioeconomic Features**

### **3.3.1 Current and Past Land Uses**

The project is located in Marter Township on provincial Crown land and private land. The Blanche River was used as a camping site by the First Nations according to the Ottawa River Heritage Designation Committee (2005).

The project is located within General Use Area ‘G1841: Little Clay Belt’(MNR 2006). According to the Policy Report, the primary intent of this area is to provide suitable lands for current and future agricultural production (MNR 2006). Forestry, mineral aggregate extraction and mining are acceptable uses. Day-use recreation activities are encouraged.

#### Traditional Canoe and Fur Trade Route

There are no known archaeological sites within the immediate vicinity of the site. Stage I and II Archaeological Assessments will be undertaken to confirm/establish any archaeological resources. If required, a Cultural Heritage Evaluation Report will also be completed to assess any cultural heritage resources potentially affected by the project.

#### Forestry

The area surrounding the proposed project site contains mesic to wet mesic mixed forest on moderately deep soils, dry mesic to mesic mixed forest on talus rock, dry mesic predominantly coniferous forest on rock outcrops, ridges and plateaus, and cliff faces and rims. Tree species present within the area include black spruce, tamarack, white spruce, balsam fir, poplar, jack pine and white birch. The watershed falls within the Timiskaming Forest Management Unit which is part of the Boreal Forest Region. No known commercial forestry is taking place in the vicinity of the project.

#### Hunting/Harvesting

The project site is located in Wildlife Management Unit (WMU) 28. The site lies with Bear Management Area KL-28-000. Popular game species include moose, black bear, fox, goose, duck and grouse.

Knowledge of trapping activities within the project area will be gathered through consultations with licensed trappers in the area, as well as the local MNR authorities. In order to ensure that all interest groups are involved, the Ontario Fur Managers Federation will also be invited to participate in consultations, if required. Subsistence trapping, hunting, and fisheries information will be collected in consultation with the local First Nations.

#### Mineral Resources

There are at least two mining claims within one kilometre of the dam (Debicki 2010).

#### Recreation/Tourism

The river itself is valued based on its recreational and tourism opportunities. Roadsides, boat launching areas, trailer camps, portages, and the upstream MNR Dam site contain habitat significantly disturbed by humans. The Blanche River is a designated canoe route according to the Crown Land Use Policy Atlas Policy Report.

#### Potential Contamination of the Site from Past Uses

No contamination of the proposed site from previous land use is known.

#### Proximity to Aboriginal Reserves and Traditional Territory

The site falls within Matachewan First Nation Traditional Territory.

#### Proximity to Important or Designated Environmental or Cultural Sites

The site lies within a river with a high potential for cultural heritage areas. Stage I and II Archaeological Assessments are scheduled to be undertaken by a licensed archaeologist to determine whether there is potential for archaeological resources to exist within the project area.

#### Proximity to Residential and other Urban Areas

The site is located within a rural area, located approximately 9 km north of the Town of Englehart.

### **4. Additional Requirements Related To Fish, Fish Habitat, Species At Risk, And Navigable Waters**

#### **4.1 Biological Assessments**

The primary goal of the 2010 field season was to determine detailed descriptions of the aquatic and terrestrial habitat, representative floral and faunal communities, as well as a determination of habitat changes that can be expected in the immediate area of the Blanche River waterpower project. The Blanche River, both upstream and downstream of the proposed site, was assessed. The consulting team utilized various methods of data collection including background information queries, interviews with locals and experts, literature reviews, scientific field data collection, as well as GIS mapping, to determine what species of flora and fauna are present at the site, and what effects the proposed project may instil upon them. Upon determining the specific ecological communities that utilize the area, changes can be made in the planning phase that will assist to mitigate or even eliminate potential negative impacts.

A summary of the surveys for the 2010 field season is outlined below:

##### **4.1.1 Background Review**

Available information for the site and surrounding area, gathered from the Ministry of Natural Resources Kirkland Lake District, local anecdotal evidence, online and periodical sources, and the Natural Heritage Information Database, were completed prior to finalizing survey sites, methodologies or target species. Known natural heritage issues which must be addressed include:

- Potential Walleye spawning near the proposed dam site
- Other fish species that may use the proposed area for habitat or spawning
- Raptor nesting sites
- Moose calving areas
- Species at risk, including Lake Sturgeon

Various environmental assessments were conducted, including:

- Aquatic and terrestrial habitat assessments both upstream and downstream of the proposed dam site, utilizing the Forest Ecosystems Classification (FEC) system (Chambers et.al., 1997)
- Aquatic and terrestrial habitat mapping, including habitat mapping of the known inundation area at the time of survey

- Bathymetric mapping of the waterway in the immediate vicinity of the project site
- Lake Sturgeon spawning survey in the immediate vicinity of and downstream of the proposed dam site. Telemetry may be required to determine Sturgeon movements within the watercourse.
- Walleye spawning survey in the immediate vicinity of the proposed dam site. Determine all of the species of fish that utilize the project site for spawning
- Assessment of fish species that utilize the project site for habitat
- Assessment of the substrate as well as benthic invertebrate communities both upstream and downstream of the proposed dam site
- Assessment of current water quality at the project site by obtaining water chemistry data (e.g. temperature, dissolved oxygen, pH, conductivity, turbidity)
- Comprehensive flora and fauna assessment, including species at risk that utilize the river and inundation area
- Assessment of access to the proposed project site

#### **4.1.2 Fisheries Habitat Assessment and Community Sampling Proposed by the Proponent**

The habitat assessments, along with anecdotal information of fish communities utilizing the Blanche River near the project site, will be used to determine the potential impacts of the proposed project to these areas. The following terms of reference have been developed to address the environmental concerns of the project.

##### Background Data Collection

A request has been made on behalf of the proponent to the Ministry of Natural Resources, Kirkland Lake District, for any existing file information on the natural environment of the project site. The request was made for any information related to the following:

- Fisheries assessments
- Fish collection records and rare species
- Drain classifications
- Wetland evaluations
- Areas of Natural and Scientific Interest
- Provincially Significant Wetlands
- Environmentally Sensitive Areas
- VTE species, significant wildlife habitats (i.e. raptor nesting, colonial species nests, deer yards and feeding areas)
- General species lists relating to animals and vegetation
- Vegetation mapping, floristic inventories (FEC, FRI, etc.)

##### Aquatic Investigations

Generalized fish sampling was conducted utilizing several approved techniques, including:

- Angling
- Short-set Gill Netting
- Minnow traps

- Seining
- Dip netting
- Night-time light reflectance observations

These surveys will help to determine fish species that utilize the Blanche River both upstream and downstream of the proposed project. The generalized fish sampling will also serve as a method of determining if any federally or provincially listed fish species at risk are present at the site and vulnerable to impacts from the proposed project. Where possible, the fish sampling was conducted during the 2010 field season.

Benthic sampling was performed utilizing kick-and-sweep assessments upstream, at and downstream of the project site.

#### Terrestrial Assessment

It is presumed that the majority of terrestrial impacts will be due to the construction of roadways, hydro lines, and buildings and those impacts will be minimized where possible to affect only the footprint of the structure, and the immediate surrounding area.

All “footprint” areas were assessed on foot during at least 3 separate surveys, a minimum of 30 days apart. This allowed for varying life cycles and seasonally dependant species to be noted where present.

Habitat on site was evaluated utilizing the Forest Ecosystem Classification (FEC) system (Chambers, et.al., 1997). These evaluations will accompany observations of the potential value of said habitat for particular species, especially those considered to be “at risk” or of “conservation concern”.

#### Wildlife Surveys

While there are no confirmed SAR species other than the aforementioned Lake Sturgeon, habitat for several potential “at risk” species exists within the proposed project area. Targeted species-specific surveys were not conducted for all of these additional species.

All incidental observations of *any* flora or fauna (including scat, tracks, eggs, fur/plumage, kill sites) were documented during any site visit. These observations will be transcribed into detailed species presence lists, and appended to the final report.

Reptilian surveys were done as incidental surveys in conjunction with habitat evaluations. Any observed reptiles or their sign (eggs, test scrapes, tracks) were noted, along with the surrounding habitat composition. Confirmed nesting sites photographed and GPS coordinates obtained.

Amphibians were surveyed as incidental observations during habitat assessments. In addition, call surveys were utilized to confirm the presence of any amphibians during the appropriate season (May-June) (e.g. Bullfrog (*Rana catesbeiana*), Spring Peeper (*Pseudacris crucifer*)). All calls were documented including environmental conditions, time and date, and species heard.

Invertebrates were documented as noted during all other surveys. Care was taken to examine shoreline substrate and vegetation for nymphs and exuviae of species such as Dragonflies, Damselflies and Stoneflies.

Avian assessment was done utilizing call surveys during the breeding season, to establish which species of breeding bird are utilizing the project area. Such surveys consisted of recording confirmed calls while walking the shoreline along the waterway, both upstream and down. Surveys were performed during the early morning optimal calling time, during the spring mating season when male territoriality is highest. All avian species observed or heard were recorded.

#### Life Stage Oriented Investigations

The proposed location of the Blanche River Dam is known to be upstream of a Lake Sturgeon and Walleye spawning area. To determine the potential impact of the project on Walleye and Sturgeon spawning, an accurate account of the exact spawning habitat, time of spawning, and the number of fish spawning is required. In order to collect this information, a spawning survey was conducted during the spring freshet. For both species noted, spawning is dependent on water temperature (6-9C for Walleye, 13-18C for Sturgeon). The primary method to obtain the Walleye data included night-time visual observations using a high-powered light. Limitations exist with this method (depth, turbulence), so additional methods to determine quantities of spawning walleye included sampling through netting and angling, as well as strategic placement of egg collecting mats in suitable spawning habitat. The sexual maturity of any fish captured was noted to determine the timing and age of the spawn within the local population.

#### Water Quality Sampling and Physical Attributes

MOE has expressed a need for water quality samples to be collected to document the baseline water quality conditions in the study area. A list of standard water quality parameters which MOE expects to see included:

- Physical measurements including pH, Dissolved Oxygen, conductivity and temperature Alkalinity
- Suspended Solids and Total Dissolved Solids
- Cations including  $H^+$ ,  $Na^+$ ,  $K^+$ ,  $Ca^{+2}$ ,  $Mg^{+2}$ ,  $Fe^{+2}$ ,  $Fe^{+3}$
- Anions including  $OH^-$ ,  $Cl^-$ ,  $S^{-2}$ ,  $HCO_3^-$ ,  $CO_3^{-}$ ,  $SO_4^{-2}$ ,  $PO_4^{-3}$
- Nutrients including nitrate, nitrite, phosphorus and TKN
- Metals (ICP scan)

Two water sampling events were completed in the spring and summer of 2010. On-site measurements of dissolved oxygen, conductivity, temperature, and pH were recorded.

#### **4.1.3 Reporting**

A comprehensive report is being prepared. The report will include a description of the aquatic and terrestrial habitat assessed, as well as a list of flora and fauna present at the project site and surrounding area. The report will also outline the potential impacts of the

proposed dam, both negative and positive, including type, area affected, duration, and magnitude of the impacts.

Potential impacts associated with the construction and operation of a hydro-electric dam on the Blanche River include, but are not limited to:

- Change in the aquatic habitat type directly upstream and downstream of the dam
- Localized impacts to fish habitat as a result of excavations and other activities during the construction of the dam
- Potential for fish fatalities as a result of entrainment on structures or through turbine mortality
- Potential change in aquatic vegetation
- Loss of terrestrial vegetation along the inundation zone
- Disruption to various terrestrial fauna, including birds
- Potential for accidents during construction that may cause the release of contaminants or other deleterious substances into the Blanche River system

The report will also include any recommended bio-monitoring of the area after the project is complete to determine the extent of the impacts associated with the project.

## **5. Potential Effects to the Environment**

### **5.1 Zone of Influence**

The construction of the dam and other headworks structures required to divert water to the proposed facility will result in the creation of a headpond and the inundation of riparian lands upstream of the dam. As a result, the facility's upstream zone of influence will extend an estimated 2.4 km for Option 1 and 1.68 km for Option 2 from the spillway dam to the upstream limit of the proposed headpond. The proposed intake structure adjacent to the spillway will divert flows through an approximate 1.2 km long penstock to the powerhouse. The facility's tailrace will extend approximately 30 to 50 m downstream of the powerhouse. The anticipated zone of influence of the operational facility on the downstream waterway is 2 km to the Misema River.

### **5.2 Potential Effects to the Environment**

In order to identify the potential effects that the proposed project could have on the environment and to develop a preliminary informational gap analysis, the Potential Effects Identification Matrix from the OWA Class EA document (OWA, 2008) was completed (Table 5.1). It should be noted that the Matrix was completed using preliminary information regarding the existing natural and socioeconomic features of the project study area and the preliminary project design (Option 2). The assessment Matrix will be updated following completion of the proposed baseline studies and further refinements of the facility engineering design.

The potential level of effect determination (positive or negative) for each criterion is based on the guidance in the OWA Class EA (OWA, 2008). Accordingly, the following effects definitions were utilized:

- A 'nil' effect would be assigned where there is no effect on that criterion
- A 'low' potential effect would be assigned where the potential impact and/or benefit is considered low or minimal
- A 'high' potential effect could be assigned where the potential impact and/or benefit is believed to be considerable
- An 'unk' would be assigned where the potential effects are unknown or there is insufficient information to assign a potential level of effect with reasonable certainty.
- A '-' means a potential negative effect
- A '+' means a potential positive effect.

The potential effect for each criterion has been rated assuming that mitigation measures have not been implemented. The 'Comments, Rationale' column in the table provides a more detailed identification of the potential effects that could occur, and the 'Mitigation Measures' column identifies the measures that could potentially be implemented to prevent or minimize adverse effects. Additional mitigation measures that could potentially be utilized are identified in Appendix B of the Class EA for Waterpower Projects (OWA, 2008).

**Table 5.1: Potential Effects Identification Matrix from the Class EA**

Criteria	Potential Level of Effect						Comments, Rationale	Mitigation Measures
	-H	-L	Nil	Unk	+L	+H		
<b>General Natural Environment Considerations</b>								
Air quality, including GHG Offsets		X				X	<ul style="list-style-type: none"> <li>• Potential adverse effects during construction due to equipment exhaust, smoke from burning waste materials and dust emissions.</li> <li>• Potential adverse effects during operations due to diesel generator emissions.</li> <li>• Potential positive effects due to GHG offsets.</li> </ul>	<ul style="list-style-type: none"> <li>• Standard construction site best management practices to minimize air emissions due to exhaust, waste burning and dust.</li> <li>• Diesel generator operates very infrequently (typically only in emergency situations).</li> </ul>
Water quality or quantity (surface water)		X					<ul style="list-style-type: none"> <li>• Potential adverse effects on water quality during construction due to erosion and sedimentation and accidental spills.</li> <li>• Potential effects on water quality during operation due to shoreline erosion, inundation of terrestrial land in head ponds (e.g., nutrients) and accidental spills.</li> <li>• Change to flow volume through bypass reach.</li> </ul>	<ul style="list-style-type: none"> <li>• Standard construction site best management practices to control erosion and sedimentation and prevent accidental spills from occurring.</li> <li>• Spill prevention and containment measures to be in place throughout operational period.</li> <li>• Run of river with limited modified peaking will minimize water level fluctuations which could otherwise cause excessive shoreline erosion and associated adverse water quality conditions – shoreline erosion protection utilized on sensitive areas.</li> <li>• Small increase above ambient river level and clearing of vegetation in proposed head ponds to limit nutrient availability in inundated area.</li> <li>• Determine volume required through bypass reach on basis of biological needs.</li> </ul>

Criteria	Potential Level of Effect						Comments, Rationale	Mitigation Measures
	-H	-L	Nil	Unk	+L	+H		
Water quality or quantity (groundwater)		X					<ul style="list-style-type: none"> <li>• Potential adverse effects on groundwater quality during construction due to accidental spills.</li> <li>• Potential decreases in local groundwater quantity during construction due to groundwater leakage into project excavations.</li> </ul>	<ul style="list-style-type: none"> <li>• Standard construction site best management practices to prevent accidental spills and manage groundwater.</li> </ul>
Species at risk and their habitat	X						<ul style="list-style-type: none"> <li>• Lake Sturgeon (<i>Acipenser fulvescens</i>) are confirmed to spawn downstream of the proposed project; fluctuations in or decrease of flow over spawning area could be detrimental</li> </ul>	<ul style="list-style-type: none"> <li>• EA will determine whether suitable habitat is present in study area.</li> <li>• Baseline inventories have been conducted in 2010 to document the presence/absence of species at risk – potential effects and required mitigation are being assessed subsequently in co-operation with MNR. ESA Agreements discussions to be initiated shortly, probably in September.</li> </ul>
Significant earth or life science features				X			<ul style="list-style-type: none"> <li>• Potential effects are not yet known, since site specific inventories have not been completed to document the extent of any representative features.</li> </ul>	<ul style="list-style-type: none"> <li>• Field studies have been conducted in 2010 and the extent of any representative features will be documented.</li> <li>• Mitigation measures are being developed to minimize potential effects on any representative features</li> </ul>
Land subject to natural or human-made hazards				X			<ul style="list-style-type: none"> <li>• It is currently unknown if any natural hazards exist at the proposed development sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Field investigations have been conducted to assess presence/ absence of natural hazards (e.g., significant existing erosion areas).</li> </ul>
Terrestrial wildlife (including numbers, diversity and movement of resident or migratory species)				X			<ul style="list-style-type: none"> <li>• Terrestrial wildlife could be affected by loss/fragmentation of habitat (associated with construction of site facilities and associated infrastructure, head pond creation, and disturbance associated with construction and operations of the proposed facilities.</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss associated with the project will be minimized to the greatest extent possible.</li> <li>• Mitigation measures will be developed to minimize potential effects on terrestrial wildlife from loss/ fragmentation of habitat and disturbance.</li> <li>• Analysis of habitat loss to inundation will consider the availability of equivalent habitat immediately outside of the zone of influence of the proposed undertaking.</li> </ul>

Criteria	Potential Level of Effect						Comments, Rationale	Mitigation Measures
	-H	-L	Nil	Unk	+L	+H		
Natural vegetation and terrestrial habitat linkages		X					<ul style="list-style-type: none"> <li>Natural vegetation and terrestrial habitat linkages could be affected by clearing associated with construction of site facilities and associated infrastructure, head pond creation, and accidental spills/malfunctions.</li> </ul>	<ul style="list-style-type: none"> <li>Extent of clearing associated with the project will be minimized to the greatest extent possible.</li> <li>Other best management practices including limiting corridor widths, signage for wildlife crossing etc will be considered to minimize potential impacts.</li> </ul>
Soils and sediment quality		X					<ul style="list-style-type: none"> <li>Soil and sediment quality could be adversely affected by excavation and removal, compaction, loss due to fugitive dust or erosion or accidental spills during construction or operation.</li> </ul>	<ul style="list-style-type: none"> <li>Construction site best management practices will be implemented for erosion and sedimentation control, dust management and prevention/ containment of accidental spills to limit the potential for adverse effects on soil and sediment quality.</li> </ul>
Significant natural heritage features and areas				X			<ul style="list-style-type: none"> <li>Potential effects are not yet known, since site specific inventories have not been completed to document the extent of any representative features.</li> </ul>	<ul style="list-style-type: none"> <li>Field studies have been conducted in 2010 and the significance of identified habitats will be determined.</li> </ul>
Other (specify)				X			<ul style="list-style-type: none"> <li>No other components identified to date.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Aquatic and Riparian Ecosystem Considerations</b>								
Shoreline dependant species		X					<ul style="list-style-type: none"> <li>Shoreline dependant riparian vegetation may be impacted by the creation of an inundation area.</li> </ul>	<ul style="list-style-type: none"> <li>It is not possible to mitigate this effect.</li> <li>Natural regeneration of shoreline habitat will eventually restore these areas for use by shoreline dependent species.</li> </ul>
Wetland dependant species				X			<ul style="list-style-type: none"> <li>It is currently unknown if any wetlands exist at the proposed development sites.</li> </ul>	<ul style="list-style-type: none"> <li>Field investigations have been conducted to assess presence of any wetlands and species therein.</li> </ul>
Fish habitat				X			<ul style="list-style-type: none"> <li>Fish habitat could be affected by instream structures (e.g., dam, tailrace excavations, temporary cofferdams and dewatering, water crossings on access roads and transmission lines), changes in flow (bypass reaches) and water level (head ponds) and sedimentation.</li> </ul>	<ul style="list-style-type: none"> <li>Fish habitat mitigation and compensation measures will be developed in discussions with MNR and DFO to ensure no net loss of the productivity of fish habitat as a result of the project.</li> <li>Bypass flow to be determined based on biological need with MNR/DFO.</li> </ul>

Criteria	Potential Level of Effect						Comments, Rationale	Mitigation Measures
	-H	-L	Nil	Unk	+L	+H		
Fish migration				X			<ul style="list-style-type: none"> <li>Dams will block upstream fish movement, although the extent and nature of existing movements is currently unknown.</li> </ul>	<ul style="list-style-type: none"> <li>Fisheries investigations have been undertaken to determine where critical spawning habitats are located and if the dam would block migration to these habitats. If movement can be blocked by the dam a plan will be developed with support from MNR/DFO for mitigation including no net loss of habitat.</li> </ul>
Fisheries		X			X		<ul style="list-style-type: none"> <li>Head pond may result in an overall increase in the amount of aquatic habitat available.</li> <li>Inundation may flood sections of existing fast water/rapids habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Although the habitat may be increased, it will be lacustrine vs riverine habitat. This must be discussed with DFO and MNR as part of the overall strategy for dealing with fish habitat loss.</li> </ul>
Erosion and sedimentation		X					<ul style="list-style-type: none"> <li>Potential for erosion and sedimentation due to construction activities.</li> <li>Potential for long term bank erosion due to water level and flow management activities.</li> </ul>	<ul style="list-style-type: none"> <li>Standard construction site best management practices to minimize erosion and sedimentation potential during construction.</li> <li>Bank stabilization measures, as required, on very susceptible erosion sites.</li> </ul>
Fish injury or mortality (impingement and entrainment)				X			<ul style="list-style-type: none"> <li>Potential for some impingement on trash racks and entrainment and mortality through turbine flows.</li> </ul>	<ul style="list-style-type: none"> <li>Inflow velocities will be compared with swimming capabilities of fish species of concern to determine the likelihood of impingement or entrainment. If a significant impact is predicted it may be necessary to adjust intake velocities to minimize impingement and entrainment potential or to consider diversion methods for fish.</li> <li>Determine expected turbine mortality using published formulas with site and facility characteristics.</li> </ul>
Water levels, flows and movement (surface or groundwater)		X					<ul style="list-style-type: none"> <li>Water levels in the head ponds will be increased due to the overflow weirs.</li> <li>Flows through bypass reaches will be reduced due to diversion of flow through the powerhouse.</li> <li>Some minor decrease in flow during head pond filling.</li> </ul>	<ul style="list-style-type: none"> <li>Run of river with limited modified peaking to minimize changes in water levels and flows.</li> <li>Field investigation to determine amount and function of habitat in bypass reaches. Flow in bypass reaches established on basis of maintaining biological function.</li> </ul>

Criteria	Potential Level of Effect						Comments, Rationale	Mitigation Measures
	-H	-L	Nil	Unk	+L	+H		
							• River flow not to be reduced by more than 10% during head pond filling.	
Drainage, flooding and drought patterns		X					<ul style="list-style-type: none"> <li>• Minor changes in local drainage will occur due to facility, lay down, access road and transmission line construction.</li> <li>• Extreme flood levels may be somewhat higher in the head ponds due to the water level increase.</li> </ul>	<ul style="list-style-type: none"> <li>• A drainage network will be installed around the facility to ensure adequate site drainage.</li> <li>• Facilities will be constructed to meet flood passage requirements.</li> </ul>
Water temperature		X					<ul style="list-style-type: none"> <li>• Changes in water temperature in head pond due to increased surface area and slower flow velocity anticipated to be negligible.</li> </ul>	• No mitigation required – overall thermal regime of the river not likely affected.
Other (specify)				X			• No other components identified to date.	• N/A
<b>Aboriginal Community Considerations</b>								
First Nation reserves or other Aboriginal communities				X			• Operation of the project should not have an adverse effect on local Aboriginal communities.	• N/A
Spiritual, ceremonial, cultural, archaeological, or burial sites				X			• Disturbance to spiritual, ceremonial, cultural, archaeological or burial sites could occur during construction and operation activities.	• Aboriginal consultation to identify local resources will be conducted to mitigate potential negative issues. A Stage One Archaeological Assessment will be completed to identify local resources (or resource potential).
Traditional land or resources used for harvesting activities				X			• Effects to the aquatic and terrestrial environment (discussed above) may result in negative effects to traditional lands and resources used for harvesting activities	<ul style="list-style-type: none"> <li>• Aboriginal consultation to identify local resources will be conducted to mitigate potential negative issues</li> <li>• Mitigation measures, as appropriate, are provided above.</li> </ul>
Employment					X		• Construction of the project may involve a First Nation workforce.	• N/A
Lands subject to land claims			X				• There are no known land claims.	• N/A

Criteria	Potential Level of Effect						Comments, Rationale	Mitigation Measures
	-H	-L	Nil	Unk	+L	+H		
Economic development				X			• Unknown	• To be determined.
Other (specify)				X			• No other components identified.	• N/A
<b>Land and Resource Use Considerations</b>								
Access to inaccessible areas (land or water)		X					• Access road upgrading to accommodate construction equipment and material delivery will result in improved access to the areas by land. Access to the area by water will remain as is.	• Public access to the construction area will be prohibited to ensure public safety. Portage routes around the project could be constructed where required to ensure safe passage around during construction and operation.
Navigation	X						• Navigation and portage routes could be affected by the proposed development.	• Existing portage routes will be identified, and a commitment will be made to maintain or temporarily re-route portage routes during construction to ensure safe passage around the sites for canoeists/kayakers. Portage routes will be restored/ maintained during operation.
Riparian rights or privileges				X			• Much of the project area, including the head pond shoreline, will exist on Provincial land and private land. At present, effects to any riparian resource users are not known.	• Consultation with stakeholders will determine appropriate mitigation.
Recreational use – (land or water)				X			• Scenic attractions and aesthetic or recreation features along the river will be assessed. The full extent of effects to recreational use will be determined in consultation with project stakeholders.	• Additional mitigation measures will be determined in consultation with project stakeholders.
Angling and hunting opportunities				X			• The extent of hunting and angling use within the project area is currently unknown; however these activities likely take place in the vicinity.	• Effects to angling and hunting opportunities will be determined in consultation with project stakeholders. • Appropriate mitigation measures will be determined based on stakeholder consultation.

Criteria	Potential Level of Effect						Comments, Rationale	Mitigation Measures
	-H	-L	Nil	Unk	+L	+H		
Trapping activities				X			<ul style="list-style-type: none"> <li>If the project is located within licensed trapping area(s), project construction and operation, including head pond filling may result in adverse effects to harvest success.</li> </ul>	<ul style="list-style-type: none"> <li>The current use of the area for trapping will be determined during stakeholder consultation and MNR feedback on permitted furbearer harvest areas.</li> <li>Appropriate mitigation measures will be determined based on stakeholder consultation.</li> </ul>
Baitfish harvesting activities				X			<ul style="list-style-type: none"> <li>Current harvesting sites are unknown. If harvesting is present, then some effects could occur during construction.</li> </ul>	<ul style="list-style-type: none"> <li>Consultation will be required with MNR and bait fishermen to identify harvesting areas and assess effects. To date, MNR have not commented on known baitfish licensing in the area.</li> </ul>
Views or aesthetics				X			<ul style="list-style-type: none"> <li>Construction and operation of the project will result in a change to aesthetics of the area. The determination of this effect as positive or negative is unknown.</li> </ul>	<ul style="list-style-type: none"> <li>Requirements for compensation flow or other aesthetic requirements will be determined in consultation with project stakeholders and in consideration of area usage (based upon a visitor usage survey).</li> </ul>
An existing land or resource management plan				X			<ul style="list-style-type: none"> <li>Unknown at this time.</li> </ul>	<ul style="list-style-type: none"> <li>To be determined</li> </ul>
An existing water management plan			X				<ul style="list-style-type: none"> <li>There is an existing water management plan.</li> </ul>	<ul style="list-style-type: none"> <li>An amendment to the existing water management plan will be prepared prior to operation.</li> </ul>
Protected areas				X			<ul style="list-style-type: none"> <li>Unknown at this time.</li> </ul>	<ul style="list-style-type: none"> <li>To be determined</li> </ul>
Other (specify)				X			<ul style="list-style-type: none"> <li>No other components identified to date.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Cultural Heritage Resources Considerations</b>								
Archaeological sites				X			<ul style="list-style-type: none"> <li>Archaeological sites within the project area are not known at this time.</li> </ul>	<ul style="list-style-type: none"> <li>A Stage One Archaeological Assessment will be completed to determine potential effects.</li> <li>Appropriate mitigation measures will be proposed based on assessment findings as required.</li> </ul>
Buildings or structures				X			<ul style="list-style-type: none"> <li>Structural resources potentially affected by the project are currently unknown.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate mitigations measures will be proposed as required</li> </ul>

Criteria	Potential Level of Effect						Comments, Rationale	Mitigation Measures
	-H	-L	Nil	Unk	+L	+H		
Cultural heritage landscapes				X			<ul style="list-style-type: none"> <li>It is unknown whether a cultural heritage landscape assessment will be required for the project.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate mitigation measures will be proposed based on assessment findings as required.</li> </ul>
Other (specify)				X			<ul style="list-style-type: none"> <li>No other components identified to date</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Social and Economic Considerations</b>								
The Location of people, businesses, institutions, or public facilities				X			<ul style="list-style-type: none"> <li>Social economic resources to the community will be identified. Potential effects will be determined in consultation with local residents, business owners and other stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate mitigation measures will be determined based on stakeholder consultation.</li> </ul>
Community character, enjoyment of property, or local amenities			X				<ul style="list-style-type: none"> <li>Effects to community character, enjoyment of property and local amenities are unknown.</li> </ul>	<ul style="list-style-type: none"> <li>To be determined</li> </ul>
Employment					X		<ul style="list-style-type: none"> <li>The construction and operation of the project will require local and non-local employment based on qualification.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
Public health and/or safety		X					<ul style="list-style-type: none"> <li>Construction and operation of the project may pose safety concern and risk for local residents.</li> </ul>	<ul style="list-style-type: none"> <li>Prevention of access to the construction site through use of signage, gates and fencing among other security procedures as required.</li> <li>Proper barriers and warning devices installed following construction to restrict public access to intake/tailrace areas during operation, including safety booms, fencing and signage.</li> </ul>
Local, regional, or provincial economies					X		<ul style="list-style-type: none"> <li>Economic benefits will include employment, expenditures on materials, equipment and services, contribution of renewable energy to the Provincial supply mix.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
Tourism values				X			<ul style="list-style-type: none"> <li>See "Recreational Use" above.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
Water supply				X			<ul style="list-style-type: none"> <li>It is currently unknown whether the river is a water supply for the Town. For potential effects to water quality, please see "Water Quality or Quantity" above.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate mitigation measures will be proposed as required.</li> </ul>

Criteria	Potential Level of Effect						Comments, Rationale	Mitigation Measures
	-H	-L	Nil	Unk	+L	+H		
Aesthetic image of the surrounding area				X			• See “Views or Aesthetics” above.	• N/A
Other (specify)				X			• No other components identified to date.	• N/A
<b>Energy/Electricity Considerations</b>								
Reliability (e.g. voltage support)					X		• New power generation units are of a relatively small capability, and operation of them in parallel with the existing power grid will provide minor impact on the overall power system reliability and power quality - voltage and frequency.	• N/A • Appropriate mitigation technical measures will be proposed in protection and control to minimize a power outage.
Security (e.g. Black Start)						X	• Operation of the projects will improve distribution customer service reliability in this area. The power generation units will be able to provide a black start and island mode of operation (assuming that is allowed by HONI) to continue to supply or electrically energize in a safe, controlled and reliable manner, part of the distribution system, including customer load that is separated from the rest of distribution system.	• The island mode of operation could require the change of the interconnection protection and control scheme/settings in the HONI distribution system. Further consultation with HONI required.
Electricity flow patterns				X			• Operation of the new power generation units will redistribute power flow in the existing distribution system.	• Appropriate mitigation technical measures will be proposed in the control system of the power grid and new generation units if required.
Other (specify)				X			• Operation of the new power generation units will affect existing protection and control settings in the distribution system. • Oil filled electrical and mechanical equipment can potentially spill oil into the Environment.	• Appropriate mitigation technical measures will be proposed in protection and control system of the power grid. • Appropriate spill preventive measures will be proposed to eliminate the risk.

## 6. References

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Kagawong Power Inc. 2010. Charlton Dam Hydroelectric Plant Expansion Project Draft Environmental Report. 37 pp.

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Ministry of Natural Resources Kirkland Lake District and Kagawong Power Inc. 2008. Charlton GS Water Management Plan.

Ministry of Natural Resources. 2010. Crown Land Use Policy Atlas. <http://crownlanduseatlas.mnr.gov.on.ca/>

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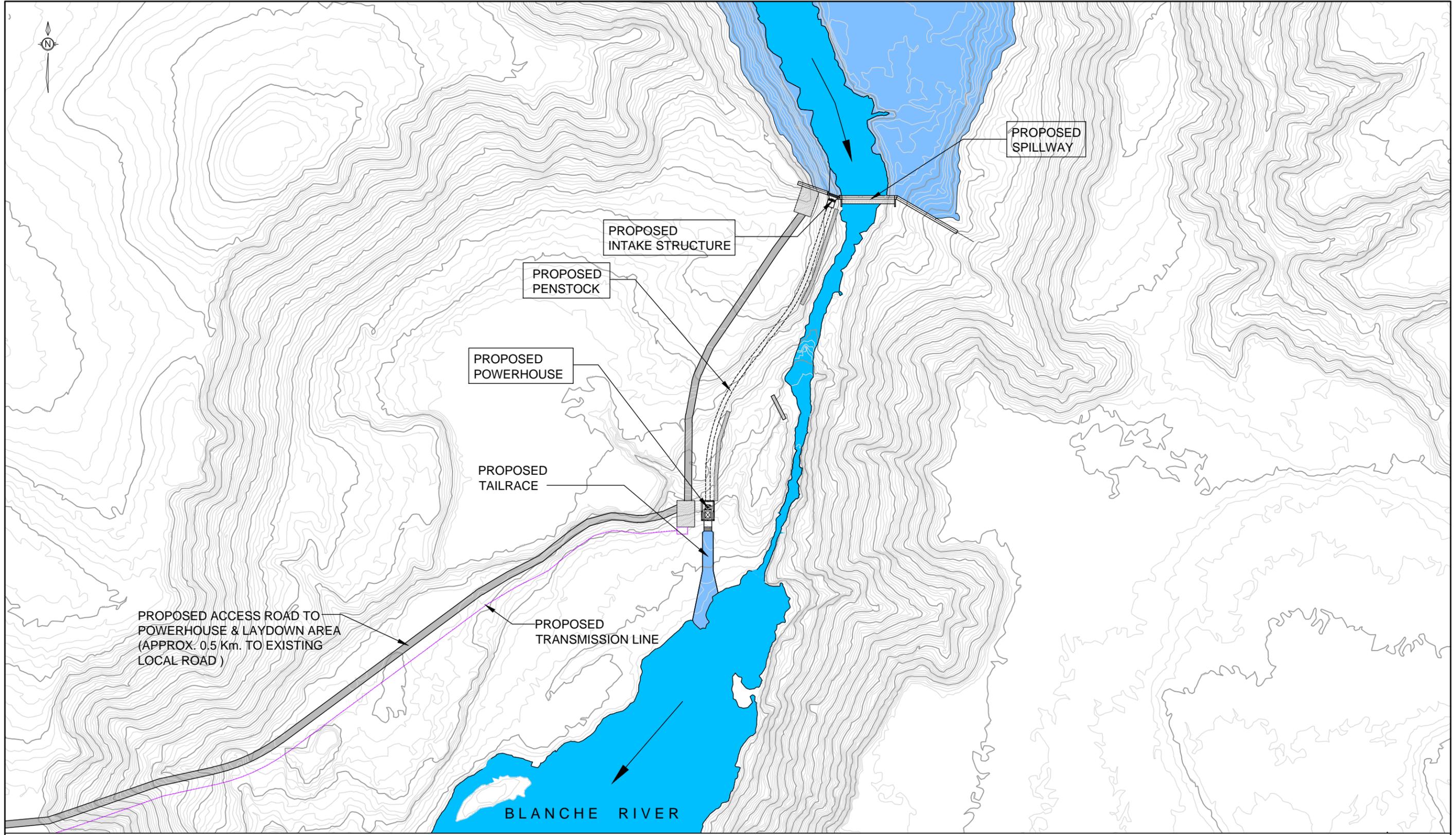
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Rowe, J.S. 1972. Forest Regions of Canada. Canadian Forest Service Publication No. 1300.

Wickware, G.M. and C.D.A. Rubec. 1989. Ecoregions of Ontario. Environment Canada Sustainable Development Branch. Ecological Land Classification Series No. 26.

## **Appendix A**

# **Conceptual Figures and Maps for Marter Township Generation Station**



Plot Scale  
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 Login name: yuzo0083  
 Drawing Name: P:\XENECA\333443\CAD\C\BLANCHE-RIVER-MARTER SITE\NEW DRAWINGS\PLATES - 1-4-NEW.dwg

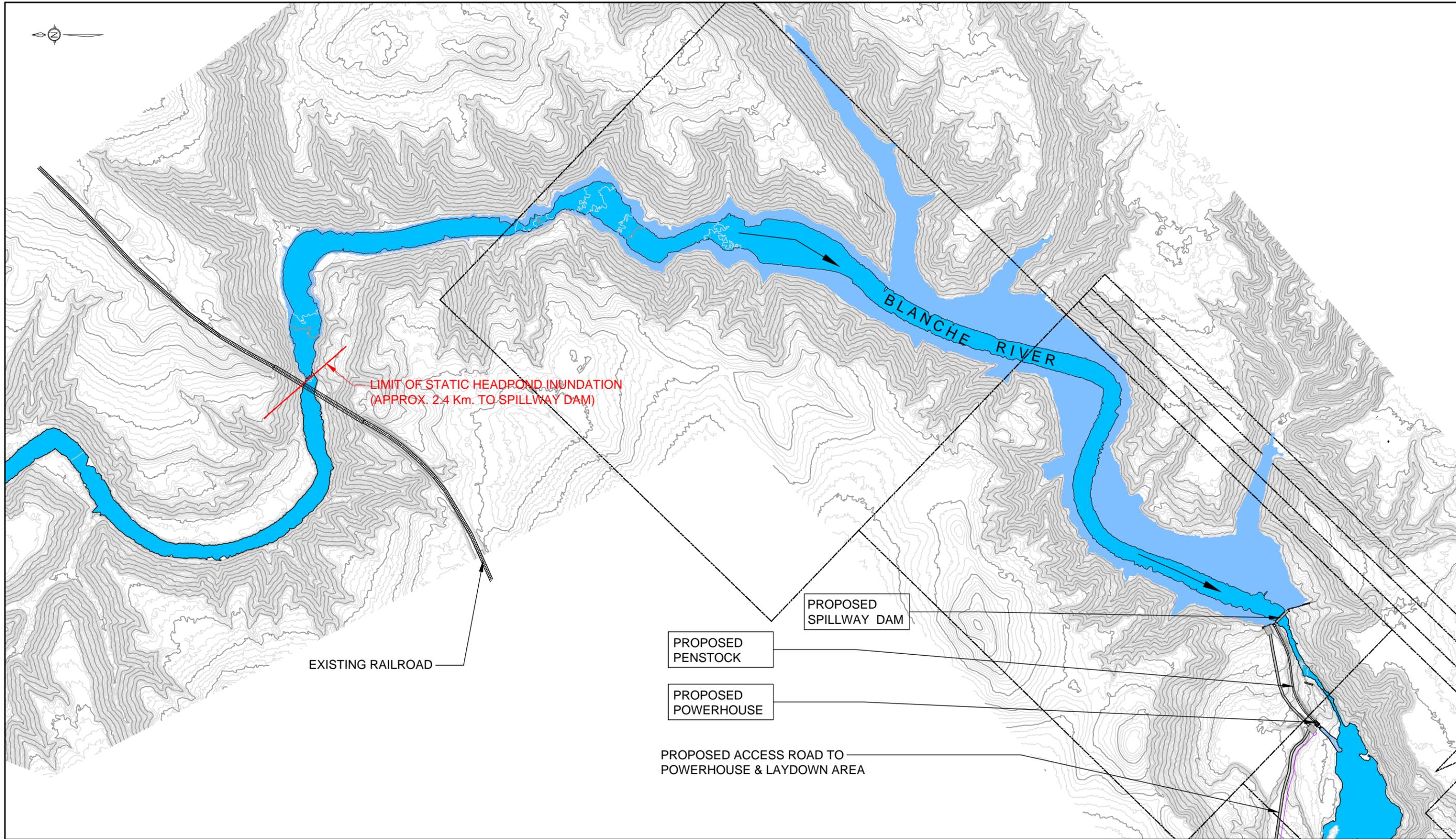
**NOTE:**

1. TOPOGRAPHIC BASE MAPPING PREPARED BY AIRBORNE LIDAR BY TERRAPOINT, SUMMER 2010. CONTOUR INTERVAL IS 0.5 METRES. PROJECT COORDINATE SYSTEM IS NAD1983, UTM ZONE 17N.
2. CONTOURS SITUATED IN RIVER CORRESPOND TO WATER SURFACE ELEVATIONS.



**LEGEND:**

- EXISTING WATER LEVEL (APPROXIMATE)
- PROPOSED HEADPOND INUNDATION & INTAKE CHANNEL



LIMIT OF STATIC HEADPOND INUNDATION  
(APPROX. 2.4 Km. TO SPILLWAY DAM)

EXISTING RAILROAD

PROPOSED  
SPILLWAY DAM

PROPOSED  
PENSTOCK

PROPOSED  
POWERHOUSE

PROPOSED ACCESS ROAD TO  
POWERHOUSE & LAYDOWN AREA

**NOTE:**

1. TOPOGRAPHIC BASE MAPPING PREPARED BY AIRBORNE LIDAR BY TERRAPOINT, SUMMER 2010. CONTOUR INTERVAL IS 0.5 METRES. PROJECT COORDINATE SYSTEM IS NAD1983, UTM ZONE 17N.
2. CONTOURS SITUATED IN RIVER CORRESPOND TO WATER SURFACE ELEVATIONS.



**LEGEND:**

- EXISTING WATER LEVEL (APPROXIMATE)
- PROPOSED INCREMENTAL HEADPOND INUNDATION (EL. 201.00)



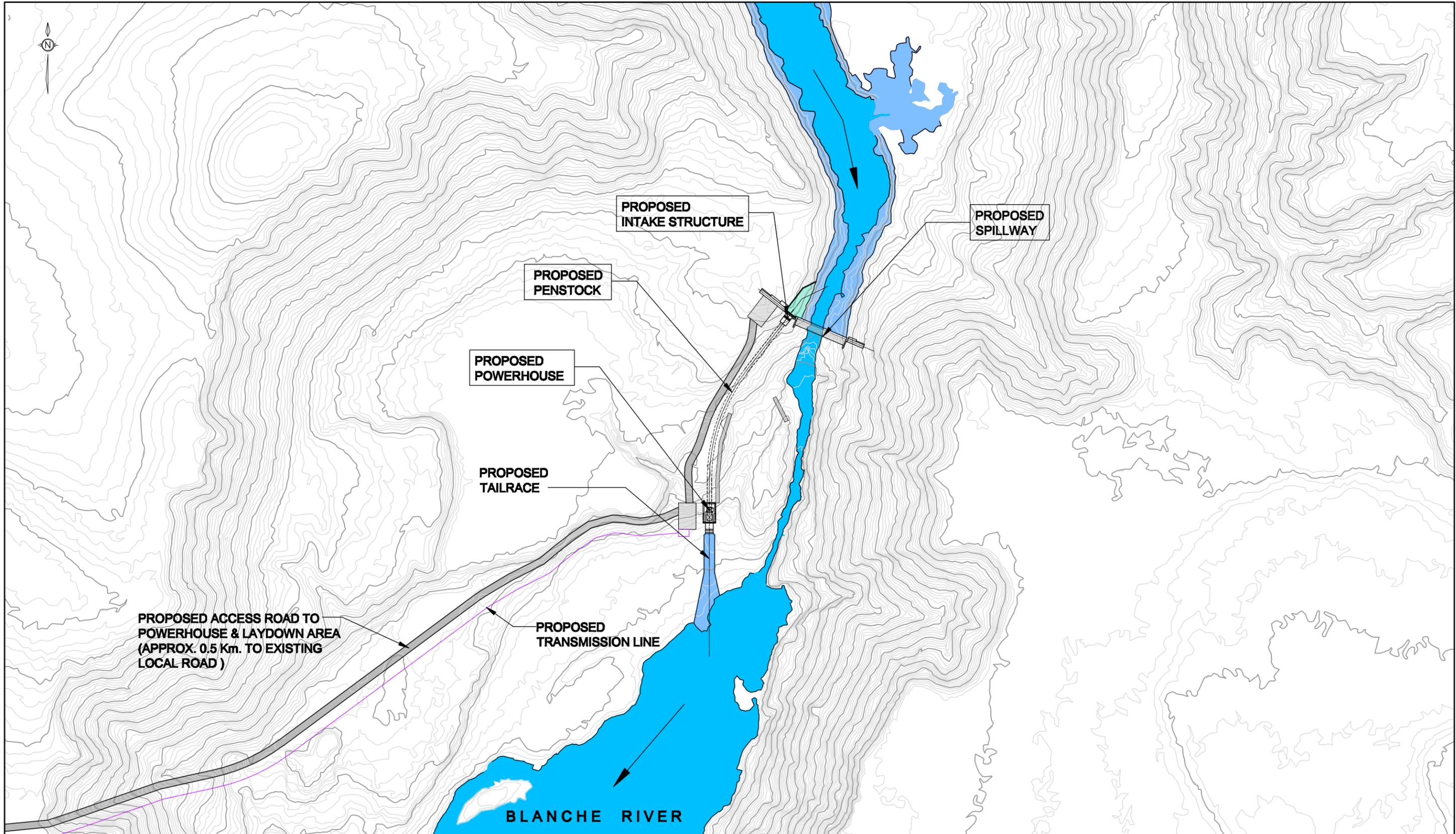
XENECA POWER DEVELOPMENT INC.  
MARTER SITE - BLANCHE RIVER HYDROPOWER DEVELOPMENT  
ESTIMATED HEADPOND INUNDATION



PLATE 4

Plot Scale  
Jun 23 . 2011 . 2:49pm  
Drawing Name: P:\XENECA\333443\CAD\C\BLANCHE-RIVER\MARTER SITE\NEW DRAWINGS\PLATES - 1-4-NEW.dwg  
Login name: yuzo50083

Plot Scale  
Jul 26, 2010, 9:46am  
Drawing Name: P:\XENECA\333443\CAD\C\BLANCHE-RIVER\MARTR SITE\PLATE - 1.dwg  
Login name: yuzo50093



**NOTE:**

1. TOPOGRAPHIC BASE MAPPING PREPARED BY AIRBORNE LIDAR BY TERRAPOINT, SUMMER 2010. CONTOUR INTERVAL IS 0.5 METRES. PROJECT COORDINATE SYSTEM IS NAD1983, UTM ZONE 17N.
2. CONTOURS SITUATED IN RIVER CORRESPOND TO WATER SURFACE ELEVATIONS.



**LEGEND:**

- EXISTING WATER LEVEL (APPROXIMATE)
- PROPOSED HEADPOND INUNDATION & INTAKE CHANNEL
- PROPOSED CLEARING

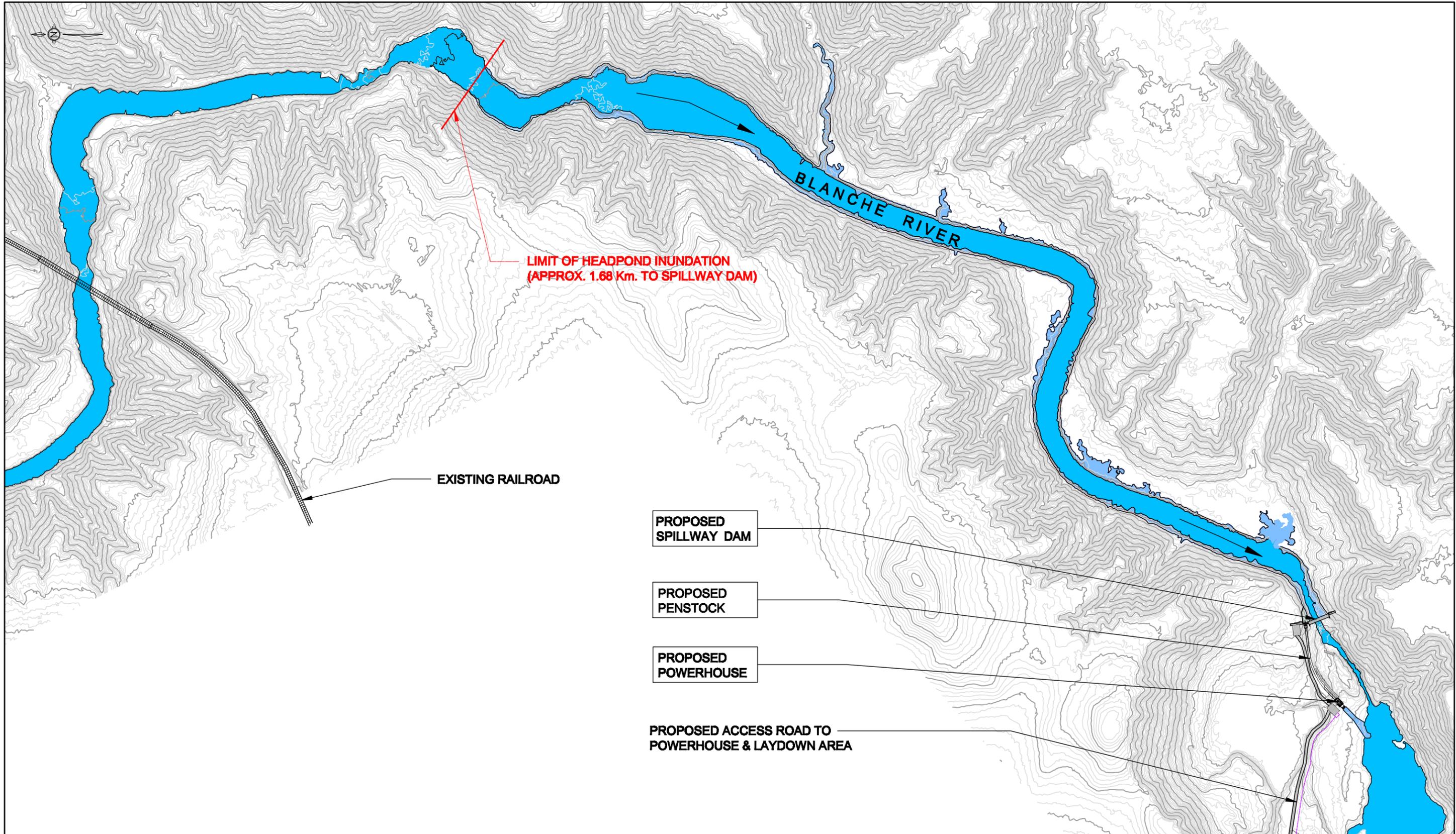


**XENECA POWER DEVELOPMENT INC.**  
MARTR SITE - BLANCHE RIVER HYDROPOWER DEVELOPMENT  
**CONCEPTUAL SITE DEVELOPMENT LAYOUT**



PLATE 1

Plot Scale  
Jul 28, 2010, 9:44am  
Login name: yuzo50093  
Drawing Name: P:\XENECA\333443\CAD\C\BLANCHE-RIVER\MARTER SITE\PLATE - 1.dwg



LIMIT OF HEADPOND INUNDATION  
(APPROX. 1.68 Km. TO SPILLWAY DAM)

EXISTING RAILROAD

PROPOSED  
SPILLWAY DAM

PROPOSED  
PENSTOCK

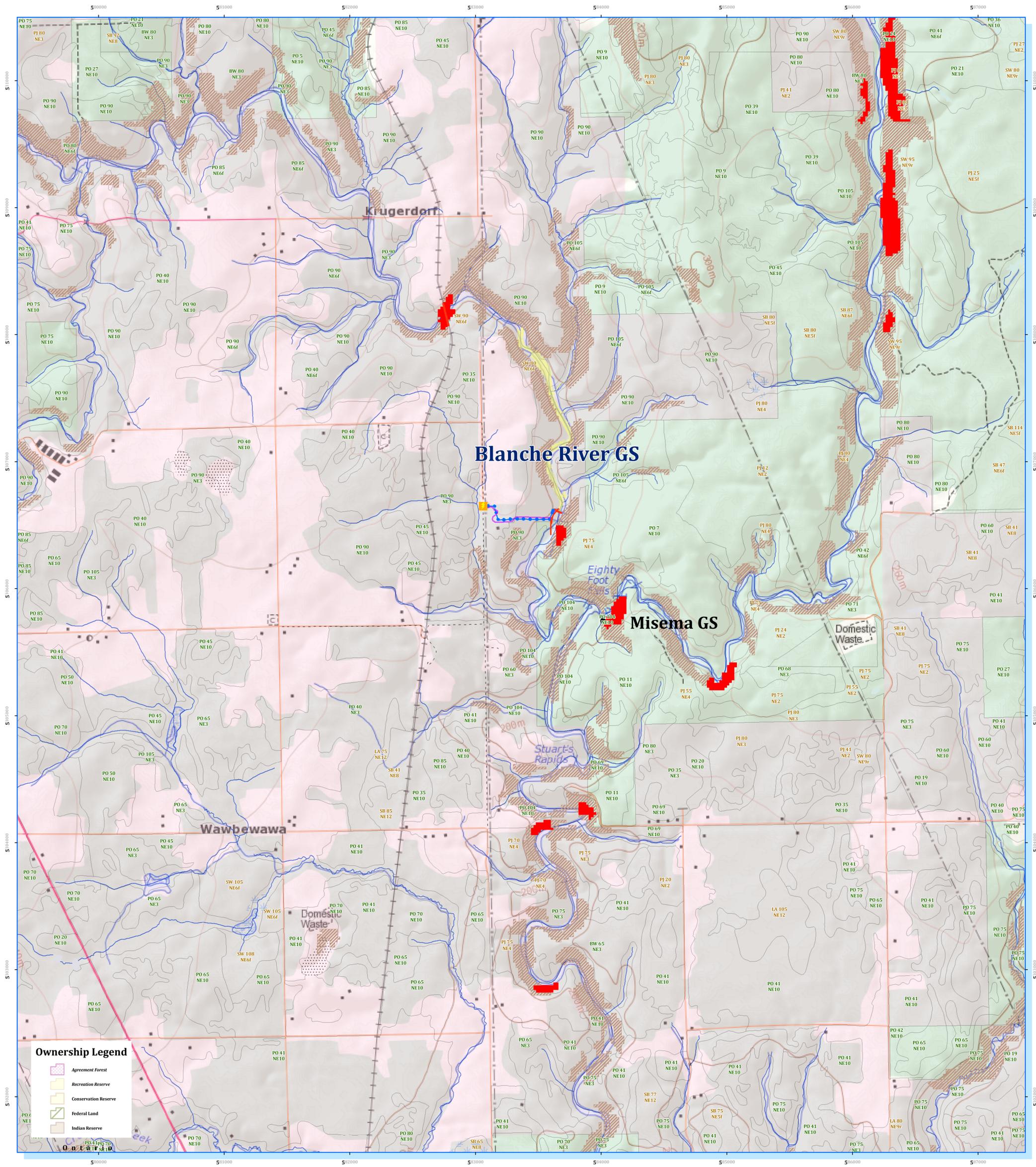
PROPOSED  
POWERHOUSE

PROPOSED ACCESS ROAD TO  
POWERHOUSE & LAYDOWN AREA

**NOTE:**  
1. TOPOGRAPHIC BASE MAPPING PREPARED BY AIRBORNE LIDAR BY TERRAPOINT, SUMMER 2010. CONTOUR INTERVAL IS 0.5 METRES. PROJECT COORDINATE SYSTEM IS NAD1983, UTM ZONE 17N.  
2. CONTOURS SITUATED IN RIVER CORRESPOND TO WATER SURFACE ELEVATIONS.



**LEGEND:**  
[Blue line] - EXISTING WATER LEVEL (APPROXIMATE)  
[Light blue area] - PROPOSED INCREMENTAL HEADPOND INUNDATION (EL. 196.00)



Reference data from the Land Information Ontario data warehouse, Ontario Ministry of Natural Resources. Toporama background from Natural Resources Canada (NRCan), Earth Sciences Sector, Mapping Information Branch, Centre for Topographic Information - Sherbrooke.

### Tile\_E\_29 Blanche River (Marter Township)

- |                                |                                      |                                                                  |                     |
|--------------------------------|--------------------------------------|------------------------------------------------------------------|---------------------|
| Point of Connection (PC)       | Potential Inundation Zone            | Resource / Recreation Access Route (requires field verification) | Secondary Haul Road |
| Point of Common Coupling (PCC) | Ecosites 14, 15, 16, 17, 18 or 19    | New Access Road                                                  | Winter Haul Road    |
| Slope Class 20 - 30%           | Proposed Distribution Line           | Potential New Access Road                                        | Tertiary Haul Road  |
| Slope Class 30% plus           | Proposed Alternate Distribution Line | Primary Haul Road                                                |                     |

