



Environmental Report

Ivanhoe River - The Chute

Hydroelectric Generating Station Project

## FOREWORD

Xeneca Power Development Inc. (Xeneca) is pleased to provide a copy of the Class EA for the proposed project: The Chute Hydroelectric Generating Station on the Ivanhoe River. This represents the culmination of a considerable joint effort by our scientists and engineers working in co-operation with agencies and stakeholders.

The completion of the Class EA is not the end of the environmental review and permitting process. A series of regulatory approvals will be required post EA under various Federal, Provincial and municipal statutes. For example, Xeneca must provide detailed design information to the Ministry of Natural Resources (“MNR”) which would consider approvals under the *Lakes and Rivers Improvement Act*.

The purpose of a Class EA is to ensure that positive and negative impacts of the proposed project are identified, evaluated and considered in the planning and execution stages and to undertake meaningful engagement of all interested stakeholders who may wish to be involved in the project planning and development process. In this context, the environment being considered includes the natural/physical, socio/economic and cultural/human landscape.

In order to meet the Milestone Date for Commercial Operation as set out the Feed-In-Tariff (“FIT”) contract requirements, Xeneca would need to commence site preparation in mid-2012, followed by the construction of the facility between 2012 and 2014. This approach allows the Agencies to complete the necessary environmental review required by the conceptual planning period in the Class EA and subsequently focus on detailed design, permitting and approvals.

### Process and Approach

The Class EA document suggests a timeline of 12-18 months to prepare a project specific Class EA document. Xeneca began work on notification of Agencies immediately upon issue of FIT contract and began Class EA activities in the summer of 2010. It should be noted that certain preliminary work on the project dates back to 2007-8 with an application for site release from the MNR.

The Class EA process suggests the collection of field data for a minimum of one season including a spring freshet which, for the project, was completed in 2010. As a proactive position, Xeneca is continuing environmental studies in 2011 and, to some extent beyond 2011, to develop a fuller information database for use in post-EA permitting and EA verification purposes. This work will also be invaluable to support any needs for Adaptive Management if any unplanned effects arise in construction or operation. This Class EA (Appendix V of Annex III) includes a list of studies, field investigations completed, underway, or planned through 2011. An Adaptive Management

workshop is proposed in the early post-EA period well in advance of any potential major permitting or construction activities. Xeneca is continuing to implement this study program in anticipation of timely issue of a Statement of Completion (MOE) and Notice to Proceed (OPA).

Under the waterpower process, detail design is undertaken following issue of a Statement of Completion. Xeneca continues to work with agencies, municipalities, the public and stakeholders in a collaborative manner to address issues that may arise during the project review process.

Review of detail designs and associated issues will be considered through the post-EA approvals process under *the Fisheries Act*, *Lakes and Rivers Improvement Act*, *the Navigable Waters Protection Act*, *the Public Lands Act*, and, if applicable, the *Endangered Species Act* using results from engineering studies, Class EA conformance and verification work and permitting activities. Adaptive Management Planning has been applied to ensure every appropriate level of review is performed at each stage of the project planning, execution and operating period. This is a practical approach arising from the Ontario Power Authority's FIT schedule to simultaneously ensure the objectives of the *Environmental Assessment Act* and the Class EA. This approach allows progressive review by Agencies before construction and operation as information becomes available from detail design or other work. This will allow Agencies opportunity to review detail design and incorporate Agency input into approvals.

The *Ontario Environmental Assessment Act* obligates a project proponent to adhere to the requirements of the Class EA and the commitments made in the Class EA. As such the Class EA forms a binding commitment between Xeneca, the government and the citizens of Ontario. Xeneca is fully committed to this process and will continue to work co-operatively with Agencies after the Class EA submission to see completion of approved post-EA studies and address any findings in refining our plant operating plans, as required.

Xeneca is extending the period for receiving comments on Class EAs beyond the minimum 30 days, as provided in the Class EA, to a period of 60 days. This extended review period will ensure Agencies and stakeholders have adequate time to review and comment on the Class EA. The Xeneca is committed to ensuring compliance with the Class EA and will develop assurance and verification measures to progressively assess conformance with Class EA commitments and environmental requirements throughout the project planning, execution and operational periods.

Xeneca is committed to continuing to engage specific stakeholders on issues of relevance to that particular stakeholder after the issuance of the Statement of Completion and into the project detail development phases.

**Government Agency Engagement Process:**

During this Class EA, Xeneca has engaged with a number of federal, provincial and municipal governments, ministries and agencies and each has its mandate and mechanisms for permitting/authorizations processes towards ensuring the proponent has met all legal requirements. These processes may have required explicitly or implicitly the involvement of First Nations. It is helpful to understand the role of the agencies in reviewing this Class EA and providing context to the information:

(a) Ontario Ministry of the Environment:

The MOE has various primary responsibilities provided by the *Environmental Assessment Act* for the Class EA process and post-EA responsibilities for the Ontario *Water Resources Act* and the *Environmental Protection Act*. The MOE is responsible for the issuance of the Permit to Take Water - Category 2 prior to construction, Category 3 prior to commissioning, and any required Certificates of Approval prior to construction or commissioning of the facility. The MOE is responsible for the administration of and compliance with the *Environmental Assessment Act*.

(b) Ontario Ministry of Natural Resources:

The MNR plays a key role in permitting and approvals of this project because it is being built on provincial Crown lands. Two key acts govern MNR's processes are:

- *Lakes and River Improvement Act*,
- *Public Lands Act*.

Under the *Lakes and Rivers Improvement Act* prior to permitting the proponent must request Location Approval at which time the MNR can request certain activities to be completed which include an:

- Class EA with a Statement of Completion,
- A Letter of Advice from the Federal Department of Fisheries and Oceans ("DFO"), and
- Any Crown Land related issues.

(c) Department of Fisheries and Oceans:

As noted above, DFO works in a complementary relationship with the MNR. After the DFO Letter of Advice is issued to MNR, the MNR may choose to issue Location Approval. Upon granting Location Approval and detail design is complete, DFO will review and

determine whether to issue an Authorization under the *Fisheries Act* for a HADD ('Harmful Alteration, Disruption or Destruction') of fish habitat.

As a result of these dependent processes, Xeneca is required to ensure both MNR and DFO are continually satisfied by the project detail design prior to construction occurring. Oversight by each agency will continue through the construction and operation period.

(d) Transport Canada:

Transport Canada ("TC") has an important role under the *Navigable Water Protection Act* to review construction of a dam in a waterway and deal with any water way crossing for the project. Final detail engineering designs are reviewed by TC and require approval under this Act.

(e) Other:

Many other agencies are also important: Health Canada, Natural Resources Canada, Ontario Ministry of Energy and Infrastructure and the Ontario Ministry of Tourism and Culture, to name a few, have an important role in the post-EA detail design and permitting process. The Ontario Ministry of Tourism and Culture ("MTC") oversees the *Ontario Heritage Act* towards the protection of archaeological sites and heritage properties. The MTC will review all archaeological investigation reports completed in support of this undertaking.

Xeneca is committed to working with these agencies to facilitate the completion of these many processes and will cooperate in responding to reasonable requests for additional information. A table outlining potential regulatory permits, approvals and authorizations that may be required for the proposed project is provided in Section 9 of this Class EA.

### First Nations and Aboriginal Communities

The development of waterpower resources on Crown Land will necessarily involve First Nations and Aboriginal communities as part of the Crown's duty to consult and as part of the specific requirements of certain regulatory processes. Prior to the Class EA process, the MNR's site release policy and procedures required the proponent to engage First Nations and Aboriginal communities. This Class EA summarizes Xeneca's efforts to seek input from and consult with the appropriate communities.

Xeneca has been respectful of each First Nations and Aboriginal communities' culture, governance and desired manner of communication in order to foster a long-term relationship throughout the lifecycle of the project. The Class EA is being submitted to the First Nations and



Aboriginal communities and Xeneca will follow-up, and if requested, meetings with the First Nation and Aboriginal communities will occur during the review period as required and will be on-going to project commissioning.

The Aboriginal Consultation Plan and the record of Aboriginal Consultation and Engagement are appended to the Class EA as Appendix E. Additional discussion on consultation with First Nations and Aboriginal communities is provided in Section 4.5 of the Class EA.

### **Other Stakeholders**

Xeneca is also sensitive to stakeholders whose primary vehicle to express concerns is through the environmental assessment process. Communication with the various stakeholders occurred during the Public Information Centres and Project Information Meetings, through public notices, Xeneca's website, individual meetings, conversations and communications. Stakeholder engagement is discussed in Section 4 of the Class EA, and a detailed consultation record is provided in Appendix D of the Class EA. Table 4 of the Class EA includes a tabular presentation of the issues raised during the public consultation process and the proposed management strategies towards the resolution of those issues.

Based on the information presented above, Xeneca is confident that issues have been addressed or can be addressed through mitigation measures applied in the final project design. Xeneca believes there is good support for the project within the community. Further, Xeneca will continue to meet with and communicate with stakeholders throughout the development of the project.

### **Conclusion**

The Chute Class EA provides a review of the potential effects, both positive and negative, of the project. The Class EA also incorporates the information and views expressed by First Nations and other Aboriginal communities, local residents, stakeholders and regulatory agencies and ministries. This is the beginning of the planning and development process and the Class EA will be used to inform the subsequent permitting and approval processes. If approved, the Class EA will provide the basis for the binding commitment of the proponent as to how it will proceed through development and detail design of the project.

Overall, this Class EA and the conceptual plans for the proposed project meet requirements of the Ontario and Federal environmental assessment process and the objectives of the *Green Energy and Green Economy Act, 2009*. It creates positive environmental and socio-economic benefits for the people of Ontario.

Xeneca looks forward to comments provided by reviewers of this Class EA and if written comment is being submitted to the MOE, requests that it is copied.

Thank you to all participants in advance for your kind consideration of this Class EA.

## EXECUTIVE SUMMARY

Xeneca Power Development Inc. (Xeneca) proposes to construct a 3.6 MW hydroelectric power generating station (GS) at the site known as “The Chute” on the Ivanhoe River. The project site is located in north-eastern Ontario, approximately 85 km west of Timmins and 15 km north of Highway 101.

The project received a Feed-in-Tariff contract from the Ontario Power Authority which stipulates facility commissioning no later than October 2014. The project represents a significant socio-economic benefit to the local community at the construction phase and operations phase. The initial capital construction cost is estimated to be \$18 million, returning approximately \$2 million in tax revenues to the province during the life of the 40 year OPA contract.

This Environmental Report (ER) describes the environmental assessment (EA) carried out as part of the planning process for the proposed project. This EA was completed in accordance with provincial and federal requirements, and was undertaken to meet the collective needs of:

- The Class Environmental Assessment for Waterpower Projects as required under the *Ontario Environmental Assessment Act*;
- The Class Environmental Assessment for MNR Resource Stewardship and Facility Development Projects as required under the *Ontario Environmental Assessment Act*;
- A federal screening as required under the *Canadian Environmental Assessment Act*.

The purpose of an environmental assessment is to ensure that potential effects are identified, evaluated and considered in the planning of a project, allowing for the avoidance or minimization of the negative impacts and the optimization of the positive impacts before construction begins. Furthermore, the EA process requires that the proponent of a project undertake meaningful engagement of all stakeholders who wish to be involved in the planning process. In this context, the environment being considered includes the natural/physical, socio/economic, and cultural/human landscape in which the project is proposed to be developed and operated.

Impacts may be either positive or negative, and are assessed for their significance and potential cumulative effects of other known (occurring) or foreseeable effects to a specific area or resource from future development. Negative impacts can then be mitigated through planning and further refinement of the proposed project, or afforded compensation in alternate ways in accordance within the mandatory regulatory approvals framework. Significant negative impacts which cannot be mitigated against or compensated for may lead to project redesign or rejection of the proposal.



This Environmental Report has been organized in the following format:

- Introduction and project overview;
- Description of the regulatory framework under which the project is being assessed;
- Identification of the existing conditions of the environment in which the project would be developed;
- A technical description of the proposed project, including its physical makeup, construction requirements, and operational regime;
- Discussion of stakeholder engagement efforts undertaken throughout the EA process, and the results of those engagements;
- Identification of the likely effects of the project both positive and negative, proposed mitigation measures to avoid the negative impacts, residual effects (those which cannot be mitigated), and any requirements for future monitoring;
- Identification of regulatory approvals which will be required as part of this undertaking;
- Conclusions and recommendations.

The process is meant to inform and enhance the project plan through investigation and consultation with affected landowners, stakeholders, First Nations and Aboriginal communities and the general public. At the EA stage, conceptual project design information is presented to ensure that stakeholders are informed about the general scope and extent of the project, particularly as it relates to understanding the socio-economic benefits of the project and how the project may potentially affect other uses of the river and the environment.

The identification of effects and mitigation plans has been developed in close liaison with environmental regulatory agencies at the Federal and Provincial level. Xeneca will continue to work closely with these agencies during the regulatory review of this document, and into the detail design, construction, and operational periods of the project. Xeneca is committed to confirm and verify the implementation of all effects and mitigation measures identified in the ER. As part of this effort, Xeneca will regularly issue a Project Implementation Report to agencies to update the project status, provide results of on-going environmental assurance and verification programs, and results of monitoring and mitigation programs.

A summary of the existing conditions at the proposed project site, the project details and the findings of the environmental assessment is presented below.

## Physical Environment

The general topography of the area is characterized by gently rising uplands and lowland flats, with the Ivanhoe River flowing through a steeply banked valley. The proposed project site is located in the northern Clay Belt; the geology of the region is complex and highly variable, and is located within the Superior Province of the Canadian Shield.

## Ecology

A wetland is located in the west channel of the proposed project site. Field investigations identified forty-five bird species in the area, all of which are listed as having secure populations throughout the province. Three species were confirmed to be breeding in the area. The bald eagle is listed provincially as a species of Special Concern and may also be breeding in the area.

Walleye, Northern pike and Brook trout were judged to be the primary valued ecosystem components within the study area by the EA team. Moose foraging habitat was confirmed as a significant habitat and bald eagle nesting and foraging areas; in addition denning habitat for large weasels (otter, mink, marten and fisher) may also be present.

No significant herpetofaunal species or SAR were identified in the vicinity of the proposed project area. Similarly, no significant mammal species were identified but the area contains a moose aquatic feeding area and the potential for bald eagle breeding habitat in the riparian forest, these are considered Significant Wildlife Habitats.

Lake sturgeon exist in the lower reach of the Ivanhoe River where it merges with the Groundhog River approximately 50 km from the site. However, no Lake sturgeon were found at The Chute and natural barriers to fish passage in the river (6 falls) over 50 km make their presence unlikely.

## Archaeological Sites

No registered archaeological sites are present in the project area however the site was determined to have archaeological potential due to its proximity to the waterway and the existence of rapids. Stage I work has been completed and Stage II is underway to access archaeological potential. Stage one studies of transmission corridors have or will be conducted as well once final routing has been determined.

## General Land and Water Use

The Ivanhoe River is considered a managed waterway due to the presence of other water control structures (i.e. Ivanhoe Lake Dam, Foleyet water intakes) as well as an existing water management plan on the waterway.

The Ivanhoe River is considered a navigable waterway as defined under the *Navigable Waters Protection Act*. The river is a recognized canoe route, and the falls at the site are navigated using existing portages located along each shoreline. The area is used for recreational activities (e.g. hiking, camping, picnicking), angling, commercial trapping, and baitfish harvesting.

No protected areas are located in the immediate vicinity of the proposed project. The Groundhog River Provincial Park is located downstream of the project site, and supports one of the last remaining sturgeon spawning grounds in the watershed. The Northern Claybelt Conservation Reserve is also located downstream of the project site.

### **Aboriginal Land and Water Use**

Aboriginal peoples harvest fish and game in and around the river. The Eastern white cedar, which is of special cultural significance to Aboriginal people, can be found in the river floodplain upstream of The Chute site, and there may potentially be culturally modified cedar trees in the area. Aboriginal input indicated a desire to consider alternative and more natural materials in the construction of the facility. An Aboriginal Consultation Plan is being developed with Community input. Community benefits are being discussed with Identified Aboriginal Communities as directed by the Ministry of Natural Resources.

### **Project Description**

The proposed hydroelectric facility would use a gross head of 9.5 m, and would incorporate an 85 m spillway dam and a 110 m long earthen embankment. The turbines would have a total nameplate rating of 3.6 MW. The station will be connected to the provincial electrical power supply grid via a 27.6 kV connection line as per its FIT Contract. Xeneca will continue to work with MNR to finalize the line design and seek further route and voltage efficiencies which may involve discussions with the Ontario Power Authority on the viability of alternate connection points.

Two different options were considered for the location of the powerhouse, each covering the same general footprint. Each option would see the powerhouse situated on one of the two river channels with the spillway on the other. Two possible connection line routes are under consideration based on the point of connection to the provincial supply grid. Final turbine design will be selected during the Plan and Specification Approval (*Lakes and River Improvement Act* administered by the Ministry of Natural Resources) of the project, where final design is approved prior to construction

Access to the project area will be via an existing road, requiring road upgrades and a short section of new road construction (less than 1 km) will be required. Temporary access roads will be needed to reach the non-powerhouse side of the river; temporary access will be decommissioned following construction. A road sharing agreement will be required with the

sustainable forest license holder, upgrades may be required at the existing bridge upstream of the falls necessitating an agreement with the bridge owner. The road will remain open to the public; the provision of public parking and a boat launch are being considered as mitigation measures.

The detail design will benefit from input by the public and regulatory agencies during the review of the Environmental Report. The proponent necessarily reserves the right to variances between the conceptual design presented herein and the detailed engineering design subsequent to the completion of the environmental assessment, provided that such variances do not materially and negatively impact the environment beyond the scope of the impacts described herein. Based on First Nation input, alternate materials other than concrete, will be considered in construction pending approval by the Ontario Ministry of Natural Resources (MNR). Plan and Specification Approval (*Lakes and River Improvement Act*) will determine final design using the Class EA as its guideline.

### **Construction Strategy**

Site preparation is currently presently proposed to begin in mid-2012, followed by the construction of the generation facility during 2012 through 2014. The construction of the connection line corridor is currently proposed to start in 2013 with completion in 2014. As per the terms of the FIT contract, commissioning will follow no later than October 2014.

Construction activities will begin following the issuance of regulatory approvals and authorizations, and will meet the requirements of applicable legislation, industry guidelines and best management practices.

### **Operation Strategy**

The operation strategy was developed based on the conceptual engineering design, available environmental data and the findings of various studies. A “modified run-of-river” mode of operation is proposed for The Chute, in which the operation of the facility would vary between run-of-river and intermittent depending on the flows in the river. This is in alignment with Ministry of Energy (formerly Ministry of Energy and Infrastructure) definition of run-of-river with modified peaking and their desire for electricity to be generated during peak hours in an environmentally sustainable manner to displace fossil fuel generation. When natural flows are below the maximum capacity of the turbines but above the required ecological flow, water will be stored during off-peak hours for use during peak hours, affecting water levels upstream and flows downstream. This approach allows for operating the facility in an environmentally responsible manner while maximizing waterpower potential of the site for the delivery of clean electricity that produces no aerial emissions and greenhouse gases to the province especially during peak demand periods. This is in alignment with the Ontario Ministry of Energy (the One Window) stated desire for clean electricity during peak demand periods. All electricity produced displaces the need for electricity from fossil or nuclear sources. Distributed generation to remote

areas also “Islands” consumers against service interruptions (e.g., ice storms and black-outs) and provides positive benefits to the power grid. Long-term the electricity produced will provide positive financial benefits to local and provincial government and help reduce electricity costs.

Inundation and backwater effects are expected to span a distance of 6.4 km upstream of the dam; operations will not impact the Ivanhoe Lake Dam located approximately 24 km upstream. In order to minimize negative environmental impacts, limits will be set to the depth and area of the inundation zone, which in turn limits storage to a few hours during moderate and low flows.

Upstream water levels may be managed by controlling various operating parameters, such as the maximum daily fluctuation and the rate of changes to the water level. Downstream flows and levels may be managed by the established environmental flow, and the compensatory bypass flow. The proposed operating parameters for the facility may be subject to change subsequent to regulatory and public review of this ER.

The operating plan of the facility at The Chute will ultimately be incorporated into the existing Mattagami River Water Management Plan (MWMP) in cooperation with MNR as outlined in the *Lakes and River Improvement Act* after commercial operation.

The facility will not negatively impact the municipal water supply or sewage treatment system for the Town of Foleyet. No adverse impacts are anticipated for the Northern Claybelt Conservation Reserve or the users of the Groundhog River.

### **Federal, Provincial, and Municipal Agency and Stakeholder Consultations**

In accordance with the Class EA for Waterpower Projects, consultation was conducted with government agencies, public and Aboriginal communities to identify concerns and issues related to the proposed development.

Key concerns identified through public consultation include impacts to local outfitter operations, recreational access, fishing, wildlife, the Pineland Forest, the Town of Foleyet’s water treatment facilities, and water levels at the Ivanhoe Lake. Consultation was also carried out with the Sustainable Forest License holder Domtar Inc-EACOM regarding road access, connection line routes, timber harvesting, and potential impacts to the bridge upstream of the project site.

Issues raised during the Aboriginal consultation include the Chapleau Cree’s preference for a rock clay-fill dam in lieu of a concrete in-water structure and impacts to cedar.

Notices of Commencement and project descriptions were sent to relevant federal and provincial agencies throughout the planning process; an EA Coordination meeting was held to discuss the undertaking, collect information on regulatory approvals and permitting requirements, and project scoping. The Canadian Environmental Assessment Agency is acting as the Federal Environmental Assessment Coordinator (FEAC) for the undertaking; Fisheries and Oceans Canada

and Transport Canada have been identified as Responsible Authorities due to project triggers under the *Fisheries Act* and the *Navigable Waters Protection Act*. It is anticipated that Environment Canada, Health Canada and Natural Resources Canada will provide expert advice on the undertaking.

Key concerns identified by agencies during the planning process to date include potential impacts to fisheries and fish habitat; terrestrial wildlife; the Town's potable water supply and sewage treatment facility; and landfill capacity for construction waste disposal.

### **Potential Project Effects**

#### **Negative Impacts:**

The environmental assessment examined the project's potential environmental impacts. Where possible, adverse impacts will be avoided or prevented and mitigation measures will be implemented to minimize those impacts that cannot be avoided or prevented.

The proposed development will result in the creation of a head pond extending approximately 6.4 km upstream of the dam. The modified run-of-river operation of the facility will result in fluctuating water levels upstream of the dam.

Fluctuation in water levels upstream of the dam may potentially increase shoreline erosion and ice scour. An erosion survey was conducted to identify areas that are susceptible to erosion following inundation and it was determined that the potential for significant erosion upstream of the dam is limited. It was similarly determined that impacts related to ice scour will be limited. Measures have been incorporated into the conceptual design and the operational plan to minimize or avoid negative impacts to civil structures and private property.

The fluctuations in water levels upstream of the dam may also impact aquatic habitat along the shorelines and/or shallow water areas. In order to minimize negative impacts, the proposed daily fluctuations were established to be less than the magnitude of historic seasonal fluctuations experienced in the project area.

Due to the very limited time of impoundment and that storage normally occurs during the evening hours, water temperature in the head pond is not expected to vary with depth and, neither will it be significantly different from the temperature of the water in the river upstream of the head pond.

Modified run-of-river will also produce downstream variability in water depth, flow velocity and wetted perimeter until the river reaches a lake or a confluence with a major tributary. A downstream minimum environmental flow of 2.3 to 2.6 m<sup>3</sup>/s is proposed to be continually



passed over the dam spillway to maintain ecological habitat viability within the variable flow reach. Operations during spawning seasons will be controlled in order to ensure fish reproduction is not adversely affected.

The applicable regulations will be respected in order to ensure the health and safety of all contractors, construction crews and operational staff. For the safety of the public, access will be restricted during construction activities. Safety measures will be erected to restrict public access to the work areas. These measures will include fencing and signage while ensuring that routes are maintained to allow the public to bypass the construction area.

Once operational, access to the facility will be restricted to maintain public safety. Safety measures including signage, fencing, gates, barriers and warning devices will be considered during the development of a Public Safety Measures Plan (PSMP). The PSMP will be completed prior to commissioning and will address both access and operational related safety issues. It is not the intent to restrict access to fishing or recreational uses where safety considerations are not an issue.

Consideration was also given to impacts specifically related to potential accidents and malfunctions that may occur during the construction and operation of the facility. The proper implementation of mitigation measures and best management practices will minimize the likelihood of accidents such as spills and leaks during the construction period. A spill response plan will be developed for the construction program to manage any accidental releases of contaminants required for the operation of construction equipment; any releases of contaminants will be reported to the Ministry of the Environment Spills Action Centre. A detailed list of mitigation measures to be implemented during the construction program is provided in this Environmental Report.

The water supply intake for the Town of Foleyet and the outflow for the sewage treatment facility are located approximately 20 km upstream of The Chute project site, extending well beyond the 6.4 km upstream zone of inundation. As such, the proponent has determined that there will be no impacts to this infrastructure by the proposed facility.

In order to preserve the aesthetic quality of the project area, the proponent will strive to maintain and enhance vegetative buffers between the river, roads and any ancillary works. This will include discussions with the Aboriginal Communities and the planting of cedar to mitigate any impacts. The proponent will seek to preserve or enhance recreational values in the area of The Chute.

#### Positive Impacts:

The construction and operation of the proposed facility will introduce employment opportunities to the communities of Foleyet, Town of Chapleau and the City of Timmins. Area First Nations communities may also benefit from the project. The initial capital construction cost is estimated

to be an \$18 million investment in Ontario with \$9 million spent in the region. The project is estimated to return approximately \$2 million in tax revenues to the local government and the province over the 40 year lifespan of the project and tax revenues can be expected as long as the plant is operational. Short-term job creation is estimated at 40,000 person hours with the equivalent of two part-time jobs created for commercial operations. Additional support and improvements for recreational and tourism values are being discussed with the local community.

Benefits to Aboriginal communities, including employment opportunities, are being discussed as outlined in the Aboriginal Consultation Plan (ACP). Discussions also include MNR's "Business to Business" relationship process for Identified Aboriginal Communities. Xeneca has voluntarily committed to support the Crown's consultation responsibilities to the Aboriginal Communities and its fiduciary obligations as defined within Bill 150, Green Energy and Green Economy Act, 2009 (GEA) and the Ontario Power Authorities Feed In Tariff process and other related Crown objectives.

Additional economic benefits will include revenue generated from local sourcing of materials, equipment and services (where available). The project will improve local infrastructure to the benefit of mines, forestry, and tourism and recreational users.

The project will provide to the region a source of reliable and clean electricity for 75+ years that will help meet local demand for 916 homes and support local supply during interruptions to service such as ice storm and blackouts.

As a lower cost source of electrical production, waterpower will provincially, assist in keeping electricity prices economical and help displace fossil fuel and nuclear sources of generation and improve system reliability.

In terms of long term generation of jobs and prosperity the development of The Chute and other current projects will help support Ontario's existing waterpower industry that employs 1600 direct and 2000 indirect jobs within a renewable sector that has significant potential of global growth according to the International Energy Agency which is estimated to exceed all other renewable sources.

New projects such as The Chute will help Ontario's waterpower industry facilitate a generational knowledge transfer that will allow it to compete in the global market for the potential 575,000 MW of new supply and 875,000 MW of refurbishments. Domestic development of waterpower has been stagnant in Ontario since the 1990s and The Chute also provides this Ontario industry an opportunity to showcase its talents and expand so as to meet the growing global demand for equipment and talent for waterpower maintenance and development.

Positive environmental effects are the production of 13,300 MWh of clean electricity with no aerial emissions for 75+ years that provide a reliable source of electricity that is economical. Environmental benefits are estimated at:

- The displacement of 9.22 tons of carbon dioxide equivalent per annum or 690 tons over the lifespan of the project;
- Displacement of 0.05 tons of sulphur dioxide per annum and 0.02 tons nitrous oxides per annum and other related pollutants related to fossil fuel emissions;
- 14,000 tons of coal per annum;
- Reduction of annual greenhouse gas emissions equivalent to 1,798 passenger vehicles or, the sequestering of carbon from nearly 791.2 hectares of pine or fir forests.

### **Effects of the Environment on the Project**

As required for projects subject to the *Canadian Environmental Assessment Act*, the effects of the environment on the project were evaluated. Events such as flooding, extreme winter and summer conditions, lightning strikes, accidental fires, earthquakes and climate change were considered. Although the powerhouse will be equipped with a diesel-powered back-up generator, it is anticipated that such events may necessitate plant shut-down and result in an interruption to the delivery of electricity to the provincial supply grid. In the event of a power failure during peak flow periods, it will be the proponent's responsibility to ensure that peak discharge can be passed.

### **Residual Adverse Effects**

The effects of a project that are expected to remain despite the application of mitigation measures, are referred to as residual effects. The residual effects of the proposed Chute development, both positive and negative, and their significances were evaluated.

Two significant negative residual effects are expected for fish habitat as a result of the construction of the intake and water conveyance structure on the upstream side of the facility, and the construction and excavation of the tailrace and powerhouse on the downstream side of the facility. This impact will be mitigated as required in coordination with the agencies.

Positive residual effects are expected for local and regional employment, the reduction of aerial emissions, and for the reliability and security of electricity and energy in the region.

## **Cumulative Effects**

Cumulative effects are the long term changes resulting from the combined effects of successive actions on the environment, and can result from the interaction of residual effects from multiple projects in a given area or multiple activities acting on a single ecosystem component.

The proponent may propose an additional generation station on the Ivanhoe River at Third Falls. If this proposed project proceeds, the cumulative effects of both projects will be considered in that environmental report

## **Monitoring and Follow-up Programs**

Monitoring programs have been proposed for the construction, post-construction and operation phases of the development. These programs will ensure that mitigation measures and industry best management practices are being properly implemented and adverse effects are minimized.

## **Commitments**

The proponent is committed to:

- ensuring compliance with this Environmental Report;
- the adoption and application of the mitigation measures detailed in this document;
- abiding by commitments to the Community and Aboriginal Communities.

In cooperation with the regulators, the proponent has reached an agreement on flow parameters in the operating plan and will work with agencies to confirm and verify these parameters as the project proceeds. Xeneca will confirm the specific operational parameters and environmental protection measures for the facility and ensure that there will be no adverse effects on valued environmental components of the Ivanhoe River within the zone of impact of the project. In coordination with MNR, these measures will be incorporated into the existing water management plan process.

The proponent will also regularly issue a Project Implementation Report to agencies, providing updates on the project status and results from ongoing environmental effects, monitoring and mitigation programs.

Following integration of The Chute Operating Plan into the Mattagami Water Management Plan (WMP), the proponent will participate in the WMP process.

## Conclusion

It is the conclusion of this environmental assessment that there will be two significant residual environmental effects after application of mitigation measures, and the proponent believes there will be a net-environmental and economic benefit. The Project is not likely to cause unacceptable harm to environmental quality and productive capacity of the affected environment, nor the socio-economic and cultural attributes of the area.

The two significant residual effects are associated with Walleye and White sucker spawning habitats that have been identified in the proposed facility/dam footprint area. The construction of the intake and water conveyance structure as well as the construction and excavation of the tailrace and powerhouse will result in the permanent alteration of sensitive spawning habitat. There may be a requirement for an Authorization under Section 35 of the *Fisheries Act* for the harmful alteration, disruption or destruction (HADD) of fish habitat. If appropriate, a compensation measures plan will be developed in consultation with the regulators.

There are also many positive environmental effects associated with the project which are considered to off-set any potential environmental impacts. These are: the tangible economic benefits for the local communities and the regional/provincial economy, employment and training opportunities, the creation of reliable and secure green energy for the province, and the generation of electricity through a renewable energy supply in support of the province's *Green Energy and Green Economy Act*.

The proponent believes the project provides net positive environmental and socioeconomic impacts to the region and the province. The EA Report and the project also meet the desired direction of the "One Window" on energy procurement and the objectives as defined within the *Green Energy and Green Economy Act*.

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Annex V:	Stage 1 Summary Archaeological Assessment Report
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### Acronyms

ARD	Acid Rock Drainage
BMP	Best Management Practice
CEAA	Canadian Environmental Assessment Act
CEA Agency	Canadian Environmental Assessment Agency
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EC	Environment Canada
ESA	Endangered Species Act
ER	Environmental Report
FEAC	Federal Environmental Assessment Coordinator
FIT	Feed-In Tariff
GEA	Green Energy and Green Economy Act
GS	Generating Station
INAC	Indian and Northern Affairs Canada
LTAF	Long term annual flow, average annual mean
ME	Ministry of Energy
ML	Metal leaching
MNDMF	Ministry of Northern Development, Mines and Forestry
MNR	Ministry of Natural Resources
MOE	Ministry of the Environment
MTC	Ministry of Tourism and Culture
NOC	Notice of Commencement
NRCan	Natural Resources Canada
NWPA	Navigable Waters Protection Act
OBBA	Ontario Breeding Bird Atlas
OCWA	Ontario Clean Water Agency
OPA	Ontario Power Authority
QP	Qualified Person
Q <sub>99</sub>	Streamflow exceeded 99% of time
Q <sub>95</sub>	Streamflow exceeded 95% of time
Q <sub>80</sub>	Streamflow exceeded 80% of time
Q <sub>50</sub>	Streamflow exceeded 50% of time
Q <sub>20</sub>	Streamflow exceeded 20% of time
Q <sub>EA</sub>	Downstream environmental flow target
Q <sub>COMP</sub>	Compensatory flow (between dam and tailrace)
Q <sub>MED</sub>	Median streamflow value
Q <sub>TMAX</sub>	Maximum turbine capacity
Q <sub>Tmin</sub>	Minimum turbine flow
Q <sub>TL</sub>	Limited turbine flow – modified ROR

Q <sub>HWM</sub>	Streamflow corresponding to high water mark
7Q2	2 year return period 7-day-average-low flow
7Q10	10 year return period 7-day-average-low flow
7Q20	20 year return period 7-day-average-low flow
Q1:2	High streamflow event; occurrence of 1 in 2 yr
Q1:100	High streamflow event; occurrence of 1 in 100 yr
RA	Responsible Authority
ROR	Run of River
ROW	Right-of-way
SAR	Species at Risk
SARA	Species at Risk Act
TC	Transport Canada
TS	Transformer Station
UTM	Universal Transverse Mercator Units

#### Units

kW	kilowatt
kWh	kilowatt hour
m	metres
m <sup>2</sup>	square metres
masl	metres above sea level
m/s	metres per second
m <sup>3</sup> /s	cubic metres per second
MW	megawatt
MWh	megawatt hour
r/min	revolutions per minute
µg	microgram
umho/cm	micromhos per centimetre



## 1. INTRODUCTION

This section presents an introduction to waterpower in Ontario, an overview of the proposed project, and the methods used to complete the work presented herein.

### 1.1 WATERPOWER IN ONTARIO

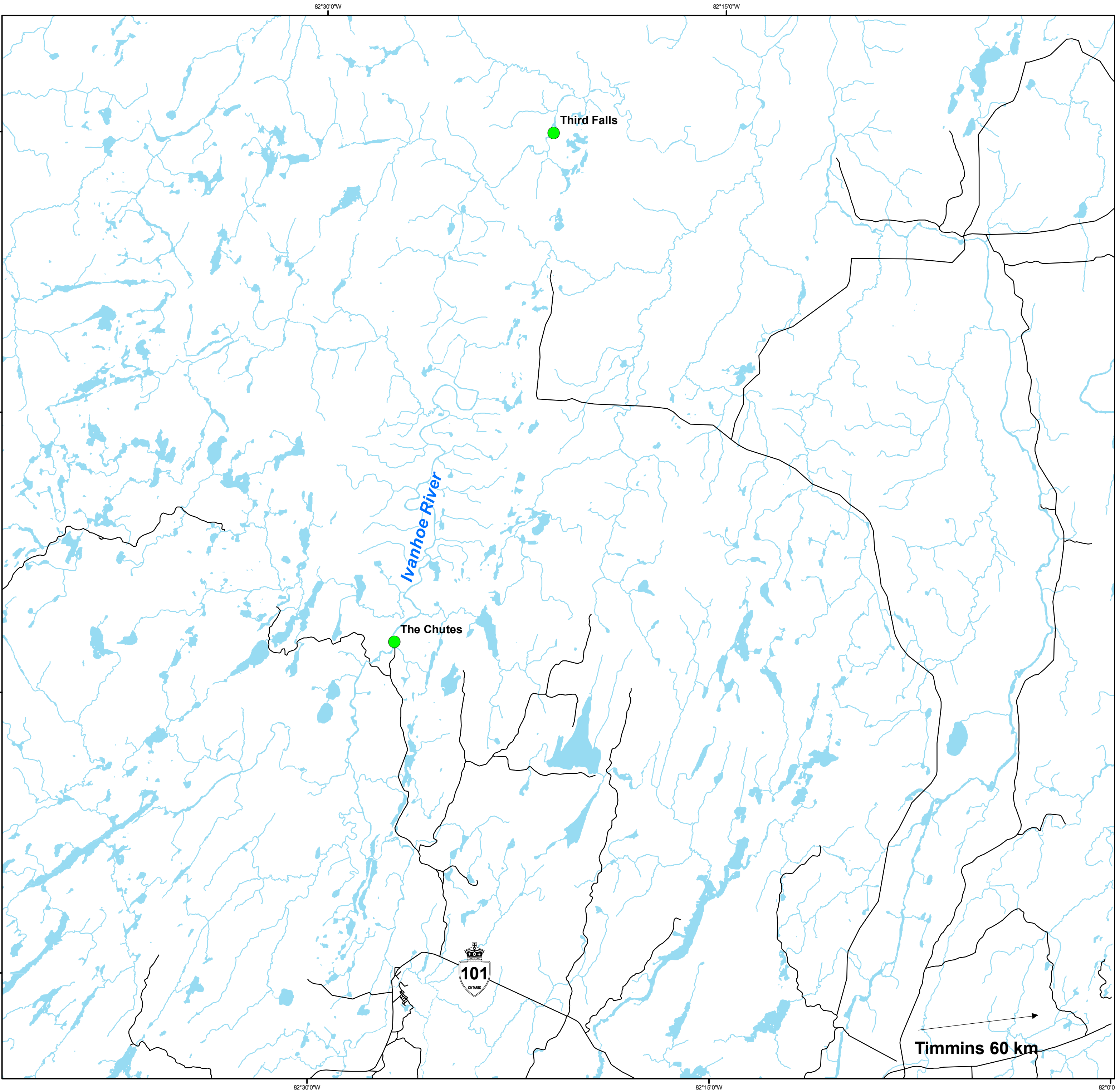
Waterpower (hydroelectricity) is generated from a naturally replenished source (water) making it both a renewable and sustainable resource. Hydroelectricity is considered the most widely-used form of renewable energy. Once constructed, hydroelectric generating station greenhouse gas emissions are effectively zero. Waterpower generation provides peak and base load energy, which replaces non-renewable sources of power such as coal and gas. Some waterpower facilities can store energy (water) until it is needed at peak periods of usage.

Hydroelectric generating stations are long-lived, lasting upward of 80 years; there remain operating waterpower facilities in the province that were constructed at the turn of the 20<sup>th</sup> century. In 2009, the Ontario *Green Energy and Green Economy Act* (GEA) was enacted with the aim of making the province a global leader in clean, renewable energy. The Feed-In-Tariff (FIT) Program administered by the Ontario Power Authority (OPA) was established under the GEA to encourage the development of renewable energy in Ontario while phasing out the province's coal-fired electricity by 2014. The FIT also promotes economic activity and the development of renewable energy technologies and the creation of new green industries and jobs.

### 1.2 INTRODUCTION TO PROJECT

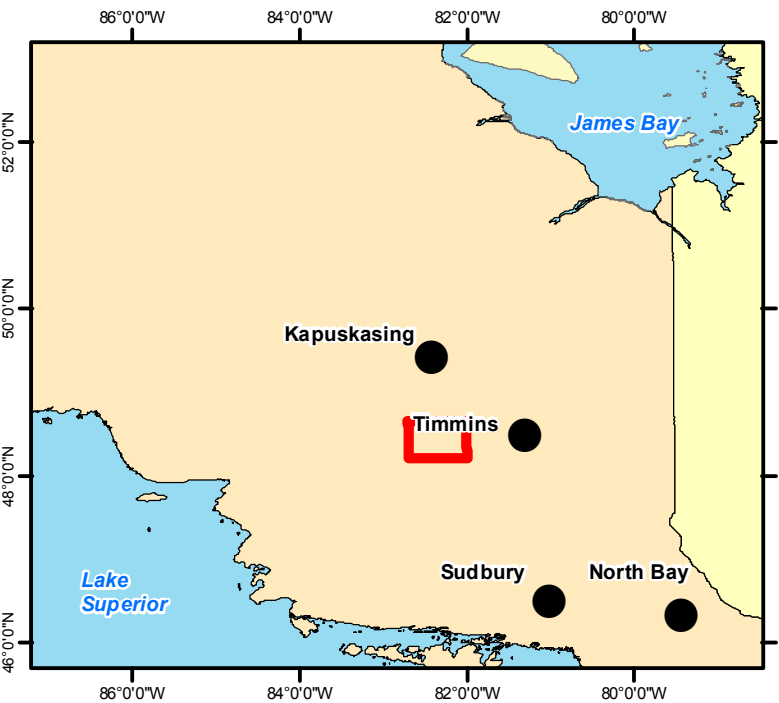
Xeneca Power Development Inc. (Xeneca) is proposing the construction of a 3.6 MW hydroelectric generating station (GS) at The Chute site on the Ivanhoe River to meet government and energy regulatory goals and objectives to generate sustainable and reliable hydroelectric power. The proposed project was awarded a 40-year FIT contract from the OPA which, subsequent to a successful EA outcome, would see the facility commissioned and delivering electricity to the provincial supply grid by October 2014.

The proposed project is located on the Ivanhoe River, approximately 85 km west of Timmins, and 15 km north of Highway 101; a site location map is provided as Figure 1. The Chute GS site is located approximately 30 km upstream from Xeneca's proposed Third Falls GS site which is being evaluated separately under the Ontario *Environmental Assessment Act* and the *Canadian Environmental Assessment Act*.



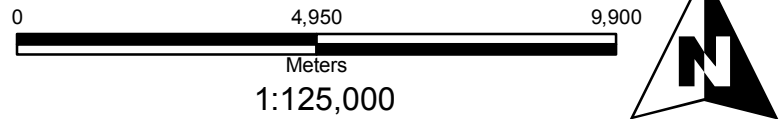
LEGEND

- Site Locations
- Roads
- Water Features



REFERENCE

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



PROJECT

IVANHOE: THE CHUTE GS

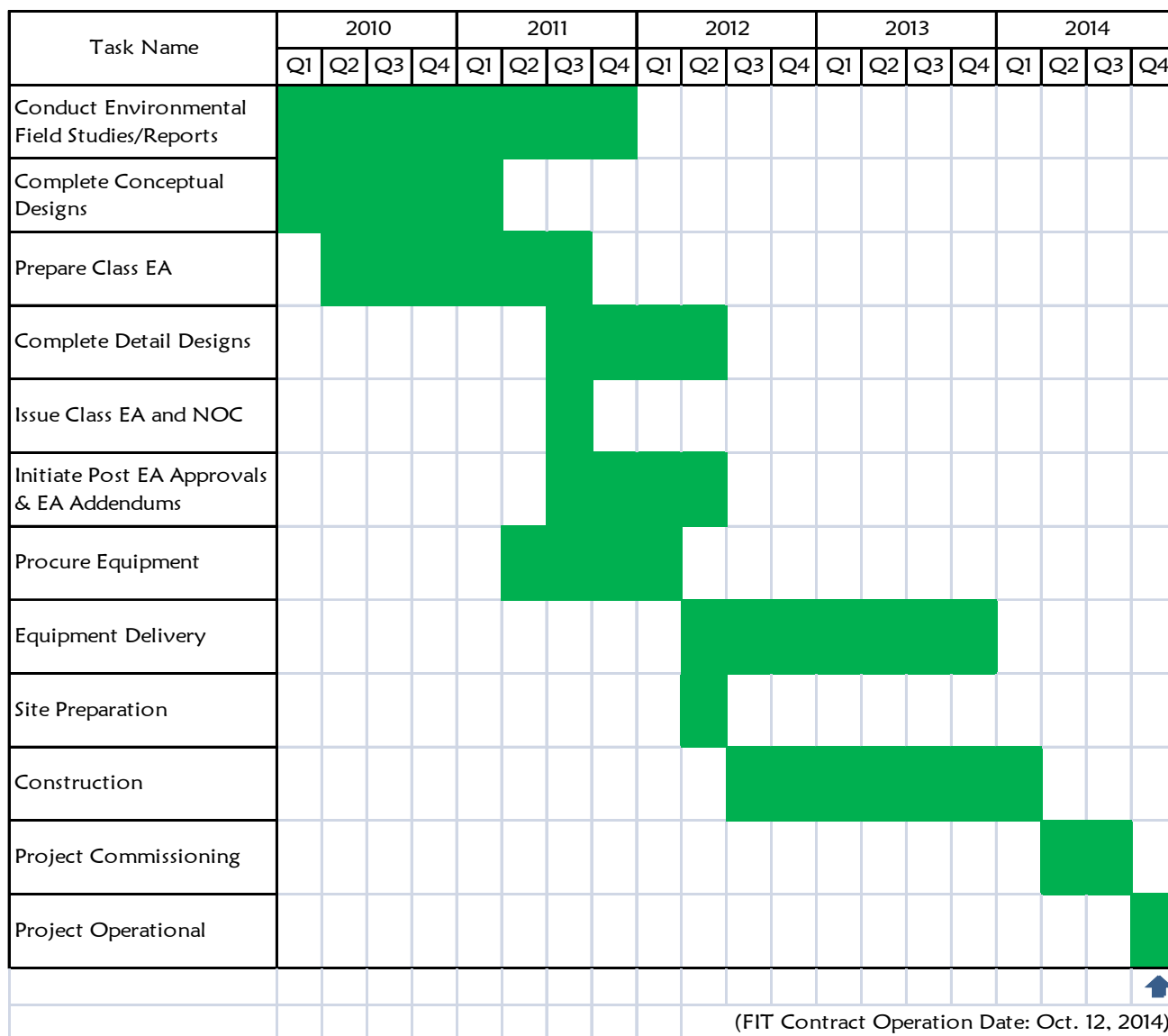
TITLE

SITE LOCATION MAP

PROJECT No.			FIGURE
DESIGN	KC	06/10/2010	
GIS	KC	06/10/2010	
CHECK	TS	06/10/2010	
REVIEW	KM	06/10/2010	
			1

A tentative project development schedule outlining key project phases which have been or will be completed is provided below in Figure 2.

**Figure 2: Project Development Schedule**



### 1.3 OVERVIEW OF THE ENVIRONMENTAL SCREENING PROCESS

The purpose of an environmental assessment (EA) is to recognize the potential effects of a project life cycle early in the project planning phase and take these effects into account during the development and design of the project. Environmental effects include both the positive and negative effects that a project would have, or could potentially have, on the environment at any

stage in the project life cycle. The assessment also considers the effects of the environment on the project. The environment is defined as a combination of natural/physical, socio-economic, and cultural-human factors.

The components of hydroelectric projects can include reservoirs or head ponds, water control structures, water conveyance structures (canals or penstocks), powerhouses, access routes, connection lines and transformer stations. For each of these components, there are three main life-stages of development: construction, operation and maintenance, and decommissioning. There are also indirect activities related to the maintenance and operation of these facilities, including small volumes of non-hazardous waste generation and their disposal, and a backup generating system powered by fuel.

The process of conducting this environmental assessment entailed the examination and evaluation of each component (i.e. dam) and life-stage (i.e. operation) of the proposed development and its potential effect on each aspect of the environment. Environmental effects may include, but are not limited to, alteration/loss/gain of natural features, flora or fauna and their habitat, ecological functions, natural resources, air and water quality, and cultural or heritage resources. Environmental effects may also include the displacement, impairment, or interference with existing land uses, land use and resource management plans, businesses or economic enterprises, recreational uses or activities, cultural pursuits, and social conditions and economic attributes.

The environmental assessment team (EA team) used a team consultative approach to avoid:

- attempts to quantify impacts which are dissimilar on a comparative basis;
- use of sophisticated matrix methods using mathematical calculations to weigh the importance of impacts;
- lack of balance in assessments due to factors such as the tendency for individual experts to concentrate on the areas of the assessment in which they are most familiar.

#### **1.4 APPROACH TO THE ENVIRONMENTAL SCREENING PROCESS**

The environmental assessment team retained by Xeneca included:

- OEL-HydroSys Inc.
- Natural Resource Solutions Inc. (NRSI)
- Woodland Heritage Services (WHS)
- ORTECH Consulting Inc.
- WESA Inc.

- KBM Resources Group
- Hatch
- Canadian Projects Limited
- BPR
- AMEC
- R.J. Burnside and Associates Limited
- Northern Bioscience

#### 1.4.1 Legal Framework

As a waterpower development with an installed capacity less than 200MW, this project is subject to the Class Environmental Assessment for Waterpower Projects (herein referred to as the Waterpower Class EA) planning process developed by the Ontario Waterpower Association as approved by the Ministry of the Environment in October 2008 (revised in March 2011) under the Ontario *Environmental Assessment Act (EAA)*. The Ivanhoe River has water control infrastructure in place in other sections of the waterway and the river is managed for water levels and flows. The proponent has categorized the proposed waterpower facility at The Chute site as a 'new project on a managed waterway' in accordance with the definitions found in the Waterpower Class EA (Appendix A-1).

The EA team also reviewed other applicable environmental assessment guidelines and legislation regulating small hydroelectric developments in the Province of Ontario, and determined that the following regulatory processes and guidelines may be applicable to this undertaking:

- The Screenings under the *Canadian Environmental Assessment Act (CEAA)*;
- Class Environmental Assessment for MNR Resource Stewardship and Facility Development Projects, Ministry of Natural Resources (MNR-RSFDP Class EA);
- The Federal Requirements for Waterpower Development Environmental Assessment Processes in Ontario – Practitioner's Guide (DFO-OWA); and
- The Water Management Planning Guidelines for Waterpower, Ministry of Natural Resources.

According to Ontario Regulation 116/01 (Electricity Regulation) connection lines less than 115 kV are Category A undertakings and therefore exempt from a provincial environmental assessment. As such, the Ministry of Natural Resources (MNR) notified the proponent that, where the disposition of Crown resources is required for the connection line, and where the project is not subject to an environmental assessment (Category A), the MNR Resource Stewardship and Facility Development Projects Class Environmental Assessment (MNR-RSFDP Class EA) would



apply. However, as the connection line will be scoped into the planning process to meet the federal screening requirements and, as the piecemealing of a project is not an acceptable EA planning practice, the proponent decided to scope the connection line into the Waterpower Class EA planning process. As such, during the initial planning meeting (EA Coordination meeting) the Ministry of Natural Resources agreed to recognize this Waterpower Class EA planning process as long as the MNR-RSFPD Class EA screening criteria outlined in Section 3 of the MNR-RSFPD Class EA document are incorporated.

Subsequent to its review of the Project Description and other supporting documentation, such as a detailed location map of the proposed connection line route(s), MNR will categorize the connection line for The Chute GS (Category A, B, or C) under the MNR-RSFPD Class EA. Given that connection lines less than 115 kV are categorized as Category A and therefore exempt from EA planning requirements within the *Electricity Regulation* and within other environmental assessment planning documents (i.e. Class Environmental Assessment for Minor Transmission Facilities) the proponent anticipates a similar categorization for this project.

The EA team worked closely with multiple stakeholders at the local, provincial and federal levels to ensure that the local environment including physical, social/cultural and economic aspects were well understood.

The EA team collaborated in the completion of the Potential Effects Identification Matrix [(Table 3, Class Environmental Assessment for Waterpower Projects (OWA, Revised March 2011)] included in the Project Description document developed by Xeneca and circulated to the regulators in order to begin the planning process.

The proposed project will also require an authorization from Fisheries and Oceans Canada (DFO) under the *Fisheries Act* and an approval from Transport Canada under the *Navigable Waters Protection Act* (NWPA). These federal approvals triggered the requirement for an environmental assessment under *CEAA*.

Based on the review of these documents and consultation with the key provincial and federal authorities assigned to the project, the EA team determined that there was an overlap of many of the requirements for the above noted processes. It therefore became an objective to harmonize the multi-jurisdictional regulatory requirements and present the results of the environmental assessment of the proposed undertaking in a single comprehensive document. All of the work presented herein was completed following the general intent of the above-noted processes while giving consideration to the other regulatory agencies, and Aboriginal and public stakeholders that have expressed an interest in the project.



#### 1.4.2 Characterize Local Environment of Proposed Development

The EA team completed the following tasks to characterize the local environment in the proposed development areas:

- A detailed literature review of existing information available through provincial and federal databases. The documents are identified in the References section in this document and in the technical reports referenced throughout this document;
- Field investigations to supplement the terrestrial and aquatic biology record available for the site. The EA team undertook detailed field investigations throughout the project area to document existing conditions and assess the potential effects of the project on these conditions. The results of these studies are presented throughout this document. This information and the expert advice of the EA team members are presented throughout this document;
- Stage 1 Archaeological Assessment to supplement the available historical record for the site.
- Field investigations to supplement the topography, water depth and hydrology data. A statistical analysis of historical hydrological data was completed. Hydraulic modeling was also undertaken to assess flow depths and velocities. A one dimensional hydraulic model was developed using HEC-RAS. Detailed reports are found in Annex I.
- Aerial photography was undertaken from which connection line and access road routes were determined.

#### 1.4.3 Identify Potential Environmental Effects

As noted above, the EA team used a consultative process to identify the potential effects of the project in the early stages of the planning process and to determine the data gathering and analysis program which was then used to identify the effects of the project on the environment. In examining the potential effects of this project, the EA team considered all stages of the project including construction, operation/maintenance and decommissioning (Appendix B).

#### 1.4.4 Identify Required Mitigation, Monitoring or Additional Investigations

The EA team developed a summary of recommended actions to prevent or mitigate negative effects of the proposed undertaking on the environment. These mitigation measures were compiled based on the information collected during the study period (field and desktop), through consultation with government agencies, the public and Aboriginal communities and the EA team's knowledge of hydroelectric developments. The residual effects, those that cannot be prevented, avoided or mitigated, are identified and classified based on their significance. It

should be noted that residual effects also include the positive benefits that would be achieved through the lifecycle of this project to ensure that all potential net effects are afforded consideration.

The EA team has also provided recommendations for environmental monitoring, where on-going data collection will be required to confirm the short-term or longer term effects (i.e. those that would be experienced during construction and those that may be experienced subsequent to commissioning).

The proponent has made commitments related to the undertaking which may include additional data and information collection activities. A list of commitments proposed by Xeneca in support of The Chute waterpower development is presented within the main document and annexes.

#### **1.4.5 Agency and Public Consultation and Aboriginal Communities Engagement**

The objectives of the Consultation and Engagement Programs were to combine the public and Aboriginal community notification/engagement/consultation requirements of the federal and provincial environmental assessment planning and subsequent regulatory approval processes, and present the results of the initiatives within this document. The agencies, ministries, First Nations, other Aboriginal groups and other stakeholders that were identified during the EA planning process include:

- Canadian Environmental Assessment Agency (CEA Agency)
- Indian and Northern Affairs Canada (INAC)
- Fisheries and Oceans Canada (DFO)
- Transport Canada (TC)
- Environment Canada (EC)
- Natural Resources Canada (NRCan)
- Health Canada (HC)

- Ontario Ministry of Aboriginal Affairs
- Ontario Ministry of the Environment (MOE)
- Ontario Ministry of Energy (ME)
- Ontario Ministry of Municipal Affairs and Housing
- Ontario Ministry of Natural Resources (MNR)
- Ontario Ministry of Northern Development, Mines and Forestry (MNDMF)
- Ontario Ministry of Tourism and Culture (MTC)
- Ontario Ministry of Transportation

Brunswick House First Nation  
Chapleau Cree First Nation (Fox Lake Reserve)  
Chapleau Ojibwe First Nation  
Constance Lake First Nation  
Flying Post First Nation  
Mattagami First Nation  
Missanabie Cree First Nation  
Michipicoten First Nation  
Moose Cree First Nation  
Taykwa Tagamou First Nation  
Wabun Tribal Council  
Métis Nation of Ontario

City of Timmins  
Foleyet Local Services Board  
Town of Chapleau

Air Ivanhoe  
Borden Lake Campers Association  
Chapleau Anglers Hunters Club  
Chapleau Arctic Watershed Snowmobile Club  
Chapleau ATV Club  
Chapleau Centennial Museum  
Chapleau Tourist Association  
Do Little Inn  
Gosenda Lodge  
Ivanhoe Lake Cottager's Association  
Kinniwabi Long Rifles Club  
Northern Wilderness Cottages  
Ontario Clean Water Agency  
Ontario Rivers Alliance  
Red Pine Lodge  
Timmins Chamber of Commerce  
Utor Gold Construction  
Whitepine Lodge  
Interested members of the public

A summary of the key consultation activities is provided below:

- A Notice of Commencement (NOC) and two subsequent revisions to the Notice were issued by Xeneca. The NOCs were concurrently advertised in local media. The first NOC was issued on July 28, 2010. The NOC was revised and re-issued on November 10, 2010, and again on December 22, 2010.
- A Project Description for the hydroelectric generating station was issued on November 19, 2010 to provincial ministries, municipal stakeholders and the Ontario Waterpower Association and circulated federally through the Federal Environmental Assessment Coordinator (FEAC).
- The Project Description was distributed in electronic format nine to First Nations and Aboriginal communities (Brunswick House First Nation, Chapleau Ojibwe First Nation, Constance Lake First Nation, Flying Post First Nation, Mattagami First Nation, Missanabie First Nation, Michipicoten First Nation, Moose Cree First Nation, Wabun Tribal Council) on December 20, 2010. Hard copies of the Project Description were distributed in April and May 2011 to Brunswick House First Nation, Chapleau Cree First Nation (Fox Lake Reserve), Chapleau Ojibwe First Nation, Constance Lake First Nation, Flying Post First Nation, Mattagami First Nation, Missanabie First Nation, Michipicoten First Nation, Moose Cree First Nation, Taykwa Tagamou First Nation, Wabun Tribal Council and Métis Nation of Ontario.
- Public Information Centres were held at the Foleyet Community Centre in Foleyet, Ontario on January 13 and 27, 2011. Another is planned for Chapleau, Ontario on July 7, 2011.
- A complete record of Agency consultation is provided and is summarized in Section 4.3. A data acquisition meeting with MNR was held via teleconference on March 3, 2010. An EA Coordination meeting attended by federal and provincial regulators and municipal representatives was held on April 19, 2011;
- Public focus group consultation events held in support of this undertaking are detailed in Section 4.4.
- Aboriginal consultation and engagement events in support of this undertaking are detailed in Section 4.5.
- Copies of advertisements, notifications, and correspondences are provided in the appendices.

The formal Notice of Completion and this Environmental Report (ER) is being provided to the agencies, ministries, First Nations, Aboriginal groups and other local stakeholders that were identified during the EA planning process for a 60-day formal review period. The Waterpower

Class EA requires only a 30 day review period but the proponent has voluntarily extended the review period. The review will follow the steps below:

- Submission of ER document to regulatory agencies, First Nations and public for review.
- Notice of Completion was issued on July 14, 2011 for publication in local media, emailed to stakeholders and posted on the Xeneca and the Ontario Waterpower Association's websites.
- Stakeholders to review ER and provide written comment indicating outstanding issues and requests to meet with Xeneca.
- Xeneca and stakeholders attempt to resolve issues.
- If, at the end of the review period, the stakeholder is not satisfied with Xeneca's proposed resolution, the stakeholder may make a written request to MOE for a Part 2 Order, such requests to be compliant with requirements of the Waterpower Class EA.
- Once outstanding issues have been resolved or if Xeneca feels its' proposal for resolution are satisfactory, Xeneca will ask the Crown to accept the Statement of Completion.

## **2. EXISTING CONDITIONS**

This section provides a description of the existing environmental conditions in the proposed project area.

### **2.1 LOCATION AND LAND OWNERSHIP IN PROJECT AREA**

The proposed project is to be located at The Chute site on the Ivanhoe River, approximately 85 km west of Timmins and 15 km north of Highway 101 (Figure 1). The site is located in the geographic Township of Oates, west of the City of Timmins, District of Chapleau. The Chute site can be accessed from Highway 101 via the Oates Road to the Laundry Road; a gravel road which stems off the Laundry Road is used to access the site.

The project footprint and potential area of impact, (i.e. for the generating station, head pond, control structure, access road(s) and connection line are located entirely on provincial lands. Conceptual design details are found in Annex II-A.

The approximate geographic coordinates for the site are (latitude, longitude): 48.3909 -82.4521. The watershed drainage area at the site is 2723 km<sup>2</sup>.

## 2.2 EXISTING INFRASTRUCTURE

The Ivanhoe Lake Dam is located approximately 40 km upstream from The Chute site. The dam is owned by the MNR and operated by Chapleau MNR to provide flood control and recreational water levels on Ivanhoe Lake. Water level/flow manipulations at the Ivanhoe Lake Dam may potentially impact the levels and flows at The Chute.

The operating regime for the Ivanhoe Lake Dam is specified in the Mattagami River Water Management Plan (MRWMP). The MRWMP was finalized in 2006 in accordance with the Water Management Planning Guidelines for Waterpower under the MNR's *Ontario Lakes and River Improvements Act*. Under the LRIA, facility operators are required to comply with the established operating regimes (required flows). The MNR has confirmed that there will be no opportunity to change the existing Ivanhoe Lake Dam operating plan.

## 2.3 TOPOGRAPHY

The general topography of the area is characterized by gently rising uplands and lowland flats (Rowe 1972). The Ivanhoe River flows through a steeply banked valley. At the proposed project location, the valley rises approximately 15m from the river's edge over a horizontal distance of less than 50 m.

## 2.4 CLIMATE

In Northern Ontario the climate is primarily continental, with cold winters and mild summers moderated by the effects of the Great Lakes. Most precipitation falls in the form of summer showers and thunderstorms; winter snowfall amounts can be significant. During the winter months, Northern Ontario can have prolonged periods of extreme cold.

For the city of Timmins, mean daily temperatures range from a high of 17.4°C in July to a low of -17.5°C in January. Mean maximum daily temperatures (mean of past 25 years) reach a peak in July of 24.2 °C, with 38.9 °C being the highest daily temperature on record. The mean minimum daily temperatures are reached in January (-23.9 °C) with -44.2 °C being the coldest day on record. Annual precipitation averages 831.3 mm with rainfall accounting for 558.1 mm of that total. On average, July is the wettest month and February is the driest. (Canada's National Climate Archive, 2009).

## 2.5 SOILS

The site is located in the northern Clay Belt and humo-ferric podzol soils tend to dominate. Site specific soil information may be available following site investigations to be undertaken in the pre-construction phase of the project development following the successful completion of this environmental assessment.

## 2.6 GEOLOGY

There is no publicly available surficial or bedrock geology mapping available from the Ontario Geological Survey although minor occurrences of glaciolacustrine sands and gravels are known. Generally, the geology of this region is complex and can change dramatically over very short distances. The study area is located within the Superior Province of the Canadian Shield and bedrock consists of Archean-aged granitoids and/or metasedimentary rocks and/or metavolcanic rocks.

The Ivanhoe River in the proximity of The Chute site is characterized by long flat reaches of the river with fine substrates running between bedrock outcrops.

## 2.7 HYDROGEOLOGY

A review of Ontario Ministry of the Environment's electronic well records database revealed there are no water well records within a 1-km radius of the project site.

## 2.8 RIVER HYDROLOGY

The following information was sourced from existing background data and data collected during field investigations.

The Ivanhoe River originates from drainage from a series of kettle lakes and feeder tributaries such as Wright Creek, Kinogoma River, Biggs Creek and flows northward into Ivanhoe Lake. Ivanhoe Lake is long and sinuous and is located approximately 8 km southwest of Foleyet. The original, natural outlet of the lake was via the "Old Channel" (near the northwest end) which was dammed to facilitate historic logging activities in the area. An esker was later breached near the northeast end of the lake which led to the formation of the "New Channel" of the Ivanhoe River (Ayer 1993). The "New Channel" is approximately 16 km in length before it reconnects with the Ivanhoe River "Old Channel". A concrete dam, currently owned and operated by Chapleau District MNR, regulates water levels in the system and is operated as required under the Mattagami River Water Management Plan.

Downstream of Ivanhoe Lake, the Ivanhoe River is generally low gradient and meandering with short stretches of rapids. The drainage area of the Ivanhoe River leading to the project site is approximately 2,723 km<sup>2</sup> (MNR 2010 b). The river channel is contained within a well defined, narrow flood plain. Minor drainages such as Heart and Biting Creek join the Ivanhoe River before the confluence with the Shawmere River approximately 32 km downstream of Ivanhoe Lake. Downstream of the Shawmere River confluence, only four additional unnamed drainages from kettle lakes and muskegs outlet to the Ivanhoe River prior to reaching The Chute hydroelectric site approximately 8 km downstream. The Ivanhoe River continues northward to



join the Groundhog River which flows for approximately 145 km before joining with the Mattagami River. The Mattagami River is joined by the Kapuskasing River approximately 12 km downstream and continues to flow northward where it contributes its flow to the Moose River and continues to James Bay. The reader is referred to Figure 1 provided in the 2009 Hydrology Review for Ivanhoe Hydropower Sites (Hatch) appended in Annex I-A.

### 2.8.1 Water Levels, Flow and Movement

Flow values for Ivanhoe River at The Chute were prorated using drainage basin area, from Water Survey of Canada gauge 04LC003 (Ivanhoe River at Foleyet). Hydrographs and flow duration curves have been developed for this site and are provided in Annex I-A.

The development and operation of the proposed generating station will alter the existing river system and impact the hydrological characteristics of the Ivanhoe River both upstream and downstream of The Chute site. Regulatory agencies expect that the proponent will determine through study the flows required to maintain aquatic ecosystem integrity in the zone of influence of the project. The potential impacts of the proposed facility development and operation on the hydrological regime at The Chute site are described within this environmental report.

### 2.8.2 Surface Water Quality

A surface water quality investigation was undertaken in 2010 to establish ambient (baseline) characteristics of the waterway. Two sampling events (spring and summer) were conducted at two locations (SW1 and SW3, shown in Annex IV at the Ivanhoe (The Chute) site. During the sampling events, general observation and characteristics of each sampling location was assessed and recorded (i.e. water level, current, color and odour). The spring event was undertaken on May 27<sup>th</sup>; the summer event was completed on July 21<sup>st</sup>, 2010.

The results were compared to the Provincial Water Quality Objectives (PWQO) to establish ambient water quality conditions in the vicinity of the proposed project location. The PWQO were established by the Ministry of the Environment in 1994. Under the *Ontario Water Resources Act* the MOE has the supervision of all surface and ground waters in Ontario. The reader will note that several of the parameters subjected to analyses do not have a PWQO objective.

In the spring sampling event, no parameter levels exceeded the PWQO. In the summer event, one of the duplicate samples exceeded the PWQO for zinc. A copy of 2010 surface water monitoring investigation, including analytical results are provided in Annex IV.

Currently, there is limited information available about the existing thermal regime. The creation of an upstream head pond has the potential to affect the existing thermal regime. To date, aquatic investigations have shown that the fish community is composed of generalist species which are not dependant on specific habitat requirements for spawning or life history processes, other than Northern pike which require specific habitat characteristics for spawning, rearing and refuge. The fish community is typical of a warm/cool water temperature regime and is more dependent on flow regime and water levels within the watershed than temperature regimes.

Additional surface water collection events will be scoped with MOE, MNR and EC in 2011 to supplement information collected in 2010.

## 2.9 ECOLOGY

A Site Information Package (SIP) for The Chute was provided to the proponent by the Ministry of Natural Resources. Key natural heritage features identified in the SIP for the project area are listed below.

### Fish and Fish Habitat

A wide variety of species are found in the Ivanhoe River within the vicinity of The Chute project:

- Walleye, Northern pike, White sucker, Yellow perch, Fathead minnow, Iowa darter, River chub and Log perch have been confirmed throughout the Ivanhoe River.
- In addition, Burbot, Lake whitefish, Cisco and Spottail shiner have been confirmed upstream.
- Good quality spawning habitat exists for Walleye at the base of The Chute as well as for Northern pike along the vegetated shorelines of the river. The likelihood for additional spawning habitat for both species also exists both above and below The Chute.

### Terrestrial and Aquatic Flora and Fauna

According to the Ministry's SIP beaver slides and activity are numerous throughout the shorelines of The Chute. Other wildlife species in the area that rely on the river system and riparian habitat also include:

- Spring peeper, otter, muskrat, mink, snowshoe hare, marten, fox, wolves, black bear, moose and various small mammals.
- There are also documented moose aquatic feeding areas along the tributaries of the Ivanhoe River both upstream and downstream of the site.

A copy of the Site Information Package is provided in Appendix A-2.

The EA team conducted fisheries and aquatic habitat, and terrestrial habitat investigations in support of the proposed generating station project to supplement the information provided by the Ministry of Natural Resources.

In 2010, the zone of influence for The Chute project was established on the understanding of the project's influence on natural environment features based on static inundation mapping. The zone of influence was defined as the extent of head pond inundation (2.8 km static) plus the downstream reach which experiences variable flows as a result of the proposed operations (approximately 400 m). The GS study area was generally defined to include these areas plus 120 m.

Based on updated 2011 hydrological information, the proposed area of inundation is now estimated to extend 6.4 km upstream from The Chute development and have an overall surface area of 59 ha. Therefore, 2011 field studies have been modified to encompass this newly identified area of inundation.

The findings of the field investigations completed during the 2010 work program are provided in Annex III of this document. A brief summary of the findings are presented below.

### **2.9.1 Terrestrial Habitat and Species**

The proposed The Chute GS project area is located approximately 85 km west of Timmins on the Ivanhoe River. The site is 40 km downstream of the MNR owned and operated Ivanhoe Lake control dam and 43 km upstream of the proposed Third Falls GS.

The construction and operation of the proposed waterpower facility will result in the creation of a head pond upstream of the proposed dam location, inundating the surrounding area.

Terrestrial forest communities were identified within 120 m of the proposed development site and for the 2.8 km inundation area are dominated by eastern white cedar (*Thuja occidentalis*) forest communities with some areas in an early succession stage following forestry activity. An open water marsh is also located on the east side of the Ivanhoe River near the anticipated inundation area.

Field observations identified 45 bird species present in the site vicinity based upon morning surveys on June 15 and July 7, 2010. Three species demonstrated confirmed breeding evidence; the hooded merganser (*Lophodytes cucullatus*), common merganser (*Mergus merganser*) and American crow (*Corvus brachyrhynchos*); all are listed as having secure populations provincially.

Based on the EA team's field observations, the bald eagle (*Haliaeetus leucocephalus*) may be breeding within the study area. The bald eagle is provincially designated as a species of Special Concern and its habitat is considered a Significant Wildlife Habitat.

No significant herptofaunal species or SAR was identified within the vicinity of the study area.

A total of 23 mammal species have been identified as potentially present within the study area. The EA team observed evidence of 9 species during site visits all of which represent common species with secure populations within Ontario. Although no significant mammal species were identified through site investigations and background review, a Moose Aquatic Feeding area, considered a Significant Wildlife Habitat is present within the study area. Moose were observed during spring and summer and it is anticipated that foraging areas exist within the vicinity.

For a full description of the results of the 2010 terrestrial ecological assessment, including complete lists of all documented species and assessment methods, please refer to the Natural Environmental Characterization and Impact Assessment Report which is appended to this document as Annex III.

## 2.9.2 Aquatic Habitat and Species

In the 2010 field surveys, the study area was bounded to the aquatic habitats of the proposed inundation area (approximately 2.8 km upstream) and 400 m downstream of The Chute.

Surveys included aquatic habitat identification, Walleye spawning and fish community sampling.

Based on the results of the aquatic surveys, 7 fish species were documented within the study area in 2010 including the Longnose dace (*Rhinichthys cataractae*), Mottled sculpin (*Cottus bairdi*), White sucker (*Catostomus commersonii*), Northern pike (*Esox lucius*), Burbot (*Lota lota*), Logperch (*Percina caprodes*), Walleye (*Sander vitreus*).

In addition to the 7 fish species captured in 2010, a further 10 species are known to occur in the Ivanhoe River based on background review. Of these 10 additional fish species, 9 have the potential to occur within the study area despite their absence in fish sampling conducted in 2010. All of these additional fish species are relatively common and widely distributed in Ontario, they include; Lake whitefish (*Coregonus clupeaformis*), Cisco (*Coregonus clupeaformis*), Common shiner (*Luxilus cornutus*), Blacknose shiner (*Notropis heterolepis*), Spottail Shiner (*Notropis hudsonius*), Iowa darter (*Etheostoma exile*), Johnny darter (*Etheostoma nigrum*), Yellow perch (*Perca flavescens*), Trout-perch (*Percopsis omiscomaycus*).

The fish community is composed primarily of generalist species that are not highly dependent on specific habitat requirements for spawning or life history processes. With the exception of Northern pike, which require specific habitat characteristics for spawning, rearing and refuge, the fish community is typical of warm/cool water temperature regimes, the distribution of which is primarily dependant on flow regime/ water levels within the watershed and to a lesser extent water temperatures.

Lake sturgeon appears to be restricted to the lower reach of the Ivanhoe River near the confluence with the Groundhog River located approximately 50 km from The Chute. There are a number of potential impediments/barriers to fish passage which likely limit their potential occurrence both downstream of the proposed The Chute site and upstream in the proposed inundation area.

For a full description of the results of the 2010 aquatic ecological assessment, including complete lists of all documented species and assessment methods, please refer to the Natural Environmental Characterization and Impact Assessment Report which is appended to this document as Annex III.

### **2.9.3 Valued Ecosystem Components**

In the opinion of the EA team, Walleye, Northern pike, Brook trout, bald eagle and moose and their habitats are the primary valued ecosystem components (VEC) in the study area.

#### Walleye

Walleye are a predatory fish species with broad distribution covering much of the eastern United States and central Canada. Found in both lakes and rivers, they are tolerant of a broad range of environmental conditions. Walleye is a widely sought-after recreational and subsistence fishery, and is often considered the finest freshwater foodfish. It may also be the most economically valuable fish species in Canadian inland waters.

During the 2010 summer field studies, Walleye were captured at one station upstream of The Chute indicating that resident populations occur upstream and most likely downstream. The surveyed sections of the river contained six areas of boulder/cobble/gravel that represent potential spawning habitat. Walleye spawning was confirmed by the presence of eggs on deployed mats.

#### Northern Pike

During field investigations conducted during the Walleye spawning surveys, a total of ten Northern pike were successfully angled both downstream of The Chute and downstream of the Oates Bridge rapids, suggesting that they are present in various sections of the Ivanhoe River.

Potentially significant spawning areas for Northern pike have been noted as existing approximately 3.5 km and 5.5 km downstream of the site (Annex III). The 2010 field investigations also identified 3 smaller potential Northern pike spawning locations. One location was noted approximately 120 m downstream (of The Chute) and the other locations were immediately upstream and downstream of the Oates Road Bridge approximately 1.8 km upstream of The Chute.

#### Brook Trout

Brook trout were also identified by the MNR as a valued species which may be present within the project area. While not observed during 2010, Brook trout are highly mobile and could be found both in the main stem of the Ivanhoe River or its tributaries depending on the time of year and available habitats. The Shawmere River joins the Ivanhoe River approximately 650 m upstream of the updated inundation area, approximately 7 km upstream of the proposed dam, and is considered by locals and MNR as a significant coldwater system with a healthy population of Brook trout.

#### Bald Eagle

Members of the EA team observed a bald eagle flying in suitable habitat on July 7, 2010, indicating possible breeding. Bald eagles nest in mature to old growth forest in close proximity (<2 km) to water bodies that provide suitable foraging opportunities (Cornell Lab of Ornithology 2010). Nests are typically greater than 500 m from human activity and are re-used from year to year indefinitely. The presence of the Ivanhoe River for foraging in combination with the cedar-conifer forest community around it provides habitat suitable for supporting bald eagle. *The Endangered Species Act* considers the bald eagle as a species of conservation concern.

#### Moose

Biologists observed moose within the study area during spring and summer 2010. The Moose Aquatic Feeding area is represented within the study area by the Open Water Marsh. It is anticipated that moose are currently making use of these areas.

The information contained in this section was reproduced from the Natural Environment Characterization and Impact Assessment Report presented in full in Annex III.

#### Large Weasel Denning

The project area features relatively undisturbed shoreline habitats of coniferous or mixed woods forests coupled with a productive fish community. These habitat features make the project area a potentially significant habitat for mink and otters (Large Weasel Denning). Further, the large

contiguous forest in the area makes the area potentially significant habitat for martens and fishers. Additional work is required to determine the significance of the study area for Large Weasel Denning and as a result it remains as a candidate significant habitat for the project.

## **2.10 CULTURAL HERITAGE**

A Stage 1 Archaeological Impact Assessment was completed for the proposed project by Woodland Heritage Services (WHS) to gain an understanding of the cultural heritage of the area. The report is appended in Annex V. A summary of key findings is presented below.

The Ivanhoe River would likely have been part of a pre-contact/early contact travel corridor between the height of land and the James Bay coast. It is quite likely that the site was used for traditional activities including fishing, hunting, trapping and gathering.

The location of the proposed dam at The Chute, as with most sites with waterpower potential, was determined to have high archaeological potential due to its proximity to a major water source and the existence of rapids. It is reasonable to assume that a portage trail exists at this location on one or both sides of the river. The two pools located above the proposed dam site also present likely subsistence fishing locations, and as such contribute to the determination of potential. An island also exists upstream from the proposed dam that has been identified as a high potential area.

### **2.10.1 Archaeological Sites**

The registered site database maintained by the Ontario Ministry of Culture (MTC) indicated that there are no registered archaeological sites in or near the project area. However, in MTC's checklist for determining archaeological potential, areas in northern Ontario within 150 m of a major water source are considered to have high cultural heritage potential.

There are no previous archaeological studies on record for the project area. It is important to note, however, that the lack of archaeological studies does not indicate or suggest that there is no archaeological or cultural heritage potential within the project area. Rather, it should be interpreted to mean simply that no archaeologist has conducted a study in this area.

It was recommended by WHS that a Stage 2 archaeological assessment take place at the location of the proposed Chute hydropower development on the Ivanhoe River. It was also recommended that Stage 2 field surveys be completed on the island and in other areas of high potential. Additionally, WHS recommended that the area atop the river valley edge be examined for the existence of a portage trail.



It is also recommended that once the final location of new transmission corridors and any areas that will be disturbed as a result of construction be subject to Stage 2 assessments if they are determined to have high archaeological potential.

### **2.10.2 Buildings and Structures**

Based on the results of the Stage 1 Archaeological Assessment, the potential for the presence of built heritage structures within the project area is expected to be negligible. This expectation will be confirmed through the Stage 2 Archaeological Assessment.

## **2.11 CURRENT LAND AND WATER USE**

### **2.11.1 Access**

There is a boat launch at the end of The Chute access road downstream of the project site that has been used for many years to support the recreational activities such as boating and angling, and to gain access to backcountry areas.

### **2.11.2 Navigation**

The Ivanhoe River is considered a navigable waterway as defined under the *Navigable Waters Protection Act*. The Act prohibits construction in navigable waters unless an Approval is issued for the undertaking for the site, work and plans. The Ivanhoe River has likely been used as a travel corridor between the height of land and the James Bay coast since pre-contact/early contact times and sections are currently navigated by local people and tourists.

### **2.11.3 Recreation Use and Commercial Tourism**

The Ministry of Natural Resources has identified the Ivanhoe River as a recognized canoe route (identified in Appendix A-2). Depending on the flow conditions, The Chute site is travelled by watercraft or is by-passed using existing portage routes.

A hiking trail runs along the eastern shoreline of the Ivanhoe River from the boat launch upstream beyond The Chute. The area adjacent (east) to the falls is used extensively for recreational camping, primarily by residents of Foleyet and Timmins. This area is very popular for camping and the cleared sites are often occupied for extensive periods throughout the spring, summer, and fall. The camp sites have been used for this purpose for many years. The falls are valued aesthetically by local residents.

#### **2.11.4 Forestry**

A 200 m forest reserve has been traditionally maintained as an Area of Concern (AOC) under the Forest Management Planning process along the length of river. The forest resources on Crown land adjacent to the falls are currently allocated under a Sustainable Forest License to Domtar Inc-EACOM (Pineland Forest Management Unit).

#### **2.11.5 Hunting/Fishing Opportunities**

Common Species hunted in this region include black bear, moose, duck and grouse.

The river stretch below The Chute is used extensively for angling. Walleye and Pike are the primary species sought after by anglers, which supports a number of remote tourism outfitters operating in the area. The Chute is a very popular spot for angling, particularly in the spring and fall season in the vicinity of the falls.

#### **2.11.6 Trapping and Baitfish Harvesting**

Commercial trapping, bear management areas and baitfish harvesting are all identified activities within the project area. It does not appear that any trap / baitfish cabins are present within the expected zone of influence (MNR, 2010a).

The site is located on the border of trap lines CP 11 and 12 with the site being situated within CP 12; Appendix A-2 identifies the individual trap lines.

The site is located within Bear Management Area CP-30-25, Appendix A-2 provides the location.

Two Baitfish Harvesting Areas are located in Oates Township (Appendix A-2).

#### **2.11.7 Protected Areas**

There are no protected areas in the immediate vicinity of the proposed project however the Northern Clay Belt Conservation Reserve (C1702) and Groundhog River Provincial Park (P1569) are located downstream of the proposed site. The Groundhog River PP is also referred to as the Groundhog River Waterway Provincial Park. According to the MNR's Crown Land Use Atlas the park has an area of 12,318 ha, and features approximately 22 different landform vegetation combinations. The park provides one of the last remaining sturgeon spawning grounds in the watershed. It connects smaller protected areas with the 70,000 ha Northern Clay belt Forest Conservation Reserve (Wildlands League website, May 2011).

### **2.11.8 Mineral Resources**

Two Category 9 aggregate permits (13 Ha and 16 Ha) are currently issued to Domtar Inc.-EACOM in Oates Township; refer to of Appendix A-2 for the location of the pits.

There are no claims or leases at The Chute or within 1 km of the site (Debicki, 2010).

### **2.11.9 Aboriginal Land and Water Use**

#### **Reserves, Communities and Land Claims**

The MNR Site Information Package identified the following Aboriginal communities for consultation with respect to possible Business to Business Relationships, the Wabun Tribal Council, the Chapleau Cree First Nation (Fox Lake Reserve), the Brunswick House First Nation, the Chapleau Ojibwe First Nation, the Mattagami First Nation, the Moose Cree First Nation, Missanabie Cree First Nation and the Michipicoten First Nation. Local Aboriginal communities that may have an interest or concern with the proposed project as identified in the SIP included the Flying Post First Nation, the Taykwa Tagamou First Nation, and the Métis Nation of Ontario.

Chapleau Cree First Nation and Chapleau Ojibwe First Nation are currently in treaty land negotiations.

There are no Reserves in the immediate vicinity of The Chute. The closest Reserve is Flying Post Reserve located approximately 20 km to the northeast. According to data obtained from Indian and Northern Affairs Canada's website, the reserve covers an area of 5957.1 hectares. In April 2011, the total population of the Flying Post Reserve was 174.

#### **Spiritual, Ceremonial, Cultural and Burial Grounds**

All waterways are viewed in traditional Aboriginal culture as the 'veins or lifeblood of Mother Earth'. Water quality and water ecosystem health and function are typically mentioned as concerns by Aboriginal people in relation to natural resource management and development projects.

Eastern white cedar grows commonly in the river floodplain, upstream of The Chute. Cedar is a species of special cultural significance to Aboriginal people and is often used in ceremony. The Chapleau Cree First Nation has identified that cedar is a sacred/medicinal plant and discourages harvesting of the species. There is potential for the presence of culturally modified cedar trees, given the amount of cedar in the river floodplain and given that this cultural activity has been confirmed by MNR Chapleau District Office.

To date no consultation with individual Aboriginal community members to gather information specific to lands and water use has been undertaken. Information on the engagement of members of the Aboriginal communities during the project development is provided in Section 4.5.

## **2.12 SOCIAL AND ECONOMIC**

The Statistics Canada 2006 Population Census lists the population of the town of Foleyet to be 216 persons. The Stats Can census tabulated a population change in the town of Foleyet between 2001 and 2006 of -19.4 % (compared with the Ontario average of + 6.6%). The population of the town began declining well before 2001 and has declined considerably over the last 20 years.

The Statistics Canada 2006 Population Census determined the population for the community of Timmins to be 42,997 persons, with no significant population change between 2001 and 2006.

### **2.12.1 Employment & Economic Setting**

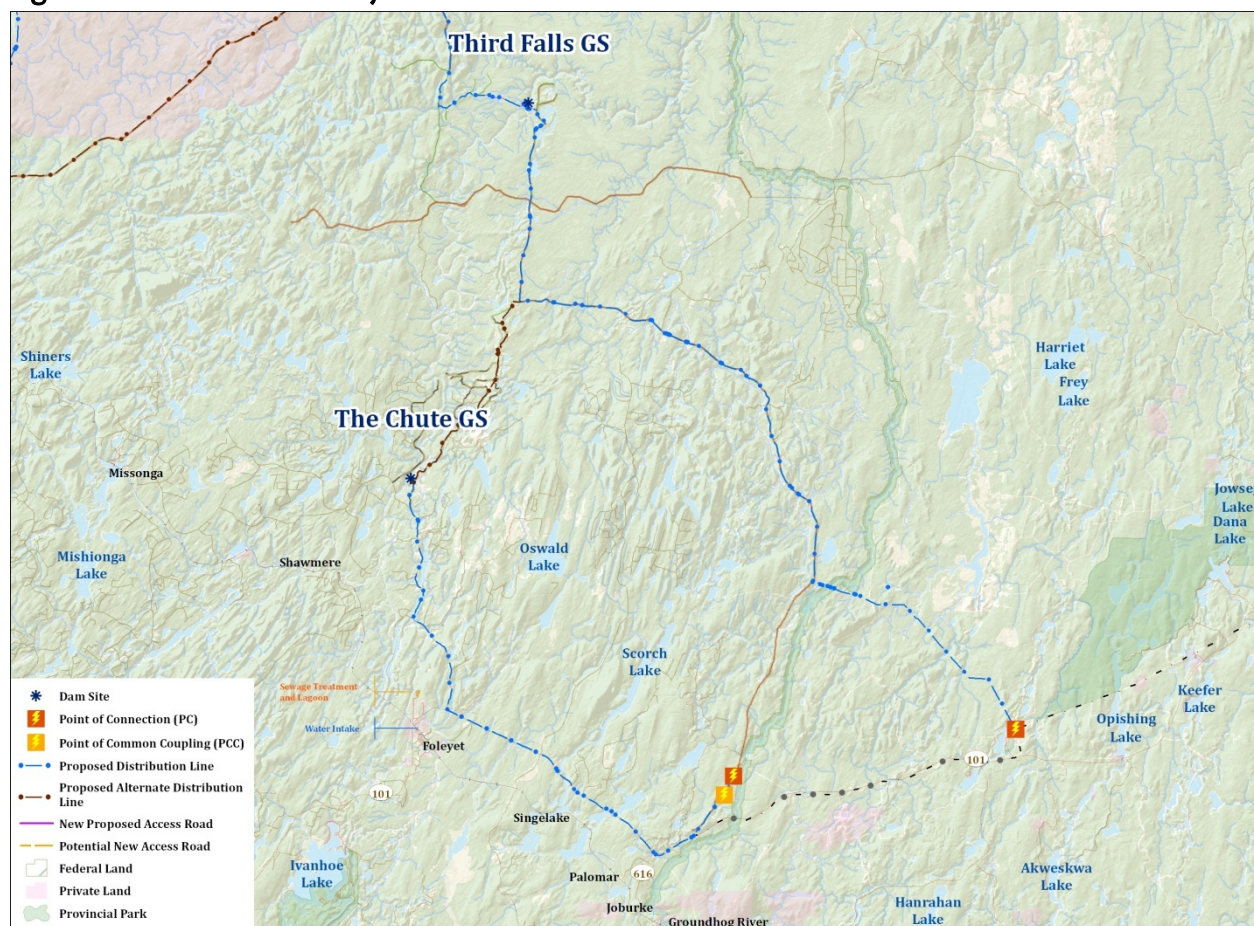
The Foleyet area is in a state of economic decline due to the decline of the pulp and paper industry within the region. As a result the employment rate is very low. There is an established economy base of outdoor recreational, hunting and angling activity in the area and there are a few outfitter businesses that capitalize on the remoteness of the wilderness in the area. In addition, the Canadian National Railway runs a significant rail yard in Foleyet and there is a large construction camp in close proximity. The Town of Foleyet for the most part relies on the income from the summer cottage community to sustain local businesses.

### **2.12.2 Water Supply**

As noted in Section 2.7, a search of the Ministry of the Environment's electronic Water Wells database did not return any well records within a 1-km radius of the project site. An October 2010 land title search in the vicinity of the project area noted that the nearest privately owned lands were the CNR Railway and those in the Town of Foleyet south of the project location. Therefore, permanent or seasonal domestic water supplies that might draw from the Ivanhoe River as a source are non-existent.

The water supply intake for the Town of Foleyet is located approximately 20 km upstream of the proposed project and is operated by the Ontario Clean Water Agency (OCWA). The location of the drinking water treatment plant intake is identified on Figure 3.



**Figure 3: Location of Foleyet Water Intake and Wastewater Outlet**

The river, both upstream and downstream of the project site is used predominantly for recreation (fishing, swimming, boating, etc). It is possible that recreational users are taking river water for personal consumption.

Consultation efforts with the Local Services Board of Foleyet and OCWA are summarized in Section 4.3.3.

### 2.12.3 Area Aesthetics

The area has been used for many years by residents of the region for various recreation activities and nature appreciation. The falls have an aesthetic value with local residents and the area is used for day trips, picnicking, and viewing the water fall.

### 3. DESCRIPTION OF PROPOSED PROJECT

This section provides a description of each element of the proposed development. The reader is referred to Annex II-A for diagrams showing relevant features of the development.

The intent and purpose of the Environmental Assessment planning process is to describe the project and its potential impacts on the natural, social and economic environment, to determine suitable mitigation measures (i.e. project design modifications) which can reduce or eliminate negative impacts, and to identify suitable compensation measures for impacts that cannot be mitigated. The process is meant to inform and enhance the project plan through investigation and consultation with stakeholders, First Nations and the general public. At the time the Environmental Assessment is undertaken, preliminary project information is presented to ensure that stakeholders are informed about the general scope and extent of the project, particularly as it relates to understanding how the project may impact other uses of the river and the environment. At this stage conceptual plans for the project have been developed. Detailed engineering design and specification work will occur after the Environmental Assessment is completed.

The proponent necessarily reserves the right to variances between the conceptual design presented herein and the final detailed engineering design, provided that such variances do not materially and negatively impact the environment beyond the scope of the impacts described herein.

Possible variances from conceptual to final design include:

1. Detailed design may incorporate changes that are specifically meant to address and/or accommodate stakeholder issues agreed to during the consultation process.
2. Construction materials may vary from those shown on conceptual drawings. Earth material may be interchanged with concrete or steel material as required in the final engineering design. Where alternative material is specified, volumes and footprints may be adjusted to reflect safe engineering design requirements.
3. Physical sizes and orientation of structures.
4. Physical size of construction site areas may be adjusted where it is required for safe site management.
5. Specifications of mechanical and electrical equipment may vary, including the physical size, number of units, and total rating.
6. Design specifications for protection of fish, such as inflow velocities and inlet spacing of trash racks.

7. The powerhouse angle and alignment may be adjusted. The location of spillway and powerhouse structures may be adjusted along the dam axis to optimize engineering design and safety.
8. Road and connection line routes may be refined.

### **3.1 DESCRIPTION OF PROPOSED HYDROELECTRIC FACILITY**

Xeneca is proposing to construct a hydroelectric facility at The Chute site, located on the Ivanhoe River, approximately 85 km west of Timmins and 15 km north of Highway 101 (Figure 1). The Chute site can be accessed from Highway 101 via the Oates Road to the Laundry Road. A gravel road which stems off the Laundry Road is used to access the site.

The proposed project at The Chute would utilize a gross head of 9.5 m. The conceptual development for the facility incorporates a spillway dam as well as an earthen embankment. Flows from the river will be directed to an intake structure which will conduct water through one or more turbines with a total nameplate rating of 3.6 MW.

A road upgrade as well as new road construction will be required to access the site.

A connection line will be required to connect the station to the provincial electrical power supply grid. Connection line and access road mapping is detailed in Annex VI.

### **3.2 DESIGN OPTIONS AND RATIONALE**

#### Powerhouse Location

Two different design options are currently being contemplated for the location of the powerhouse. The original design (Option 1) has the powerhouse located in the narrower east river channel and the overflow spillway across the west channel. This arrangement allows for a shorter permanent access road and simpler connection line routing. Through the initial environmental field work, a significant wetland was identified in the west channel downstream of the proposed spillway location.

An alternate option (Option 2) is also being considered which has the powerhouse in the west channel and the spillway in the east channel such that there will always be flow to the spawning bed from the powerhouse without having to pass a minimum environmental flow through the spillway. Both options cover the same general footprint and require the same construction sequencing and temporary structures. The discussion below is intended to be read from the perspective of either option.



### Connection line Route Selection

Two connection route options are proposed for The Chute site based on the location of the point of connection and the capacity of the connection point. The description of these options and a discussion of the rationale for their selection are provided below in Section 3.4.1.

## **3.3 GENERATING STATION COMPONENTS**

The following is a description of the generating station components. The reader is referred to Annex II-A for conceptual engineering drawings in support of the information detailed below. It should be noted that final engineering drawings for the components of the proposed undertaking must be submitted for applicable regulatory approvals prior to issuing of provincial permits to construct and federal authorizations. The details presented below are based on conceptual engineering design calculations and subject to some modification at the final design stage.

### **3.3.1 Installed Capacity and Annual Energy Output**

The approximate installed capacity of this project will be 3.6 MW, generated by one turbine unit. This will provide approximately 13,300 MWh of renewable energy annually. The production of 13,300 MWh of renewable energy represents the equivalent of:

- The displacement of 9.22 tons of carbon dioxide equivalent; or
- The annual greenhouse gas emissions from 1,798 passenger vehicles; or
- The sequestering of carbon from nearly 791.2 hectares of pine or fir forests.

### **3.3.2 Headworks Structure**

The proposed headworks structures include an 85 m spillway dam. A 110 m long earthen embankment dam may be required at the downstream limit of an unnamed tributary approximately 1 km upstream of The Chute facility.

The construction of the spillway dam would require the installation of a cofferdam upstream of the structure and, depending on hydrological conditions, may require the construction of a downstream cofferdam to control backwater effects below the proposed dam. The cofferdam upstream of the spillway dam would temporarily exclude approximately 670 m<sup>2</sup> of river bed while the downstream cofferdam would temporarily exclude 1370 m<sup>2</sup>. The dam itself would have a footprint of approximately 860 m<sup>2</sup>.

If required, the embankment dam would be constructed to limit backwater effects into the tributary. The dam would have an approximate footprint of 1222 m<sup>2</sup> based on conceptual engineering design.

The dam and embankment may be constructed from any or all of the following materials within the engineering constraints for the same; reinforced 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 (i.e.: 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 water conveyance routing.

### **3.3.3 Intake and Conveyance System**

A 475 m<sup>2</sup> area upstream of the powerhouse will be excavated for the facility intake. The excavation will start approximately 30 m upstream of the powerhouse and slope down to reach an approximate elevation of 280 masl at the powerhouse intake. In addition, based on the conceptual construction plans available to date (See Annex II-A), the cofferdam required for the construction of the facility intake would temporarily exclude and dewater 912 m<sup>2</sup> of river bed.

No water conveyance system is required for the proposed project; flows would be directed to the GS facility intake by the water control structure directly.

### **3.3.4 Powerhouse**

As mentioned previously, there are two options being considered for the location of the powerhouse however both options cover the same general footprint and require the same construction sequencing and temporary structures.

The proposed powerhouse will have a footprint of approximately 644 m<sup>2</sup> including the water intake, and draft tube. The powerhouse will be constructed with reinforced concrete floors and walls to a level above the historical flood level. Construction above this defined line can be reinforced concrete, insulated steel panels or a combination of the two based on physical needs and constraints. The water passage within the powerhouse will be constructed from a combination of concrete and steel conduits.

### **3.3.5 Turbines**

Turbine selection is based on the project site head, flow and economics. In instances of low head and intermediate to large flows, Kaplan, Propeller or Cross Flow (Banki-Ossberger) type turbines are deemed most efficient. For very low heads, a horizontal Kaplan is the preferred option as it requires less excavation than the vertical turbine and can maximize turbine efficiency over a wide range of flows. Regarding additional economics of the turbine selection, cost varies directly with

the maximum operating flow, but because a large component of cost is fixed for a development regardless of the flow, an optimum size results through balancing the cost versus the revenue generated from turbines of various sizes (diameters).

Based on the rationale described above, a horizontal or vertical Kaplan turbine will be selected for The Chute site due to low head (9.5 m); intermediate flows (Long Term Annual Flow 29.7 m<sup>3</sup>/s) and economic concerns.

### **3.3.6 Tailrace**

The facility's tailrace will have an overall area of 571 m<sup>2</sup> and extend approximately 30 m downstream of the powerhouse. The excavation will be to an elevation of 281 masl at the powerhouse outlet and taper up towards the end of the canal.

## **3.4 ANCILLARY WORKS**

The following describes the ancillary works proposed for the project.

### **3.4.1 Connection line Route**

A Connection line Summary Report for The Chute has been prepared and is included in this document in Annex VI. A summary of the report is provided below.

The preliminary connection line route was prepared based on the location of the facility. The point of common coupling (PCC) and the point of connection (PC) are identified in the conditionally approved FIT application. The proposed line location was then overlain with assembled values layers and a summary of the potentially impacted values was compiled and summarized. Data layers used for this exercise included:

- Land Information Ontario dataset
- NRCan Topographic data
- 2008 Forest Resource Inventory data
- Medium resolution SPOT panchromatic orthoimagery from Natural Resources Canada
- NRVIS Data Layers (circa Feb 2011)

Where appropriate, additional line routes were proposed. These were presented and explained in the report as alternatives with a primary goal of following existing roads and reducing impact to sensitive areas and identified values. Consultation with the Sustainable Forest Licenses holders linked to the project was also undertaken and most of the license holders provided GIS datasets including all road networks, planned harvest block locations and aggregate pit locations.

The line route was reviewed using all available information and revised where appropriate in an effort to:

- reduce environmental impact (i.e. streams & wetland crossings);
- minimize landscape footprint and fragmentation;
- coincide with existing road corridors; and
- reduce total line length.

Two connection route options are proposed for The Chute site based on the location of the point of connection.

In the first option, Xeneca is proposing a single 27.6 kV connection line traveling south from the powerhouse along an existing well used forestry road connecting to Hwy 101 traveling SE then NE to the point of connection at Weston Lake DS Feeder F1. The total line length is 39.79 km, of which 98.5% will be along pre-existing roads. This line would require 18 water crossings at pre-existing road corridor water crossings and would skirt five wetlands. The majority of the line route is located on Crown land with only 148 m crossing patent land.

In the second option, the connection line would run north east from The Chute to Nova Road. The line would then run adjacent to Nova Road before turning east and crossing both Crown land the Groundhog River Provincial Park (approximately 0.5 km) to its Point of Connection at Weston Lake DS T61S Tower 217. A total of 24 water crossings occur along the proposed line route with half of those along new corridor sections. Three wetlands would be crossed and one would be skirted. This option would only be considered should Xeneca's Third Falls hydroelectric project on the Ivanhoe River be approved.

Flyover photography is complete for the route and wetland assessment ranking is underway. Further ground truthing of the proposed lines and access routes is planned following the processing of all of the digital aerial photography captured in early June, 2011.

### **3.4.2 Electrical Substation**

A transformer substation will be required and located adjacent to the powerhouse at the site. The dimensions of the substation have been included in the estimation of the powerhouse footprint. The transformer area will be surrounded by security fencing.

### **3.4.3 Access Roads**

Access road planning to the project site was determined in close consultation with the forest management companies which hold Sustainable Forest Licenses (SFL) for the project area. The goal is to merge Xeneca's road access needs with the SFL holder's current and future operational

access plans and develop with the forest management companies a long term cost sharing and road maintenance plan. Further consultation with government agencies will be required to ensure that regional and provincial access policies and guidelines are met.

While approximately 20 km of existing road will be used to access the area from Hwy 101, a road upgrade as well as new road construction will be required to access the site. The proposed site access will require upgrades to approximately 1.8 km of existing gravel road and the construction of a 500 m new gravel road on the east side of the Ivanhoe River and a 100 m spur constructed on the west side of the river to access the project site. Road upgrades will be required to improve stability and drainage for construction traffic.

New road construction will require the clearing of a 10 – 30 m right of way (ROW). Access road details are provided in Annex VI. Access roads to the non-powerhouse side of the river will be temporary and will be abandoned following construction.

### **3.4.4 Other Civil Works**

There is an existing forest access road bridge across the Ivanhoe River, approximately 2 km upstream of the proposed development site. The bridge is owned by the EACOM Timber Corporation. The proponent will be required to enter into a roads sharing agreement with EACOM.

## **3.5 CONSTRUCTION STRATEGY**

The following is a summary of the construction activities and temporary works required during the construction of the project. A construction management plan, including conceptual drawings, has been prepared and is presented in Annex II-B. It should be noted that final engineering details for these temporary works will be submitted for applicable regulatory approval in advance of the construction stage of the undertaking. The details presented below are based on conceptual engineering design calculations and subject to some modification at the final design stage.

Site preparation activity will commence in May 2012. Construction of the proposed facility is scheduled to take place between 2012 and 2014 with commissioning of the facility anticipated by October 2014. Under the terms of the FIT contract awarded to Xeneca, the facility must be commissioned no later than October, 2014.

Tentative dates for the commencement and completion of various project components are presented in Table 1:

**Table 1: Project Component Construction Schedule**

Component	Dates	
	Start	Finish
Roads and Bridges	Start	May 2012
	Finish	Jun 2012
Powerhouse	Start	Jun 2012
	Finish	Jan 2013
Control Structures	Start	Jun 2012
	Finish	Nov 2012
Intake and Penstock	Start	Jul 2012
	Finish	Oct 2012
Connection Line and Associated Components	1 <sup>st</sup> Phase	Jan 2013 to Mar 2013
	2 <sup>nd</sup> Phase (if required)	Jan 2014 to Mar 2014
Civil/Mechanical Equipment	Installed	Oct 2012
Water-to-Wire Equipment	Installed	Apr 2013

The following construction stages are proposed for the construction of the generating station and its appurtenant facilities:

- clearing and grubbing of the site, including work area and laydown areas;
- road upgrades and construction of new road access;
- construction of phase 1 cofferdam;
- excavation of powerhouse, intake and tailrace;
- construction of concrete powerhouse and intake structure;
- substation construction;
- construction of auxiliary dam;
- removal of phase 1 cofferdam and installation of phase 2 cofferdam;
- construction of spillway structure and overflow control gate (if required);
- removal of phase 2 cofferdams and installation of phase 3 cofferdam;
- completion of intake structure;
- equipment installation and other electrical works required to meet project completion schedule;
- removal of phase 3 cofferdam;
- site rehabilitation.

Construction will be initiated once all applicable regulatory approvals and authorizations have been issued. The construction program will be advanced to meet the requirements of relevant legislation, industry guidelines and best management practices aimed at ensuring the highest level

of protection of the environment. Specific proposed mitigation measures that will be integrated into the site's construction strategies are presented in Section 5 and explained in further detail throughout the supporting Annexes of this report. In-water construction related timing restrictions will be stipulated by the regulatory agencies during the permitting and approvals stage. Some general construction strategies are presented below.

### **3.5.1 Clearing and Grubbing**

Trees cut within the inundation area and along the ROW for the connection line and access roads right-of-way will have their roots left intact wherever possible.

Merchantable timber will be segregated for removal by the sustainable forest license holder within the area to be inundated, along new access road corridors and along the connection line route. Clearing will be managed in accordance with applicable forestry management guidelines and best management practices. All clearing of timber will conform to the *Crown Forest Sustainability Act*, The Forest Operations and the Silviculture Manual.

### **3.5.2 Aggregate Borrow and Laydown Areas**

Aggregate for the construction of roads, embankments, yards, cofferdams and concrete structure backfill will be primarily sourced from re-used granular material created during road construction and site excavation. Additionally, several borrow material areas have been identified within 5 km of the project site should excavation and construction activities not produce the volume of materials required. The total volume of borrow materials required is not known at this time as it will depend on the final project design. Granular materials may require on-site processing to improve the engineering characteristics.

A 1000 m<sup>2</sup> laydown area will be cleared to service the primary worksites of the intake/powerhouse and the spillway on either side of the river. The construction office will be located in one of these laydown areas. An additional 250 m<sup>2</sup> area for vehicle parking will be located on the powerhouse side of the river. A 5000 m<sup>2</sup> stockpile area will be created on the west side of the river near the proposed auxiliary dam and will provide a central location for permanent storage of unsuitable overburden materials that are not used in the reclamation phase. This stockpile area will also serve as a temporary stockpile site for materials excavated from the worksites that can be re-used for the auxiliary dam construction.

### **3.5.3 Cofferdams**

Cofferdams will be required to allow for the construction of all components which are below existing or final water levels. Drawings No. 13-152 and No. 13-153, in Annex II-B identifies the proposed cofferdam locations.



Cofferdams will be constructed of cargo bags filled with clean, granular material re-used from excavation activities and/or transported to site in trucks or trailers (see Annex II-B, Drawing 00-151). They are installed using an excavator and/or a crane to place the bags sequentially in the river. Cofferdams will be between 40 to 80 metres long with footprints that will depend on the height of elevation of the dam required to manage the 1:20 year flow rate and the depth to suitable substrate within the river.

#### **3.5.4 Dewatering**

Water that accumulates behind the cofferdams will be discharged in accordance with the *Environmental Protection Act*. Category 2 Permits to Take Water (PTTW) and Certificates of Approvals for Discharge of Sewage Waste Water to the environment will be required from the Ministry of the Environment prior to the initiation of in-water construction activities.

#### **3.5.5 Excavation of Powerhouse and Tailrace Canal**

Excavation for the powerhouse and tailrace will be completed using appropriate methods. Tailrace excavation at the intersection with the river will be completed within the in-stream work window. The excavation will be carried out from the powerhouse working towards the water course so that flowing water does not infiltrate the cut until the final phase of excavation.

#### **3.5.6 Concrete Production**

A concrete batch plant will be required for the production of concrete for the construction of the facility. An aggregate deposit owned by Custom Concrete has been identified in Foleyet. This location would be ideal for the location of the aggregate batch plant as it has been previously disturbed and could serve as a source of aggregate. Final selection and approvals for a concrete batch plant location and certification will be determined through project permitting and will also depend on how construction contracts are managed.

#### **3.5.7 Connection line**

Regardless of which route is selected, the connection line will consist of an indeterminate number of wood poles extending approximately 10 m above the ground surface. The construction of a 20 m (approximate) wide ROW is required for the connection line.

#### **3.5.8 Management of Waste Materials during Construction**

Solid nonhazardous construction waste (e.g. material packaging) generated during the construction process will be removed from the site to an approved disposal location. The MOE advised that the local licensed waste disposal site did not have sufficient capacity to accept the

project's construction waste. Therefore, the proponent is required to find an alternative disposal site and/or recycling/composting facility (e.g. licenced waste management facility). The receiving facility may be required to amend its' licence accordingly.

No gaseous wastes other than construction equipment emissions are anticipated. Industrial liquids such as paints, sealants, fuels and lubricating fluids will be stored in secure containment areas and disposed of in accordance with provincial and federal liquid waste disposal regulations (e.g. *Environmental Protection Act*, *O. Reg. 347*, and *Transportation of Dangerous Goods Act*).

### 3.5.9 Water Crossings

Access to the project area will be by existing roads and access the Ivanhoe River and construction sites will require approximately 600 m of new road construction. At this time it is not anticipated that any water crossings will be required along these new roads. Upgrades to access roads, including upgrades for drainage (culverts, ditches, etc) may be required to allow for the increased volume of construction related traffic.

As noted in Section 3.3.1. there are two options for the routing of the connection line

Option 1 will be constructed almost entirely adjacent to an existing access road and will traverse 18 existing water crossings along its length, no new water crossings will be required. Road upgrades, including upgrades for drainage (culverts, ditches, etc) may be required.

Option 2 would require the construction of 13 new water crossings along its length and the route would cross one wetland. The route would also cross water at 12 existing crossings.

Documentation of the proposed access and connection routes by air photo analysis will be completed in summer 2011; a final determination will be made regarding water crossing requirements based on that analysis.

The DFO Overhead Line Construction Operational Statement (v. 3.0, 2007) will be adhered to in order to minimise impacts to fish and fish habitat associated with construction or upgrades to all water crossings.

## 3.6 OPERATION STRATEGY

This section summarizes how the facility will be operated and how the operation will be modified to address potential effects on the river including seasonal considerations, proposed operating rules and target limits. The full draft operating plan for The Chute is presented in Annex I-B.

The operations strategy is based on the conceptual engineering design and environmental data available at the time of writing and was developed subsequent to data analysis collected through various studies, including:

- Lidar Survey: detailed topographic mapping of the upstream and downstream river reach;
- Conceptual Design: drawings of the structures as conceptually proposed for the project;
- Hydrology Study: an analysis of the natural river flows;
- Bathymetric Study: a field study of water depths upstream and downstream of the project location and a spot measurement of flows required for hydraulic model calibration;
- HEC-RAS Study: a hydraulic engineering model was carried out under separate cover (i.e. a 1-dimensional HEC-RAS model) to better understand the various hydraulic parameters relevant to assess operational and environmental matters;
- Erosion Survey: a desktop analysis of upstream locations that could be sensitive to future shoreline erosion after the project is built;
- Sediment Study: a review of available sediment transport data and an assessment of the potential for sedimentation concerns related to the project;
- Environmental field studies: studies of environmental areas and aspects of interest as documented in other parts of this environmental report.

As the engineering design is finalized and other environmental information becomes available this strategy may be adjusted to ensure that potential impacts are mitigated.

### 3.6.1 Site Operating Strategy

The electricity generated from this project has been contracted to the Ontario Power Authority under a FIT Contract. The terms and conditions of the FIT Contract encourage the facility to generate electricity between the hours of 11 am and 7 pm (on-peak hours) from Monday to Friday, when needed most in Ontario.

It is proposed that The Chute will operate as a “*modified run-of-river*” generating facility. Effectively, the operations of the facility would vary between run-of-river and intermittent operation depending on the flows present in the river. This mode of operation takes into account the objective of building and operating the project in an environmentally sensible manner, while trying to achieve the socio-economic objective of generating power when it is needed in the Province.

When natural flows exceed the amount of water that can be passed through the turbine excess water would be bypassed through/over the dam. The combined flow of the water used in the turbine to generate electricity and the water bypassed over the spillway will therefore be equal to the natural flow of the river. This situation occurs primarily during spring run-off conditions and during/after significant precipitation events in the spring, summer and fall.

At low flow periods of the year when natural flows are so low that any available water must be released downstream to protect the environment, flows will be too low to allow for electricity generation. All available water will be passed through/over the dam to maintain aquatic habitat downstream. This situation occurs primarily in late summer and late winter when natural flows are typically very low.

At other times, the facility would “modify” the natural flow in the river by storing some of the natural river flow during off-peak hours to be used during on-peak hours (i.e. intermittent operation) when the need for electricity in the Province is greater.

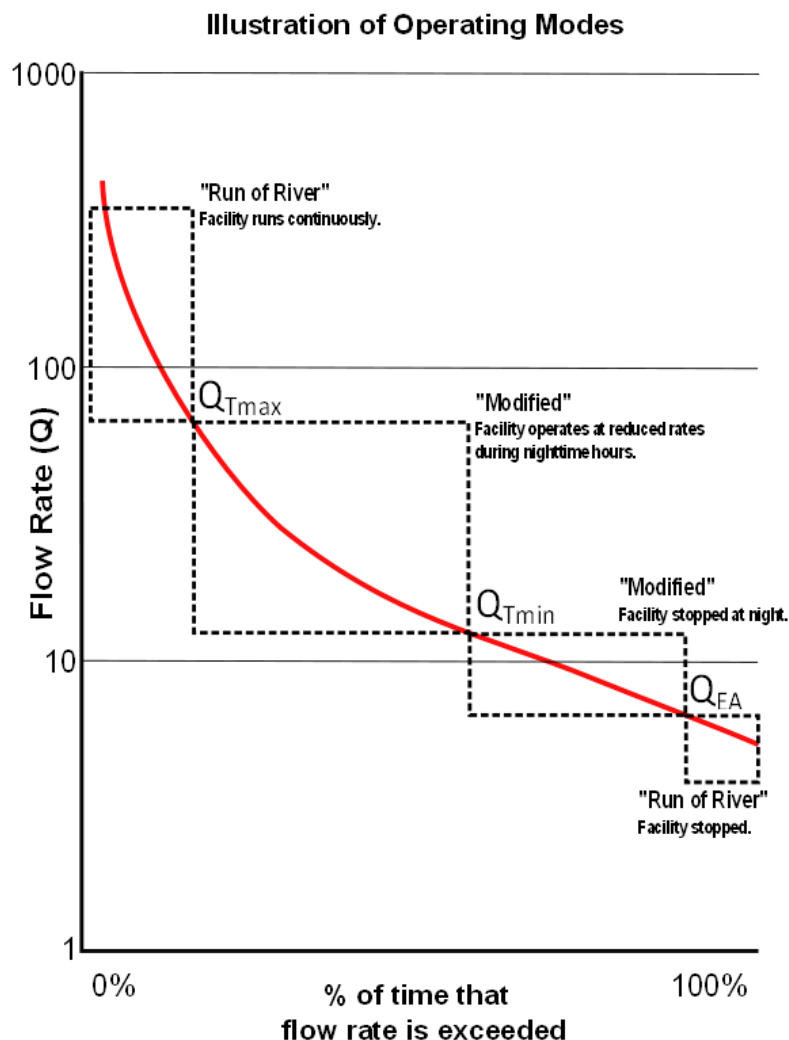
Modified run-of-river operation would occur during moderate and low flows when the natural flow in the river is significantly below the maximum capacity of the turbines but above the minimum flow required to protect the environment. During these flow conditions, some of the natural river flow during off-peak hours can be saved and used to produce electricity during on-peak hours.

When natural river flows are between the minimum and maximum turbine capacity, the facility runs continuously, but some of the water is saved during off-peak hours. This operation results in downstream flows that are smaller than natural river flows during off-peak hours and larger than natural river flows during on-peak hours when electricity use is higher. It is expected that the difference in flow rate would be up to four times greater during on-peak hours in this operating mode. Downstream flows during the off-peak hours can be reduced to less than half of natural river flows.

When natural river flows are below the minimum turbine capacity, the facility will need to stop operation during some off-peak hours to store water until operation is again possible. The lower the natural river flow, the longer the period of stoppage will be. When the facility operates, it operates at a rate less than maximum turbine capacity. To ensure that the river downstream of the facility receives enough water flow to protect the environment, an appropriate amount of water is released through a bypass while the turbine operation is stopped. Typically, the facility operation will be stopped at night to allow the head pond to fill in preparation for the following day.

Figure 4 below illustrates the mode of operation that occurs depending on the amount of natural flow in the river.

Figure 4: Modes of Operation



An important factor in modified run-of-river operation is the availability of water storage upstream of the facility. Based on the dynamic modeling (HEC-RAS) of the river channel completed to date, The Chute facility may result in inundation and backwater effects up to 6.4 km upstream of the dam.

To achieve the objective of building a project with limited environmental impact, the conceptual design of the facility limits the height of the dam structure, and therefore the depth and the area of inundation upstream. Consequently, the amount of storage available for operation is inherently limited in relation to the natural flow in the river, thereby limiting the storage to a few hours during moderate and low flows. The ability to use this storage is further controlled by environmental constraints outlined in other parts of the environmental assessment document. It

is the limited storage in head ponds that differentiates modified run-of-river projects from hydroelectric projects that create large storage reservoirs with the ability to store water for weeks or seasons to “peak” when seasonal periods of hot or cold weather raise the need for extra electricity production. Typically, modified run-of-river projects have significantly less environmental impact than peaking hydroelectric projects. The proposed Chute GS will be operated as a modified run-of-river facility.

### 3.6.2 Summary of Hydraulic Characteristics

Estimated water levels:

Normal operating headwater level	298 masl
Normal tailwater level downstream of powerhouse	288.5 masl
Normal operating gross head	9.5 m
1:100 year flood flow	370 m <sup>3</sup> /s
1:100 year low flow	0.8 m <sup>3</sup> /s
Long-term average flow	29.7 m <sup>3</sup> /s

### 3.6.3 Operating Parameters for Water Control Structures

In selecting the operation parameters for the facility, the environmental aspects outlined in the previous sections were considered so as to provide a reasonable balance among operational constraints, environmental aspects and mitigation of possible impacts.

It should be noted that changes in upstream levels and downstream flows related to operation occur only when the facility is in modified run-of-river operations mode. While the facility is in run-of-river mode and subject to the amount of natural flow in the river, the upstream levels will be maintained at a constant level and downstream flows will equal the natural flow in the river.

The definition of operating parameters affecting the channel upstream and downstream of the facility has not been completed. These parameters will be developed following the completion of the environmental assessment, based on discussions with key regulators and stakeholders. Xeneca is committed to the construction and operation of the project in an environmentally sensible manner while realizing the socio-economic objective of generating power when it is needed in the Province.

### Operation Parameters

The operating parameters that can be used to manage upstream water levels are:

- **Maximum Daily Fluctuation of Upstream Water Levels:** Under normal operation and during normal river flows, upstream water levels can be controlled as required by the rate of water use and hence electricity production. In modified run-of-river facilities, a portion of the normal river flow is typically stored during off-peak hours causing water levels to rise upstream until the rate of production is increased again during on-peak hours when electricity demand is higher. The range of daily water fluctuation in the inundated area upstream of the facility will be determined to mitigate upstream impacts.
- **Rate of upstream water level change:** To a limited degree, the rate of change of upstream water levels within the daily fluctuation range can be managed by the rate of electricity production while the facility is operating. The possible production rates range from the minimum to maximum turbine flow capacity. The rate of water level and flow increase/decrease within the maximum daily range of fluctuation will be acceptable to protect shorelines and habitat.
- **Minimum Upstream Operating Water Level:** The minimum upstream operating water level is the water level below which no power is generated during normal operations. It should be noted that the need to provide environmental flows may result in drops of upstream water levels below the minimum water level even if no power is generated. This situation can occur during prolonged periods of drought and cannot be controlled by plant operation.
- **Maximum Upstream Operating Water Level:** The maximum upstream operating water level is the water level beyond which water is bypassed through the spillway during normal operations to avoid further water level rise upstream. During flood conditions (i.e. the spring freshet), water levels may rise above this level due to natural factors. Various engineering documents or drawings may refer to this level as the “Normal Operating Level (NOL)” or the “Full Supply Level (FSL)”.

The operating parameters that can be used to manage downstream flows/levels are:

- **Upper Turbine Limit ( $Q_{TL}$ ):** The maximum amount of flow generated by the facility operation while intermittent turbine operation is occurring. The turbine(s) can be operated in a range of flows and outputs ranging from minimum turbine capacity to the maximum turbine capacity. When it is desirable to minimize the difference between on-peak and off-peak flows, the upper limit of turbine operation can be set as an operating parameter. Setting the upper limit has to take into account that the turbines do not operate very efficiently below roughly 65% of their maximum capacity.



- **Turbine Ramp Time:** This parameter defines how quickly a turbine can shift from being stopped (i.e. not operating) to the desired operating flow. Turbine start up involves going from being stopped to the minimum turbine capacity in a very short period of time. Once the turbine is operating, the turbine capacity can then be increased gradually to the desired operating flow. By increasing the flow gradually, downstream impacts can be reduced.
- **Turbine Down Ramp Time:** Essentially the reverse of Turbine Ramp Time. The time during which a turbine is taken down to minimum turbine capacity prior to shut down. By decreasing the flow gradually, downstream impacts can be reduced.
- **Environmental Flow:** The amount of flow that is provided to the Variable Flow Reach during intermittent operation when the turbine is stopped. It should be noted that the environmental flow provided through operations cannot be larger than the natural flow upstream in the river.
- **Compensatory Bypass Flow:** The amount of flow that is provided at all times to the river reach between the control structure and the powerhouse tailrace outflow. This flow is only relevant where the final design involves a separation between the containment structure and the powerhouse tail water outflow (i.e. where the design creates a section of river that is bypassed by the facility). This flow is not applicable where the final design involves a close coupled design where the powerhouse tailrace outlet is immediately downstream of the containment structure. Where this parameter is applicable it is independent of the facility operation mode.

Potential operational impacts to environmental components vary significantly depending on the mode of operation and flow conditions which are in turn typically dependent on seasonal conditions. For the purposes of the operating plan, the operating seasons have been determined by reviewing a hydrograph of average annual flows and periods of special environmental significance (i.e. fish spawning). Table 2 summarizes the start and end dates for each season as they relate to the operations of The Chute facility.

**Table 2: Seasonal Hydrological Periods**

Spring	April 16 <sup>th</sup> – June 1 <sup>st</sup> (46 days)
Summer	June 2 <sup>nd</sup> – September 1 <sup>st</sup> (92 days)
Fall	September 2 <sup>nd</sup> – November 1 <sup>st</sup> (61 days)
Winter	November 2 <sup>nd</sup> – April 15 <sup>th</sup> (166 Days)

Table 3 provides a description of the proposed operating parameters which have been determined for the facility. As mentioned above, these parameters will be further refined following the completion of the environmental assessment, based on discussions with key regulators and stakeholders.

**Table 3: The Chute Proposed Operating Parameters**

Description	Acronym	Project & Streamflow Conditions (m <sup>3</sup> /s)			
		Spring	Summer	Fall	Winter
Streamflow Exceeded 99% of the time	Q <sub>99</sub>	8.0	2.6	2.3	6.6
Streamflow Exceeded 95% of the time	Q <sub>95</sub>	14.6	4.2	3.3	8.5
Streamflow Exceeded 80% of the time	Q <sub>80</sub>	30.5	8.3	6.0	11.6
Streamflow Exceeded 50% of the time	Q <sub>50</sub>	71.6	15.1	15.7	18.4
Streamflow Exceeded 20% of the time	Q <sub>20</sub>	140.0	30.6	31.7	30.5
Downstream environmental flow target	Q <sub>EA</sub>	No int. op.	2.6	2.3	2.3
Compensatory flow (between tailrace and dam)	Q <sub>COMP</sub>	1.0 + spillway	0.5	0.5	0.5
Maximum turbine flow capacity	Q <sub>TMAX</sub>	38.0			
Minimum turbine flow capacity	Q <sub>TMIN</sub>	11.4			
Limited turbine flow – Modified ROR	Q <sub>TL</sub>	24.7			
Long term annual flow, average annual mean	LTAF	29.7			
Median streamflow value	Q <sub>MED</sub>	18.9			
2 year return period 7-day-average-low flow	7Q <sub>2</sub>	4.42			
10 year return period 7-day-average-low flow	7Q <sub>10</sub>	2.49			
20 year return period 7-day-average-low flow	7Q <sub>20</sub>	2.09			
Streamflow corresponding to high water mark*	Q <sub>HWM</sub>	25-35			
High streamflow event; occurrence of 1 in 2 yr	Q <sub>1:2</sub>	187			
High streamflow event; occurrence of 1 in 100 yr	Q <sub>1:100</sub>	370			
Turbine Ramp Time	N/A	20 min			
Turbine Ramp Down Time	N/A	20 min			

Notes: Flow percentile information based upon period of record

Low flow statistics based upon Gumbel distribution, High stream flow events (instantaneous) based upon General Extreme Value (GEV)

Q<sub>in</sub> – instantaneous river inflow, m<sup>3</sup>/s

\* value obtained from field observation and Hydraulic modeling

In a June 15<sup>th</sup> 2011 meeting with the MNR, it was determined that in order to preserve the ecological viability of the Clay Belt Conservation area that Xeneca will commit to providing monthly Q<sub>80</sub> flows at the boundary into the Conservation Area at all times, provided that the natural inflow at The Chute is at least Q<sub>80</sub>. During times when the natural inflow into The Chute is less than Q<sub>80</sub>, Xeneca will provide not less than 80% of the natural flow that would otherwise occur at the Conservation Area boundary.

### 3.6.4 Special Event Operation

Operation during special events, such as floods, droughts and safety emergencies may need to deviate from the normal operating parameters to manage flows and mitigate impacts.

- **Normal Flood Operation:** Normal flood events are defined as flows that exceed the maximum capacity of the plant up to and including the one in two year flood event level. Flood events of this magnitude are normal occurrences in the river and present minimal concern for public safety or environmental impacts. During these periods, the facility is operated to manage water levels upstream below the maximum upstream operating water level where possible. This is achieved by allowing any water that is in excess of the maximum turbine capacity to bypass the facility through the spillway.
- **High Flood Operation:** High flood events are defined as events that exceed the one in two year flood event level but are within the safe design level of the facility. Flood events of this frequency are anticipated to occur only infrequently over the life of the facility. The objective of this type operation is to ensure public safety. This is typically achieved by allowing any water that is in excess of the maximum turbine capacity to bypass the facility through the spillway and by operating the spillway and the power generation facility in a manner that achieves this objective.
- **Extreme Flood Operation:** Extreme flood events are defined as events at which the facility cannot be attended safely by operators and where the risk of flooding of the generation equipment is possible. The emphasis on operation is on ensuring public and operator safety. Where advance warning is received that an extreme event may occur, the operation of the facility will be adjusted in advance of the flood peak to maximize its ability to pass water and provide minimal obstruction to the passing of flood waters.

The inundation map and river profile mapping provided in Annex I-D show the water depths and extents for various flood conditions. The objective of flood operation for the spillway, turbine and bypass is to ensure that the backwater inundation effect is minimized and kept within the projected distance limits.

### 3.6.5 Compliance Considerations

The operation of the facility will be aligned with the existing Mattagami WMP during a comprehensive review in 2014. The Chute Operating Plan will be made available to all identified stakeholders (see the Plan in Annex I-B and reference to stakeholder list) for consideration during the EA review process and for discussion in subsequent stages of the development. The approved Operating Plan will become part of the Mattagami WMP through a

*Lakes and River Improvement Act* (Section 23.1), Water Management Plan amendment. After the approval of the amendment by the Minister, Xeneca will have the right and obligation to participate in the Mattagami WMP process.

Upstream of The Chute is the Ivanhoe Lake Dam which is operated by the MNR. The Ivanhoe Lake Dam controls downstream flow as outlined in the Mattagami WMP. Existing stakeholders upstream of the Ivanhoe Lake Dam are the property owners along Ivanhoe Lake and Parks Ontario. Lake levels are currently managed by MNR as outlined in the Mattagami WMP. The Chute's operating plan does not consider changes to the MNR management of lake levels at Ivanhoe Lake and the operation of The Chute facility will not impact on the operation of the Ivanhoe Lake Dam.

The water intake for the municipal water supply for the Town of Foleyet is located downstream of the Ivanhoe Lake Dam. MNR operates the Ivanhoe Lake Dam to maintain specific water levels downstream of the dam so it does not adversely affect the water-intake. The operating plan for The Chute contemplates no changes to the current operations of Ivanhoe Lake Dam and no adverse affects on the water intake have been identified.

In anticipation of the comprehensive review Xeneca will work with the upstream stakeholders to ensure there are no adverse affects on any user of the Ivanhoe River within the zone of impact of the project and, within the existing Mattagami WMP, support positive change for all concerned.

Downstream of The Chute the Ivanhoe River joins the Groundhog River. Operations of The Chute will have no adverse affects on the downstream Conservation Reserve or users of the Groundhog River.

Xeneca suggests that the Operating Plan be accepted based on the Waterpower Class EA process. Additional issues raised by the Ministry of Natural Resources and stakeholders identified in the Mattagami WMP will be addressed as part of a comprehensive review.

### **3.6.6 Provisions for Plan Reviews, Amendments and Plan Renewals**

An amendment to the Mattagami WMP will be required to include the new facility and operator and to incorporate the approved operation plan for the facility/dam. Once this is completed, Xeneca will adhere to any provisions for plan reviews, amendments and plan renewals required by the Mattagami WMP.

#### 4. FEDERAL, PROVINCIAL AND MUNICIPAL AGENCY AND STAKEHOLDER CONSULTATIONS

This section presents the methods and scope of stakeholder consultation conducted for this proposed development.

##### 4.1 CONSULTATION GUIDELINES

One of the main objectives of the Waterpower Class EA process is to coordinate and integrate the requirements of regulatory agencies under the provincial *EAA* and the federal *CEAA*. This involves gathering information from public, private and Aboriginal stakeholders to identify environmental concerns and to inform project decision makers.

To meet this objective and to effectively engage with agencies and stakeholders, the Waterpower Class EA builds on the public notification requirements mandated under the *EAA*, and other EA processes (i.e. MNR-RSFD Class EA) which recommend that consultation and engagement planning be incorporated as an integral component of the planning process. Xeneca also designed its consultation and engagement plans to meet the requirements of the *CEAA* federal screening process.

Xeneca's consultation programs are designed to provide the outreach to identify potential stakeholders, engage stakeholders and provide the means and opportunity for participation in the development planning process. The goals of the consultation programs are to:

- Identify and notify potentially interested and affected stakeholders;
- Identify and assess the range of positive and negative environmental and socio-economic effects of the project;
- Address the concerns of adjacent property owners, local and regional interest groups, individual members of the public and Aboriginal communities that may be directly affected by the project.

To achieve these goals, the consultation programs strive to:

- Identified potentially affected stakeholders;
- Described how the project may affect the natural and socio-economic environment;
- Provided notification to identified stakeholders as prescribed by *CEAA* and the Waterpower Class EA;

- Inform the public, Aboriginal communities and regulatory agencies where, when and how they can engage in the process;
- Identify public and Aboriginal community benefits, concerns and issues related to the project;
- Address public, Aboriginal community and regulatory agency concerns and issues raised regarding the development and operation of the project;
- Document public, Aboriginal community and regulatory agency input and how concerns were addressed, issues avoided and mitigation measures put into place during project planning.

The records of public, government agency and aboriginal community consultation undertaken in the planning of this development proposal are provided in Appendices C, D and E, respectively.

## **4.2 CONSULTATION STRATEGIES**

The consultation programs undertaken by Xeneca were intended to meet all mandatory consultation requirements as well as to assist in the identification and resolution of environmental concerns relating to the project. Xeneca was responsible for direct consultation with First Nations and Aboriginal communities and the public at large. Public and Aboriginal Community Consultation Plans were prepared by Xeneca for the proposed development and are presented in Appendices D and E, respectively. Key components of the consultation plans including the specific tools and approaches to consultation are described below.

### **4.2.1 General Print and Mailing**

General mailing of reports, notices and letters through postal, courier and electronic methods were used. To promote environmental sustainability, the EA team did attempt to minimize printed media; however, hard copy print was used where electronic formats were not guaranteed to reach the intended target audience and where specifically requested.

### **4.2.2 Print Media**

All print advertising in support of the undertaking was circulated in the Timmins Daily Press and Chapleau Express to ensure broad formal notification of key project milestones and key meeting dates to members of the public. Public Information Centres (PICs) advertisements were circulated in advance of meeting dates. Advertisements were placed in the Chapleau Express and Timmins Daily Press in both English and French; copies of the advertisements issued in support of this undertaking are presented in the Appendix D. The Public Information Meeting held in Foleyet on



July 6, 2011 was also distributed by the Local Services Board as well as in the Timmins Daily Press. The PIC held in Chapleau on July 7, 2011 was advertised in both the Timmins Daily Press and the Chapleau Express in advance of the event.

#### **4.2.3 Web Media**

Throughout the planning process Xeneca has provided regular project status updates through emailing and through its website to complement the consultation and engagement program for the project. Key documents (Project Descriptions, etc) and notifications were provided through emailing and Xeneca's website at [www.Xeneca.com](http://www.Xeneca.com); preliminary distribution of Project Descriptions was through the OEL-HydroSys Inc. website at [www.wesa.ca](http://www.wesa.ca). In some cases, Xeneca personnel also employed other social media communication tools to garner and provide feedback to the public.

#### **4.2.4 Meetings**

Direct and/or teleconference meetings with various stakeholders such as municipalities, and public interest groups were a component of the consultation initiative intended to assist in the identification and resolution of environmental concerns. A summary of these events is presented in Section 4.3.3 and 4.4.

Meetings were held with identified Aboriginal communities as part of the business to business aboriginal consultation initiative. As part of these meetings, considerations to the concerns of First Nations and other Aboriginal communities located in the vicinity of, and/or having a potential interest in the project was afforded. To help facilitate these activities, Xeneca assisted interested Aboriginal communities in accessing government programs and funding.

First Nations and other Aboriginal communities located within or having traditionally used the project area were identified in the MNR Site Information Package provided to the proponent and through dialogue with the Ministry. A copy of all notifications of the proposed undertaking provided by the proponent to First Nation and Aboriginal communities is provided in Appendix E. In addition, Xeneca solicited participation of Aboriginal communities in the Stage II archaeological study for the site and requested their participation in project planning.

#### **4.2.5 Public Information Centres (PICs)**

In addition to direct correspondence, two public information centres (PICs) and one Public Information Meeting as well as community meetings and interest group meetings were held to collect information on concerns as well as to allow the EA team to inform members of the public and to provide direct and immediate feedback. The date and time for the PICs was advertised in local publications and notification was sent either by electronic or mail to participating members

of stakeholder groups and government agencies well in advance of the scheduled date. Members of Xeneca staff as well as key experts from the EA team were on hand to answer public questions and to address concerns related to the development. The PIC featured posters and maps with information about the project, a copy of which is provided in Appendix D. Attendees of the meeting were asked to provide their name and contact information, to identify whether they wished to be provided with project updates, and to provide feedback on the project. A summary of these events is presented in Section 4.4.

### **4.3 GOVERNMENT AND AGENCY CONSULTATION**

The EA team was responsible for regulatory agency and government consultation. Xeneca issued a Notice of Commencement for the proposed undertaking on July 28th, 2010. The Project Description document was provided to regulators on November 19th, 2010. A revised Notice of Commencement was issued on November 10th, 2010, with a third NOC revision issued on December 22, 2010. A copy of each NOC is provided in Appendix D. A complete record of contact and evidence of the provincial and federal government consultation effort is presented in Appendix C.

The EA team engaged federal, provincial and municipal agencies during an EA Coordination meeting on April 19th, 2011 to introduce the project and collect feedback for regulatory approvals, permitting and requirements and project scoping.

A summary of the consultation events with government regulators and stakeholders is presented below. For the reader's convenience, a summary of the issues identified during the regulatory agency and public consultation process is provided in tabular format as Table 4 (Identified Issues and Management Strategies). The table also identifies whether and how resolution of the identified issue has been or may be addressed, and which issues remain unresolved. Future efforts to resolve these issues are outlined in Section 5 of this report.

#### **4.3.1 Federal**

##### **Canadian Environmental Assessment Agency**

The Canadian Environmental Assessment Agency (CEA Agency) was provided an introductory letter and project overview by Xeneca in June 2010. The proponent was advised that the CEA Agency would be acting at the Federal Environmental Assessment Coordinator (FEAC) for the proposed project. The CEA Agency requested from the proponent a full Project Description and clarification as to whether federal funding was being contemplated for the project. The proponent was advised that federal agencies to be contacted through the FEAC would include Environment Canada, Fisheries and Oceans Canada, Health Canada, Indian and Northern Affairs

Canada, Natural Resources Canada, and Transport Canada. Xeneca was informed that documents may be made available to the public, and that information related to the EA will be included in the Canadian Environmental Assessment Registry.

A copy of the Project Description was provided to the FEAC and each of the above referenced federal agencies in November 2010.

An EA Coordination meeting for the proposed projects on the Ivanhoe River was held in Timmins on April 19, 2011. The CEA Agency was unable to participate in the meeting and requested a copy of the meeting minutes.

A federal scoping document has not yet been issued by the CEA Agency.

### **Fisheries and Oceans Canada**

At the EA Coordination meeting held on April 19<sup>th</sup>, 2011 Fisheries and Oceans Canada (DFO) was identified as a Responsible Authority for the project. DFO outlined their concerns and responsibilities regarding the project including impacts to fisheries and fish habitat around the project sites and at any proposed water crossings as well as provisions for fish migration and passage and the requirement for detailed information. In order for DFO to complete their review of the undertakings, accept the EA planning outcomes, and ultimately make a determination under the *Fisheries Act* sufficient detailed information relating to these issues must be made available.

Future consultation with DFO will be required as the project moves forward in the development process. The final detailed engineering drawings and other supporting information will be submitted to DFO for a determination under the *Fisheries Act*.

### **Transport Canada**

Transport Canada (TC) was provided with a Project Description on November 19<sup>th</sup>, 2010. The Agency confirmed its role as a Responsible Authority for the project under the *Navigable Waters Protection Act (NWPA)*. The Act prohibits the construction or placement of any “works” in, on, over, under, through or across navigable waters without first obtaining approval.

During the EA Coordination meeting TC confirmed that based on The Chute Project Description, approvals under the *NWPA* will be required. The agency confirmed it would provide a comprehensive list of requirements which would need to be addressed prior to accepting the outcomes of the EA and ultimately make a determination under the *Navigable Waters Protection Act*. TC advised the proponent to submit its application for a project review request under the *NWPA* as soon as possible, the application is pending.

Future consultation with TC will be required as the project moves forward in the development process. The final detailed engineering drawings will be submitted to TC for a determination under the *NWPA*.

### **Environment Canada**

A surface water monitoring program was conducted during the 2010 field season at the proposed project site. The results of the program were summarized in a baseline surface water quality investigation report (Annex IV) which Environment Canada (EC) received on March 22, 2011. EC was also informed of the proponent's timeline for releasing additional supporting documentation by the end of March 2011, reference was made to reports that would encompass hydrology, operations, existing conditions and archaeology.

Acting as an expert Federal Authority for the EA, EC reviewed the surface water quality monitoring report and provided feedback to the federal agencies, the proponent and its consultants on April 15, 2011. Comments and recommendations were made regarding the collection and reporting of data for the Fish Species Inventory, the identification of potential environmental effects during the construction and operation phases of the projects, and ongoing monitoring of surface water chemistry, the details of which are provided below.

EC requested mapping indicating the sampling areas and stations that were included in the Fish Species Inventory Survey and as part of the Walleye Spawning Survey along with the water quality sampling stations. Clarification as to the location of the reference sampling area prior to head pond creation to ensure appropriate sampling had been undertaken is required. This information is presented in the EA team's technical report titled Natural Environmental Characterization and Impact Assessment Report provided in Annex III.

The 2010 habitat investigations identified Walleye and Pike as the primary species targeted by anglers within the Ivanhoe River in the area of The Chute (Annex III). EC sought clarification as to why the proponent targeted only Walleye in its spawning survey.

The Agency recommended that baseline studies be continued to determine mercury concentrations in sport fish and in the study area, detailing specific parameters to which the proponent has committed to in future work plans. It was noted that further consideration was required since the undertaking would result in the creation of an upstream head pond, presenting the potential of an increase in mercury levels in both surface water and fish tissue.

EC requested an estimate of the expected temperature and volume of the thermal discharge from the powerhouse and clarification as to whether this discharge would be released into the Ivanhoe River in order to quantify the potential change in surface water temperature in the head pond due to increased surface area and slower flow velocity. EC noted that there was mention of small

areas of wetland in the proposed development area and requested results of the study conducted which are provided in Annex III. Additional information and measurements were requested in relation to hardness of water, water levels and currents by EC, a copy of the correspondence is provided in Appendix C.

In response to EC's requests the proponent has committed to consultation with EC in 2011 in order to scope and undertake a surface water quality characterization study and impact assessment during subsequent field seasons leading up to the construction phase, in order to determine any potential negative effects of the proposed project on this regime.

#### **4.3.2 Provincial**

Various provincial ministries were provided copies of an introductory letter, a Notice of Commencement, a revised Notice of Commencement and the Project Description document for the Project. A record of government agency consultation is provided in Appendix C.

The following is a synopsis of correspondence and consultation undertaken with provincial agencies.

##### **Ontario Ministry of Natural Resources**

The Ontario Ministry of Natural Resources (MNR), based on to its mandate to manage natural resources and to promote renewable energy in the province, has legislative as well as natural heritage and water management planning policy roles in this project.

The proponent's notification and consultation with the Ministry includes the provision of early notices of the project, requests for background/baseline information on Natural Heritage information in the vicinity of the project site, scoping consultation, and requests for Scientific Collectors Permits to undertake terrestrial and aquatic baselines surveys within the anticipated project zone of influence.

Prior to the EA planning phase of the project, the Ministry of Natural Resources, Chapleau District office, provided instructions specific to site release issues which included MNR's requirements for Aboriginal consultation and the procedures associated with the Site Release Policy 4LC18. This included the provision of a Waterpower Declaration Form. Throughout this process issues pertaining to the project that the Ministry would like to see addressed through the Waterpower Class EA were identified.

A Site Information Package (SIP) for The Chute project was received from the MNR on October 19, 2010.

In the course of the Class EA planning process, meetings were held between the EA team and the Ministry of Natural Resources to develop field study work plans and investigation protocols, data information and reporting requirements and eventually to negotiate issues surrounding the results of these actions. A summary of these meetings is provided below:

- March 3, 2010 teleconference to scope the work plan and identify the Scientific Collectors Permits requirements for aquatic investigations in advance of the 2010 field season.
- September 2010 species at risk discussion between the EA team and the Chapleau District Office in order to determine the applicability of the *Endangered Species Act* to the project. One species at risk, Lake sturgeon, has been observed in the Ivanhoe River. MNR recommended that field work be conducted to determine if sturgeon spawning areas exist within the study area; studies are being carried out in 2011. There was a meeting on January 26<sup>th</sup>, 2011 to discuss the preliminary findings of the 2010 field season and other issues. The following issues were identified *by the MNR at this meeting*:
  - Issue of only one season of biological data, during which historically low water levels were reported. It was suggested that additional data collection in the 2011 field season would be required to augment the baseline studies (Annex III).
  - The importance of clearly defining the ecological impacts for the Aboriginal and local communities involved in the project as they might provide extensive local knowledge of the river and surrounding area. Regular updates to MNR on Aboriginal community consultation were expected, and that a formal public and Aboriginal engagement and consultation plan was required. A subsequent letter from the MNR to Xeneca dated May 17, 2011, outlined the next steps in Aboriginal engagement and consultation for the site release and environmental assessment processes and provided a clarification of responsibilities. A list of Local Aboriginal Communities and Identified Aboriginal Communities was provided. Public and Aboriginal Consultation Plans are located in Appendix D and E respectively.
  - Sharing of information in regards to the operation of the Ivanhoe Lake Dam (rule curve) and other hydrological data for the river available currently, from the water level monitoring station and, in the future from the facility once built.
  - The preservation and protection of the Northern Claybelt Conservation Reserve located downstream of the project site.
  - Water management planning requirements for the proposed facility (i.e. dam operating plan and flood flow management plan) which can be found in Annex I-B.



- April 19<sup>th</sup>, 2011 environmental assessment coordination meeting a number of topics were discussed at the meeting between MNR and the proponent and meeting minutes are provided in Appendix C. The following key planning considerations were discussed at this meeting;
  - The project planning will be undertaken as a harmonized environmental assessment in order to integrate federal and provincial EA planning requirements. For the federal EA, as a result of a recent Supreme Court decision (*MiningWatch Canada v. Canada (Fisheries and Oceans)*), all components associated with the undertaking, including the connection line right-of-way, will be scoped into the assessment. The *Canada - Ontario Agreement on Environmental Assessment Cooperation (November 2004)* was discussed. The agreement requires the federal and provincial governments to coordinate the environmental assessment processes whenever projects are subject to review by both jurisdictions. The proponent will follow the Waterpower Class EA process as approved under the Ontario *Environmental Assessment Act*, and incorporate additional information necessary to satisfy the requirements of the *Canadian Environmental Assessment Act*. The Agreement requires that under this harmonized approach the proponent will present its findings on the predicted environmental effects of the project in a single body of documentation. In keeping with this agreement which encourages efficient and comprehensive planning, the proponent has decided to incorporate the connection line ROW into the environmental assessment of the undertaking even though under the provincial process, a <115 KV line is a Category A undertaking is exempt from an EA. The MNR agreed that dispositions that may be required under the MNR-RSFDP Class EA may be embedded into the Waterpower Class EA if the proponent can demonstrate they have adhered to MNR-RSFDP Class EA planning principles.
  - It was determined that discussion and decisions surrounding the classification of the project as a “managed waterway”, would be deferred to the Operation Plans Meeting to be held April 28<sup>th</sup>, 2011.
  - First Nation and other Aboriginal community consultation should be well documented and should follow a formal consultation plan. Xeneca’s Public and Aboriginal Consultation Plans can be found in Appendix D and E, respectively.
  - Public Information Centres (PIC’s) were requested for Timmins, Chapleau and Foleyet. It was also noted that the proponent provided public notice in advance of previous meetings.

- Consultation requirements include the need to present the findings of any investigations within the course of the environmental assessment process.
- Documentation identifying which First Nations had agreed to representation by the Wabun Tribal Council was requested by MNR to be included in the ER. This information is still pending.
- A detailed Construction Management Plan and Sediment and Erosion Control Plan are required at the permitting and approvals stage of the project.
- Ministries and Agencies present confirmed they would provide the project team with information for regulatory permit applications and the supporting documentation requirements at a later date.
- Proposed access road and connection line corridor route maps will be required (Annex VI) along with Public Lands Act permit applications. Part 1 Form should be submitted as soon as possible to MNR.
- MNR stated that operations of the Ivanhoe Lake Dam will most likely not be altered in support of this project.
- It was agreed between the proponent and the MNR that the zone of influence of the project would be clearly identified in the Operating Plan and through HEC-RAS modeling as part of the environmental report (Annex I-B and I-D).
- MNR cautioned the proponent about proceeding with EA planning as site release approval had not yet been provided for the project. It was recommended that the proponent initiate conversations with the Mattagami WMP Standing Advisory Committee to facilitate approval and incorporation into the Water Management Plan. The proponent must ultimately demonstrate that water management planning was incorporated into all notification and display material either through the EA or through a separate water management plan amendment process.
- All maps provided in the ER should show all protected area boundaries.
- Key study and permitting requirements were identified and can be found in the meeting minutes in Appendix C including *LRIA* and *ESA*.

- On April 15<sup>th</sup>, 2011 the proponent met with a task team of MNR and MOE hydrologists to discuss the hydrologic modeling methodology which was undertaken to develop the Operational Plan for the site.

On April 28<sup>th</sup> and April 29<sup>th</sup> 2011 a meeting to discuss the proposed operational strategy for the proposed facility was held with district and regional level staff of the MNR, MOE and DFO. The proponent presented the conceptual engineering design for the site, and the proposed Operation Plan, which included maps of the upstream inundation zone of influence for The Chute site.

- The Agencies requested more details on the modeling parameters and methods in order to confirm the information. This additional information has been provided in the revised Operating Plan provided in Annex I-B.
- Topics such as potential impacts to riparian land and civil structures were preliminarily discussed. The proponent advised that standard engineering design work such as a downstream dam break analysis would not be conducted until the detailed design stage of the project. The proponent considered that only a conceptual design was required for the EA planning stage and the legislative approvals stage would be where more detailed information was provided. MNR cautioned that it would be best to consider all potential impacts at the EA stage to avoid opening the addendum provision of the Waterpower Class EA at a later date.
- The erosion potential downstream in the variable flow reach was also identified as a potential information gap. The proponent committed to addressing this issue by providing an erosion potential assessment. This report is included in Annex I-C of this document.

Comments on the Project Description were received on May 30<sup>th</sup>, 2011 (see Appendix C). At the April 19<sup>th</sup>, 2011 EA Coordination meeting, it was agreed that an addendum to the Project Description may be required if erroneous information was presented or if significant changes to the proposal were being introduced. However, the proponent's position is that, within the Waterpower Class EA process, the Project Description is intended to be a starting document that initiates the planning discussion and is built upon over time eventually shaping into the ER. The MNR review comments on the Project Description document did not indicate any misconceptions but it was noted that the Document was deficient of some information which has since been addressed in this document. Therefore, an addendum to the Project Description was not deemed necessary.

Additional discussions were held on the subject of operations and potential ecological effects between the MNR, proponent and the EA team on May 31<sup>st</sup> and June 15, 2011. The outcomes of these discussions are summarized in a letter from Xeneca to the MNR dated July 4<sup>th</sup>, 2011 (Appendix C) pending the finalizing of the meeting minutes and have been included in the Natural Environmental Characterization and Impact Assessment Report in Annex III.

The MNR attended the PIM in Foleyet on July 6 and the PIC in Chapleau on July 7, 2011. Discussions were held regarding connection lines and connection points, details can be found in the meeting minutes located in Appendix C. The proponent committed to providing copies of lines and roads maps by July 11, 2011.

The Ministry also launched an Ivanhoe River Usage Survey on June 6, 2011 with the approval of the proponent in order to assist all parties to gain a better understanding of the use of the area by recreational anglers and commercial outfitters. Details of this survey effort can be found in Section 4.4.

As the MNR is a key agency in the EA process Xeneca is committed to ongoing consultation throughout the permitting and approvals stage.

### **Ontario Ministry of the Environment**

A project overview and draft Notice of Commencement was provided to the Ministry of the Environment (MOE) on June 10, 2010 by the proponent. A response was received from the MOE's Regional Environmental Assessment Coordinator - Northern Region on August 12, 2010. The MOE cautioned the proponent that by proceeding with the Class EA for Waterpower Projects prior to having secured Applicant of Record status from the Ministry of Natural Resources, Xeneca was facing possible risks by not having the same level of information that is provided once Applicant of Record is awarded. The proponent's was urged to discuss the classification of the waterway as unmanaged with both the MOE and MNR. Additionally, the proponent was advised that in the MOE's opinion the Draft Notice of Commencement (NOC) provided in the project information package failed to meet the minimum requirements for such a Notice. Detailed comments for the NOC were provided along with a request for a copy of the Final NOC and confirmation of advertising for the Notice.

The Ministry recommended that the proponent host an Agency coordination meeting prior to the release of the NOC.

The Ministry referred the proponent to various resources aimed at ensuring that Aboriginal communities that should be consulted regarding the undertaking were identified. The MOE recommended that the proponent provide information directly to the Aboriginal communities that may be directly affected by, or have an interest in the undertaking as early as possible.

The MOE also provided comment on the Environmental Report, consultation and issue resolution requirements, permits and approvals and federal triggers for waterpower projects. A copy of the letter issued to the proponent by the MOE is provided in Appendix C.

At the EA Coordination meeting held on April 19<sup>th</sup>, 2011, the MOE stated that the Potential Regulatory Permits and Approvals List provided in the Project Description was insufficient and requested an expanded list of all activities that will occur during construction and operation, so as to provide the Ministry with sufficient detail to identify all applicable permits and approvals. This request was supported by MNR.

MOE stated that there is a concern with waste disposal for the undertaking since the local landfill does not have the capacity to accept the project's construction waste, noting an alternative for waste disposal will be required. The MOE stated the burning of waste on site would not be permitted.

Concerns were expressed with the proposed timing for the completion of the EA since investigations planned to be completed subsequent to the date of the submission of the Environmental Report would not be addressed in the document. Additionally, they noted that there would remain the requirement for public consultation to present the findings of these post EA investigations. The EA team explained that the proponent's approach would be to identify clear commitments in the Final ER to complete any outstanding studies thereafter, and to develop impact management strategies that would have to be agreed by the various agencies and honoured by the proponent moving forward, otherwise an amendment to the EA would be required.

### **Ontario Ministry for Municipal Affairs and Housing**

In response to the request for comments on the proposed project, the Ontario Ministry for Municipal Affairs and Housing advised the proponent on July 20, 2010 (Appendix C) that their Ministry did not intend to comment specifically on any of the projects proposed by Xeneca as it was understood that consultation efforts with potentially affected communities was being undertaken by the proponent.

### **Ontario Ministry of Energy**

The Ministry of Energy requested additional information on Xeneca's proposed approach to fostering Aboriginal and First Nation partnerships within the development proposal via an e-mail on December 21, 2010 (Appendix C). ME noted that although the Ministry might not participate in all planning meetings, the ME would like to be kept abreast of the planning process

developments. Additionally, ME confirmed on January 5, 2011 (Appendix C) that they wanted to be included in the distribution of all technical documents and the ER in order to provide comment where appropriate.

### **Ontario Ministry of Transportation**

The Ministry of Transportation (MTO) provided a response to several of Xeneca's proposed undertakings on February 18<sup>th</sup>, 2011. Information was provided as per the *Public Transportation and Highway Improvement Act* and applicable permits (Appendix C). MTO identified the requirements for any project that requires modification to a highway entrance. The Ministry identified that all connection lines must be placed outside of existing MTO right-of-way (ROW), and that permits will be required for all proposed ROW crossings or for lines located within 45 metres of MTO ROW limits.

### **4.3.3 Municipal**

The project site is located within an unorganized township. As such, both the City of Timmins and the Foleyet Local Services Board were provided copies of the introductory letter and a Notice of Commencement for the proposed undertaking on July 28<sup>th</sup>, 2010. The Project Description document was provided on November 19<sup>th</sup>, 2010. A revised Notice of Commencement was issued on November 10<sup>th</sup>, 2010, with a third NOC revision issued on December 22, 2010. A copy of each NOC is provided in Appendix D. A revised Notice of Commencement was issued on November 10<sup>th</sup>, 2010, with a third NOC revision issued on December 22, 2010. Xeneca met with the Foleyet Local Services Board (Foleyet LSB) on November 1<sup>st</sup>, 2010. Draft versions of the information panels for upcoming public information centres (PICs) in Foleyet were presented and can be found in Appendix D. Xeneca outlined its corporate profile, the Class EA for Waterpower process, and presented conceptual project designs and development timelines.

Foleyet LSB expressed concerns about the potential for the project to impact the town water supply and water intake, and the sewage treatment plant. Xeneca replied that The Chute project zone of influence would be located approximately 14 km downstream from the water intake, and that the project's anticipated upstream zone of influence would not extend beyond 3 km upstream of the proposed dam, adding that there would be minor, if any impact to the river in the vicinity of Foleyet. The LSB noted a previous dam failure at Ivanhoe Lake Dam which resulted in significant damage within the town. Xeneca responded that water control at The Chute would be automated and that the facility design is based on extreme flood conditions.



LSB members identified that the community's drinking water and sewage treatment is managed by the Ontario Clean Water Agency (OCWA) and that OCWA should be included in the planning process. The meeting notes are located in Appendix C. The economic cost and benefits to the Town of Foleyet were discussed, and it was noted that Xeneca will endeavour to procure goods and services locally where possible.

Members enquired as to Xeneca's expertise and experience in building and operating waterpower plants and they were directed to the Misema GS near Englehart, Ontario. The executive team at Xeneca Power Inc. was part of the team that developed the Misema GS.

Questions were raised as to the impact to terrestrial wildlife (particularly the rare white moose population). The proponent advised that more definitive answers would be provided in the Waterpower Class EA technical reports (see Annex III). The report does not specifically address the rare white moose population but encompasses moose populations as a whole.

The Foleyet Local services Board (LSB) attended the EA Coordination meeting. The LSB requested an additional PIC in Foleyet in May. The LSB re-iterated its concerns about water levels since Foleyet's sewage treatment facility (two lagoons - alternate discharge to river) may be impacted by loading rates which in turn could affect water quality.

A guarantee was sought from the proponent that there would be no impacts to the community's potable water supply as a result of this undertaking.

LSB sought clarification as to whether Xeneca would provide notification prior to operating its facility, and whether the project would have an effect on operations at the Ivanhoe Lake Dam. A letter to the proponent was circulated by the LSB at the meeting (Appendix C).

OCWA was contacted by the EA team to verify the water intake location for the Town of Foleyet and to identify any outstanding issues. OCWA identified high and low water levels as being a concern for the operation of the water treatment plant, citing past issues with seasonal runoff and drought conditions.

The Local Services Board of Foleyet was contacted by the EA team on May 5<sup>th</sup>, 2011 to determine the location of the sewage treatment plant and the information was referenced to aerial photography for confirmation.

Given that the water supply intake and sewage treatment facility outflow are both located well upstream of the 6.4 km inundation area, it is not anticipated that the project will result in impacts to the Town's potable water supply or wastewater treatment facility.



#### 4.4 PUBLIC CONSULTATION

Public Consultation was undertaken by the proponent in the form of Public Information Centres (PICs) and focus group meetings where requested. The PICs were advertised in local publications at least ten days prior to the event; copies of the print advertising is provided in Appendix D. Information collected at these events including signed attendance sheets and completed comment forms are also provided in Appendix D along with a detailed record of consultation. Initial contact with the public stakeholders listed below was in the form of a letter dated October 13, 2011, containing details of a potential PIC which was subsequently rescheduled.

Air Ivanhoe  
Borden Lake Campers Association  
Chapleau Anglers Hunters Club  
Chapleau Arctic Watershed Snowmobile Club  
Chapleau ATV Club  
Chapleau Centennial Museum  
Chapleau Tourist Association  
Do Little Inn  
Gosenda Lodge  
Ivanhoe Lake Cottager's Association  
Kinniwabi Long Rifles Club  
Northern Wilderness Cottages  
Ontario Clean Water Agency  
Ontario Rivers Alliance  
Red Pine Lodge  
Timmins Chamber of Commerce  
Utor Gold Construction  
Whitepine Lodge

A brief summary of Xeneca's public consultation initiative, and the concerns raised during the consultation process is presented below.

Xeneca met with Air Ivanhoe, a local remote tourism outfitter, on November 2<sup>nd</sup>, 2010. Gosenda Lodge and Red Pine Lodge (also operating as outfitters) were invited but unable to attend. Xeneca presented draft versions of the information panels to be finalized for public information centres (PICs) in Foleyet in January 2011 (Appendix D). Xeneca outlined its corporate profile, the Waterpower Class EA process, presented conceptual project designs and development timelines. The outfitter listed concerns with the Kapuskasing River Projects, specifically Outlet at Kap lake as that is the area in which the company has tourism based assets. The operator suggested that a survey of its client base to solicit additional information would be beneficial.

A survey was subsequently drafted by the Ministry of Natural Resources to solicit public input on the proposed undertaking. Prior to the opening of Walleye season, the Chapleau District MNR distributed log sheets to local outfitters known to frequent The Chute/Third Falls sites, asking that they record catch/keep data from their clientele. The Ministry also launched an Ivanhoe River Usage Survey on June 6, 2011 with the approval of the proponent in order to assist all parties to gain a better understanding of the use of the area by recreational anglers and commercial outfitters. The results will assist with determining the potential impacts of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River; a copy of the survey is provided in Appendix C.

On June 6<sup>th</sup> 2011, the MNR posted notices and comment boxes at both the Third Falls site and The Chute site (see picture provided in Appendix C). Ministry staff returned to the sites on June 17<sup>th</sup> to collect comment cards and stopped by one of the outfitters to collect any information recorded to date. There were no comment cards submitted at either box site however the outfitter provided a number of catch/keep records of angling activities. Most of the angling activity was focused around The Chute site, directly below the rapids from either the shore or from boats, with a total of sixty-five (65) Walleye harvested. Additional visits to the site boxes and to other outfitter operators by the Chapleau District MNR staff are planned throughout the remainder of the summer and fall seasons, information will be provided to the proponent as it becomes available.

The issue of the proposed connection lines intersecting forestry land was also raised by Air Ivanhoe. The proponent confirmed that discussions were underway with SFL holders. The meeting notes can be found in Appendix D.

Xeneca received requests from companies, cottagers associations and individuals to be included as stakeholders and invited to future PICs. A list of the requests for information on the proposed undertaking was compiled by Xeneca and is presented in tabular format in Appendix D.

A public information centre was held in Foleyet, Ontario on January 13, 2011; approximately 40 participants attended. A second public information event was held in Foleyet on January 27<sup>th</sup>, attendance was approximately 25 people. Background project information, including information on the proponent and the site, was presented as a poster display session. Hand-out material, including comment forms were available to those in attendance. An overview of the information provided and collected at each PIC event is attached as Appendix D.

Members of the EA team were available at the January 13<sup>th</sup> meeting to address questions or concerns expressed by the attendees. A list of issues raised through discussions at the PIC and the returned comment cards is presented below:

- provision of continued recreational access to the site was raised several times;
- potential effects to the Town's sewage treatment facility and resultant surface water quality from the proposed undertaking;
- local anglers concerned whether the project will impact fishing and whether local spawning sites will be impacted;
- concerns on whether the project would alter water levels in Ivanhoe Lake were identified;
- concerns raised as to whether increased access will result in disturbances to wildlife;
- effects of the project on fish migration during low flow years;
- effects of the project on the Pineland Forest, including the potential for chemical vegetation control along the connection line;
- effects of construction traffic and facility operation on the Ivanhoe Road Bridge.

Additional comments (and all comment cards) returned to Xeneca from the PICs are provided in Appendix D.

The Ivanhoe Lake Cottagers' Association sent a letter to the proponent on April 3<sup>rd</sup>, 2011 in which concerns were raised about effects on the natural value of the site. The Association requested a letter stipulating that the proponent would not request the opening of the Ivanhoe Lake Dam to facilitate their own operations and that the agreement be included in any future sale of the plant. The Cottagers Association issued an invitation to the proponent to meet on May 22<sup>nd</sup>, 2011 since many cottage owners were absent for the PICs but would be returning to the area for the spring and summer seasons, a copy of the letter is provided in Appendix D.

Xeneca representatives answered questions from approximately twenty-five (25) attendees on the January 27<sup>th</sup>, 2011. A representative from the Chapleau Fur Council completed a comment form requesting information on the potential effects of the project on fur bearing aquatic animals losing access to riverine habitat as a result of inundation of riparian land, and whether the proponent would compensate trappers for any financial losses (Appendix D).

Continued recreational access to the river at the project location was also raised as a concern as was the aesthetic value of the falls. Xeneca indicated that they were committed to maintaining river access except as required for public and worker health and safety (i.e.; fencing for security and in hazardous areas).

In addition, Xeneca has been contacted by members of the public regarding the proposed development. Inquiries were received seeking additional project information, the proposed location for the project and the potential impacts on water levels in Ivanhoe Lake and on water supply from the Ivanhoe River. The individuals were referred to the company website for available project information (Appendix D). Xeneca confirmed that the water levels at Ivanhoe Lake would not be affected by The Chute project, and that the control of the Ivanhoe Lake Dam will remain with the Ministry of Natural Resources.

Xeneca was contacted by telephone by a member of the Ontario Rivers Alliance (ORA) a recently formed citizen's interest group monitoring new energy project proposals on the province's northern waterways. The ORA member voiced opposition to Xeneca's proposed developments on the Ivanhoe River, adding that it is not the position of the Alliance to oppose all waterpower projects. A discussion followed on the rationale for the Ivanhoe projects and the public consultation process. In response to a request that a PIC be held in Timmins, the caller was informed that the project area is more than 60 km away and that PICs in Timmins were unlikely. However, Xeneca was willing to meet with the ORA to discuss the projects. The ORA was encouraged to remain in contact with the proponent (Appendix D).

A number of concerns were raised in correspondence from the White Pine Lodge to the proponent dated April 3<sup>rd</sup>, 2011 (Appendix D) regarding the proposed waterpower projects on the Ivanhoe River. Concerns were raised regarding the effect of the project on fish habitat, more specifically staging and spawning areas and mitigation strategies. Questions were asked about provisions to protect moose aquatic feeding areas and the presence of the bald eagle and impacts from fluctuating water levels and erosion effects. The economic benefits of the project were queried along with the loss of aesthetic value of the falls and fish populations. The owner stated that the area provides 150 days of fishing which if lost would present serious implications for tourism and outfitters.

In a letter to the proponent dated April 5<sup>th</sup>, 2011 the Friends of the Ivanhoe River stated their opposition to the project. A number of questions are presented to the proponent in relation to ecosystem health, mitigation for loss of fish habitat, Lake sturgeon and liability issues were raised, details are presented in Appendix D. Answers to these questions are addressed in the Ivanhoe River: The Chute & Third Falls - FAQs in Appendix D, alternatively they are posted on the Xeneca website.

In order to address some of the concerns raised during the public consultation process to date, Xeneca scheduled additional public consultation events with local stakeholders, including a meeting with the Ivanhoe Lake Cottagers Association Executive on Wednesday, July 6, 2011 in Foleyet and PIC in Chapleau on July 7, 2011.

The July 6, 2011 Public Information Meeting (PIM) was advertised in English and French on June 25<sup>th</sup> in the Timmins Daily Press and was scheduled from 4 to 6 p.m. at the Foleyet Community Centre, Foleyet, Ontario. The meeting location, date and time was also posted at the Community Centre and distributed by the Local Service Board to community members.

There were a total of 21 persons in attendance representing community interests from Timmins, Ivanhoe Lake Cottagers' Association, the Town of Foleyet, a local tourism outfitter and lodge owner. The proponent presented a powerpoint presentation describing the project, studies conducted and the EA process. Also presented were a number of poster panels copies of which are presented in Appendix D. The following issues were raised:

- Environmental concerns over the spawning areas and fish habitat in proximity to the project (i.e. residual water flows, water level fluctuations). The proponent explained that extensive biological studies of the area have been undertaken and are ongoing. Spawning sites have been identified as well as year round habitat. Operating plans have been shared with regulatory agencies including MNR and ecological flows must be maintained in the river at all times. During spawning seasons, water levels will be maintained at seasonal averages. It was further explained that the proponent aims to avoid impacts to spawning areas and that possible enhancements to spawning sites will be explored in consultation with MNR.
- Access to fishing areas in proximity to the project. The proponent responded that it intends to maintain and possibly enhance public access to fishing at The Chute site. Fencing may be put in place to ensure public safety. There will be improvements to road access and boat launching in addition to the creation of parking and rest areas.
- Impact on Ivanhoe Lake levels. The proponent explained that the Ivanhoe Lake Dam is owned and operated by the MNR whose primary objective is to maintain Ivanhoe Lake levels. The proponent will not require or request water to be released from Ivanhoe Lake for its operations.
- Impact on Foleyet water treatment facilities. The proponent noted that the zone of influence of The Chute project and its inundation area is over 7 km downstream from Foleyet and there will be no impacts.
- Decommissioning plans should the facility permanently cease operation. There are no plans to decommission these projects. FIT contracts are 40 years in duration. Waterpower facilities have a lifespan of 80+ years and can be retro-fitted to last decades longer.

The July 7, 2011 PIC in Chapleau was advertised in English and French in Chapleau Express June 25<sup>th</sup> and July 2 and in the Timmins Daily Press June 25<sup>th</sup> and June 29<sup>th</sup> and was scheduled from 4 to 6 p.m. at the Chapleau Branch of the Royal Canadian Legion.

There were two members of the public who attended the PIC. They were presented with a series of poster panels describing the project, studies conducted and the EA process (Appendix D), they raised the following issues:

- Effects of low flows and turbine design on the river and the drying out of the opposite channel. The proponent responded that the proposed ecological flow for the channel is assumed to be acceptable.
- Operation of the Ivanhoe Lake Dam upstream in aid of the project resulting in less water in the Ivanhoe Lake. The proponent confirmed that the Ivanhoe Lake Dam is operated by the MNR and that no water would be released by MNR to accommodate the proposed power facility. Any restrictions and environmental flows agreed upon in the ER for the proposed facility would be part of the operational requirements for The Chute site.
- Conceptual drawings were requested showing the location of promised boat ramps and docks. The proponent stated that this would be provided during the development process.
- Effects of sedimentation on upstream spawning sites. It was noted that a sedimentation study was not completed. The EA team (biologist) further explained that large scale sedimentation usually only occurred at large dams and that this was a relatively small structure.
- Clarification was requested in relation to the EA process and future studies proposed before and after submission of the ER document.
- Concerns were raised about dam safety and design as the Ivanhoe Lake Dam has experienced breaches on more than one occasion. The proponent advised that a dam safety study for the proposed new dam would be completed by a competent engineering design firm which would address the design in accordance with the known flow history for the site, a hydrograph would be provided.

Xeneca has recorded all public comments and concerns for the proposed Ivanhoe River projects over the course of the EA planning process and will continue to do so throughout the development process. A record of public participation compiled by Xeneca is provided in Appendix D along with all meeting notes and minutes. A summary of the identified issues and concerns raised during the public consultation process is provided in Table 4.



#### 4.4.1 Industry

KBM Resource Group (KBM) undertook consultation with the Sustainable Forest License holder Domtar Inc. -EACOM under the Pineland Forest Management Plan towards the design of access roads and connection lines for the project. GIS datasets including all road networks, planned harvest block locations and aggregate pit locations were referenced along with specific information based on KBM's extensive knowledge with forestry management and the land base.

A representative of EACOM Timber Corporation attended the January 13<sup>th</sup> PIC in Foleyet and returned a comment card (Appendix D). A comment was provided that any work to complete required improvements to the existing bridge over Ivanhoe River should be borne by the proponent. It was stated that timber harvesting in the zone of inundation should be conducted by the license holder and that the proponent should initiate dialogue with EACOM. It was suggested that the connection line follow existing roads and that ROW width be increased, that timber removal should be conducted by a local contractor and merchantable wood be sold to EACOM. Detailed maps and aerial photos were requested along with a plan for long term road maintenance. Further consultation with EACOM on March 9<sup>th</sup>, 2011 indicated that existing Pineland Forest roads and bridges could provide access to the site but a roads sharing agreement is required. The proponent commits to developing this agreement with EACOM and to working with traditional forest licence holders in the area for the removal and utilization of merchantable wood from Crown land.

The proponent acknowledges that they will have to consider potential erosion and safety impacts to the Ivanhoe River Bridge located upstream of the project as a result of inundation. The proponent is aware that any required improvements to the bridge in support of the project will be the responsibility of Xeneca. Any potential impacts to the bridge must be anticipated and satisfactorily addressed with the bridge owner and the province before any regulatory permits are issued. The proponent also acknowledges that further consultation with the traditional forest licence holders will be required in the planning of the connection line construction program.

#### 4.5 ABORIGINAL ENGAGEMENT

Aboriginal communities hold a unique position in Canada, and have a legally protected right to participate in the development and review of resource management strategies or plans in areas they assert to be traditional territories, including Crown lands outside areas where treaties apply.

While it is understood that consultation with Aboriginal communities is the responsibility of government and that consultation is deemed to be a government to government mandate, Xeneca supports the approach harmonizing government duty to consult and the proponent's engagement and consultation requirements as directed by the Waterpower Class EA planning process. Corporately, Xeneca also supports the development of business to business relationships



with identified Aboriginal communities and the company believes in providing economic opportunities to Aboriginal communities in support of GEA and Ministry of Natural Resources Site Release Process objectives.

A complete list of involved Aboriginal communities, a record of engagement to date and an Aboriginal Consultation Plan is presented in Appendix E. A brief summary of the consultation outcomes to date is presented below.

Xeneca corresponded with the following identified First Nations regarding the proposed undertaking:

- Brunswick House First Nation
- Chapleau Cree First Nation (Fox Lake Reserve)
- Chapleau Ojibwe First Nation
- Constance Lake First Nation
- Flying Post First Nation
- Mattagami First Nation
- Missanabie Cree First Nation
- Michipicoten First Nation
- Moose Cree First Nation
- Taykwa Tagamou First Nation
- Wabun Tribal Council
- Métis Nation of Ontario

On June 24, 2010, Xeneca mailed letters to the above listed First Nations announcing that it had received Feed-in-Tariffs contracts for eighteen project sites throughout Ontario (the Métis Nation of Ontario received this letter on June 10, 2010). At the time, Xeneca invited the above noted First Nation communities to enter into discussion regarding those projects falling within their traditional lands. A request for the Aboriginal communities to share information about the project site area was also made at that time.

Subsequent to receipt of the Site Description Package (SDP), which categorizes First Nations and Metis communities into “Identified” and “Local” designation, the final list of communities involved at The Chute were determined to be:

Identified	Local
Chapleau Cree First Nation	Taykwa Tagamou First Nation
Chapleau Ojibwe First Nation	Flying Post First Nation
Brunswick House First Nation	Metis Nation Ontario Timmins Metis Council
Mattagami First Nation	Information is also provided to Moose Cree First Nation and Michipicoten First Nation

Through a community agreement, Wabun Tribal Council is managing business negotiations and environmental assessment consultation on behalf of 5 communities including Brunswick House First Nation, Chapleau Ojibwe First Nation, Flying Post First Nation, Mattagami First Nation, and Matachewan First Nation

The Chapleau Cree were sent a Project Overview document via email on June 16, 2010, in response to a request for additional information (a copy of the document, which was also distributed to the public, can be found in Appendix D). In a January 27, 2011, meeting between Xeneca and the Chapleau Cree (see meeting minutes in Appendix E), the latter expressed opposition over concrete styled dams. In a May 9, 2011 letter to the Chapleau Cree, Xeneca stated that its technical staff would investigate the viability of adopting a rock clay-fill structure dam or use of other alternative materials

In a July 8, 2010 letter to the First Nations and Métis listed above, Xeneca announced that they were preparing the Notice of Commencement for a number of their waterpower projects. In the announcement, the proponent explained eligibility for benefits, partnership, and funding under the FIT initiative, including the requirement for Traditional Knowledge (TK) studies and sought the communities' support for the completion of TK studies.

An explanation of the planned archaeological assessments was provided in a September 16, 2010 letter to the First Nations listed above, along with an invitation to these communities to participate in these studies. Invitations were also sent to these communities (as well as the Wabun Tribal Council and the Métis Nation of Ontario) to participate in Public Information Centres, which were planned for the winter of 2010-2011. The Chapleau Cree, Taykwa Tagamou First Nations and Wabun Tribal Council responded that their preference is for community based consultation (Appendix E).

In late 2010 and early 2011, Xeneca distributed Project Descriptions to all the communities listed above. At that time Xeneca noted that a proponent-led EA Coordination meeting would be undertaken in the spring of 2011 with key government agencies and requested that First Nation communities identify whether they had an interest in participating in this meeting.

The proponent was informed by the Wabun Tribal Council that, until a Memorandum of Understanding between Xeneca and the Tribal Council is accepted by all parties, the consultation and engagement process with represented First Nations cannot begin.

On May 13, 2011, further correspondences from Xeneca were distributed to continue the Aboriginal consultation dialogue. It was stated that the Aboriginal community engagement plan will formally begin after the issuance of the Notice of Completion at which time the report will be provided to the communities for review. This action will be followed by a minimum period of 60 days for review and engaged discussion on any issues that may arise.

Subsequently, Memorandums of Understanding have been drafted and negotiations are under way to finalize these agreements. Dialogue is ongoing and Xeneca continues to work with First Nations and Métis to ensure open dialogue, consultation and, where appropriate, business to business discussions.

## 5. EVALUATION OF POTENTIAL PROJECT EFFECTS

Environmental assessment legislation in Ontario defines an effect as:

*“(a) any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by First Nations persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance and (b) any change to the project that may be caused by the environment, whether any such change occurs within or outside of Canada.”*

The purpose of an environmental assessment is to identify all the ecosystem components that make up the environment (biological, social and economic) within the project area, and evaluate how the project would affect these valued ecosystem components during its construction, operation and end of life cycles. The EA team has adopted the conceptual hierarchy of avoidance, prevention and mitigation for the project. Where an impact cannot be avoided or prevented, mitigation measures were considered.

Mitigation measures include:

- Reducing the magnitude and duration of the impact;
- Repairing the situation post-impact to return to a pre-impact state;
- Offsetting the impact through other means.

Investigations undertaken in support of this project identified the anticipated effects of the project, at both the generating station site and ancillary components as presented in Sections 3.2 and 3.3, respectively. Once identified, the EA team worked collectively to apply its expertise to finding solutions to avoiding, mitigating or minimizing the identified effects.

The results of the project life-cycle potential impact analysis based on available data and information and recommended mitigative measures are presented and discussed within this report. Additionally, the results of the technical investigations completed by the EA team members are provided in the Annexes which accompany this document. A summary of the recommended mitigative measures is presented in tabular format for the reader's convenience in Table 4.

## **5.1 IDENTIFIED POTENTIAL EFFECTS**

Project effects and management strategies considered by the EA team during the preparation of conceptual site designs, construction plans and operation plans, and those identified through the consultation program, are discussed below. The discussion is divided into areas of the proposed development as indicated:

- identified zone of influence - upstream;
- area of impact of the facility site and ancillary components; and,
- identified zone of influence – downstream.

An additional assessment of effects will be undertaken subsequent to the 2011 field investigations, and further discussion is planned between the EA team and interested parties.

The results of the project life-cycle impact analysis and recommended mitigative measures have been presented and discussed within the main report as well as in the appended investigation reports. A summary of the recommended mitigative measures is presented in Table 4.

## Identified Potential Effects

- Air Quality
  - Exhaust from vehicles and equipment
  - Odour from waste
  - Dust from vehicles and equipment
- Water Quality
  - Contamination from construction activities
  - Increased levels of suspended sediment
  - Elevated levels of Mercury from head pond flooding
- Terrestrial Wildlife
  - Effects on habitat during ROW and access road construction and maintenance
  - Effects on habitat during facility site construction
  - General disturbance
- Soil and Sediment Quality
  - Soil compaction
  - Management of excavated materials
- Significant Natural Heritage Feature
  - Effects on the Northern Claybelt Conservation Reserve
- Shoreline Dependant Species
  - Water level and flow fluctuations
  - Construction activities
- Wetland Dependant Species
  - Water level and flow fluctuations
- Fish Habitat
  - Water crossings on ROW and access roads
  - Destruction of spawning beds from construction of intake and tailrace
  - Change due to water level fluctuations
- Fish Migration
  - Upstream effects through eastern channel and Oates Road Bridge crossing at lower flows
  - Downstream effects through all channels
- Fisheries
  - Similar issues to fish habitat above
- Fish Injury or Mortality
  - Entrainment and impingement effects
- Erosion and Sedimentation
  - Increased shoreline erosion and sediment deposition due to inundation and water level fluctuations, including ice scouring

- Water levels, flows and movement
  - Increased water levels and residency time in head pond
  - Variation in flows within downstream variable flow reach
- Changes to thermal regime of waterway
  - Changes as a result of inundation and storage
- Drainage, flooding and drought patterns
  - Alteration from natural patterns
- Spiritual, ceremonial, cultural, archaeological or burial sites
  - Culturally modified trees (Eastern White Cedar)
- Rivers and Waterways
  - Effects of the use of concrete in waterway
- Access to Inaccessible Areas
  - Effects of increased access as a result of upgrades/maintenance of access roads
- Navigation
  - Impacts to recognized canoe route
- Recreational Use
  - Impacts to water access (boat launch downstream), recreational camping and hiking
- Angling, hunting opportunities
  - Effects on bear and moose hunting
  - Effects on Walleye and Northern pike angling
- Views or Aesthetics
  - Changed landscape views
- Existing land or resource management plan
  - Impacts to Sustainable Forestry License holder (Eacom)
- Existing water management plan
  - Mattagami Water Management Plan
- Protected areas
  - Groundhog River Provincial Park
  - Northern Clay Belt Conservation Area
- Forestry
  - Harvesting of merchantable timber during construction
  - Processing of merchantable timber
- Archaeological Sites
  - Destruction/Disturbance
- Cultural Heritage Landscapes
  - Destruction/Disturbance
- Location of people businesses, institutions or public facilities
  - Disruption to access, schedules and activities

- Community character, enjoyment of property or local amenities
  - Potential effects on ice fishing due to water level fluctuations
- Employment
  - Local employment opportunities
- Local, regional or provincial economies
  - Impacts to remote tourism/outfitters operators
- Public health or safety
  - Forest or brushfires
  - Impacts to navigation
  - Waste production
  - Construction
- Tourism
  - Impacts to visitor numbers and access



TABLE 4: Identified Issues and Management Strategies

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
General Natural Environment				
Air quality	Exhaust emissions from equipment and vehicles	<ul style="list-style-type: none"> <li>• implement standard construction site best management practices</li> <li>• reduce equipment engine idling</li> <li>• limit the use of diesel generator during operation (typically only in emergency situations)</li> </ul>	Low negative impacts - impacts mitigated or eliminated where ever possible, C of A required	Yes
	Odour	<ul style="list-style-type: none"> <li>• utilize approved waste disposal sites and best practices for VOC/organic waste disposal</li> <li>• Appropriate disposal containers will be available for the prompt disposal of waste</li> <li>• full disposal containers will be removed to the appropriate waste disposal facility on a regular basis</li> <li>• Organic/food waste will be collected daily and stored in closed, animal resistant containers until disposed of at an approved waste disposal site or incinerated on-site according to project permitting standards</li> </ul>	No impacts anticipated - proper handling of VOC/organic waste onsite and offsite disposal at an approved disposal location will mitigate potential impacts	Yes
	GHG Offsets	Waterpower can offset GHG emissions from coal.	Positive effects due to GHG offsets by building a hydroelectric generating station to generate 13,300 MWh of renewable energy represents the displacement of 9,217 tons of carbon dioxide equivalent	Yes
	Dust emissions from construction activities and vehicles	<ul style="list-style-type: none"> <li>• project personnel will control dust at work sites when it is warranted by the conditions</li> <li>• a water truck or alternate method will be used to suppress dust on all project roads and work areas when required as a result of dry or dusty conditions</li> <li>• dust control techniques will be implemented prior to reaching critical conditions</li> <li>• trucks will be required to use dust covers when traveling through populated areas</li> </ul>	Low negative impacts - impacts mitigated or eliminated wherever possible, C of A required	Yes

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Water quality (surface and groundwater)	Surface water - general construction activities along shoreline of waterway	<ul style="list-style-type: none"> <li>• implement standard construction site best management practices</li> <li>• construction machinery should arrive on site in a clean condition</li> <li>• ensure a spill response plan is in place</li> <li>• maintain appropriate emergency response measures</li> <li>• implement wet weather restrictions</li> <li>• stabilize all waste materials above the high water mark</li> <li>• use mechanical means (not chemical) to clear and manage vegetation within ROW</li> <li>• all concrete work will be completed in dewatered areas, water will not be reintroduced to dewatered areas until concrete is cured</li> <li>• Project personnel will be made aware of safe concrete handling procedures. Concrete handling will employ watertight forms, spill contingencies, and designated truck clean out pits.</li> <li>• contractors will have prepared and will follow a Care of Water Plan</li> <li>• Earthworks will be scheduled to minimize duration of exposure</li> <li>• Turbidity of water close to construction site will be monitored;</li> <li>• contain material when working near water bodies; cofferdam, silt curtains, sediment traps and settling ponds</li> <li>• removal of riparian vegetation should be minimised</li> <li>• No excavation or borrowing will be done without the appropriate plans, surveys, permits, and approvals in place</li> <li>• Where practical, existing borrow sites and associated roads, trails or cut lines will be used instead of developing new sites</li> <li>• Borrow sites for aggregate will be located in upland locations and separated from streams and lakes by a minimum 30 m wide buffer of undisturbed terrain in order to minimize potential for siltation</li> <li>• Borrow area will be staked to prevent accidental over-extension of the affected area</li> </ul>	Low negative effect - impacts mitigated or eliminated wherever possible through implementation of mitigation measures	Yes
Water quality (surface and groundwater)	Surface Water - In-water works construction and removal of the cofferdam: potential for excess sediment to be suspended and carried downstream by river flow	<ul style="list-style-type: none"> <li>• Ensure that all rock materials placed into the river have been prewashed.</li> <li>• Construct and remove the cofferdam during an appropriate low flow period (generally during the summer months).</li> <li>• Ensure that construction takes the least possible time by having all construction materials and necessary equipment available prior to construction or removal of the cofferdam.</li> <li>• Avoid construction and removal during the time typically associated with spawning and egg incubation times of warm water fish species (typically April 1 to July 15). Specific timing windows should be agreed to with the local MNR as part of the permitting process;</li> </ul>	<p>Due to the velocities present in this section of river, it may not be possible to isolate the cofferdam construction from the channel using a silt curtain or equivalent, in this case; Adhere to all applicable standard best management practices available to the industry;</p> <p>The Chapleau Cree indicated a preference for the construction of a rock clay-fill dam instead of a concrete water control structure to minimize the effects on water quality. Xeneca engineering team will investigate the use of natural materials (rock clay-filled) for the dam structure if the geotechnical results are favourable to this design option.</p>	Yes

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Water quality (surface and groundwater)	Contamination from spills or leaks of hazardous substances	<ul style="list-style-type: none"> <li>spill prevention and containment measures to be put in place throughout operational period</li> <li>ensure that workers are adequately trained in the implementation of a prepared spill response plan</li> <li>personnel will be trained in the requirements for the storage and transport of hazardous material</li> <li>ensure availability of spill control equipment and materials</li> <li>store hazardous materials at least 150m away from water bodies</li> <li>provide impervious dikes and liners around oil, fuel and chemical storage areas</li> <li>avoid in-water works during periods of high precipitation</li> <li>refuel machinery on impermeable pads or pans designed to allow full containment of spills a minimum of 30m from water bodies</li> <li>fuelling and maintenance activities should occur within an area where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow</li> <li>monitor area for leakage; in the unlikely event of spillage the supervising engineer would halt all construction activities and corrective measures would be implemented; any spills would be immediately reported to the MOE Spills Action Centre (1.800. 268.6060)</li> <li>All hydrocarbon fuels, oils, and lubricants will be stored in a secondary containment area</li> <li>Drip pans will be installed on equipment to intercept minor leaks</li> <li>Sumps will be installed including an oil trap to prevent contaminated water from being pumped into a water course</li> <li>All fuel or lubricant contaminated materials will be collected and trucked to an approved regional disposal facility, or will be treated with in situ bio-remediation techniques approved by the Proponent and Regulators</li> </ul>	Low negative effect - impacts possible in the event of accident/malfunction; impacts mitigated or eliminated wherever possible through implementation of mitigation measures	Yes
	Intermittent operation of facility - increase in suspended sediment	<ul style="list-style-type: none"> <li>maximum suspended sediment concentration should not decrease the Secchi disc reading by more than 10%</li> <li>Limit maximum daily fluctuations of upstream water levels</li> <li>Limit the rate of change of upstream water levels</li> <li>Where the erosion survey has identified potential for shoreline erosion or ice scour, inspect and monitor for signs of erosion in year one and year five of operation to document degree of erosion and develop and implement additional mitigation measures as required</li> </ul>	Negative impacts possible - impacts mitigated or eliminated wherever possible (i.e. use mechanical and vegetative erosion controls along shoreline at risk). Monitoring undertaken to document continued effectiveness of mitigation measures. Additional mitigation measures will be developed as required.	Yes
	Reduced dissolved oxygen levels in as a result of reduced flows and mixing downstream of the facility	<ul style="list-style-type: none"> <li>Minimum ecological flows have been proposed and will be finalized in consultation with regulators, which consider aquatic habitat requirements downstream of the facility</li> </ul>	Ecological flow values will be adopted into Dam Operation Plan as finalized and accepted by regulators	Unknown due to outstanding data and information
	Inundation resulting in elevated levels of methyl-mercury in water	<ul style="list-style-type: none"> <li>Terrestrial vegetation and woody debris will be removed from areas to be inundated prior to construction and inundation</li> </ul>	The proponent will meet with regulators in order to determine further sampling (fish tissue, soil, surface water) and follow-up monitoring requirements and establish a mitigation and monitoring plan	Unknown due to outstanding data and information

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Species at risk and their habitat (SAR)	No SAR were identified in the geographic study area that has been investigated to date. However, 2011 field investigation results are pending.	In the event of a SAR species being confirmed as a result of future investigation or observations; <ul style="list-style-type: none"> <li>• identify species-specific mitigation measures in co-operation with MNR and enter into ESA Agreements/permits as required</li> <li>• circulate an information and identification sheet to all personnel prior to the onset of construction activities to ensure awareness, identify areas of high SAR potential and actions to be taken</li> <li>• reduce speed limit for access roads where there is a high potential for SAR occurrence</li> </ul>	If provincial an endangered species signed agreement or permit will be required. If federal, a species an authorization will be required.	Unknown due to outstanding data and information
Significant earth or life science features	No issues	<ul style="list-style-type: none"> <li>• No ANSI identified in project area as indicated by MNR Site Information Package</li> </ul>	N/A	No
Land subject to natural or human made hazards	No issues	<ul style="list-style-type: none"> <li>• No land subject to natural or human made hazards identified</li> </ul>	N/A	No
Terrestrial wildlife (numbers, diversity, distribution)	General disturbance to habitat during construction and maintenance	<ul style="list-style-type: none"> <li>• limit use of machinery in and around watercourses and sensitive terrestrial areas</li> <li>• clearly define access and transportation routes to minimize disturbance</li> <li>• use woody debris and non-merchantable logs from corridor clearing to establish brush piles and downed logs adjacent to the cleared right-of-way to improve habitat</li> <li>• allow for detour around sensitive habitat areas</li> <li>• use mechanical means (not chemical) to clear and manage vegetation within ROW</li> <li>• limit removal of vegetation during construction/maintenance to maintain habitat connectivity</li> <li>• schedule activities to avoid migratory nesting periods</li> <li>• all construction traffic should adhere to speed limits and construction crews should be aware of the potential for wildlife crossings</li> <li>• any roadway mortalities of herpetofauna should be reported and a reduction in speed limits should be imposed in specific areas to prevent additional mortalities</li> </ul>	Construction Management Plan will be finalized to include protocols and procedures for minimizing the disturbance to wildlife during the construction program.	Yes
	Access road construction	<ul style="list-style-type: none"> <li>• To be determined</li> </ul>	Once the access road alignment is finalized it is Xeneca's intention to conduct detailed field surveys along the alignment in order to identify potential impacts and develop appropriate mitigation.	Unknown due to outstanding data and information
	Connection line construction	<ul style="list-style-type: none"> <li>• The existing natural environment features along the proposed route have been reviewed from a biological perspective by the EA team in the desktop screening study and presented under a separate report entitled Xeneca Power Hydroelectric Developments Transmission Line and Access Road Natural Environment Preliminary Analysis (see Annex III).</li> <li>• Special areas in the final routes where habitat potential exists will be surveyed by field crews</li> </ul>	As the routing studies currently underway conclude and the alignment is finalized it is Xeneca's intention to conduct detailed field surveys along the alignment in order to identify potential impacts and develop appropriate mitigation.	Unknown due to outstanding data and information

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Terrestrial wildlife (numbers, diversity, distribution)	Loss of vegetation and terrestrial wildlife during powerhouse construction activities - clearing, grubbing and stockpiling	<ul style="list-style-type: none"> <li>The area of disturbance within the overall site boundaries will be kept to a minimum and clearing will only occur where necessitated by construction.</li> <li>High visibility snow fencing will be installed to restrict heavy equipment traffic to the area identified for clearing.</li> <li>Travel paths, stockpile areas and staging areas will be carefully planned and followed.</li> </ul>	The clearing and grubbing of land will result in a loss of some vegetation and in turn potential wildlife habitat. In-direct impacts also have potential to occur during active construction (i.e. noise)	Yes
	Construction of earthen embankment occupying an approximate footprint impact area of 1222m <sup>2</sup>	<ul style="list-style-type: none"> <li>To be determined</li> </ul>	The exact location of the dam is yet to be determined and therefore specific surveys of vegetation to be cleared have not been undertaken.	Unknown due to outstanding data and information
Terrestrial wildlife (numbers, diversity, distribution)	General disturbance to wildlife	<ul style="list-style-type: none"> <li>Where possible, avoid important habitats</li> <li>Where possible, activities will be scheduled to avoid sensitive nesting, rearing, mating, or staging periods</li> <li>All food and food waste will be properly stored and disposed of to prevent attracting wildlife</li> <li>All Project personnel will use proper care and caution when operating vehicles to avoid collisions with wildlife</li> <li>Wildlife are relocated as required during the work and after the work has been completed</li> </ul>	Construction Management Plan will be finalized to include instructions and protocols for minimizing the disturbance to wildlife during the construction program.	Yes
Natural vegetation and habitat linkages	Effects on vegetation and habitat during ROW construction and maintenance	<ul style="list-style-type: none"> <li>schedule construction during winter months, when possible, to minimize habitat disturbance</li> <li>limit use of machinery in and around watercourses and sensitive terrestrial areas</li> <li>clearly define access and transportation routes to minimize disturbance</li> <li>allow areas of exposed soil to naturally regenerate with native species (*ensure no new vegetation is introduced on provincial parks land)</li> <li>use mechanical means (not chemical) to clear and manage vegetation within ROW</li> <li>limit removal of vegetation during construction/maintenance to maintain habitat connectivity</li> </ul>	Construction Management Plan will be finalized to include instructions and protocols for minimizing the disturbance to terrestrial ecosystem during the construction program.	Yes
Soil and sediment quality	Soil compaction	<ul style="list-style-type: none"> <li>schedule construction of ROW to minimize ground disturbance (winter)</li> <li>stop activities when ground conditions could potentially severely disturb soil profile (high precipitation, etc)</li> <li>be prepared to alter construction activities as a result of sudden thaw conditions</li> <li>stabilize high traffic areas with gravel surface layer or other suitable cover material</li> <li>establish a designated construction access route to minimize area of impact</li> <li>time construction activities to minimize effects on surface vegetation and subsurface rooting zones</li> <li>vehicles and equipment access will be restricted to the minimum area necessary</li> <li>conduct site reclamation activities as soon as possible following the disturbance</li> </ul>	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible. Soil compaction will reverse naturally over time if left undisturbed.	No

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Soil and sediment quality	Management of excavated materials (blast rock, fill, aggregates, etc)	<ul style="list-style-type: none"> <li>• transport blast rock to lay down area for stockpile and/or crushing</li> <li>• install mechanical erosion control measures at blast rock storage site near water body</li> <li>• re-use blast rock for aggregate and shoreline stabilization</li> <li>• apply water to dry soil/rock to minimize dust</li> <li>• instruct workers and equipment operators of dust control methods</li> <li>• install mechanical barriers to prevent run off from dust piles into water bodies</li> <li>• If Acid Rock Drainage (ARD) is determined to be an issue, an ARD Management Plan will be prepared including measures for avoidance, mitigation, and treatment methods for ARD as well as long-term storage methods for acid-generating spoils which would entail isolation of spoils from water and air to prevent leaching</li> </ul>	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No
Significant natural heritage features and areas	Northern Clay belt Conservation Reserve	Xeneca would commit to providing monthly Q80 flows at the boundary into the Conservation Area at all times, provided that the natural inflow into the project was at least Q80.	Commitment outlined in Operation Plan for the facility.	No
<b>Aquatic and Riparian Ecosystem</b>				
	<i>See Fish Habitat Section below</i>			
Shoreline Dependent Species	Aquatic mammals (beaver and otter, etc) and their habitat	<ul style="list-style-type: none"> <li>• Planning for flooding of new reservoirs should avoid the winter/ice over period when filling could cause direct mortality by drowning furbearing mammals in their dens</li> <li>• Specific mitigation to be developed once impact assessment is complete</li> </ul>	It is Xeneca's intention to conduct detailed field surveys along the shoreline within zone of influence in order to identify potential impacts and develop appropriate mitigation.	Unknown due to outstanding data and information
Shoreline Dependent Species	Impacts to Bald Eagle and their habitat	<ul style="list-style-type: none"> <li>• Specific mitigation to be developed once impact assessment is complete</li> </ul>	Specific impacts to this species as it relates to the project zone of influence (inundation and construction of components) have not been identified at this time. In order to identify potential impacts and develop appropriate mitigation further investigation are required.	Unknown due to outstanding data and information
Wetland Dependent Species	Potential for habitat destruction/ displacement and effects on aquatic feeding areas as a result of construction activities, inundation and water level fluctuations (i.e. Moose).	<ul style="list-style-type: none"> <li>• restrict construction vehicles to existing access routes and staging areas</li> <li>• minimize access</li> <li>• retain vegetation to the extent practicable</li> <li>• During clearing, trees will be felled into the proposed site wherever possible</li> <li>• Clearing will comply with the requirements of all applicable permits and approvals, the Crown Forest Sustainability Act, The Forest Operations and the Silviculture Manual</li> <li>• Trees cleared during headpond preparation will be not be felled into the water</li> <li>• Wildlife trees, Culturally Modified Trees and other significant trees will be marked for protection; marked trees will only be removed if they are a safety concern that cannot be addressed in other practical ways</li> <li>• Brush will be disposed of by burning or chipping. When burning is carried out, it will be under permit with the MNR and according to the Forest Fires Prevention Act</li> <li>• Connection line poles should be situated at either end of a wetland to eliminate the need for pole installation within the wetland limits</li> </ul>	It is Xeneca's intention to conduct detailed field surveys within zone of influence in order to identify potential impacts and develop appropriate mitigation.	Unknown due to outstanding data and information

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Fish Habitat	Potential effects on habitat associated with water crossings on ROWs for access roads and distribution line	<ul style="list-style-type: none"> <li>Impacts to local fish populations and their habitats will be discussed with DFO and MNR as part of overall strategy for dealing with fish habitat at water crossings</li> <li>DFO Operational Statement for Overhead Line Construction will be adhered to in order to minimise impacts to fish and fish habitat.</li> </ul>	As the routing studies for access roads and distribution line ROWs currently underway conclude and the alignment is finalized it is Xeneca's intention to conduct detailed field surveys along the alignment, especially at key water crossings, in order to identify potential impacts and develop appropriate mitigation.	Unknown due to outstanding data and information
	Walleye and White Sucker spawning habitat within the anticipated inundation area.	<ul style="list-style-type: none"> <li>At this time the hydraulic modeling and the surveying required to fully assess the impacts to these fast water areas within the potential inundation area, both in terms of the extent of upstream influence and the potential range and frequency of water level fluctuations, is incomplete.</li> <li>It will be necessary to collect detailed survey information at each of these habitat areas for input to the HEC RAS model.</li> </ul>	Additional hydraulic modeling will be conducted to assess the potential impacts.	Unknown due to outstanding data and information
	Operational impacts on Walleye spawning habitat and invertebrate production at the base of the existing falls on the west side of the river	<ul style="list-style-type: none"> <li>It will be necessary to ensure that adequate flow is maintained over this habitat to ensure that it continues to function effectively for walleye spawning and egg incubation.</li> <li>The maximum turbine flow of the facility will be 38m<sup>3</sup>/s. Currently, the long term median flow during the walleye spawning season is estimated to be in the range of 100 m<sup>3</sup>/s.</li> </ul>	In order to predict the required flows necessary to protect the spawning function of the west channel walleye habitat and invertebrate production, it will be necessary to undertake modeling studies to determine the depth, velocity and wetted width of that habitat under a range of flows, to which the proponent is committed to undertaking.	Unknown due to outstanding data and information
	Operational impacts on fast water habitats which function as invertebrate habitat and possibly spawning habitat and will be altered by headpond inundation.	<ul style="list-style-type: none"> <li>These habitats would largely not be functioning after inundation. They would be included in DFO compensation plan.</li> </ul>	In order to determine whether ecological function is maintained, it will be necessary to undertake modeling studies to determine the depth, velocity and wetted width of that habitat under a range of flows, to which the proponent is committed to undertaking.	Unknown due to outstanding data and information
	Impacts to Northern Pike and their habitat	To be included in DFO compensation program.	In order to identify potential impacts and develop appropriate mitigation further investigation are required.	Assumed to be Yes
Fish Habitat	Impacts to Brook trout and their habitat	Presence not confirmed within project zone of influence. If confirmed, specific mitigation to be developed once impact assessment is complete.	In order to identify potential impacts and develop appropriate mitigation further investigation are required.	Assumed to be Yes



Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Fish Habitat	Construction activities in general	<ul style="list-style-type: none"> <li>• respect all-in water timing restrictions</li> <li>• isolate in-water construction area before or after in-water timing restrictions to avoid impacts</li> <li>• placement of intakes near natural barriers to migration</li> <li>• ensure a qualified person is on hand to oversee de-fishing activities prior to dewatering</li> <li>• design habitat mitigation and compensation measures through discussion and guidance with relevant authorities</li> <li>• employ best management construction practices including fish relocation plan, work site isolation and sediment control measures</li> <li>• blasting will occur outside of warm water fish spawning and incubation periods (April 1 to July 15, specific requirements to be established with DFO and MNR)</li> <li>• other blasting mitigation measures may include bubble curtains, isolation and dewatering of blast area, use of smaller charges, staggering of blasts</li> <li>• adhere to DFO operational statements for application during crossing of waterways for construction of transmission line, including Overhead Line Construction, Temporary Stream Crossings and Maintenance of Riparian Vegetation in Existing Right-of-Ways</li> <li>• conduct environmental monitoring to ensure that predicted conditions are accurate</li> <li>• Prompt and effective clean up and restoration once construction is complete</li> </ul>	Construction Management Plan will be finalized to include instructions and protocols for minimizing the disturbance to aquatic ecosystem during the construction program.	No
	Construction of intake and water conveyance structure and the temporary loss of habitat related to the construction of the coffer dam.	<ul style="list-style-type: none"> <li>• The cofferdam is anticipated to be constructed in accordance with the appropriate in-water timing window dictated by the Ministry of Natural Resources.</li> <li>• During construction, it is assumed that flow will be maintained uninterrupted downstream through staging and sequencing of construction.</li> <li>• Construction best management practices will be implemented to minimize the risk of off-site migration of sediments as well as adherence to in-stream timing window restrictions for construction activity.</li> </ul>	The impacts related to construction at the proposed powerhouse intake will be limited primarily to the alteration of habitat through the construction of the intake channel and the temporary loss of habitat related to the construction of the coffer dam. The upstream coffer dam construction will result in the temporary occupancy of 912m <sup>2</sup> of low sensitivity river bed.	Yes
	Construction of intake and water conveyance structure will result in the permanent loss of Walleye and White sucker spawning habitat. Based on the assessment of the conceptual design, the construction of the intake channel will result in the permanent alteration of 474m <sup>2</sup> of medium sensitivity habitat.	<ul style="list-style-type: none"> <li>• To be determined</li> </ul>	With regards to the Risk Management Framework it is contended that this undertaking represents a High degree of impact to medium sensitivity habitat. For these reasons the undertaking represents a Moderate risk to overall fish habitat productivity and will result in the requirement of a Fisheries Act Authorization for the HADD of fish habitat.	Yes

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Fish Habitat	Construction and excavation of tailrace and powerhouse -This alteration will result in the removal of the existing rapids (identified as spawning habitat) and smoothing of bottom substrates. This undertaking will result in the permanent alteration of approximately 571m <sup>2</sup> of Moderate/High sensitivity channel bed identified to contain spawning habitat.	<ul style="list-style-type: none"> <li>To be determined</li> </ul>	<p>Based on this assessment it is anticipated that the impacts associated with the tailrace and powerhouse construction have a High potential to result in the harmful alteration, disruption or destruction (HADD) of fish habitat due to the temporary loss and permanent alteration of spawning habitat for Walleye and White Sucker. For these reason the requirement for a Fisheries Act Authorization for the HADD of fish habitat is anticipated.</p> <p>The proposed compensation for these anticipated impacts will need to be developed and discussed with DFO once the engineering details for the project have been advanced during the permitting phase of the project. Effectiveness goals will need to be discussed with MNR and DFO to ensure the compensation will be effective. It is expected that the replacement of spawning habitats that will be lost or altered as a result of The Chute development will be required. In addition, a multi-year monitoring program (likely 1, 3 and 5 year) will be required to address the compliance and effectiveness monitoring of the elements detailed in the Fisheries Act Authorization.</p>	Yes
	Construction of Dam -The construction of the dam will effectively limit any upstream fish movement. Based on the assessment of the conceptual design, this undertaking will result in the permanent loss of approximately 1332m <sup>2</sup> of Moderate/Low sensitivity channel bed near the upstream limit of the rapids.	<ul style="list-style-type: none"> <li>To be determined</li> </ul>	With regards to the Risk Management Framework it is contended that this undertaking represents a High degree of impact to medium to low sensitivity habitat. For these reasons the undertaking represents a Moderate risk to overall fish habitat productivity and will result in the requirement of a Fisheries Act Authorization for the HADD of fish habitat.	Yes
	Construction of earthen embankment occupying an approximate footprint impact area of 1222m <sup>2</sup>	<ul style="list-style-type: none"> <li>Further study of the exact nature of the tributary habitat and the implications, from a fish habitat perspective will occur once the dam location if finalized.</li> </ul>	Relatively unstudied aspect of this project; Commitments to understanding the potential impacts associated with the construction of the earthen embankment dam will be further discussed through the impact assessment, detailed design, and permitting stages of the project.	Unknown due to outstanding data and information

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Fish Habitat	Potential effects on habitat and spawning from dewatering operations	<ul style="list-style-type: none"> <li>Dewatering activities will be done in a controlled manner so as not to discharge turbid water to the receiving watercourse.</li> <li>Materials such as filter bags, straw bales, filter fabric and paige wire fencing will be on site to create a dewatering corral for waste water as a contingency plan in the event that groundwater is encountered and additional filtering properties are required.</li> <li>Suitable containment/treatment areas will be identified by the Contract Administrator.</li> <li>The discharge point in the receiving watercourse will be carefully chosen as an area with low scour potential (i.e. bedrock bottom).</li> <li>If scour potential does exist, the contractor will use energy dissipation in the form of a splash pad or rock protection for the stream bottom.</li> </ul>	The ultimate discharge point to the receiving watercourse will be monitored to ensure that the filtering is effective in removing excess sediment. It will also be necessary for qualified professionals under permit from the MNR to complete a fish salvage operation from the area to be dewatered. In the event that not all fish can be successfully collected and relocated, a Section 32 Permit authorizing the destruction of fish by means other than fishing will also be required	Yes
Fish migration	Upstream passage through the eastern channel	<ul style="list-style-type: none"> <li>Upstream fish passage through the eastern channel is highly dependent on water levels and velocities and is only possible under certain flow conditions</li> </ul>	Relatively unstudied aspect of this project; Commitments to understanding the potential impacts to passage at the proposed Chutes GS will be further discussed through the impact assessment, detailed design, and permitting stages of the project.	Unknown due to outstanding data and information
	Downstream passage	<ul style="list-style-type: none"> <li>Downstream movement of larval fish and adults is quite likely; MNR has identified the requirement to maintain the downstream fish (larval and adult) movement through the operation of the spillway at The Chute</li> </ul>	Relatively unstudied aspect of this project; Commitments to understanding the potential impacts to passage at the proposed Chutes GS will be further discussed through the impact assessment, detailed design, and permitting stages of the project.	Unknown due to outstanding data and information
Fisheries	<i>See Fish Habitat Section above</i>			
Fish injury or mortality	Fish impingement or entrainment resulting in injury or mortality	<ul style="list-style-type: none"> <li>Engineer facility intake and design velocities to account for fish swimming capabilities to minimise potential for impingement or entrainment through turbine(s)</li> <li>If significant entrainment potential is identified, consider diversion methods for vulnerable fish species</li> </ul>	Specific turbine information such as diameter, number of blades, operational speed (r/min) and hydraulic capacity ranges (cms) is required for determining turbine mortality and needs to be determined.	Unknown due to outstanding data and information

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Erosion and sedimentation	Construction related impacts - Overland flow paths within the construction areas have the potential to carry construction-related sediment to the watercourse.	<ul style="list-style-type: none"> <li>• Areas will be identified in advance of construction and receive added protection and scrutiny during routine construction inspections particularly during the periods before and after rain events.</li> <li>• Sediment and erosion control measures will be installed prior to construction and maintained diligently throughout the construction operations.</li> <li>• Planting of vegetative cover will then follow in the next growing season.</li> <li>• Maintenance and inspection of the vegetative cover will continue until such time as the disturbed areas are sufficiently stabilized through vegetative growth to prevent overland runoff of suspended materials.</li> <li>• If construction finishes in a cleared area, with insufficient time left in the growing season to establish vegetative cover, an overwintering treatment such as erosion control blankets, fibre matting or equivalent will be applied to contain the site over the winter period.</li> <li>• Stockpile and staging areas will be well removed from the watercourse and be isolated with sediment and erosion control measures to prevent migration of material to the watercourse and natural areas.</li> <li>• Excess material from in-water excavation will be removed immediately from the channel area and temporarily stockpiled in suitable locations identified by the design drawings and on-site areas approved by an environmental inspector.</li> </ul>	Adhere to all applicable standard best management practices available to the industry	No
	Operation - Increased shoreline erosion and sediment deposition due to inundation and water level fluctuations	<ul style="list-style-type: none"> <li>• Limit maximum daily fluctuations of upstream water levels</li> <li>• Limit the rate of change of upstream water levels</li> <li>• Where the erosion survey has identified potential for shoreline erosion or ice scour, inspect and monitor for signs of erosion in year one and year five of operation to document degree of erosion and develop and implement additional mitigation measures as required</li> </ul>	Operations will be established to minimise erosion where possible. Follow-up monitoring will be completed to determine where erosion and sedimentation are occurring as a result of operations	Yes
Water levels, flows and movement (surface water)	Increase in water level and residency time in headpond	<ul style="list-style-type: none"> <li>• Limit maximum daily fluctuations of upstream water levels</li> <li>• Limit the rate of change of upstream water levels</li> <li>• Facility will operate as a modified run of river facility (run of river operation during extreme high and low flow periods of the year)</li> <li>• Headpond volume limited to approximately 275,000 m<sup>3</sup> which represents no more than a few hours water storage during intermittent operations</li> </ul>	A headpond will be required for the project.	Yes
	Variation in flows within downstream variable flow reach	<ul style="list-style-type: none"> <li>• A downstream minimum environmental flow of 2.3-2.6 cms is proposed to be continually passed over the spillway of the dam to maintain ecological habitat viability within the variable flow reach</li> <li>• Further consultation with regulators will be conducted to confirm this minimum environmental flow value</li> </ul>	DFO authorization for seasonal minimum environmental flow in variable flow reach will be sought following consultation with regulators and incorporated into the approved operating plan for the facility	Unknown due to outstanding data and information
Changes to overall thermal regime of waterway	Changes to thermal regime of waterway within headpond as a result of inundation and storage	<ul style="list-style-type: none"> <li>• Headpond volume limited to approximately 275,000 m<sup>3</sup> which represents no more than a few hours water storage during intermittent operations</li> <li>• Temporary storage would occur during night time hours when additional solar absorption is limited</li> </ul>	No impacts anticipated - small headpond with low storage capacity and timing of temporary storage will mitigate potential for significant change in thermal regime	No

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Drainage, flooding and drought patterns	Alteration from natural patterns	<ul style="list-style-type: none"> <li>• Limit maximum daily fluctuations of upstream water levels</li> <li>• Limit the rate of change of upstream water levels</li> <li>• Facility will operate as a modified run of river facility (run of river operation during extreme high and low flow periods of the year)</li> <li>• Final facility design to ensure flood passage capacity and public safety issues are adequate to meet the requirements of the <i>Lakes and Rivers Improvement Act</i> approval following the completion of the EA</li> </ul>	Low negative impacts anticipated - Dynamic modeling shows facility will modify normal flooding patterns	Yes
<b>Aboriginal Community</b>				
First Nations reserves or other aboriginal communities	Local Aboriginal Communities (LAC), Identified Aboriginal Communities (IAC) request for engagement	<ul style="list-style-type: none"> <li>• MNR has notified LAC's and IAC's of the proponents request for site release</li> <li>• Proponent commits to engage in discussion after the issuance of a Notice of Completion at which time EA will be provided to communities for review for a minimum of 60 days</li> </ul>	Ongoing engagement and consultation with Aboriginal communities will continue after completion of EA	Unknown due to outstanding data and information
Spiritual, ceremonial, cultural, archaeological or burial sites	Culturally modified trees (Eastern white cedar); other cultural resources	<ul style="list-style-type: none"> <li>• transplant and relocate traditionally valued plants to designated areas with similar habitat conditions for protection</li> <li>• Workers will be advised to follow the Discovery Protocol and to notify their supervisor immediately for instructions if they encounter any trees they suspect may have been culturally modified</li> </ul>	Ongoing engagement and consultation with Aboriginal communities will continue after completion of EA. In addition, a Stage 2 archaeological survey will be conducted in 2011 to identify the presence of and assess impacts to cultural heritage in the footprint of the project. Participating Aboriginal community members will be engaged during this assessment.	Unknown due to outstanding data and information
Traditional land or resources used for harvesting, hunting, fishing, trapping	Impacts to traditional resource gathering activities	<ul style="list-style-type: none"> <li>• keep trap lines and trails clear of slash</li> <li>• minimize alteration and turbidity of fish habitat</li> <li>• minimize harassment of wildlife</li> <li>• keep staging areas tidy and free of litter</li> </ul>	Ongoing engagement and consultation with Aboriginal communities will continue after completion of EA	Unknown due to outstanding data and information
Lands subject to land claims	No issues	<ul style="list-style-type: none"> <li>• there are no land claims in the projects area of impact</li> </ul>	N/A	
Rivers and waterways - Culturally significant	Culturally significant waterway, Chapleau Cree First Nation opposed to concrete in waterways	<ul style="list-style-type: none"> <li>• proponent will consider alternative dam design and construction methodology to utilise alternate materials and methods (rock fill, etc) to minimise the use of concrete wherever possible</li> </ul>	Ongoing engagement and consultation with Aboriginal communities will continue after completion of EA	Unknown due to outstanding data and information
<b>Land and Resource Use</b>				
Access to inaccessible areas	Facilitation of access as a result of upgrades/maintenance of area access roads and bridges	<ul style="list-style-type: none"> <li>• install gates, fencing and signage to limit unauthorised public access</li> <li>• operational staff to monitor for signs of unauthorised access and report to appropriate local authorities/MNR</li> </ul>	Low negative impacts - road upgrades and ongoing maintenance activities could result in increased access to the area	Yes

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Navigation	The Ivanhoe River is a recognized canoe route	<ul style="list-style-type: none"> <li>consult with MNR and local boaters to determine periods of use and minimum flow requirements</li> <li>provide for and maintain portage and canoe passage around the site to ensure safe passage</li> <li>Portage routes will be subject to review under the Navigable Waters Protection Act</li> <li>consult with MNR and local users to determine periods of use and potential mitigation strategies</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
Riparian rights or privileges	Impacts associated with inundation	<ul style="list-style-type: none"> <li>the project will operate as a run-of-river with modified peaking facility and inundation area and variable reach is located entirely on Crown land</li> </ul>	N/A	No
Recreational use	Potential impacts to the boat launch downstream either through access or water level fluctuation	<ul style="list-style-type: none"> <li>provide for and maintain portage and canoe passage around the site</li> <li>consult with MNR and local boaters to determine periods of use and minimum water level requirements</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
Recreational use	Popular recreational camping area is located adjacent to the project site	<ul style="list-style-type: none"> <li>provide for and maintain portage and canoe passage around the site</li> <li>consult with MNR and local users to determine periods of use and potential mitigation strategies</li> <li>review potential for upgrade of boat launch and tailoring areas adjacent to established boat launch</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
	Public access and hiking trail on Eastern shore; access to general area	<ul style="list-style-type: none"> <li>provide for and maintain portage and canoe passage around the site</li> <li>consult with MNR and local users to determine periods of use and potential mitigation strategies</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
Angling, hunting opportunities	Effects on bear and moose hunting	<ul style="list-style-type: none"> <li>keep trap lines and trails clear of slash</li> <li>minimize alteration and turbidity of fish habitat</li> <li>minimize harassment of wildlife</li> <li>keep staging areas tidy and free of litter</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
Trapping	Project activities on trapping lines in the area	<ul style="list-style-type: none"> <li>Consultation with MNR SIP has identified no trap lines within the projects area of influence</li> </ul>	N/A	No
Baitfish harvesting activities	No issues	<ul style="list-style-type: none"> <li>Consultation with MNR SIP has identified no bait fish harvesting areas within the projects area of influence</li> </ul>	N/A	No

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Views or Aesthetics	Area is a popular recreational area	<ul style="list-style-type: none"> <li>consult with MNR and local users to determine periods of use and potential mitigation strategies; The Chapleau Cree indicated a preference for the construction of a rock clay-fill dam instead of a concrete water control structure to minimize the effects on natural aesthetics of the area.</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
An existing land or resource management plan	Forest resources on Crown Land adjacent to the site are allocated under a Sustainable Forestry License to Domtar Inc. - Eacom	<ul style="list-style-type: none"> <li>negotiate with license holder and MNR to permit for the harvesting/clearing of forest resources within the proposed inundation area/road construction prior to construction/flooding</li> </ul>	Ongoing engagement and consultation with SFL holder will continue after completion of EA	Unknown due to outstanding data and information
	The Ivanhoe River is managed under the Mattagami water management plan	<ul style="list-style-type: none"> <li>the development will conform to the principles of the existing Mattagami River Water Management plan</li> <li>Water management planning principles taken into account during project planning and incorporated into operating plan for the facility</li> </ul>	Ongoing engagement and consultation with Mattagami WMP SAC will continue after completion of EA	Unknown due to outstanding data and information
Protected areas	Distribution route (Option 2) crosses Groundhog River Provincial Park for 0.5km	<ul style="list-style-type: none"> <li>Distribution line (Option 2) would only be selected should the Third Falls project be approved</li> <li>Proponent will ensure selected route will minimise impacts to Park lands</li> </ul>	Low negative impacts - impacts possible if distribution line route (Option 2) is selected as Point of Connection requires crossing of Park lands	Yes
Forestry	Harvesting of merchantable timber during construction	<ul style="list-style-type: none"> <li>restrict clearing to approved right-of-way to minimize area of impact</li> <li>negotiate with license holder and MNR to permit for the harvesting/clearing of forest resources within the proposed inundation area/road construction prior to construction/flooding</li> </ul>	Positive impact - Timber removal represents a potential benefit to local SFL holder by sale/processing of merchantable timber.	Yes
	Processing of non-merchantable timber	<ul style="list-style-type: none"> <li>make useable fuel wood available to local communities</li> <li>chip brush and slash to minimize fire hazards</li> <li>site ROW along existing access where possible to limit soil/habitat disturbance</li> <li>ROW maintenance should be completed using mechanical (not chemical) controls</li> </ul>	No impacts anticipated - following removal of merchantable timber, ROW and inundation area will be maintained.	No
Mine claims	Possible presence of mine claims within project area or along distribution line route	<ul style="list-style-type: none"> <li>verification of claims in the vicinity through CLAIMS Maps have revealed no mine claims in project area (CLAIMS last checked on July 6, 2011)</li> </ul>	N/A	No



Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
<b>Cultural Heritage Resources</b>				
Archaeological sites	Disturbance or destruction to significant archaeological sites	<ul style="list-style-type: none"> <li>• Stage 1 archaeological review identified areas of high archaeological potential within the project area</li> <li>• Stage 2 when completed will identify potential for archaeological resources to be located in project area.</li> <li>• If archaeological or heritage resources are discovered during clearing or construction, work will be stopped until an archaeologist has assessed the find and a course of action is determined.</li> <li>• A step-by-step Discovery Protocol will be prepared and implemented for project construction</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Stage 2 Archaeological Review)	Unknown due to outstanding data and information
Buildings or structures	Disturbance or destruction to heritage buildings or structures	<ul style="list-style-type: none"> <li>• Results of Stage 1 did not identify potential for built heritage structures within the project area.</li> </ul>	No further action required.	No
Cultural heritage landscapes	Disturbance or destruction to cultural heritage landscapes	<ul style="list-style-type: none"> <li>• Results of Stage 1 did not identify potential for cultural heritage landscapes within the project area. Stage 2 study will confirm this assessment</li> </ul> <p>The Chapleau Cree indicated a preference for the construction of a rock clay-fill dam instead of a concrete water control structure to minimize the effects on natural aesthetics of the area.</p>	Will be determined following the conclusion of 2011 data acquisition strategy (Stage 2 Archaeological Review)	Unknown due to outstanding data and information
<b>Social and Economic</b>				
The location of people, businesses, institutions or public facilities	Impacts to riparian property or businesses	<ul style="list-style-type: none"> <li>• No private riparian land exists within the projects area of influence</li> </ul>	N/A	
The location of people, businesses, institutions or public facilities	Disruption to access, schedules and activities	<ul style="list-style-type: none"> <li>• limit disruptions to traffic flow by maintaining adequate access along travelled routes, and alternate access if required</li> <li>• avoid sensitive time periods and advise residents of planned activities that may cause a disruption in schedule</li> <li>• construction materials and equipment should be segregated in staging areas during off hours</li> <li>• monitor condition of gravel roads and if construction traffic is causing damage, that repairs are undertaken promptly</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
Community character, enjoyment of property or local amenities	Potential effects on property enjoyment, recreational water use, tourism values, aesthetic image	<ul style="list-style-type: none"> <li>• No private riparian land exists within the projects area of influence</li> </ul>	N/A	No
Community character, enjoyment of property or local amenities	Local community and cottagers potential effects on ability to ice fish	<ul style="list-style-type: none"> <li>• Engage with local community and cottagers to identify areas and times of use and minimum water level and fluctuation requirements to mitigate impacts</li> <li>• avoid sensitive time periods and advise residents of planned activities that may cause a disruption in schedule</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Employment - Local and regional labour supply	Construction activities will support direct and indirect local employment	<ul style="list-style-type: none"> <li>• promote contract bids and offers of service from communities including Foleyet and Timmins</li> </ul>	Positive impact - construction and operation represents a potential benefit to local communities	Yes
Local, regional or provincial economies	Remote tourism operators potential increase of public access through new road construction may deter tourists and affect remoteness of area	<ul style="list-style-type: none"> <li>• conduct a survey of client base to determine which elements are worth paying a premium; remoteness, good fishing</li> <li>• build landing areas or docking facilities to compensate for impacted portage routes and launching areas</li> <li>• install gates and fencing</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
	Impacts to tourism/outfitters as a result of impacts to fisheries and public access	<ul style="list-style-type: none"> <li>• provide for and maintain portage and canoe passage around the site</li> <li>• consult with MNR and local users to determine periods of use and potential mitigation strategies</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
Public health and/or safety	Forest or brush fires caused as a result of project activities	<ul style="list-style-type: none"> <li>• project personnel will be prepared and be familiar with the site Fire Preparedness Plan</li> <li>• fire fighting equipment will be available to all workers and the location of such equipment will be outlined in the Fire Preparedness Plan</li> <li>• Locations of equipment and muster points will be advertised as necessary around the site</li> <li>• project personnel will be familiar with fire-fighting techniques and the use of supplied equipment</li> <li>• uncontrolled fires will be immediately reported to the nearest fire emergency service and the MNR in the case of an uncontrolled fire on Crown land</li> <li>• smoking will only be permitted in designated smoking areas equipped with fire extinguishers</li> <li>• disposal and storage of waste will be into proper waste containers to prevent fires</li> </ul>	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No
	Impacts associated with facility construction	<ul style="list-style-type: none"> <li>• Restriction of public access to the site during construction (fencing, signage, etc)</li> <li>• provide and maintain routes for the public to be able to bypass the site (portage, etc)</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>	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No
	Impacts for navigation and recreation associated with facility operation	<ul style="list-style-type: none"> <li>• A public safety measures plan will be developed for the site to identify hazards and suggest mitigation measures to address identified safety issues</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>	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Public health and/or safety	Production of waste in and around work site	<ul style="list-style-type: none"> <li>• Appropriate disposal containers will be available for the prompt disposal of waste</li> <li>• full disposal containers will be removed to the appropriate waste disposal facility on a regular basis</li> <li>• Organic/food waste will be collected daily and stored in closed, animal resistant containers until disposed of at an approved waste disposal site or incinerated on-site according to project permitting standards</li> <li>• keep staging areas tidy and free of litter</li> <li>• Bear awareness training will be provided to all Project personnel.</li> </ul>	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No
Tourism values	Impacts to tourism/outfitters as a result of impacts to fisheries and public access	<ul style="list-style-type: none"> <li>• consult with MNR and local users to determine periods of use and potential mitigation or compensation strategies</li> </ul>	Will be determined following the conclusion of 2011 data acquisition strategy (Ivanhoe River Usage Survey) which is currently being conducted by MNR with the approval of the proponent to fully understand the impact of the proposed development on the fisheries and recreational enjoyment of the Ivanhoe River	Unknown due to outstanding data and information
Water supply	Town of Foleyet Water Supply	<ul style="list-style-type: none"> <li>• Hydraulic modeling and consultation with the Town of Foleyet has determined that the maximum extent of headpond inundation (6.4 km) will not impact the intake for the drinking water or waste water outflow (located approx 20 km upstream of the proposed facility location)</li> </ul>	No potential for impact - consultation and investigation show that inundation will not have the ability to impact utilities	No
Aesthetic image of the surrounding area	Impacts to the remote/rural aesthetic of the project area	<ul style="list-style-type: none"> <li>• maintain and enhance vegetative buffers between the river, roads, and any ancillary works to preserve the aesthetic quality of the area for recreational enjoyment of the river</li> <li>• infrastructure design should consider aesthetics to provide the minimal visual impact while remaining economically feasible</li> </ul>	Low negative impacts - impacts will be mitigated to the greatest extent possible through the design of the facility and operational plan. Access controls will be implemented to discourage more use of the site thereby maintaining the rural residential nature of the site	Yes
<b>Energy/Electricity</b>				
Reliability	Voltage support	<ul style="list-style-type: none"> <li>• Capacity of new power generation units are relatively small</li> </ul>	Operation of facility in parallel with the existing power grid will provide minor impact on the overall power system reliability and power quality (voltage and frequency)	Yes
Security	Black Start capability	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	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.	Yes

Environmental Component	Issue	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Electricity flow patterns	Power flow system	<ul style="list-style-type: none"> <li>• Appropriate mitigation technical measures will be proposed in the control system of the power grid and new generation units if required</li> </ul>	Operation of the new power generation units will redistribute power flow in the existing distribution system.	Yes
Other	Protection control settings	<ul style="list-style-type: none"> <li>• Appropriate mitigation technical measures will be proposed in protection and control system of the power grid.</li> </ul>	Operation of the new power generation units will affect existing protection and control settings in the distribution system.	Yes

### 5.1.1 Inundation

Hydraulic modeling with HEC-RAS has indicated that the construction of the water control structures required to divert water to the proposed facility will potentially result in the creation of a head pond extending approximately 6.4 km upstream. In 2010, field investigations were geographically scoped for a 2.88 km reach upstream of the dam. To address this gap, the project team has identified key areas of interest upstream of the 2.88 km point.

The approach to evaluating the potential effects to these areas and any required mitigation were developed by the project team and regulators during a meeting held with MNR on June 15, 2011. Assessments will be completed through the 2011 field season and prior to permitting and construction. A July 4, 2011 letter from Xeneca to the MNR summarising the results of the meeting is included in Appendix C.

### 5.1.2 Flow Effects

Those effects and management strategies associated with the operation of the facility, especially in the head pond and variable flow reach, are summarised in the Proposed Operating Flows and Levels report found in Annex I-B and the Natural Environmental Characterization and Impact Assessment report found in Annex III.

#### Erosion

In order to minimize erosion effects, the maximum daily fluctuations of upstream water levels will be limited. The operating plan parameters proposed in Annex I-B for daily fluctuation have been selected to be less than the amount of seasonal and inter-annual fluctuation that has been occurring naturally over time in the upstream river reach. By limiting the daily fluctuation, vegetation will be able to naturally re-establish along the shoreline, thereby limiting the erosion potential.

Rapid changes in shoreline water levels can increase erosion. Where pore water in the soil dissipates too quickly, pore pressure can loosen soil grains and cause loss of stability in the soil structure, thereby enhancing erosion. By limiting the rate of change upstream water levels, this erosion mechanism is avoided.

### 5.1.3 Aquatic Habitat (Ecological Flow/Water Level Requirements and Effects)

A discussion of identified potential effects and general mitigation measures can be found in the Natural Environmental Characterization and Impact Assessment report found in Annex III, and have been summarized in Table 4.

### Water Temperature in Head Pond

The total proposed head at the dam is 9.5 m, and water withdrawal will be across the entire depth of the water column. With this head, surface and bottom waters are typically similar in temperature. Additionally, the proposed head pond is quite small, with a storage capacity of only a few hours. As a result, water temperature within the head pond is not expected to change significantly from that of the inflowing river.

### Mitigation for Impacts Associated with Operation

To reduce the potential for negative habitat impact upstream during modified run-of-river operation, the maximum daily fluctuations of upstream water levels will be limited. The operating plan parameters proposed herein for daily fluctuation have been chosen to be less than the amount of seasonal and inter-annual fluctuation that has been occurring naturally over time in the upstream river reach. This does not eliminate the potential for effects, but it limits the potential extent of impact while still maintaining the socio-economic benefit of shifting some electricity production to times when electricity usage is high in the Province.

The design of the facility is intended to minimize the environmental footprint of the project and, in combination with the proposed operating parameters, is believed to avoid significant impacts on the upstream habitat that has been studied.

To reduce the potential for impact within the Variable Flow Reach during intermittent operations, the following approach was employed when selecting operating parameters:

1. Timing of event: Special attention was given to the timing of aquatic habitat events and the relationship to the range of natural flows that could occur during these periods. Where intermittent operation may occur during the identified periods, the bypass flow to be provided while the facility is stopped was given special consideration.
2. Sizing of bypass flows: Bypass flows were considered in the context of the associated water depth, flow velocity and wetted perimeter in the Variable Flow Reach. The objective is to minimize the amount of water released during times when the facility is stopped, while providing enough water to minimize stress on the aquatic environment.
3. Controlled ramping of flows: To minimize the sudden release of water that occurs during start up, a ramping procedure was developed. The ramping procedure requires the facility to start at minimum turbine capacity ( $Q_{Tmin}$ ) and gradually ramp up output until the desired operating rate is reached.

4. Limiting maximum turbine flow ( $Q_{\text{Lim}}$ ): During intermittent operation, the turbine flow will be set to not exceed an upper limit to minimize the amount of flow variability that occurs on a daily basis.

The proposed operating parameters have been designed with the objective of avoiding significant impacts on the downstream habitat associated with the project. It should be noted that operating parameters for turbine flows depend on the final design and equipment selected at construction. As such, some variation in the identified parameters may occur, however the objectives of the mitigation and ecological flows ( $Q_{\text{EA}}$ ) provided will not change.

#### **5.1.4 Project Footprint**

Those effects and management strategies associated with constructing and maintaining the facility and ancillary components are predominantly associated with the natural heritage aspect of the overall environment, and are therefore identified in the Natural Environmental Characterization and Impact Assessment Report found in Annex III. These have been summarized in Table 4.

#### **5.1.5 Fish Entrainment and Impingement and Turbine Mortality**

A discussion of identified potential effects and general mitigation measures in regards to fish entrainment and impingement will be undertaken once the type of turbine, detailed design of the intake structure and approach velocity are known. Operational management measures that can be considered to reduce the potential risk to fish upstream of the intake can be found in Table 4.

#### **5.1.6 Navigation**

The river is not used for commercial navigation but is used for recreational purposes. As mentioned previously, the Ivanhoe River is a recognized canoe route which provides a waterway link to James Bay. The construction of a dam across a navigable waterway will require an approval by Transport Canada under the *Navigable Waters Protection Act*. Access to the Ivanhoe River is via a boat launch immediately downstream of the project site. This point provides a link to backcountry hunting and fishing activities not accessible by road. The Chute is by-passed via established portage routes located on both banks. The proposed facility will require the re-establishment of portages to mitigate impacts in relation to flooding and the project footprint. Special arrangements will be made during the construction phase of the project in order to ensure public safety during this time.

Recreational use and enjoyment of the waterway was discussed during the Public Information Centres and other stakeholder consultation events. Members of the public in attendance appeared to be satisfied with these management strategies.



Navigation impacts downstream of the site could result during times of modified run-of-river operation in the Variable Flow Reach. During certain hours, the flows and water depths would be lower than those presently experienced. At other times, flows and water depth would be greater than normal.

Intermittent operation would occur only in periods while flows are low, some of which occur during the winter months when the river is frozen and not navigable. During summer months, the proponent is committed to the determination of minimum flows that would occur when the facility is stopped to mitigate potential restrictions to watercraft.

#### **5.1.7 Public Safety**

Public safety during construction and operation of the project has been identified as a concern. Those effects and management strategies associated with the construction and operation of the facility are summarised in the Proposed Operating Flows and Levels report found in Annex I-B and in the Construction Management plan found in Annex II-B.

#### **5.1.8 Civil Structure and Private Property**

The following steps were taken in developing the proposed operating parameters for the Project to mitigate impacts to Civil Structure and Private Property:

The maximum upstream operating water level was carefully set based on the results of the HEC-RAS Study to specifically avoid infringing on the pre-construction High Water Mark at any civil structure or private property. The proposed operating values were reviewed to ensure that any backwater inundation effect does not exceed the natural High Water Mark in areas where the potential for impact exists. The operating plan parameters proposed in Annex II-B for daily fluctuation were reviewed to ensure that impact on civil structures would not be a concern. During flood passage, where the natural flow exceeds the maximum turbine capacity, the facility will be operated to minimize flood impacts upstream by operating the spillway, turbine and bypass structures accordingly. The spillway and bypass structures will be sized and designed to provide the amount of flood passage capacity required to meet the objectives of the operating plan. This step will be assessed in more detail in the detailed engineering design stage.

#### **5.1.9 Surface Water Quality**

Consideration was given to the effects of the project on surface water quality, including the potential use of the waterway as a potable water supply.

There are potential adverse effects on water quality during construction due to erosion and sedimentation, accidental spills, clearing, backfilling, contouring and excavation. As a result, standard construction and industry best management practices will be maintained during the

construction program to prevent accidental spills, control erosion and sedimentation, and to manage any groundwater that must be removed from excavations. Spill prevention and emergency fuel supply containment measures (as required by Technical Standards and Safety Authority) will be required within the facility throughout the operational period; mitigation measures are described in detail in Table 4.

The Chapleau Cree indicated a preference for the construction of a rock clay-fill dam, instead of a concrete water control structure, to minimize the effects on water quality and natural aesthetics. Xeneca engineering team will consider this alternative material to concrete structure if the geotechnical investigation results are favourable to this design option.

During operation, potential effects on water quality may occur as a result of accidental spills and sedimentation as a result of shoreline erosion caused by inundation and water level fluctuation in the head pond.

The intake for the water supply and the outflow for the sewage treatment facility for the Town of Foleyet are located approximately 20 km from the proposed facility, outside of the proposed 6.4 km inundation area. As a result, the proposed facility will not impact the operation of these facilities.

#### **5.1.10 Area Aesthetics**

Preserving the natural aesthetics of the waterway and surrounding area will be considered as part of the proposed development. As mentioned previously, the area of the falls have an aesthetic value with local residents and tourists as well as Aboriginal community members. People engage in camping, hiking, fishing and other associated outdoor pursuits. In order to determine public access and use of the area, a value based survey is being conducted by the MNR under agreement with the proponent.

Maintaining or enhancing vegetative buffers between the river, roads, and any ancillary works should be a consideration during detailed design to preserve the aesthetic quality of the area; proposed mitigation measures are provided in Table 4.

#### **5.1.11 Employment & Economic Effects**

Construction and operation of the project will generate a positive economic effect in the Township of Foleyet, the Town of Chapleau and the City of Timmins resulting in opportunities for employment of community members. Similar employment opportunities will also exist for the Taykwa Tagamou Nation and the Chapleau Cree First Nation (Fox Lake Reserve).

Economic benefits will include employment, expenditures on materials, equipment and services and contribution of renewable energy to the Provincial supply mix. The proposed Ivanhoe River - The Chute generating station will have a total installed capacity of approximately 3.6 MW. Waterpower creates jobs, generates revenue for the taxpayers of Ontario, and is the longest lived and most reliable source of renewable electricity:

- Direct economic activity to build a waterpower project in Ontario is approximately \$5 million per megawatt. Generally, about half of this amount is spent locally (approximately \$9 million in the case of this project), in procuring construction labour & materials, consulting and legal services, trucking and other services such as accommodation, food and fuel.
- Direct job creation (construction) is estimated to be approximately 36,000 person hours of work. Indirect job creation is estimated to be approximately 54,000 person hours of work supporting the project and personnel.
- A significant return to the people of Ontario paid through Gross Revenue Charges (GRC) and provincial and federal income taxes. Return to the people of Ontario will continue past the 40 year contract, likely as long as the facility is in operation.
- Waterpower lasts. Many power plants built in the early 1900s are still in operation and with regular maintenance and upgrades can last for many generations. In comparison, the life span for other sources of renewable power is: nuclear 40 years, wind 20 years, solar 20 years.

Although jobs will be created, remote tourism operators are concerned that their businesses will suffer as a result of increased access to otherwise inaccessible areas. The operators promote themselves based on the remoteness and the unique experience that visitors will have. Many visitors come to experience backcountry hunting and fishing, The MNR, with approval from the proponent, began conducting a value based survey on June 6<sup>th</sup>, 2011 of river users. The results from this survey will facilitate the identification of the potential impacts to these businesses.

## 5.2 SPECIFIC CONSULTATION ISSUES AND RESOLUTIONS

A summary of the specific issues identified during the regulatory agency, government department and public and Aboriginal consultation process is presented in tabular format as Table 4: Identified Issues and Management Strategies, for the reader's convenience. The table identifies how resolution to each identified issue has been or may be resolved, and whether any outstanding issues or concerns remain. The issues are presented by environmental consideration.

### 5.3 CONSIDERATION OF ACCIDENTS AND MALFUNCTIONS

This section presents the issues identified specifically related to potential accidents and malfunctions during operation.

Under *CEAA*, the federal environmental assessment of the undertaking must consider the effects to the environment if an accident or malfunction were to occur during the construction or operation of the project. Consideration must be given to such events as spills and leaks, power failures, toxic substances, and worker and public health and safety.

As the mitigation measures and best management practices detailed in Table 4 of this document will be implemented, it is unlikely that spills and leaks would occur during the construction period. The engagement of an environmental monitor to oversee construction activities should further ensure the prevention of releases of deleterious substances to the environment. Additionally, the health and safety of all contractors and construction crews on both federal and provincial lands will be subject to *Ontario Regulation 231.91* which governs construction projects in Ontario. The health and safety of operational staff at the generating station will be governed by the *Occupational Health and Safety Act*. Public access will be restricted during the construction activities at both the GS site and along the connection line.

Toxic substances are rarely employed at hydroelectric generating stations. Generally, only small quantities of normal industrial lubricants are required for operation. A diesel generator for emergency power supply at the generating station will be required, necessitating the installation of an above- ground storage tank (AST) for diesel fuel. The installation and operation of the AST will be subject to the *Technical Standards and Safety Act*, Ontario Reg. 213.01 (fuel oil).

A power failure at the generating station will result in the inability of the powerhouse to discharge water which will affect project revenues. Should this power failure occur during peak flow periods, the proponent will be responsible for ensuring that peak discharge can be passed downriver.

### 5.4 EFFECTS OF ENVIRONMENT ON THE PROJECT

For projects subject to the *CEAA*, there is a requirement to consider the effects of the environment on the project. These effects may be of short duration such as a heavy rainfall event, or longer duration such as the anticipated effects of climate change on the project.

Disruptions in energy transmission and generation would result in decreased economic returns for the proponent. The powerhouse will be equipped with a back-up generator to ensure that station service power can be restored to the facility should a grid failure occur. However, the facility cannot be operated (i.e. generation cannot recommence) until the electrical grid can

accept the power generated. In this situation no water would be passed through the powerhouse but would be directed through the by-pass designed into the facility. The design of this by-pass will represent at least the pre-project capacity of the natural Chute. This aspect of the approval process will be dealt with after the environmental assessment process is completed, as the detailed engineering design is being finalized.

#### **5.4.1 Precipitation and Flooding**

Operations during extreme events, such as floods, droughts and safety emergencies may need to deviate from the normal operating parameters to manage flows and mitigate impacts. Proposed operational changes in response to floods are described in Section 3.6.4.

It should be noted that the facility is not designated to mitigate the effects of naturally occurring events such as floods and droughts. However, there are circumstances where the existence of the facility can either aid in managing such an event or pose an additional risk. The flood risk aspects are managed, in part, through the government approval under the *Lakes and Rivers Improvement Act* of the engineering plans and specifications for the design of the facility. The purpose of this process is to ensure that the flood passage capacity of the facility is adequate and that the risk to property and public safety is duly considered. This aspect of the approval process will be dealt with after the environmental assessment process is completed and when the detailed engineering design is being finalized.

#### **5.4.2 Extreme Winter Conditions**

Extreme cold weather conditions may lead to a build-up of ice at the intake that could necessitate plant shut-down and an interruption to the delivery of electricity to the provincial supply grid.

#### **5.4.3 Extreme Summer Conditions**

Drought conditions could necessitate the shut-down of the facility and an interruption to the delivery of electricity to the provincial supply grid as a result of reduced flows within the river.

#### **5.4.4 Lightning Strikes**

A direct hit on the facility may lead to facility shut-down and prolonged interruption to the delivery of electricity to the provincial supply grid.

#### **5.4.5 Accidental Fires**

Lightning strikes as well as manmade fires could result in uncontrolled forest/brush fires which may interrupt the operation of the facility and the delivery of electricity to the provincial supply grid. Forest fires may also limit the ability of personnel to access the facility to conduct operations or maintenance.

#### **5.4.6 Earthquakes**

The continual shifting of large segments of the earth's crust, called tectonic plates, causes more than 97% of the world's earthquakes. Eastern Canada is located in a relatively stable continental region within the North American Plate and, as a consequence, has a relatively low rate of earthquake activity. Nevertheless, large and damaging earthquakes have occurred here in the past, and will inevitably occur in the future.

The project area is located in the Northeastern Ontario Seismic Zone, and according to Natural Resources Canada (<http://earthquakescanada.nrcan.gc.ca>) this zone experiences a very low level of seismic zone activity. NRCan reports that from 1970 to 1999, on average, only one or two magnitude 2.5 or greater earthquakes were recorded in this area, and two magnitude 5 earthquakes (northern Michigan and northwest of Kapuskasing) have occurred in this region. The location of the project in this low seismic activity area presents a low potential for the facility to be affected by this type of geological event.

#### **5.4.7 Climate Changes and Other Weather Related Effects**

According to the National Round Table on the Environment and the Economy ([www.nrtee-trnee.com](http://www.nrtee-trnee.com)), widespread impacts are expected across Canada as a result of increasing temperatures and moisture levels. Among the changes predicted, the Round Table is forecasting that Ontario will experience increased disruptions to energy generation and transmission. Among the many predictions offered, there includes a doubling in the frequency of extreme rain events and increasing costs to providing community services in Canada during the 21st century.

### **6. RESIDUAL ADVERSE EFFECTS AND SIGNIFICANCE**

A summary of the specific issues identified during the regulatory agency and public consultation process is presented in Table 4. The final column in Table 4 indicates whether an issue remains unresolved and is therefore considered a residual effect.

The residual effects of a project are those that are expected to remain despite the application of mitigation measures. The Ministry of the Environment's *Guide to Environmental Assessment Requirements for Electricity Projects* (March 2001) provides criteria for assessing significance:

- the value of the resource affected;
- the magnitude of the effect;
- the geographic extent or distribution of the effect;
- the duration or frequency of the effect;
- the reversibility of the effect;
- the ecological/social context of the effect.

By applying these criteria, the residual effects can be then be classified as either **not significant**; the residual effect is minor or insignificant, or **significant**; no additional mitigative measures can be applied to reduce the impact of the effect so the effect remains significant.

An assessment of the residual effects (including the positive impacts) of the proposed undertaking are presented in Table 5.



TABLE 5: Residual Environmental Effects and Significance

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/Social Context	Likelihood of Effect	Significance
<b>General Natural Environment</b>										
Air quality	Exhaust emissions from equipment and vehicles	Yes	High	Low	1-10	13-36	Reversible	Relatively Pristine	High	Not Significant
	Odour	Yes	High	Low	< 1	13-36	Reversible	Relatively Pristine	Low	Not Significant
	GHG Offsets	Yes	High	Low	> 10,000	Continuous	Reversible	Previously Impacted	High	Positive
	Dust emissions from construction activities and vehicles	Yes	High	Low	1-10	13-36	Reversible	Relatively Pristine	High	Not Significant
Water quality (surface and groundwater)	Surface water - general construction activities along shoreline of waterway	Yes	High	Low	1-10	13-36	Reversible	Relatively Pristine	Low	Not Significant
Water quality (surface and groundwater)	Surface Water - In-water works construction and removal of the cofferdam: potential for excess sediment to be suspended and carried downstream by river flow	Yes	High	Low	11-100	1-12	Reversible	Relatively Pristine	Low	Not Significant
	Contamination from spills or leaks of hazardous substances	Yes	High	Low	1-10	13-36	Reversible	Relatively Pristine	Low	Not Significant
	Intermittent operation of facility - increase in suspended sediment	Yes	High	Low	1-10	possible for up to 9 months of every year	Reversible	Relatively Pristine	Low	Not Significant
Terrestrial wildlife (numbers, diversity, distribution)	General disturbance to habitat during construction and maintenance	Yes	Medium	Low	11-100	Continuous	Reversible	Relatively Pristine	High	Not Significant

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/Social Context	Likelihood of Effect	Significance
Terrestrial wildlife (numbers, diversity, distribution)	Loss of vegetation and terrestrial wildlife during powerhouse construction activities - clearing, grubbing and stockpiling	Yes	Medium	Low	1-10	13-36 Continuous	Reversible	Relatively Pristine	High	Not Significant
Terrestrial wildlife (numbers, diversity, distribution)	General disturbance to wildlife	Yes	High	Low	11-100	During construction period and then once every few years for maintenance	Reversible	Relatively Pristine	Medium	Not Significant
Natural vegetation and habitat linkages	Effects on vegetation and habitat during ROW construction and maintenance	Yes	Medium	Low	11-100	Continuous	Reversible	Relatively Pristine	High	Not Significant
<b>Aquatic and Riparian Ecosystem</b>										
Shoreline Dependent Species	<i>See Fish Habitat Section below</i>									
Fish Habitat	Impacts to Northern Pike and their habitat	Assumed to be Yes	High	Unable to determine	11-100	Unable to determine	Unable to determine	Relatively Pristine	Unable to determine	Unable to determine
Fish Habitat	Impacts to Brook trout and their habitat	Assumed to be Yes	High	Unable to determine	11-100	Unable to determine	Unable to determine	Relatively Pristine	Unable to determine	Unable to determine
	Construction of intake and water conveyance structure and the temporary loss of habitat related to the construction of the coffer dam.	Yes	Low	High	< 1	1-12	Reversible	Relatively Pristine	High	Not Significant
	Construction of intake and water conveyance structure will result in the permanent loss of Walleye and White sucker spawning habitat. Based on the assessment of the conceptual design, the construction of the intake channel will result in the permanent alteration of 474m <sup>2</sup> of medium sensitivity habitat.	Yes	High	High	< 1	Continuous	Irreversible	Relatively Pristine	High	Significant

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/Social Context	Likelihood of Effect	Significance
Fish Habitat	Construction and excavation of tailrace and powerhouse -This alteration will result in the removal of the existing rapids (identified as spawning habitat) and smoothing of bottom substrates. This undertaking will result in the permanent alteration of approximately 571m <sup>2</sup> of Moderate/High sensitivity channel bed identified to contain spawning habitat.	Yes	High	High	< 1	Continuous	Irreversible	Relatively Pristine	High	Significant
	Construction of Dam -The construction of the dam will effectively limit any upstream fish movement. Based on the assessment of the conceptual design, this undertaking will result in the permanent loss of approximately 1332m <sup>2</sup> of Moderate/Low sensitivity channel bed near the upstream limit of the rapids.	Yes	Medium	High	< 1	Continuous	Irreversible	Relatively Pristine	High	Significant
Fish Habitat	Potential effects on habitat and spawning from dewatering operations	Yes	High	Low	< 1	< 11	Reversible	Relatively Pristine	High	Not Significant
Fisheries	<i>See Fish Habitat Section above</i>									
Erosion and sedimentation	Operation - Increased shoreline erosion and sediment deposition due to inundation and water level fluctuations	Yes	Medium	Low	11-100	possible for up to 9 months of every year	Irreversible	Relatively Pristine		Not Significant
Water levels, flows and movement (surface water)	Increase in water level and residency time in headpond	Yes	High	Medium	1-10	Continuous	Reversible	Relatively Pristine	High	Not Significant
Drainage, flooding and drought patterns	Alteration from natural patterns	Yes	Medium	Low	1-10	frequency dependant on flood event frequency	Irreversible	Relatively Pristine	High	Not Significant

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/Social Context	Likelihood of Effect	Significance
<b>Land and Resource Use</b>										
Access to inaccessible areas	Facilitation of access as a result of upgrades/maintenance of area access roads and bridges	Yes	High	Medium	1-10	Continuous	Reversible	Previously Impacted	Medium	Not Significant
Protected areas	Distribution route (Option 2) crosses Groundhog River Provincial Park for 0.5km	Yes	High	Low	< 1	Continuous	Reversible	Relatively Pristine	Low	Not Significant
Forestry	Harvesting of merchantable timber during construction	Yes	High	Medium	11-100	13-36	Irreversible	Relatively Pristine	High	Positive
<b>Social and Economic</b>										
Employment - Local and regional labour supply	Construction activities will support direct and indirect local employment	Yes	High	High	101-1000	13-36	Reversible	Previously Impacted	High	Positive
Aesthetic image of the surrounding area	Impacts to the remote/rural aesthetic of the project area	Yes	High	Low	1-10	Continuous	Reversible	Relatively Pristine	Medium	Not Significant
<b>Energy/Electricity</b>										
Reliability	Voltage support	Yes	High	Low	> 10,000	Continuous	Reversible	Previously Impacted	High	Positive
Security	Black Start capability	Yes	High	Low	> 10,000	< 11	Reversible	Previously Impacted	High	Positive
Electricity flow patterns	Power flow system	Yes	High	Low	1001-10,000	Continuous	Reversible	Previously Impacted	High	Not Significant
Other	Protection control settings	Yes	High	Low	1001-10,000	Until installed	Reversible	Previously Impacted	High	Not Significant

## 7. CUMULATIVE EFFECTS

Cumulative effects can be defined as long term changes that may occur as a result of the combined effects of each successive action on the environment. Cumulative effects may result from interacting effects of multiple projects in a given area, or multiple activities acting on a single ecosystem component. The assessment of the potential cumulative effects posed by a project is a requirement under the *CEAA*. *CEAA* requires that the assessment of cumulative effects examines past, present and “reasonably foreseeable” future activities in addition to the activities posed by the project, and how these would affect the valued ecosystem components within the project area, and beyond, if necessary.

The assessment of cumulative effects outlined below is based on a precautionary approach and the professional judgement of the EA team. As additional information about The Chute and other projects and activities in the area becomes available, the characterization and assessment of cumulative effects will be further discussed through the impact assessment, detailed design, and permitting stages of the project.

The potential cumulative effects of the proposed development are discussed in the following sections:

### 7.1 IDENTIFICATION OF OTHER PROJECTS AND ACTIVITIES

There are known activities within the area that should be considered along with any residual effects of The Chute project in order to undertake an assessment of cumulative effects. These projects or activities are described below.

#### Ivanhoe Lake Dam

The existing Ivanhoe Lake Dam is located approximately 40 km upstream from The Chute site. The MNR owns and operates the dam to provide flood control and to maintain recreational water levels on Ivanhoe Lake. The dam operating regime is currently specified in the Mattagami River Water Management Plan. Operation of the Ivanhoe Lake Dam may potentially impact the levels and flows at the proposed Chute GS resulting in cumulative effects on recreation, operations, and aquatic or terrestrial natural heritage.

#### Third Falls GS

The proponent is also proposing the construction of an another hydroelectric project (Third Falls GS) located approximately 43 km downstream from The Chute project site. If both projects are built, there would then be a total of three structures on the river where only one currently exists, and there may be cumulative effects associated with intermittent operation and inundation.

### Forestry Harvesting

The study area is located within a forest management area. The forest resources on Crown land adjacent to the site are currently allocated under a Sustainable Forest License to Domtar Inc-EACOM (Pineland Forest Management Unit). Therefore, forestry operations are planned within the general area.

### Access Roads

Approximately 20 km of existing forestry road will be used to access the area from Hwy 101. Access road planning to the project site was determined in close consultation with the forest management companies with the purpose of incorporating access with existing forestry roads wherever possible. Access road details are provided in Annex VI.

## **7.2 ASSESSMENT OF POTENTIAL CUMULATIVE EFFECTS**

An analysis was undertaken to determine cumulative effects associated with the interaction between each known residual effect of the project and other past, present and future planned projects and activities within the study area. The result of this assessment as well as the significance of each cumulative effect is presented in Table 6: Cumulative Environmental Effects and Significance.

Table 6: Cumulative Environmental Effects and Significance

Component	The Chute Confirmed Net Impacts	Identified Projects and Activities				Assessment of Significance								
		Ivanhoe Dam	Third Falls	Access Roads	Forestry Harvesting	Value of Resource	Magnitude	Geographic Extent (km <sup>2</sup> )	Duration (months) or Frequency (events/year)	Reversibility	Ecological/ Social Context	Likelihood of Cumulative Effect	Significance	
General Natural Environment														
Air quality	Exhaust emissions from project equipment and vehicles during construction		✓	✓	✓	High	Low	101-1000	13-36	Reversible	Relatively Pristine	Low	Not Significant	
	Odour		✓	✓	✓	High	Low	11-100	13-36	Reversible	Relatively Pristine		Not Significant	
	Dust from construction activities and vehicles during construction		✓	✓	✓	High	Low	101-1000	13-36	Reversible	Relatively Pristine	Low	Not Significant	
Water quality (surface and groundwater)	Intermittent operation of facility - increase in suspended sediment		✓			High	Low	11-100	possible for up to 9 months of every year	Reversible	Relatively Pristine	Low	Not Significant	
	General construction activities along shoreline of waterway		✓			High	Low	11-100	13-36	Reversible	Relatively Pristine	Low	Not Significant	
	In-water works - construction and removal of the cofferdam and potential for excess sediment to be suspended and carried downstream by river flow		✓			High	Low	11-100	< 11	Reversible	Relatively Pristine	Low	Not Significant	
Terrestrial wildlife (numbers, diversity, distribution)	Disturbances to general wildlife		✓	✓	✓	High	Low	1001-10,000	Continuous	Reversible	Previously Impacted	Medium	Not Significant	
Terrestrial wildlife (numbers, diversity, distribution)	General disturbance to habitat during construction and maintenance	✓	✓	✓	✓	High	Low	1001-10,000	Continuous	Reversible	Previously Impacted	Medium	Not Significant	
Natural vegetation and habitat linkages	Disruption of habitat for terrestrial wildlife due to vegetation removal		✓	✓	✓	High	Medium	101-1000	13-36	Reversible	Relatively Pristine	Medium	Not Significant	
Aquatic and Riparian Ecosystem														
Fish Habitat	Effects associated with inundation and water level fluctuations	✓	✓			Medium	Low	11-100	possible for up to 9 months of every year	Reversible	Previously Impacted	High	Significant	
	Construction of intake and water conveyance structure and the temporary loss of habitat related to the construction of the coffer dams		✓			High	Low	< 1	< 11	Reversible	Relatively Pristine	Low	Not Significant	
	Permanent destruction of 474m2 of medium sensitivity Walleye and White sucker habitat		✓			Medium	High	< 1	Continuous	Irreversible	Relatively Pristine	High	Significant	
	Permanent alteration/ destruction of 571m2 of moderate/high sensitivity spawning habitat resulting from construction and excavation of tailrace and powerhouse		✓			High	High	< 1	Continuous	Irreversible	Relatively Pristine	High	Significant	



Component	The Chute Confirmed Net Impacts	Identified Projects and Activities				Assessment of Significance								
		Ivanhoe Dam	Third Falls	Access Roads	Forestry Harvesting	Value of Resource	Magnitude	Geographic Extent (km <sup>2</sup> )	Duration (months)	or Frequency (events/year)	Reversibility	Ecological/ Social Context	Likelihood of Cumulative Effect	Significance
Fish Habitat	Potential effects on habitat from dewatering operations		✓			High	High	< 1	13-36	Reversible	Relatively Pristine	Low	Not Significant	
Erosion and sedimentation	Increased shoreline erosion and sediment deposition due to inundation and water level fluctuations	✓	✓			Medium	Low	11-100	possible for up to 9 months of every year	Irreversible	Relatively Pristine	Low	Not Significant	
Water levels, flows and movement (surface water)	Increase in water level and residency time in head ponds	✓	✓			High	Medium	11-100	Continuous	Reversible	Relatively Pristine	High	Not Significant	
Drainage, flooding and drought patterns	Alteration to natural patterns	✓	✓			High	Low	11-100	Continuous	Irreversible	Previously Impacted	High	Not Significant	
Land and Resource Use														
Access to inaccessible areas	Facilitation of access to remote areas (road and bridge upgrades, etc)		✓	✓		High	Medium	101-1000	Continuous	Reversible	Previously Impacted	High	Not Significant	
Protected areas	Distribution route (Option 2) crosses Groundhog River Provincial Park for 0.5km		✓			High	Low	< 1	Continuous	Reversible	Relatively Pristine	High	Not Significant	
Forestry	Harvesting of merchantable timber during construction		✓		✓	High	Medium	101-1000	13-36	Irreversible	Relatively Pristine	High	Positive	
Social and Economic														
Community character, enjoyment of local amenities	Potential effects on recreational water use, tourism values, aesthetic image		✓			High	Medium	11-100	Continuous	Irreversible	Relatively Pristine	High	Significant	
Employment	Construction activities will support direct and indirect local employment		✓	✓	✓	High	High	1001-10,000	37-72	Reversible	Area currently economically depressed	High	Positive	
Local, regional or provincial economies	Impacts to tourism/outfitters as a result of impacts to fisheries and public access		✓	✓		High	Medium	101-1000	Continuous	Irreversible	Previously Impacted	Medium	Not Significant	
Aesthetic image of the surrounding area	Impacts to the remote/rural aesthetic of the project area		✓	✓	✓	High	Low	101-1000	Continuous	Reversible	Previously Impacted	Medium	Not Significant	
Energy/Electricity														
Reliability	Voltage support		✓			High	Low	>10,100	Continuous	Reversible	Previously Impacted	High	Positive	
Security	Black start capability		✓			High	Low	>10,101	< 11	Reversible	Previously Impacted	High	Positive	
Electricity flow patterns	Power flow system		✓			High	Low	1001-10,000	Continuous	Reversible	Previously Impacted	High	Not Significant	
Other	Protection control settings		✓			High	Low	1001-10,001	Until Installed	Reversible	Previously Impacted	High	Not Significant	

### Air quality

Impacts to air quality associated with the project (dust, odour, exhaust, etc) are all expected to occur mainly during the construction phase of the project and will be curtailed during operation. Given the mitigative measures which will be taken and the remote nature of the project these impacts are anticipated to be both short term and minor and therefore not significant.

Additionally, as a modified run-of-river facility, the project will generate sustainable and renewable energy and, in combination with other green energy projects, contribute to the improvement of air quality and public health in Ontario by facilitating and compensating for the shutdown of coal fired generation facilities throughout the province.

### Flow and inundation effects on water quality, movement and erosion

The cumulative effects associated with the alteration from natural flow patterns as a result of three projects on the river; one existing Ivanhoe Lake Dam and two new proposed Xeneca facilities. Low negative impacts are anticipated as dynamic modeling shows that the facility will modify normal flooding patterns but will operate as a run of river facility during high and low flow periods. Additional mitigation entails limiting maximum daily fluctuations in upstream water levels and their rate of change. In order to manage the activities, a communications protocol between the operators of the Ivanhoe Lake Dam and the Xeneca facilities (Third Falls GS and The Chute GS) will be implemented. An operating strategy for The Chute GS will be incorporated into the Mattagami Water Management Plan. Xeneca is also proposing to monitor the watercourse for the effects of erosion and ice scour following the construction of The Chute facility and, if required, modifying operations at The Chute to mitigate any impacts.

If built, Third Falls GS would create an inundation area that would reach to the downstream side of The Chute. The Third Falls project would create a backwater effect that would prevent the downstream reach from draining during intermittent operation. In this case the downstream water level effect would be less than 0.15 m during any operating cycle, and impacts downstream would be different. There are a number of associated cumulative impacts to consider with the construction and operation of two new waterpower projects on the same waterway, and they are presented in Section 7.2.

### Disturbance of terrestrial wildlife and vegetation

The construction and operation of The Chute and Third Falls facilities will result in an increase in traffic in local access roads as well as the construction of additional roads and connection line ROW. In combination with the existing access roads and forestry activity these activities will

have the potential to disturb terrestrial wildlife. While construction activity will result in higher traffic volume and activity, it will not continue once the project is operational. Route selection for connection lines and roads has been sited along existing roads wherever possible.

Given the relatively large area over which the disturbance will be distributed and the fact that wildlife in the area is disturbed through forestry activity regardless, the overall impacts are not anticipated to be significant.

#### Alteration and/or destruction of fish habitat

The construction of The Chute facility is anticipated to result in the destruction or alteration of approximately 1050 m<sup>2</sup> of fish habitat (low to high sensitivity) as a result of excavation for the powerhouse, intake and tailrace. The creation of the head pond may also result in the alteration of fast water habitats upstream of the facility.

It is unknown at this time what the specific impacts of the creation of the Third Falls facility downstream of The Chute will be; however, there exists the potential for cumulative impacts to fish and fish habitat between the two projects on the Ivanhoe River.

#### Access to inaccessible areas; community character, enjoyment of local amenities; local, regional or provincial economies

The Ivanhoe River is a popular recreation destination for anglers, boaters and paddlers, the effects associated with the changes to the waterway from the addition of two hydroelectric generating stations may result in cumulative impacts to the populations of local fish species and recreational use and enjoyment of the river.

The cumulative effects associated with the above mentioned components relate to the facilitation of access through the construction of new roads and road upgrades, increased use of the river, and ongoing operations. These may have an effect on tourism values, the viability of local outfitter businesses, recreational water use and aesthetic image.

#### Employment and forestry

There exists a potential benefit to the local and regional population in that the construction of The Chute GS and Third Falls GS may result in the prolonged or additional hiring of local labour and local construction material sourcing (i.e. aggregate).

Connection line construction will require the clearing of a 10 – 30 m ROW. The proposed connection line layout suggests that the ROW should follow exiting forestry roads where possible.

New road construction will require the clearing of a 10 – 30 m ROW. There may be sections along new access roads where more than 30 m of new ROW will be required. This also presents the potential increased benefit of timber harvesting which can provide local employment opportunities and merchantable wood.

#### Energy and electricity reliability, security and distribution

Xeneca's two proposed projects on the Ivanhoe River will have a combined installed capacity of 8.7 MW and will be operated to meet the socio-economic objective of generating clean energy when it is required by the province. Consultation with Hydro One and adjustments to the regional distribution grid will be required for connection of the projects to the Provincial transmission grid. The projects will also have black start capability, and will be able to contribute to reliable generation capacity.

## **8. MONITORING & FOLLOW-UP PROGRAMS**

Proposed monitoring and follow-up programs are presented below. Additional programs may emerge through on-going consultation within the regulatory approvals stages of the development planning.

### **8.1 CONSTRUCTION MONITORING**

Prior to construction, the Construction Management Plan (CMP) presented in Annex II-B will be enhanced to incorporate any construction management strategies outlined in the ER and supporting annexes as well as any permit application or federal approval/authorization requirements. The final CMP will be submitted to the regulators as supporting documentation for construction permits and approvals.

The proponent will:

- Ensure that all necessary regulatory permits and approvals (federal and provincial) have been obtained prior to the start of any site preparation or construction activities.
- Ensure that all contractors are familiar with and are applying the identified mitigation measures outlined in the CMP and industry/regulator best management practices.
- Ensure that controls to minimize environmental effects during construction (e.g. sediment fencing) are regularly inspected and functional, and conduct inspections after any event which might disturb the control measure (e.g. a heavy rainfall event).

- Ensure that the mitigation measures being applied are not creating adverse environmental effects, and that mechanisms are in place for corrective and remedial action to address these if they occur.
- Ensure that all signage and required traffic control measures, including posted speed limits, remain in appropriate locations as construction proceeds and in good visual condition.
- Ensure that all site restoration activities have been implemented.

## 8.2 POST-CONSTRUCTION / OPERATION MONITORING

Prior to commissioning, an Operation and Maintenance Plan will be prepared for the facility. The Operation and Maintenance Plan should include:

- The locations where the potential for erosion has been identified will be inspected and assessed at intervals after operation commences.
- Where monitoring reveals significant erosion and the potential for adverse environmental effects, further monitoring and/or mitigation strategies will be developed, as required.

Based on the results of the post construction monitoring, further mitigation strategies will be developed as required. Other items in the Operation and Maintenance Plan include:

- Emergency response plans for hazardous materials spills, fire, etc.
- Health and safety guidelines for powerhouse employees.
- Waste and hazardous materials handling, storage and disposal guidelines.

### Shoreline Erosion

- The locations where the potential for erosion has been identified in the erosion survey will be inspected and assessed after operation commences to document whether and to what degree erosion has occurred.
- If significant erosion occurs, mitigation measures will be implemented in cooperation with the MNR.

### Environmental Assessment Commitment Implementation and Review Plan

Xeneca will continue to work closely with federal and provincial agencies, during the EA review process and afterwards during the detailed design, construction, and operational phases of the project. As part of this effort, Xeneca will issue a regular Project Implementation Report to

agencies to update project status, implementation of commitments, and results from effects and mitigation programs.

## 9. REGULATORY APPROVALS AND PERMITS

Following the successful completion of the EA and the completion of detailed engineering design, the proponent will make application to various federal, provincial and municipal agencies for regulatory permits, approvals and authorizations. These permits, approvals and authorizations are required before site preparation or construction, or prior to the commissioning of the facility. A list of the regulatory permits that may be required for this undertaking is presented below in Table 7.

**Table 7: List of Potential Regulatory Approvals**

Permit and Legislative Requirement	Agency
<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
Requires construction of fish-ways – <i>Fisheries Act</i> (Section 20)	Department of Fisheries and Oceans
Requires fish guards or screens to prevent entrainment of fish at any water diversion or intake – <i>Fisheries Act</i> (Section 30)	Department of Fisheries and Oceans
Requires sufficient flow of water for the safety of fish and flooding of spawning grounds as well as free passage of fish during construction – <i>Fisheries Act</i> (Section 22)	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) – Section 14 - Location Approval and Plans and Specifications Approval	Ministry of Natural Resources
<i>Lakes and Rivers Improvement Act</i> (LRIA) – Section 23.1 - Water Management Plan amendment	Ministry of Natural Resources
<i>Public Lands Act</i> (PLA) – Work Permits (Parts 1-5, as required).	Ministry of Natural Resources

<i>Public Lands Act (PLA)</i> – Land Use Permit or Licence to Construct	Ministry of Natural Resources
<i>Public Lands Act (PLA)</i> – Licence of Occupation	Ministry of Natural Resources
<i>Public Lands Act (PLA)</i> – Water Power Lease Agreement	Ministry of Natural Resources
<i>Public Lands Act (PLA)</i> – Grants of Easements (Policy PL 4.11.04)	Ministry of Natural Resources
<i>Endangered Species Act (ESA)</i> – permits and agreements, as applicable	Ministry of Natural Resources
<i>Crown Forest and Sustainability Act (CFSA)</i> - Forest Resource Licence and Overlapping Licence Agreement	Ministry of Natural Resources
<i>Crown Forest and Sustainability Act (CFSA)</i> – Use/maintenance agreement	Ministry of Natural Resources
<i>Forest Fires Prevention Act (FFPA)</i> - Burn permit on Crown Land	Ministry of Natural Resources
<i>Aggregate Resources Act (ARA)</i> – Aggregate Permit	Ministry of Natural Resources
<i>Ontario Heritage Act</i> and the <i>Ontario Heritage Amendment Act (OHA and OHAA)</i> - Cultural Heritage Clearances and Registration to Database	Ministry of Tourism and Culture
Permit to Take Water – <i>Ontario Water Resources Act</i> (Section 34), Category 2 (construction) and 3 (operation)	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>Ontario Energy Board Act (OEBA)</i> - Electricity Generation Licence Potentially leave to construct (section 92) and Wholesaler license if transmission connected. Note would also require market authorization from the IESO if transmission connected.	Ontario Energy Board
<b>Municipal</b>	
Road Use Agreement	Municipality
Building Permit	Municipality
<i>Fire Protection and Prevention Act (FFAPA)</i> - Burn Permit	Municipality



## 10. COMMITMENTS

The following commitments are made by the proponent, Xeneca Power Developments Inc. in order to ensure the development of a sustainable waterpower project;

### General

- The proponent is committed to ensuring compliance with the ER as a contract with the people of Ontario.
- The proponent is committed to the adoption and application of the mitigation measures outlined within this document for both the construction and operation of the proposed undertaking according to applicable legislation (i.e. adherence to Construction Management Plan and best management practices, such as applicable DFO Ontario Operational Statements as listed at <http://www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/provinces-territoires-territoires/on/index-eng.htm> ). This may be achieved through the hiring of an environmental inspector for the duration of the construction program and through operator training on environmental issues within the operational phase of the project.
- The proponent is committed to developing appropriate compensation for any significant adverse impacts in cooperation with the Agencies once the engineering details for the project have been advanced during the permitting phase of the project.
- The proponent is committed to the development and implementation of a regular reporting process including a Project Implementation Report.

### Facility Operations

- The proponent is committed to verifying the specific operational parameters in consultation with regulators and to documenting any updates in the operational plan for the facility.
- The operation of the facility will be aligned with the existing Mattagami River WMP during a comprehensive review in 2014. The Chute Operating Plan will be made available to all identified stakeholders (please see the Plan in Annex I-B and reference to stakeholder list) for consideration during the EA review process and for discussion in subsequent stages of the development. The approved Operating Plan will become part of the Mattagami River WMP through a *Lakes and River Improvement Act*, Section 23.1, Water Management Plan amendment. After the approval of the amendment by the Minister, Xeneca will participate in the Mattagami WMP process.

- To ensure that the project will not have any deleterious effect on the Clay Belt Conservation Reserve located 43 km downstream, Xeneca will commit to providing monthly Q80 flows at the boundary into the Conservation Area at all times, provided that the natural inflow at The Chute is at least Q80. During times when the natural inflow into The Chute is less than Q80, Xeneca will provide not less than 80% of the natural flow that would otherwise occur at the Conservation Area boundary.

### Consultation

- The proponent is committed to realizing a signed Memorandum of Understanding with the Wabun Tribal Council.
- The proponent is committed to continuing to engage specific stakeholders on relevant issues after the issuance of the Notice of Completion and Statement of Completion.
- The proponent is committed to sharing all information from studies as well as the operational strategy proposed for the site with the interested First Nation, Aboriginal and other communities.
- Xeneca will work with the recreational fishing community, local tourism operators and other interested parties to ensure that access, fisheries, tourism values and aesthetics are not negatively affected by the project. Xeneca is also willing to facilitate access by improving boat launches, parking and portages where possible. Recognizing that there is a potential conflict between these two objectives, given the remote aesthetic of the area, Xeneca will seek to reach a mutually agreeable solution with stakeholders.

### Further Investigations

Additional hydrological modeling (HEC-RAS) will be undertaken for areas upstream and downstream of the facility to refine the zone of influence for the project and to assist with impact verification.

- The proponent will update the Construction Management Plan based on advanced project design to include instructions and protocols for minimizing the disturbance to valued ecosystem components.
- The proponent will document and verify impacts associated with inundation and flow effects within the expanded zone of influence upstream (inundation area) and downstream (variable flow reach) of the facility.
- The proponent will enhance shoreline erosion investigations completed to date through further studies of reservoir sedimentation during the detailed design phase of the project.

- The proponent will undertake Stage 2 and, if required under the *Heritage Act*, Stage 3 and/or 4 archaeological investigations within the project area including both the project site in those areas which the Stage 1 archaeological assessment determined to have a high potential for archaeological resources.
- The proponent will continue to actively solicit the involvement of participating Aboriginal communities in any cultural heritage assessment activities to be undertaken for the project.

## 11. CONCLUSIONS

Xeneca Power Development Inc. (Xeneca) proposes to construct and operate The Chute hydroelectric power generating station (GS) on the Ivanhoe River. This document describes the environmental assessment (EA) carried out as part of the planning process for the proposed project.

Throughout the environmental planning process, Xeneca has endeavoured to understand the environment in which the project would be built by undertaking an extensive information and data collection program. Data on areas of the environmental setting of the project was collected by discipline experts including:

- Stage 1 archaeological assessment;
- A natural environment characterization and impact assessment;
- Erosion study on the riverine system in the zone of influence;
- Database analysis and mapping exercise and wetland assessment and flyover to route the connection line and access roads;
- A statistical analysis of historical hydrological data;
- A hydraulic model study analysis;
- Conceptual engineering design; and
- Baseline surface water quality study

A comprehensive agency and public consultation program also contributed key information towards the identification of the potential adverse and positive environmental effects of the project. While Xeneca is committed to continuing the discussion with local groups it is anticipated that any identified issues can be resolved. Agency approval for the proposed operating strategy and permitting and authorizations in support of construction will be sought following consultation with regulators and incorporated into the final design of the facility and its' components.

Aboriginal and First Nation engagement was undertaken with each community's leadership as part of the business to business Aboriginal consultation initiative by the proponent. A comprehensive engagement initiative with each community located within, or having traditionally used the project area has been underway since issue of the Notice of Commencement and will continue beyond Notice of Completion and into project implementation.

Additionally, the Stage 1 archaeological assessment of the project determined the potential for cultural resources to be impacted by the project. As a result, a Stage 2 assessment is underway with participation by First Nation and Aboriginal communities. Further archaeological assessment requirements will be determined subsequent to the findings of the Stage 2 study in accordance with the *Ontario Heritage Act*.

The results of the HEC-RAS modeling of the inundation area revealed that the zone of influence of the inundation area had expanded from 2.8 km to 6.4 km upstream of the proposed dam location. Additional scientific investigations and modeling exercises will be undertaken to assess and verify the potential impacts at this ecosystem.

Throughout this document, management strategies have been developed and applied to known impacts in order to avoid, prevent or minimize any identified adverse environmental effects of the project. It is the conclusion of this environmental assessment that the planned undertaking will result in residual adverse effects. An analysis of the identified residual adverse environmental effects was undertaken to determine their significance, and commitments for any required additional measures for the further management of these potential residual effects have been made.

The majority of the identified adverse effects were determined to be "not significant", meaning that they are not likely to cause unacceptable harm to environmental quality, productive capacity of the effected environment, or the socio-economic and cultural attributes of the area.

There are however three adverse environmental effects that have been identified that were determined through professional judgment to have significance. These effects are associated with the construction of the footprint of the facility at The Chute (i.e. intake and conveyance structure, powerhouse and tailrace):

- A high degree of impact to medium sensitivity habitat (Walleye and White sucker spawning bed) associated with the construction of the intake and water conveyance structure. Based on the assessment of the conceptual design, the construction of the intake channel will result in the permanent alteration of 474 m<sup>2</sup> of medium sensitivity habitat.

- The construction and excavation of the tailrace and powerhouse will result in the removal of the existing rapids and smoothing of bottom substrates. This undertaking will result in the permanent alteration of approximately 571 m<sup>2</sup> of Moderate/High sensitivity channel bed containing spawning habitat for Walleye and White sucker.
- The construction of the dam will effectively limit any upstream fish movement. Based on the assessment of the conceptual design, this undertaking will result in the permanent loss of approximately 1332 m<sup>2</sup> of Moderate/Low sensitivity channel bed near the upstream limit of the rapids. For these reasons the undertaking represents a Moderate risk to overall fish habitat productivity.

Based on this assessment it is anticipated that the impacts associated with the dam, intake, tailrace and powerhouse construction have a high potential to result in the harmful alteration, disruption or destruction (HADD) of spawning habitat for Walleye and White sucker. The requirement for an Authorization under Section 35 of the *Fisheries Act* for the HADD of fish habitat is anticipated.

The proposed compensation for these anticipated impacts must be developed and discussed with Fisheries and Oceans Canada once the engineering details for the project have been advanced during the permitting phase of the project. It is expected that the replacement of spawning habitats that will be lost or altered as a result of The Chute development will be required.

There are also many positive environmental effects associated with the project which are considered to off-set the adverse environmental effects associated with the project, these include:

- Tangible Economic Outcomes for the Local Communities and the Regional / Provincial Economy:
  - Benefit to the local SFL holder by sale/processing of merchantable timber along the connection line and access road ROWs, and the merchantable timber to be harvested from the area of inundation.
  - Job creation during construction both directly and indirectly in the near North Region of Ontario. Direct employment (construction only) for waterpower projects is estimated at 10,000 person hours per MW; indirect jobs multiply by 1.5; and up to two (2) part time jobs will be available in the operation and maintenance of the facility.
  - An increase in economic activity (direct and indirect) to build the project procuring everything from consulting and legal services to concrete, steel, trucking and other services such as lodging, food and fuel. The majority of this activity will be created within the local/regional economy.

- Employment and training opportunities (planning, construction and operation phases of the project);
- Creation of reliable and secure green energy for the province and reduced Greenhouse Gas emissions:
  - The project will reduce CO<sub>2</sub> emissions by eliminating the need for an equivalent amount of electricity to be produced through the combustion of fossil fuels.
  - Benefits to the population, commerce and industries of Ontario by providing more reliable and consistent renewable power to the provincial grid for many years to come. Many power plants built in the early 1900s are still in operation and with regular maintenance and upgrades can last for generations to come.
  - The operation of the facility in the existing power grid will be compatible with the overall power system reliability and power quality (voltage and frequency) objectives while improving distribution customer service reliability in this area, from a sustainable and consistent power source.
- The generation of electricity through a renewable energy supply in support of the province's *Green Energy and Green Economy Act*.

Preliminary planning discussions towards the development of various management strategies are outlined in this document, and the proponent will continue to work with the regulators and other interested parties in support of securing approvals for this undertaking. The application of the recommended management strategies and adherence to the identified commitments by the proponent will help to realize a sustainable renewable energy development project.

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Xeneca Power, 2011. Email from Grace Yu of Xeneca Power to Dave green of NRSI dated June 2 2011 providing construction details and footprint areas of impact.