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Swift River Energy Limited

Environmental Screening/ Review Report - Addendum

North Bala Small Hydro Project

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Project Report

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Swift River Energy Limited
North Bala Small Hydro Project

DISTRIBUTION
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Environmental Screening/Review Report - Addendum

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Glossary of Abbreviations

CFIP	Community Fisheries Involvement Program
CRB	Conservation Review Board
DFO	Fisheries and Oceans Canada
DMM	District Municipality of Muskoka
EIS	Economic Impact Study
ESA	Endangered Species Act
ES/RR	Environmental Screening/Review Report
GBTTCC	Georgian Bay Traditional Territory Consultation Committee
GS	Generating Station
MOE	Ministry of the Environment
MNR	Ministry of Natural Resources
MRWMP	Muskoka River Water Management Plan
NWPA	Navigable Water Protection Act
NOZ	Normal Operating Zone
OPA	Ontario Power Authority
OPG	Ontario Power Generation
PAC	Public Advisory Committee
SARA	Species at Risk Act
SARO	Species At Risk Ontario
SREL	Swift River Energy Limited
TC	Transport Canada
TML	Township of Muskoka Lakes

Executive Summary

Swift River Energy Limited (SREL) is proposing to construct and operate a small hydroelectric power facility on the Moon River in the Town of Bala, Ontario, named the North Bala Small Hydro Project (Project). The Notice of Completion for the Environmental Screening/Review Report (ES/RR) (Hatch Energy, 2009), prepared under the Electricity Projects Regulation (O. Reg. 116/01), was issued in October 2009. A decision by Ministry of Environment (MOE) Director of the Environmental Assessment and Approvals Branch (Agatha Garcia-Wright), was issued in March 2011, that denied all elevation requests received from the public under the provincial appeal process, and outlined a number of conditions on the Project and SREL. A number of requests were subsequently received by the Minister of the Environment requesting a Minister's review of the Director's decision as per the provincial appeal process. The Minister also denied the appeal requests.

This Addendum has been prepared as a result of two key proposed modifications to the Project, as it was originally presented in the ES/RR. These modifications include

- a change in the preferred location of the Project to a location discussed in the original ES/RR, and
- a change in the operational regime of the project.

Proposed Modification to Project Location

The preferred Project location identified in the ES/RR was approximately 25 m south of the existing North Bala Dam, which is owned and operated by the Ontario Ministry of Natural Resources (MNR). This Project location was identified as layout Alternative 2D in the ES/RR. Subsequent to a change in leadership at the Township of Muskoka Lakes (TML) and the District Municipality of Muskoka (DMM) in October 2010, land tenure issues for the municipal lands required for Alternative 2D have arisen unexpectedly.[1]

SREL, therefore, has made the corporate decision to adjust the Project location such that it is constructed entirely on land owned by the Provincial Crown for which SREL has been awarded Applicant of Record Status by the MNR through its Waterpower Site Release Program. A similar layout was identified in the ES/RR as Alternative 1. Alternative 1 has been slightly updated since the ES/RR, and is identified as Alternative 1A for the purposes of this Addendum.

The modifications to the project as it was identified in the ES/RR include altering the location of the proposed facility and changing the size of the powerhouse to meet the constraints associated with the smaller parcel of land available for development. This Addendum has assessed the potential for adverse effects arising from the differences between Alternative 2D, as assessed in the ES/RR and Alternative 1A.

[1] Note that ownership of the municipal land located between the North Bala dam and the South Bala Dam, and west of MR-169 was changed from DMM to TML subsequent to the ESRR.

Potential net adverse effects of Alternative 1A during construction include

- an increase in the amount of aquatic habitat temporarily lost due to cofferdam and dewatering requirements. This will not cause a significant adverse effect and no additional mitigation is necessary.
- an increase in the amount of habitat permanently altered due to the footprint of the intake and tailrace channels. Additional habitat compensation has been proposed to mitigate this effect.
- restrictions on public access and use in laydown areas, potentially including the area on the north side of North Bala Falls, lands at Diver's Point and on the south side of North Bala Falls. No mitigation is possible to prevent this short-term effect from occurring.

Potential net adverse effects of Alternative 1A during operation include

- the powerhouse will be higher, more visible and closer to the North Bala Falls, which may be perceived as an adverse effect. Swift River has committed to working with a Public Advisory Committee (PAC) on the final appearance of the powerhouse and site. Due to the constraints associated with the smaller land parcel available for development, no additional mitigation is possible to prevent this potential adverse effect.
- public access to the south side of North Bala Falls will be restricted during operations due to safety concerns, however, it may be possible to incorporate a viewing platform on the roof of the powerhouse so the public may view the falls and Moon River from the south side of the falls.

These net adverse effects were subjected to a cumulative effects assessment. The project will result in cumulative effects on visual aesthetics, public access and land use, due to the project acting in conjunction with effects of other nearby residential, commercial and infrastructure developments. No additional mitigation is possible to prevent these cumulative effects from occurring.

No additional or altered components of the monitoring program proposed in the ES/RR are required as a result of the net adverse effects of the proposed change in Project location to Alternative 1A.

In addition to the above potential net adverse effects, the following potential net positive effects include the following:

- by locating the intake further downstream for Alternative 1A, CP Rail and Purk's Place's upstream riparian rights will not be adversely affected i.e. Purk's Place docks may remain.
- no construction work will be required under MR-169, therefore, anticipated prolonged road disturbances will no longer be required during construction.
- the overall footprint of the proposed structures will be reduced, thereby decreasing the overall amount of land impacted by the Project.

Proposed Modification to Operational Regime

As stated above, the MOE Director's decision issued in March 2011 imposed several conditions, including imposed restrictions on the future operations of the facility that differed from that outlined in the ES/RR. Therefore, for completeness, SREL has included the changes to the operating regime imposed by the MOE Director's decision in this Addendum.

The facility was originally proposed in the ES/RR to operate as a run-of-the-river hydroelectric facility. Through the elevation request process, Ontario Power Generation Inc. (OPG) requested SREL for information to determine potential impacts from the Proposed Undertaking to OPG, including its downstream facilities Ragged Rapids and Big Eddy generating station and OPG's ability to comply with the Muskoka River Water Management Plan. SREL and OPG agreed that the Proposed Undertaking will be operated as a run of river facility, incorporating a flow plan developed weekly in consultation with the MNR and OPG, based on the conditions forecast for each week. Given that the discharge capability will be greater than OPG's downstream facility and the operation plans for the Proposed Undertaking are not yet finalized, there is no way for OPG to ensure that OPG is not adversely affected by the operation of the Proposed Undertaking. In order to comply with the MOE Director's conditions, SREL intends that when outflow from Lake Muskoka was lower than 26 m^3/s, the North Bala facility would be cycled on and off on a daily basis, using a very small amount of storage capacity of Lake Muskoka to provide minimum plant flows of 20 m^3/s, which in combination with the proposed minimum continuous flows of 1 m^3/s through the North and South Bala Dams and the 4 m^3/s through Burgess GS, would allow periodic operation of the downstream Ragged Rapids GS.

This Addendum has assessed the potential for adverse effects arising from the differences between the run-of-river operational regime, as assessed in the ES/RR and the proposed low flow cycling operations. There are no net adverse effects of the cycling operations during the construction phase of the project.

Potential net adverse effects of the low flow cycling operations include the following:

- alterations in outflow rate from Lake Muskoka during cycling operations and minor changes in Lake Muskoka water level (up to 2 cm of fluctuation) on a daily basis during periodic cycling operations.
- potential for increased fish and planktonic organism entrainment at the facility due to cycling operations. Mitigation will be implemented to minimize this potential.
- short-term changes in localized benthic invertebrate use of proposed tailrace habitat shoals during cycling operations.

These net adverse effects were subjected to a cumulative effects assessment. The project has a minor potential to result in cumulative effects on overall water management (water levels and flows) throughout the watershed as well as increased fish and planktonic organism entrainment, due to the project acting in conjunction with effects of other water management structures and hydroelectric facilities. All water management facilities will continue to be operated in accordance with the existing Muskoka River Water Management Plan (MRWMP).

Additional monitoring not discussed in the ES/RR may be undertaken to assess the potential for increased entrainment as a result of cycling, depending on what mitigation options are ultimately agreed to with DFO and MNR.

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1. Introduction

1.1 Background

Swift River Energy Limited (SREL) is proposing to construct and operate a small hydroelectric power facility on the Moon River in the Town of Bala, Ontario, named the North Bala Small Hydro Project (Project). The Notice of Completion for the Environmental Screening/Review Report (ES/RR) (Hatch Energy, 2009), prepared under the Electricity Projects Regulation (O. Reg. 116/01), was issued in October 2009. A decision by Ministry of Environment (MOE), Director of the Environmental Assessment and Approvals Branch, Agatha Garcia-Wright, was issued in March 2011, that denied all elevation requests received from the public under the provincial appeal process. A number of requests were subsequently received by the Minister of the Environment requesting a Minister's review of the MOE Director's decision as per the provincial appeal process. The Minister denied the appeal requests.

It should be noted that the Director's decision imposed a number of conditions on the Project and SREL, that are outlined in the document. A copy of the Director's decision and the associated conditions has been provided in Appendix A of this document. A copy of the Minister's decision is also provided in Appendix A.

1.2 Purpose

As noted in the Addendum Provisions of the Ontario Ministry of the Environment's (MOE) Guide to Environmental Assessment Requirements for Electricity Projects (MOE, 2001), modifications to the proposed Project, as described in the ES/RR, must be assessed to determine if the proposed modification has the potential to have negative environmental effects. This Addendum to the ES/RR has been prepared to address several proposed modifications to the Project, resulting from changes in:

- Project location, and
- operational regime of the facility.

These changes are outlined in the following sections.

1.3 Change in Project Location

The preferred Project location identified in the ES/RR was approximately 25 m south of the existing North Bala Dam, which is owned and operated by the Ontario Ministry of Natural Resources (MNR). This Project location was identified as layout Alternative 2D in the ES/RR. Subsequent to a change in leadership at the TML and the District Municipality of Muskoka (DMM), land tenure issues for the municipal lands required for Alternative 2D have arisen unexpectedly.[1] SREL, therefore, has made the corporate decision to adjust the Project location such that it is constructed entirely on land owned by the Provincial Crown for which SREL has been awarded Applicant of Record Status by the MNR through its Waterpower Site Release Program. A similar layout was identified in the ES/RR as Alternative 1. Alternative 1 has been slightly updated since the ES/RR, and is identified as Alternative 1A for the purposes of this Addendum.

[1] Note that ownership of the municipal land located between the North Bala Dam and the South Bala Dam, and west of MR-169 was changed from DMM to TML subsequent to the ES/RR.

1.4 Change In Operating Regime

As stated above, the MOE Director's decision issued in March 2011 imposed several conditions, including imposed restrictions on the future operations of the facility that differed from that outlined in the ES/RR. Therefore, for completeness, SREL has included the changes to the operating regime imposed by the MOE Director's decision in this addendum.

The facility was originally proposed in the ES/RR to operate as a true run-of-the-river hydroelectric facility. Through the elevation request process, Ontario Power Generation Inc. (OPG) requested SREL for information to determine potential impacts from the Proposed Undertaking to OPG, including its downstream facilities Ragged Rapids and Big Eddy generating station and OPG's ability to comply with the Muskoka River Water Management Plan. SREL and OPG agreed that the Proposed Undertaking will be operated as a run of river facility, incorporating a flow plan developed weekly in consultation with the MNR and OPG, based on the conditions forecast for each week. Given that the discharge capability will be greater than OPG's downstream facility and the operation plans for the Proposed Undertaking are not yet finalized, there is no way for OPG to ensure that the OPG is not adversely affected by the operation of the Proposed Undertaking. To comply with the MOE Director's conditions, SREL intends that when outflow from Lake Muskoka was lower than 26 m^3/s, the North Bala facility would be cycled on and off on a daily basis, using a very small amount of storage capacity of Lake Muskoka to provide minimum plant flows of 20 m^3/s, which in combination with the proposed minimum continuous flows of 1 m^3/s through the North and South Bala Dams and the 4 m^3/s through Burgess GS, would allow periodic operation of Ragged Rapids GS. The proposed operation will, therefore, be modified run-of-river with periodic cycling at low flows during certain times of year.

1.5 Addendum Report

The above proposed modifications are discussed in more detail in Section 2 and screened for potential adverse environmental effects in Section 4 of this Addendum Report. Detailed assessment of potential effects during construction and operations are assessed in Sections 5 and 6, respectively. The cumulative effects of the proposed modifications are assessed in Section 7 and additional monitoring requirements are identified in Section 8. Section 9 summarizes the proposed modifications and the overall advantages and disadvantages of the modifications.

A draft version of this report (Revision 0) was provided to Fisheries and Oceans Canada (DFO), Transport Canada (TC), and the Ontario Ministry of Natural Resources (MNR) on September 21, 2011, and to the MOE on October 7, 2011 for initial comments. This version (Revision 2) reflects changes made in response to comments from those agencies. Section 3 provides a full summary of the consultation efforts made by SREL with respect to the above changes prior to the 30-day public review period as per the provincial regulations.

2. Proposed Modifications

This section describes the proposed modifications to the Project location and the operating regime.

2.1 Project Location

The ES/RR investigated several alternative locations for the Project, including, but not limited to

- the "preferred" layout referred to as Alternative 2D that would utilize a combination of both Crown and municipal lands, and
- the original Alternative 1 location that would be located entirely on Crown lands. Note that this was the original project layout provided to MNR in 2005 for its Waterpower Site Release Program and presented at the first Public Information Centre in August 2007.

Due to unforeseen issues arising from land tenure negotiations with the TML and DMM, SREL has made the corporate decision to move the Project from the "preferred site" of Alternative 2D, to the Alternative 1 site, so that it will be situated entirely on provincial Crown land for which SREL is the Applicant of Record under the MNR Waterpower Site Release Program. Note that SREL is considering two general equipment layouts of Alternative 1 and it has been slightly updated since the ES/RR. It is, therefore, referred to as Alternative 1A in this document.

Specifically, this proposed modification involves altering the location of the proposed intake, powerhouse and tailrace so that all of the permanent components of the proposed facility are situated on land owned by the provincial Crown. Due to the smaller land base available for this alternative, the shape and size of the powerhouse has changed and the turbine configuration for the facility has changed (due to the limited space). The energy output will remain between 4 and 5 MW using either a one or two turbine configuration, as per the ES/RR. Given the space restrictions, the final equipment configuration will either be one or two, vertical or horizontal Kaplan turbines (the ES/RR only considered horizontal units). The footprint and elevation of the Alternative 1A plan presented in this Addendum illustrates the largest building size required for both configurations. Therefore, this size may indeed be reduced following detailed design prior to construction.

The facility will be located immediately south of the existing North Bala Dam, approximately 25 m north of the Alternative 2D location proposed in the original ES/RR (see Figure 2.1 for the proposed new layout for Alternative 1A). Similar to the originally proposed facility, the development will require the excavation of an approach channel, the installation of an intake leading to a powerhouse and a tailrace returning water to the Moon River immediately downstream of the dam (Figure 2.1). The arrangement of the proposed development is based on a gross head of approximately 6.2 m (as per the ES/RR option), which is provided by the existing dam at the site.

A 44-kV line will convey power from the main station transformer within the powerhouse to the interconnection point. The interconnection will consist of an overhead cable running approximately 40 m from the proposed powerhouse to an existing 44-kV hydro line just south of the intersection of Muskoka Road 169 and Bala Falls Road (Figure 2.1). The interconnection point is the same as described in the ES/RR.

Power produced by the project will be sold under the terms of a power purchase agreement with the Ontario Power Authority (OPA).

Figure 2.1 displays the general layout of Alternative 1A. The general layout of Alternative 2D, as identified in the ES/RR, is provided in Appendix B. The components of the development are described in the following subsections.

2.1.1 Dams

No new dam construction will be involved in the development of the proposed facility. The two dams associated with the project will be the existing MNR-owned North Bala and South Bala Dams. The facility will utilize the head provided by these two dams. Both dams are presently operated as control structures, and are the main means of regulating the water levels on Lake Muskoka and controlling flows downstream into the Moon River. Both dams are presently operated by the removal and replacement of timber stop logs. The South Bala Dam is operated as the main flow passage structure, with log manipulation being dictated by inflows into Lake Muskoka. The operation of the North Bala Dam is presently limited mainly to the removal of logs to allow passage of the spring freshet, with their subsequent replacement.

Passing of flows in excess of the turbine capacity (spilling) will be accomplished primarily through stop-log operation at the South Bala Dam, with the North Bala Dam being operated only as required. SREL will operate both the North and South dams upon completion of the facility, as per the ES/RR.

2.1.2 Water Conveyance and Powerhouse

An approximately 30-m long approach channel will be created by modifying sections of the bedrock upstream of the existing North Dam by blasting. The approach channel will commence between the two in-water piers of the Highway 169 bridge over the river upstream from the North Bala Dam. This approach channel will lead to the intake of the powerhouse. The intake will be located immediately upstream of the dam and will allow water to flow into the approach channel and the powerhouse for generation. The intake will contain trashracks.

The reinforced concrete powerhouse, founded on bedrock immediately south of the North Dam, will contain either one 4 to 5-MW or two 2 to 2.5-MW horizontal or vertical Kaplan turbines (total combined capacity 4 to 5 MW), with a maximum combined plant flow capacity of 96 m^3/s, which is the same as Alternative 2D from the ES/RR. The powerhouse will have a draft tube(s) for flows exiting the turbine(s). A short tailrace channel (approximately 13 m) will be excavated and blasted to convey the powerhouse flows into the Moon River below the dam.

The remaining elements of the powerhouse will be similar to that as outlined in the ES/RR as follows. There will be a room above which will contain electrical components such as switchgear and a dry-type power transformer. The switchgear and transformer will convert the generated power to the 44-kV voltage required for distribution. The placement of the transformer inside the powerhouse will eliminate the visual impact of a typical external transformer and switchyard.

2.1.3 Electrical Interconnection and Distribution

The power generated will be conveyed from the transformer room inside the powerhouse via an overhead cable to an interconnection point on the existing local line along Muskoka Road 169 (MR-169) approximately 30 m from the powerhouse. The proposed interconnection point is the same for both the original and proposed facilities. The final distribution line voltage will be at 44 kV. The ES/RR included an underground cable running alongside the Alternative 2D tunnel under MR-169, that would not be possible with this location change.

Lake
Muskoka

Dock

Bala South
Control Structure

Bala Falls Rd.

Diver's Point
Gravel Parking Area

Crown Land

CP Rail Bridge

Canadian Pacific Railway

Crown Land
Portage Landing
Parking Lot

Existing Safety Boom

Flow

Dock

Purk's Place

Crown Land

District Road No. 169

Bala Falls Rd.

The Stone Church

Flow

Parking Area

Crown Land
Shield Parking Lot

Municipality
P.I.N. 48029-0638
P-2157-77

Bala North
Control Structure

Intake
Channel

Property Line

Bala Falls

Crown Land
Burgess Park

Powerhouse

Crown Land

Property Line

Municipality
P.I.N. 48029-0638

Tailrace
Channel

Proposed Floating
Safety Boom

Base of
North Bala
Falls

Water Level 219.40

Moon River

Building

Building

0 15 30 45 60 75 Metres

Scale 1:750

Note:
The Existing Safety Boom location shown represents a proposed relocation plan provided by MNR and approved by Transport Canada in 2011, that is scheduled to be implemented by MNR in 2012. Also note that MNR has stated that it will be installing new safety / warning signage around the dam site as part of its own dam safety program, during this same period of time. This boom relocation and additional signage by MNR is not part of this project, however, since it is schedule to be completed well before construction of this project, it has been labelled as "Existing"

Figure 2.1

Swift River Energy Ltd.
North Bala Small Hydro Project
General Arrangement - Alternative 1A

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May 28, 2012 - 9:28am Login name: parkl10733
Drawing Name: P:\SWIFT\327078\CAD\C3-Figures\327078-Fig 2.1 General Arrangement.dwg

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2.1.4 Other Infrastructure

Other infrastructure components will include a works yard/site office, laydown areas, temporary bridge, and crane working area. These features will be situated on Crown land in the general vicinity of the proposed facility, including a small parcel of land east of MR-169 (bordered by the north channel, Purk's Place and Bala Falls Road), a parcel of land north of the North Bala Dam (Burgess Park) and a parcel of land at Diver's Point. These areas may also be situated on municipal land owned by TML, located immediately south of the project site and east of MR-169 adjacent to Bala Falls Road.[1] Additional temporary staging areas may be required in the general vicinity including but not limited to existing parking lots east of MR-169, pending agreements with the landowners and possibly at remote locations. Existing roads, specifically MR-169, which runs through Bala at the project site, will provide direct site access.

Should the TML land south of the site not be made available for use during construction, a temporary cellular cofferdam will be erected in the vicinity of the tailrace to facilitate construction activities in the dry. A cellular cofferdam is necessary, as opposed to a rock or earth-fill cofferdam in order to minimize the footprint size and avoid encroachment onto municipal owned land on the shoreline to the south of the tailrace channel. A work barge may also be necessary to facilitate construction of this cofferdam. If TML land is made available, a rock or earth-fill cofferdam may be used in place of the cellular cofferdam. A sheet-pile cofferdam will be installed around the proposed intake channel working area. A temporary bridge may also be required over the north channel to facilitate sufficient construction access.

Table 2.1 summarizes the main differences in the Project compared to the project described and assessed in the October 2009 ES/RR. The proposed modifications required to relocate the facility to Crown owned lands are the subject of this Addendum.

[1] Note that the ownership of the municipal land located between the Bala North Dam and the Bala South Dam, and west of MR-169 changed from DMM to TML subsequent to the ESR.

Table 2.1 Comparison of Original and Revised Project Components

Project Component		Alternative 2D – Original Project from ES/RR	Alternative 1A – Revised Project
Intake Channel	Location	Between MR-169 Bridge and Rail Bridge	Between North Bala Dam and MR-169 Bridge
	Length	25 m	30 m
Intake Channel Cofferdam	Type	Rock-fill working platform	Sheet-pile cofferdam
	Total Area	906 m^2	840 m^2
Water Conveyance Structure	Location	Located underground between the intake channel and the powerhouse. A portion of it would run under MR-169.	Not required, since intake will be integral with powerhouse.
Powerhouse	Location	~25 m south of North Bala Dam	Immediately south of North Bala Dam
Turbine	Type	One 4 to 5-MW or two 2 to 2.5-MW horizontal Kaplan turbines	One 4 to 5-MW or two 2 to 2.5-MW horizontal or vertical Kaplan turbines
	Maximum Flow Capacity	96 m^3/s	96 m^3/s
Tailrace Channel	Length	20 m	13 m
Tailrace Channel Cofferdam	Type	Rock-fill Cofferdam	Rock-fill or Cellular Cofferdam
	Size	1491 m^2	336 m^2
Transformer	Location	Within powerhouse	Within powerhouse
Electrical Connection	Interconnection Point	Existing distribution line along MR-169	Existing distribution line along MR-169 (no change)
	Line Type	Buried	Overhead
	Line Distance	40 m	30 m
Temporary Laydown and Works Areas	Location	Crown and municipal land east of MR-169 at north side of Bala Falls Road, Crown.	Crown land east of MR-169 at north side of Bala Falls Road, Diver's Point, Burgess Park northwest of North Bala Dam, TML land south of powerhouse site, parking lots located east of MR-169, and remotely.
Temporary Works	Location	Temporary bridge over excavation site for water conveyance structure under MR-169. Used for construction and local traffic.	May require temporary bridge over north channel, south of MR-169. Used for construction traffic only.
Long-term Parking Area	Location	On adjacent Municipal-owned land	On Crown land

2.2 Operational Modifications

The ES/RR indicated that the proposed facility would operate in a strict run-of-river-mode of operation, using only the flow available in the river, with no cycling of flow. However, during its review of the ES/RR, OPG expressed concern with the potential of impacts from the Proposed Undertaking to OPG, including its downstream facilities Ragged Rapids and Big Eddy and OPG's ability to comply with the Muskoka River Water Management Plan (MRWMP). Based on this concern, the MOE Director ultimately imposed a list of conditions on the facility in her decision issued in March 2011. The elements of those conditions with respect to the proposed change are quoted below (note that a complete copy of the Director's decision is provided in Appendix A):

1. "The Proposed Undertaking shall be operated only as a run-of-river facility, incorporating a flow plan developed weekly in consultation with the Ministry of Natural Resources ("MNR") and OPG, based on the conditions forecast for each week. The facility would initially be run flat under normal flow conditions (i.e., no load cycling of the unit throughout the day). The intent of this condition is to simulate the status quo.

2. Lake Muskoka would not be used as storage with respect to the operating regime of the Proposed Undertaking.

3. When Inflow at the Proposed Undertaking is less than 26 cms (the minimum operating capability of Ragged Rapids GS), the Proposed Undertaking shall be cycled such that its operating discharge is 26 cms or more. Compliance with the WMP and public safety will continue to be ensured. During summer months, this discharge is to be timed in order to provide adequate navigable water conditions for Go Home Lake on Friday and Sunday evenings. This requirement would be included in the weekly flow plan.

5. To ensure no impacts to OPG compliance under the MRWMP with respect to the walleye spawning period, ranging from approximately April 15 to June 1 of any year, during such period, the Proposed Undertaking shall be operated with no cycling of units (i.e. run flat).

8. SREL agrees to enter into a communications protocol to ensure that the communication and notification specified herein is carried out effectively."

To provide the required operating discharge of 26 m^3/s (26 cms), continuous minimum flows of 1 m^3/s through each of the North and South Bala dams will be maintained and the proposed North Bala facility will be operated at 20 m^3/s (the minimum operating capability of the proposed facility), leaving a flow of 4 m^3/s for Burgess GS as per the MRWMP. The proposed North Bala facility will be operated at a flow rate of 20 m^3/s for up to 24 hours.

Once the planned daily release from Lake Muskoka (according to the weekly plan) is reached, operation of North Bala facility would temporarily cease; the minimum flow at each dam and the flow through Burgess GS would continue to provide discharges at Bala Falls. This would allow the water level of Lake Muskoka to rise back up to the original level. The cycling process would then be repeated the next day. The duration of the facility runtime will be varying with the rate of inflow to Lake Muskoka.

The maximum water level change in the upstream Lake Muskoka during this cycling will be 2 cm, and will be dependent on the rate of inflow to the lake. The change in water level in the downstream Moon River will conform to the MRWMP. However, it is expected that very little, if any, change in water level will be noted in the downstream Moon River due to this mode of operation as the upstream North Bala facility and the downstream Ragged Rapids facility will be operating in a coordinated manner to ensure a balancing of the inflows and outflows to the reach.

Based on an analysis of the flow regime expected under the MRWMP, the Inflow at the Proposed Undertaking will fall below 26 m^3/s from mid-July to mid-August in most years, thus requiring cycling during this time period. Furthermore, it is expected that in 50% of the years on average, the Inflow at the Proposed Undertaking will fall below 26 m^3/s for a longer duration, potentially between mid-June to mid-September and cycling would occur throughout this period, except when inflows

increase in response to precipitation events. If there is a dry fall period, the inflow can fall below 26 m^3/s from mid-September to late November, but this only occurs in 10 to 20% of the years. In the spring, the Inflow at the Proposed Undertaking can fall below 26 m^3/s from late April to mid-May but the North Bala facility would not be cycled in this period due to the MOE restrictions for spring spawning as noted above.

Furthermore, this condition is clearly outlined to only be applicable during low flow conditions when daily average flows are less than 26 m^3/s. The planned mode of operation is to operate without cycling the rest of the time.

It should be noted that the cycling will occur so as to pass only 20 m^3/s, through the facility and not the maximum capacity of 96 m^3/s.

3. Community Engagement and Stakeholder Consultations

The Alternative 1A project location was included in the ES/RR under a similar layout named Alternative 1. This was the project location that was used in the initial MNR Waterpower Crown Land Site Release process in 2005 and was presented to the public at the first Public Information Centre in August 2007 (as described in the ES/RR). During the environmental screening process, the "preferred" location was changed in response to requests from the public and municipal government representatives. Alternative 2D was developed to satisfy their concerns with respect to restricted access to the south side of the North Bala Falls and the aesthetics of a tall above ground powerhouse. However, as discussed in earlier sections, the Alternative 2D plan required use of municipal lands in addition to the provincial Crown lands for which SREL had been awarded Applicant of Record. Since the municipality would not finalize any lease agreement for those lands required until after the environmental screening process was complete, SREL maintained both options but focused the ES/RR on the "preferred" Alternative 2D. On several occasions, SREL presented both options, side-by-side, to the municipality and the public. Drawings, renderings and descriptions of both options have been maintained on the project website (www.balafalls.ca) since fall 2007. The following is a summary of the efforts made by SREL to ensure that the general public and the potentially affected Muskoka, First Nations and Métis communities were all aware that Alternative 1/1A was still available should the lease with the municipality not come to fruition.

3.1 Municipal and Public Stakeholders

SREL has continued to keep the municipal authorities, including the Township of Muskoka Lakes (TML) and the District Municipality of Muskoka (DMM) informed of the progress of the project and has provided further information clarification to concerns and questions raised since the ES/RR was posted. Information provided to these authorities has been made available to the public by postings on the project website and through these authorities own public record. SREL has also maintained Facebook ("Bala Falls Small Hydro Project") and Twitter ("@BalaFallsHydro") sites to provide information and updates to the public.

A brief summary of the key consultation with the municipal authorities and public stakeholders regarding the location change and/or the change in operational regime is provided below with a more detailed listing provided in Appendix C:

- Public Information Centre in August 2007 presented the project on the site of Alternative 1A (as described in ES/RR).
- SREL and its representatives have made several presentations to both the DMM Council and its Public Works Committee to discuss the two location alternatives, both before and after the ES/RR. All of these presentations were open to the public and many were very well attended. These presentations were also open to the local media and were generally well covered in news articles in the local newspapers, magazines, television and/or radio.
- SREL and its representatives have made several presentations to TML Council to discuss the two location alternatives as well as the change in operational regime, both before and after the ES/RR. All of these presentations were open to the public and many were very well attended. These presentations were also open to the local media and were well generally covered in news articles in the local newspapers, magazines, television and/or radio.

- Project briefing notes were provided to TML candidates prior to the October 2010 municipal election including outlines of the two alternative project locations.
- Project information packages were provided to all new DMM and TML council members subsequent to the October 2010 municipal election including outlines of the two alternative project locations.
- Copies of the March 2011 MOE Director's Decision outlining the imposed conditions on the project including the change in operational regime were provided to all DMM and TML council members and posted on the project website for review by the public.
- A lease application package was provided to DMM with a copy to TML providing description and drawings for both alternative project locations.
- Various letters and emails were sent to DMM and TML council members providing clarification that both alternative project locations were still being considered by SREL, including the circulation of updated drawings for Alternative 1(1A) that were also posted on project website.
- Ads were taken out in local newspapers depicting the two alternative project locations and requesting feedback on the community's preference.
- Interviews were given to local newspapers, magazines, radio and television outlining the two project locations.
- Interviews were given to local newspapers outlining the change in operational regime.
- SREL provided written answers to over 156 questions that TML had gathered from the public requesting further clarifications on the project. These answers included discussion on the two alternatives of the project locations and outlined the change in operational regime. These answers were provided to the public on the project website and on the TML website.
- SREL met with the local cottage association Muskoka Lakes Association (MLA) (that represents over 2500 members) on two occasions in 2011. A presentation was made outlining the two alternative project locations. Discussion also included an outline of the change in operational regime.
- Swift River posted a "Letter to the Community" in the local newspapers and with the local radio station on October 18, 19 and 26th, 2011, and on its project website announcing its intention to abandon Alternative 2D and pursue Alterative 1A.

3.2 Provincial Agency Consultations

The Ministry of Natural Resources (MNR) was consulted on the impacts of the change in operational regime subsequent to the issuance of the March 2011 MOE Director's Decision. Both MOE and MNR were provided copies of a letter prepared for DFO on impacts of the proposed changes to the operations regime in May 2011.

MNR and MOE were provided copies of a draft version of this addendum on September 21, 2011 and October 7, 2011 respectively, for review and comment prior to issuance to the public.

A conference call was held with DFO, TC, MNR, SREL and Hatch on October 12, 2011 to discuss this Addendum. MNR also provided comments via email on September 29 and 30, 2011. A

meeting was held with MOE, SREL and Hatch on October 27, 2011 to discuss this Addendum. Comments were primarily of an editorial nature and these were addressed through revisions to this document. Other comments were provided requesting additional information on potential impacts to existing walleye spawning locations downstream from the North Bala Falls and clarification regarding the relocation of the existing safety boom upstream from the North Bala Dam, which MNR has stated is scheduled to be (by MNR) in fall 2011 or winter 2012, in accordance with an approval MNR received from TC under the Navigable Waters Protection Act. MNR also confirmed that they did not feel the revised facility location would have any potential for incremental impacts on Species at Risk, but further noted that the possibility of encounters with Species at Risk and the potential for Species at Risk and/or their protected habitat for new species added to the Species At Risk in Ontario (SARO) list should be considered.

Supplemental information was provided to MNR on October 29 and November 1, 2011 with respect to changes in the upstream flow patterns for Alternative 1A as well as the change in operations, and on December 5, 2011 with respect to changes in the downstream flow patterns for Alternative 1A.

3.3 Federal Agency Consultations

DFO was consulted on the impacts of the change in operational regime subsequent to the issuance of the March 2011 MOE Director's Decision. A letter was provided to DFO May 17, 2011 providing responses to questions posed by DFO regarding this change.

A conference call was held with DFO, TC, SREL and Hatch on July 28, 2011. The discussion included the changes in project location and operational regime.

DFO and TC were provided copies of a draft version of this addendum September 21, 2011 for review and comment prior to issuance to the public.

DFO provided written comments on the Addendum on October 6, 2011. A conference call was held with DFO, TC, MNR, SREL and Hatch on October 12, 2011 to discuss this Addendum. DFO provided several comments requesting additional information and analysis in the Addendum regarding fisheries including the following:

- Discussion of potential impacts on spawning habitat due to the change in cofferdam types (e.g., cellular and sheet pile cofferdams compared to the originally proposed rock-fill cofferdams)
- Discussion of potential impacts of the revised tailrace location on existing walleye spawning habitats, particularly those installed under the Community Fisheries Involvement Program (CFIP)
- Additional information on the proposed spawning shoals adjacent to the tailrace
- Confirmation that the walleye spawning flow of 9.5 m^3/s proposed in the ES/RR to maintain spawning habitat downstream from the existing North Bala Falls would be maintained under the proposed modifications.

These comments were addressed through revisions to this Addendum document.

Supplemental information was provided to TC on October 26 and 29, 2011 with respect to changes in upstream flow patterns for Alternative 1A as well as the change in operations. A conference call was held with TC, SREL and Hatch on October 27, 2011 to discuss the results of the flow modelling

for the upstream north channel. TC provided written comments to the Addendum and supplemental information on November 1, 2011.

TC requested additional information on potential impacts to navigation downstream from the North Bala Dam as a result of the proposed modifications to the tailrace location. Results of downstream flow modelling were issued to TC on December 5, 2011. TC's comments were addressed through revisions and the inclusion of the requested information to this Addendum.

3.4 Aboriginal Communities

3.4.1 General

This addendum was sent to the following aboriginal communities for review and comments:

- Wahta Mohawk First Nation
- Moose Deer Point First Nation
- Beausoleil First Nation
- Chippewas of Rama First Nation
- Wasauksing First Nation
- Shawanaga First Nation
- Métis Nation of Ontario, Georgian Bay Traditional Territory Consultation Committee (GBTTCC).

3.4.2 Shawanaga First Nation

Subsequent to the ES/RR, SREL and Hatch met with Chief and Council for the Shawanaga First Nation (April 21, 2011). The presentation made by SREL and Hatch, and the accompanying Project Information Packages distributed at the meeting included outlines of both project locations. A copy of the MOE Director's Decision including the outline of the condition for a change in operational regime was also included in the package. Briefing notes from the meeting were provided to Shawanaga First Nation and the Crown along with the report completed by Hatch illustrating the appearance of different flows spilling over each of the dams.

The Shawanaga First Nation recently requested that a community meeting be held for the Shawanaga community to outline the project. A date for this meeting was originally set for November 2, 2011 but was subsequently cancelled by Shawanaga First Nation. At the time of writing this addendum a new date has not yet been set.

3.4.3 Moon River Métis Council (Métis Nation of Ontario)

The Georgian Bay Traditional Territory Consultation Committee includes representation from the Moon River Métis Council. Subsequent to the ES/RR, SREL and Hatch met with the Métis Georgian Bay Traditional Territory Consultation Committee (GBTTCC) (April 15, 2011). The presentation made by SREL and Hatch, and the accompanying Project Information Packages distributed at the meeting included outlines of both project locations. A copy of the MOE Director's Decision including the outline of the condition for a change in operational regime was also included in the package.

A follow-up letter was sent to GBTTCC on July 14, 2011 to address concerns discussed at the April meeting.

4. Screening of Effects

The determination of the potential for negative effects of the proposed modifications discussed in Section 2, compared to the design and mode of operation presented in the ES/RR was made utilizing the Screening Criteria identified in MOE (2001). Table 4.1 represents an assessment of the potential for negative effects resulting from the proposed modifications of the Project. The potential for negative effects is assessed on the basis that the mitigation previously identified in the ES/RR (Hatch Energy, 2009) would remain in place for the proposed modifications (if applicable). Any new negative effects identified as a result of the proposed modifications are listed here. Where new mitigation measures not previously identified in the ES/RR are required to address potential effects, they are also listed.

The following sections provide a summary of the difference(s) between the project as proposed in the ES/RR and the proposed modifications related to physical (i.e., surface and groundwater), natural environment (e.g., fish habitat, spawning, benthic invertebrate production), resources (e.g., fish entrainment/impingement), socioeconomic and Aboriginal parameters on the basis of the comparative screening. Subsequent sections provide more detail related to construction, operation and cumulative effects.

4.1 Surface and Groundwater

The proposed modification to the operational regime will result in a change in the amount of flow leaving Lake Muskoka and entering Bala Reach during periods when cycling is in effect. Cycling will be initiated when flows are less than 26 m^3/s. When the plant is operating during the cycling period, outflow from Lake Muskoka will be 26 m^3/s, taking into consideration the flow through the proposed facility, the minimum continuous flows through North and South Bala Dams and the flow through Burgess GS. When the plant is not operating, outflow from Lake Muskoka will be temporarily reduced to the minimum continuous flows through North and South Bala Dams and the flow through Burgess GS, with no flow through the facility. Therefore, during cycling operations, outflow from the lake will be different than what would occur under the operational conditions discussed in the ES/RR. During higher flow periods when cycling is not occurring, there will be no change to the flow regime, net effects and mitigation measures identified in the ES/RR.

The proposed modification to the project location (i.e., the location of the powerhouse) will not result in any net adverse effects to the components identified under the heading of "Surface and Groundwater" within Table 4.1.

4.2 Land

The proposed modifications to the Project will not result in any net adverse effects to the components identified under the heading of "Land" within Table 4.1. The modification is being made in response to land tenure issues which have prevented the long-term use of municipal land for the project, as originally proposed in the ES/RR. The proposed modification will be consistent with municipal policies.

4.3 Air and Noise

The proposed modifications to the Project will not result in any net adverse effects to the components identified under the heading of "Air and Noise" within Table 4.1. The proposed facility is feasible from a noise viewpoint, both at its original location (Alternative 2D) and after the

change to the powerhouse location noted for Alternative 1A. The noise levels and the need for mitigative measures will be reviewed in more detail when the Certificate of Approval submission is made prior to construction.

4.4 Natural Environment

The proposed modifications to the Project will not result in any net adverse effects to most of the components identified under the heading of "Natural Environment" within Table 4.1, including rare and endangered species (Species at Risk), protected areas, wetlands, wildlife, migratory birds and locally important or valued ecosystems and vegetation.

There will be net adverse effects related to fish and fish habitat, as discussed in Sections 4.4.1 and 4.4.2.

With respect to Species at Risk, the proposed modifications to the facility (i.e., change in Project location and modified low flow operational regime) do not result in any incremental effect to any species listed on the federal Species at Risk Act (SARA) or the provincial Endangered Species Act, 2007 (ESA). Additional information on Species at Risk is provided in Section 4.4.3.

4.4.1 Fisheries – Effects Due to Change in Project Location

The altered configurations of the Alternative 1A intake and tailrace channel will cause a net increase of 146 m^2 in the amount of aquatic habitat adversely altered as a result of the permanent Project footprint. The original Alternative 2D layout in the ES/RR permanently altered 437 m^2 of aquatic habitat (250 m^2 in the intake channel and 195 m^2 in the tailrace channel), while the new layout permanently alters 583 m^2 of aquatic habitat (386 m^2 in the intake channel and 197 m^2 in the tailrace channel). Additional compensation measures over and above those identified in the ES/RR and the Letter of Intent issued to DFO (provided in Appendix D of this document) will be required to account for the increase in adversely affected aquatic habitat. This is discussed in more detail in Section 5.

The proposed change in cofferdam type for Alternative 1A (sheet pile and cellular cofferdams) will have an adverse effect on aquatic habitat compared to the rock fill cofferdams previously proposed for Alternative 2D. However, this is a temporary effect and no additional mitigation is proposed. This is discussed in more detail in Section 5. The temporary cofferdam will not be located in any location used by walleye or white sucker for spawning habitat.

The turbine(s) associated with Alternative 1A has slightly different characteristics (slightly smaller runner diameter) than the original turbine(s). In order to assess the potential for an adverse effect related to fish passage and turbine mortality, the formula utilized to assess fish mortality in the ES/RR for Alternative 2D was utilized for Alternative 1A (as described further in Section 6.2.1 of this document). The formula predicted a negligible increase in turbine mortality (<0.5% for 500-mm fish) which is considered to be within the margin of error for the formula. As such, no net adverse effect on fish mortality is predicted due to Alternative 1A.

The change in Project location is not anticipated to have any adverse effects on existing spawning habitat, including spawning areas enhanced under the Community Fisheries Involvement Program (CFIP). The tailrace location is not situated in an area that was previously enhanced under the CFIP and the area of the tailrace was not determined to provide any spawning habitat for species such as walleye or white sucker. The change in flow vector from the revised powerhouse location will not

have any adverse effect on flow and velocity over the existing spawning areas downstream from the North Bala Dam or South Bala Dam. This is discussed in more detail in Section 6.

4.4.2 Fisheries – Effects Due to Change in Operational Regime

The proposed cycling operations have the potential to result in an increase in fish (including ichthyoplankton) entrainment and potential for mortality due to the changes in flow velocity that will occur during each turbine start-up cycle. Additional mitigation is required over and above that specified within the ES/RR and the Letter of Intent issued to DFO in order to mitigate this potential adverse effect.

The proposed cycling flows may alter benthic habitat use of the proposed tailrace shoal enhancement areas discussed in the ES/RR and DFO Letter of Intent. Cycling may result in an increase in invertebrate drift from the shoal area, which would temporarily decrease invertebrate biomass on the shoals. This effect was not assessed in the original ES/RR.

The proposed cycling operation will not occur during the potential walleye spawning period (April 15 to June 1), per the requirement of the MOE Director's Decision, and will therefore not affect the provision of the 9.5 m^3/s continuous flow over the North Bala Dam during the walleye spawning period, as committed to in the ES/RR. Therefore, no adverse effects on walleye spawning are anticipated to occur.

4.4.3 Species at Risk

As noted in the ES/RR, there are 14 species protected under the ESA whose range overlaps with the Project study area. Therefore, if suitable habitat was present within the area, there is potential that these species could be present. However, the habitat types present in both the original project footprint area (Alternative 2D) and the proposed modified project footprint area (Alternative 1A) generally lack suitability for the noted protected species.

Preferred habitat (as defined based on the known habitat preferences of the 14 protected species, as identified in Table 2.21 of the ES/RR) is not present within the area encompassed by the Project footprint for either Alternative (e.g., intake, tailrace, powerhouse, temporary construction areas). This area primarily consists of a small, isolated patch of natural vegetation with some trees, bounded by Highway 169, within a relatively highly utilized portion of the Town of Bala. This vegetation and level of disturbance is not conducive to use by area sensitive species such as Cerulean Warbler, Golden-winged Warbler or Red-Headed Woodpecker, nor were any Bald Eagle nests observed, or expected to be present, in the area. There are no wetlands or soft aquatic sediments in the area, which would preclude use by wetland birds (e.g., Least Bittern) and the various turtle species and Eastern Ribbonsnake. Although rocky outcrops are present, it is extremely unlikely that Massassauga Rattlesnake would be present in the proposed project footprint area. Suitable habitat for Milksnake, Monarch Butterfly and Branched Bartonia is also not present within the project footprint area. It is not expected that critical habitat for any of these species would be present in areas to be directly disturbed by the project, therefore, it is not anticipated that the Project would result in contravention of the prohibitions in the ESA, 2007.

Suitable habitat for some of these species is known to be present in the Moon River downstream from Bala Reach. However, the Project will not have adverse effects on the environment in these areas, therefore no adverse effects are anticipated to occur on these species.

4.5 Resources

The proposed modifications to the Project will not result in any net adverse effects to the components identified under the heading of "Resources" within Table 4.1.

4.6 Socioeconomic

The proposed modifications to the Project have the potential to result in adverse effects to "neighbourhood and community character" and "recreation, cottaging and tourism", since the Alternative 1A Powerhouse is higher and closer to the falls, and will be more visible from both MR-169 and downstream locations. Therefore, the facility may adversely affect these socioeconomic components since, depending on one's personal preferences, increased visibility could detract from one's enjoyment of the falls and surrounding areas. The extensive proposed landscaping plan for Alternative 2D, including walkways will not be possible with Alternative 1A due to limited land size. The roof of the powerhouse, however, could still be used as a lookout with limited interpretive signage.

Public access to the south side of the North Falls will be restricted by Alternative 1A, which could adversely affect use and enjoyment of the falls, and related values of local residents, cottagers and tourists. However, the north side of the North Falls will provide access to the falls from Burgess Park after construction is complete.

Public access to Burgess Park and Diver's Point will be temporarily restricted due to use of those areas as temporary construction staging and laydown areas.

The change in project location is not anticipated to cause any net adverse effects to privately owned shorelines due to minor changes in the location of the main flow path from the powerhouse. The flow will still be located south of the main flow currently going over the North Dam and no significant changes in overall flow vector or velocity are anticipated to occur as a result of this change.

Alternative 1A will not require excavation or construction beneath MR-169 for the project water conveyance structure. Therefore, the lane and road closures anticipated for Alternative 2D will not be required for Alternative 1A. As such, there will no longer be a requirement to restrict the start of construction activities until after mid October (i.e., after Cranberry Festival).

4.6.1 Heritage and Culture

The proposed modifications to the Project will not result in any net adverse effects to heritage buildings, structures or sites, archaeological resources, or cultural heritage landscapes. The Stage 1 Archaeological Assessment (Appendix C7 of the ES/RR) concluded that the area that would be disturbed by Alternative 1A has no archaeological potential due to presence of steep slopes and disturbed areas associated with the North Bala Dam. Therefore, no adverse effects on archaeological potential are anticipated.

However, the proposed Alternative 1A facility may have an adverse effect on aesthetically pleasing landscapes or views since it is located closer to the North Bala Falls and is a larger, more visually imposing structure than Alternative 2D. Due to the height of the powerhouse required to house the vertical turbine (required to retain facility footprint on the available Crown lands) for Alternative 1A, it is not possible to implement the landscaping plan that was proposed for Alternative 2D to minimize the visual impact of facility. The Bala Falls Cultural Heritage Landscape Study included in

the ES/RR noted that an alternative to burying the powerhouse would be "to design the walls with a visual connection to the evolution of hydroelectric power at Bala Falls and/or early development of hydro power in Muskoka". This study recommended that the intake and powerhouse "be designed such that they are visually sympathetic to the cultural heritage landscape of Bala Falls". The recommendations will be considered along with recommendations by a PAC that will be appointed to assist with the final aesthetics of the building and landscaping during the detailed design stage of the Project.

It has been noted that the TML has posted a Notice of Intention to Designate six properties in Bala (5 of which are in the vicinity of the Project) on August 17, 2011, subsequent to the issuance of the ES/RR. The five properties in the Project area include

- Bala Township Dock on Lake Muskoka
- The Shield Parking Lot (adjacent to MR-169)
- The Township Dock on Moon River
- The Bala Cenotaph between Bala Falls Road and the CP Rail tracks
- Portage Landing on the Moon River.

Several objections to these designations were received by the TML during the comment period. Unfortunately, the notice did not provide sufficient information regarding the Cultural Heritage Value or Heritage Attributes to be preserved for these properties to determine how the Project could impact these properties if designation is ultimately made. At the time of writing this Addendum, TML was still awaiting a date for a pre-hearing with the Conservation Review Board (CRB) to hear the objections.

In the absence of a decision by the CRB, Alternative 1A will not impact any of the listed properties with the exception of the facility being visible from the following two properties:

- The Township Dock on Moon River
- Portage Landing on the Moon River

In comparison to Alternative 2D in the ES/RR, the powerhouse would also have been visible from both of these properties. The intake would have been visible from the Bala Township Dock on Lake Muskoka property as well. The powerhouse would actually have been located on the Portage Landing on the Moon River property for Alternative 2D, but will be adjacent to this property under Alternative 1A.

4.7 Aboriginal

The proposed modifications to the Project will not result in any net adverse effects to the components identified under the heading of "Aboriginal" within Table 4.1.

4.8 Other

The proposed modifications to the Project will not result in any net adverse effects to the components identified under the heading of "Other" within Table 4.1.

Table 4.1 Screening Criteria (MOE, 2001)

Potential Effect	Yes	No	Additional Information	Net Effects
Will the project...				
1.0 Surface and Groundwater				
1.1 Have negative effects on surface water quality, quantity or flows?	X		Cycling of flows will occur when outflows from Lake Muskoka decrease below 26 m^3/s. During such times, outflows from Lake Muskoka will vary from what would occur under the run-of-river mode of operation assessed in the ES/RR.	Alterations in natural outflow rates from Lake Muskoka due to cycling operations.
1.2 Have negative effects on groundwater quality, quantity or movement?		X	No change from initial screening.	None.
1.3 Cause significant sedimentation, soil erosion or shoreline or riverbank erosion on or off site?		X	No change from initial screening. Daily water level fluctuations in Lake Muskoka during cycling periods will be limited to 2 cm or less. No increase in erosion is anticipated in the Bala Reach due to minor change in location of the main flow path from the facility.	None.
1.4 Cause potential negative effects on surface or groundwater from accidental spills or releases into the environment?		X	No change from initial screening.	None.
2.0 Land				
2.1 Have negative effects on residential, commercial or institutional land uses within 500 m of the site.		X	This alternative results in less disruption to adjacent commercial and institutional land uses, in particular Purk's Place and the Stone Church.	Positive
2.2 Be inconsistent with the Provincial Policy Statement, provincial land use or resource management plans?		X	No change from initial screening. Change in mode operation will remain consistent with the flow and water level requirements of the MRWMP.	None.
2.3 Be inconsistent with municipal land use policies, plans and zoning bylaws?		X	This alternative does not require the permanent use of municipal lands as required by local legislators.	Positive
2.4 Use hazard lands or unstable lands subject to erosion?		X	No change from initial screening.	None.
2.5 Have potential negative effects related to the remediation of contaminated land?		X	No change from initial screening.	None.

Potential Effect	Yes	No	Additional Information	Net Effects
Will the project...				
3.0 Air and Noise				
3.1 Have negative effects on air quality due to emissions of nitrogen dioxide, sulphur dioxide, suspended particles, or other pollutants?		X	No change from initial screening.	None.
3.2 Cause negative effects from the emission of greenhouse gases (CO_2, methane?)		X	No change from initial screening.	None.
3.3 Cause negative effects from the emission of dust or odour?		X	No change from initial screening.	None.
3.4 Cause negative effects from the emission of noise?		X	Facility is slightly further away from primary receptors and slightly closer to secondary receptors. Essentially, no change from initial screening.	None.
4.0 Natural Environment				
4.1 Cause negative effects on rare, threatened or endangered species of flora or fauna or their habitat?		X	No change from initial screening.	None.
4.2 Cause negative effects on protected natural areas such as ANSIs, ESAs or other significant natural areas?		X	No change from initial screening.	None.
4.3 Cause negative effects on wetlands?		X	No change from initial screening.	None.
4.4 Have negative effects on wildlife habitat, populations, corridors or movement?		X	No change from initial screening.	None.
4.5 Have negative effects on fish or their habitat, spawning, movement or environmental conditions (e.g., water temperature, turbidity, etc)?	X		The modified Project location will result in a small increase in the amount of aquatic habitat permanently altered by the project footprint. Additional compensation measures will be required to mitigate the net adverse effects. Incremental impacts may also occur due to the change in cofferdam materials. Cycling operations have the potential to result in increased fish entrainment through the facility and altered habitat use in the tailrace area. Additional mitigation required to minimize potential for entrainment and subsequent mortality.	None following implementation of additional mitigation/ compensation.
4.6 Have negative effects on migratory birds, including effects on their habitat or staging areas?		X	No change from initial screening.	None.

Potential Effect	Yes	No	Additional Information	Net Effects
Will the project...				
4.7 Have negative effects on locally important or valued ecosystems or vegetation?		X	No change from initial screening.	None.
5.0 Resources				
5.1 Result in inefficient (below 40%) use of a non-renewable resource (efficiency is defined as the ratio of output energy to input energy, where output energy includes electricity produced plus useful heat captured)?		X	No change from initial screening.	None.
5.2 Have negative effects on the use of Canada Lands Inventory Class 1-3, specialty crop or locally significant agricultural lands?		X	No change from initial screening.	None.
5.3 Have negative effects on existing agricultural production?		X	No change from initial screening.	None.
5.4 Have negative effects on the availability of mineral, aggregate or petroleum resources?		X	No change from initial screening.	None.
5.5 Have negative effects on the availability of forest resources?		X	No change from initial screening.	None.
5.6 Have negative effects on game and fishery resources, including negative effects caused by creating access to previously inaccessible areas?		X	No change from initial screening.	None.
6.0 Socioeconomic				
6.1 Have negative effects on neighbourhood or community character?	X		Powerhouse is higher and closer to the falls, and will be more visible from both Highway 169 and downstream locations.	Facility more obvious than initial plan.
6.2 Have negative effects on local businesses, institutions or public facilities?		X	Alternative 1A will have a positive effect on Purk's Place Boat House and Marina, since its docks will not have to be removed or relocated. Positive effect to both Purk's Place Boat House and Marina and the Stone Church since the intake will no longer use the existing parking area for these businesses.	Positive

Potential Effect	Yes	No	Additional Information	Net Effects
Will the project...				
6.3 Have negative effects on recreation, cottaging or tourism?	X		Powerhouse is higher and closer to the falls, and will be more visible from both Highway 169 and downstream locations. Public access to the south side of the North Falls will be restricted. The upstream existing portage landing on Lake Muskoka would not be affected by Alternative 1A as it was previously with Alternative 2D. Public access to Burgess Park and Diver's point will be temporarily restricted as those areas will be used as construction staging and laydown areas. Bala Falls Road will not need to be closed during winter, therefore, no changes to snowmobile trail along Bala Falls during construction.	Facility more obvious than initial plan and will eliminate access to the south side of the North Falls. Increase in public access restrictions during construction at Burgess Park and Diver's Point. No changes required to upstream portage landing or snowmobile trail from existing conditions.
6.4 Have negative effects related to increases in the demands on community services and infrastructure?		X	No change from initial screening.	None.
6.5 Have negative effects on the economic base of a municipality or community?		X	No change from initial screening.	None.
6.6 Have negative effects on local employment and labour supply?		X	No change from initial screening.	None.
6.7 Have negative effects related to traffic?		X	Alternative 1A eliminates the need for work under Highway 169 and therefore, the road associated road closures and lane reductions would not be required. Alternative 1A eliminates the need for road closure of Bala Falls Road and additional traffic signal at southeast end of Bala Falls Road.	Positive.
6.8 Cause public concerns relating to public health and safety?		X	No change from initial screening.	None.
7.0 Heritage and Culture				
7.1 Have negative effects on heritage buildings, structures or sites, archaeological resources, or cultural heritage landscapes?		X	Blasting work will be conducted further away from the two noted heritage buildings/building of historical interest. Therefore, less impact on these buildings.	Positive

Potential Effect	Yes	No	Additional Information	Net Effects
Will the project...				
			The powerhouse for Alternative 1A will not be located on one of the newly listed properties under consideration (Portage Landing on the Moon River) as it would have been for Alternative 2D.	Positive
7.2 Have negative effects on scenic or aesthetically pleasing landscapes or views?	X		Alternative 1A has a greater visual impact since the powerhouse is higher and closer to the falls.	Decreased aesthetics associated with Alternative 1A powerhouse.
8.0 Aboriginal				
8.1 Cause negative effects on First Nations or other Aboriginal communities?		X	No change from initial screening.	None.
9.0 Other				
9.1 Result in the creation of waste materials requiring disposal?		X	No change from initial screening.	None.
9.2 Cause any other negative environmental effects not covered by the criteria outlined above?		X	No change from initial screening.	None.

5. Construction Effects, Mitigation and Residuals

5.1 Identification of Potential Effects

Table 5.4 in the ES/RR summarizes the potential adverse effects, mitigation measures and residual effects due to construction of the proposed facility, organized by environmental component. For the purposes of this Addendum, this table has been utilized and modified (see Table 5.1) to identify differences in potential adverse effects between the projects as proposed in the ES/RR and the proposed modifications which are the subject of this Addendum.

This section is limited to the discussion regarding the proposed alteration in project location, since the proposed alteration in the operational regime will not result in any differences to the project at the construction stage.

5.2 Discussion of Net Adverse Effects

Where a net adverse effect associated with Alternative 1A compared to Alternative 2D is present, it is discussed in more detail in the following sections.

5.2.1 Aquatic Habitat and Biota

5.2.1.1 Temporary Habitat Effects

Alternative 1A will result in a greater amount of temporary aquatic habitat loss due to upstream and downstream cofferdam structures than would Alternative 2D from the ES/RR. Figure 5.1 shows the areas of aquatic habitat that would be altered by Alternative 1A.

Upstream Cofferdam

Alternative 2D would have resulted in the temporary loss (i.e., no use possible) of 666 m^2 of aquatic habitat within the footprint of the intake cofferdam. An additional 240 m^2 of existing aquatic habitat would have been altered due to the fill for the cofferdam, but would have remained wetted and available for use by aquatic organisms. The total surface area affected by the Alternative 2D upstream cofferdam is 906 m^2. Alternative 1A (which uses a sheet-pile cofferdam as opposed to a rock-fill cofferdam) results in the temporary loss of 840 m^2 of aquatic habitat within the footprint of the cofferdam and associated dewatered area (see Figure 5.1). There will not be any 'altered but useable' aquatic habitat associated with the upstream cofferdam so the total temporary loss is 840 m^2.

Therefore, the Alternative 1A upstream cofferdam has a higher net temporary loss of aquatic habitat compared to the Alternative 2D upstream cofferdam (840 m^2 vs 666 m^2 for a net increase of 174 m^2). The habitat that will be temporarily altered by Alternative 1A is immediately upstream of the North Bala Dam, and is located between the dam and the MR-169 bridge piers. The area is shallower than the habitat that would have been altered by Alternative 2D. Neither area is considered to provide any critical aquatic habitat functions (e.g., spawning, nursery or significant foraging habitat) and the proximity of the Alternative 1A area to the dam further diminishes its habitat value due to the increased potential for entrainment over the dam. The presence of the Alternative 1A cofferdam will not significantly affect the volume of flow over the North Bala Dam during construction, so no adverse effects on existing spawning areas downstream from North Bala Dam are anticipated to occur, even if the cofferdam is in place during the spring spawning period. Accordingly, no mitigation measures are proposed to account for the increase in the amount of temporary aquatic

habitat lost due to the Alternative 1A upstream cofferdam compared to the Alternative 2D upstream cofferdam. As per the ES/RR, MNR's timing restrictions regarding in-water work will be followed during installation and removal of the cofferdam and the cofferdam will be completely removed from the water.

Downstream Cofferdam

The proposed cofferdam around the Alternative 2D tailrace would have resulted in the temporary loss of 1165 m^2 (within the footprint of the cofferdam that would not remain wetted) and temporary alteration of 326 m^2 of aquatic habitat (on the portion of the side slopes of the rock-fill cofferdam that will remain wetted during construction), for a total of 1491 m^2 of affected aquatic habitat. Alternative 1A results in the temporary loss of 336 m^2 of aquatic habitat within the footprint of the downstream cellular cofferdam and associated dewatered area (see Figure 5.1). The size of the downstream cofferdam for Alternative 1A is significantly less than that for Alternative 2D due to the specification of a cellular cofferdam. Therefore, this results in 829 m^2 less temporary habitat loss than the original alternative proposed in the ES/RR, although the cellular configuration of the Alternative 1A cofferdam will not provide any habitat that will remain wetted, as the Alternative 2D cofferdam would have (this has been accounted for in the habitat calculation, since the 326 m^2 of habitat that would have remained available has not been accounted for in the comparison of alternatives). While the Alternative 1A cofferdam is located closer to the base of North Bala Falls than Alternative 2D, no critical habitat (e.g., spawning habitat for walleye or sucker, such as that created by the Community Fisheries Involvement Program), was identified in this area and no net adverse effect is predicted due to the presence of the cofferdam. In addition, the presence of the cofferdam is not anticipated to create any change in flow velocity or vector over the existing walleye spawning habitats at the base of the flow channels downstream from the North and South Bala Dams (i.e., the CFIP created spawning beds), even if the cofferdam is in place during the spring spawning period.

5.2.1.2 Long-Term Habitat Effects

Alternative 1A will result in the permanent alteration of 386 m^2 of aquatic habitat due to intake channel excavation and permanent alteration of 197 m^2 of aquatic habitat due to tailrace channel excavation, for an overall alteration of 583 m^2. Alternative 2D in the ES/RR had a net overall adverse alteration of 437 m^2 of aquatic habitat, including 247 m^2 in the intake area and 190 m^2 in the tailrace area. Overall, Alternative 1A results in a greater amount of habitat alteration in the intake area (net increase of 139 m^2) and a slight increase in habitat alteration in the tailrace area (7 m^2), for a total net increase of 146 m^2.

As a result, a greater amount of aquatic habitat will be adversely affected. Adverse effects in the intake channel and tailrace areas include alterations to the channel bed required for deepening and smoothing the invert of these project components. This has the effect of reducing habitat complexity, as the exposed underlying bedrock has less habitat value than the existing lake bottom substrates (i.e., boulder, cobble, and sand) in front of the dam (see Figure 2.7 in ES/RR). Decreased habitat complexity on the channel bed could reduce the suitability of this habitat for benthic invertebrates and small fish, and the associated foraging value for larger fish from these prey items. However, a comparison of habitat complexity between the areas lost for each alternative indicate that the Alternative 1A habitat is of less value than the area that would be lost for Alternative 2D.

Table 5.1 Comparison of Potential Effects between Alternative 2D and Alternative 1A During Construction Phase

Environmental Component	Sources of Effect	Potential Effect	Comparison Between Alternative 2D in the ES/RR and Alternative 1A	Net Effect of Alternative 1A
Geology	Excavation for intake, powerhouse and tailrace.	Loss of bedrock due to excavation.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Soils	Excavation for intake, powerhouse and tailrace, and associated infrastructure (access roads, works yard).	Disturbance to soils.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	General construction activities resulting in exposure of organic and mineral soils.	Soil erosion as a result of exposure to wind, precipitation and surface water flow.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Soil stockpiling.	Adverse effects on soil quality.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Access road, laydown and works area construction.	Mixing of soils with gravel.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Use of heavy equipment on riverbanks and riparian areas.	Reduction in riverbank stability and potential increases in shoreline erosion.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Use of heavy equipment, storage of construction materials, soil stockpiling.	Soil compaction.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Use of potentially contaminating materials on site (e.g., fuels, lubricants).	Soil contamination due to accidental spills.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Air Quality	Traffic along access road, soil moving and stockpiling, erosion from disturbed areas and other construction activities (e.g., crusher use, blasting).	Increased dust levels in work areas.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Use of combustion equipment (vehicles and machinery).	Short-term increase in local airborne contaminant concentrations due to combustion emissions.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Groundwater	Excavations for powerhouse, intake and tailrace channels.	Infiltration of groundwater into excavations.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Use of potentially contaminating materials on site (e.g., fuels, lubricants).	Groundwater contamination due to accidental spills.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Surface Water Hydrology and Hydraulics	Working platform construction in the tailrace area.	Changes in local hydraulics (flow velocity and vectors) due to presence of working platform in riverbed.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Vegetation clearing, land grading, ditching, drainage improvements resulting in more impervious surfaces.	Potential increase in local runoff rates and quantity, and associated decreases in runoff duration.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Surface Water Quality	General construction activities resulting in exposure of organic and mineral soils.	Impairment to surface water quality due to increased turbidity and suspended solids due to erosion of terrestrial soils to watercourses.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Installation of upstream and downstream cofferdams.	Adverse effects on surface water quality due to fine sediment mobilization.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Use/storage of hazardous materials (e.g., fuel, lubricants).	Impairments to surface water quality due to spills or use of machinery in watercourses.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	General construction activities in proximity to watercourses.	Impaired surface water quality due to release of construction debris (e.g., concrete dust, sawdust).	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Release of sewage effluents.	Impaired downstream surface water quality.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Potential for Acid Rock Drainage (ARD).	Impaired surface water quality due to ARD.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Use of treated wood in aquatic environments.	Water quality impairment due to leaching of toxic chemicals from treated wood.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None

Environmental Component	Sources of Effect	Potential Effect	Comparison Between Alternative 2D in the ES/RR and Alternative 1A	Net Effect of Alternative 1A
Aquatic Biota	Impaired surface water quality due to fugitive dust deposition and/or erosion and sedimentation.	Potential impacts on fish health or behaviour due to surface water quality impairment.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Accidental spills or leaks of potentially hazardous materials (e.g., fuels, oils, cement, explosives).	Potential impacts on fish health due to surface water quality impairment.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	In-stream and riparian construction activities.	Disruption of fish and locally increased turbidity resulting in injury to aquatic biota, altered foraging and/or behaviour.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Blasting in or near fisheries habitats.	Fish mortality or injury due to blasting.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Aquatic Habitat	Increased transport of fine sediment into watercourse due to construction activities (e.g., wind or water erosion and transport).	Sedimentation of riverbed; resulting in harmful habitat alteration.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Installation of in-stream working platform and cofferdam to allow intake, tailrace and powerhouse construction to be undertaken in the dry.	Temporary losses of aquatic habitat during construction period.	• Temporary loss of 840 m^2 within the intake cofferdam area for Alternative 1A, compared to Alternative 2D which resulted in temporary loss of 666 m^2 and temporary alteration of 240 m^2 for total temporary adverse effect on 906 m^2 of aquatic habitat. Therefore greater amount of temporarily lost habitat (174 m^2) associated with Alternative 1A. Affected area has less complex substrates for Alternative 1A than 2D and the 1A area is shallower and closer to the North Bala Dam. No impact on identified spawning areas downstream from the North Bala Dam due to revised cofferdam location. • Temporary loss of 336 m^2 of aquatic habitat within the tailrace cellular cofferdam for Alternative 1A, compared to temporary loss of 1165 m^2 and temporary alteration of 326 m^2 of aquatic habitat within the tailrace cofferdam area. Therefore, decrease of 829 m^2 of habitat temporarily lost due to Alternative 1A downstream cofferdam. No impact on identified spawning areas for walleye and sucker, including the CFIP created areas due to revised cofferdam location. • Overall net decrease in amount of habitat temporarily altered in intake/tailrace areas. • Mitigation measures identified for Alternative 2D in ES/RR still apply (timing constraints for installation and removal, complete removal of cofferdam material from watercourse).	Overall net decrease in amount of habitat temporarily lost in intake and tailrace areas due to cofferdams and dewatering, although more habitat temporarily lost in intake area.
	Construction of powerhouse, intake and tailrace.	Permanent alteration of aquatic habitat within intake and tailrace channel.	• Permanent alteration of 386 m^2 of aquatic habitat due to intake channel excavation, permanent alteration of 197 m^2 of aquatic habitat due to tailrace channel excavation and permanent gain of 60 m^2 of aquatic habitat due to tailrace channel excavation – overall alteration of 583 m^2. Original project design in ES/RR had net alteration of 437 m^2 of aquatic habitat. • To compensate, the spawning shoals in the tailrace area will be enlarged from the original size of 82 m^2 to a total of 220 m^2 • The Alternative 1A tailrace is not located in an area that currently provides spawning habitat for walleye and sucker, including any of the spawning beds created under the Community Fisheries Involvement Program. Therefore, no adverse effects on spawning habitat for these species will occur due to the footprint of the Alternative 1A tailrace. • Outflow from the Alternative 1A tailrace will not have any effect on flow velocity and flow vector at the identified existing spawning areas downstream from the North and South Bala Dams so no adverse effects on the spawning suitability of those areas are predicted to occur.	Net adverse alteration of 146 m^2 of aquatic habitat due to modified Project. Additional compensation required.
Terrestrial Vegetation	Clearing of vegetation for facility construction.	Clearing of vegetation in the project area.	• Alternative 2D resulted in clearing of 1230 m^2 of vegetation including 1100 m^2 in the powerhouse area and 130 m^2 in the intake area. Alternative 1A results in clearing of 1100 m^2 of natural vegetation in the powerhouse area if TML land is available for temporary construction use immediately adjacent to the powerhouse location. If TML land is not made available, clearing in temporary construction areas may include 1600 m^2 at Burgess Park (north of the North Bala Dam), and ~600 m^2 at Diver's Point (the overall area available for use at Divers Point is ~1200 m^2, but a gravel parking area occupies a significant proportion resulting in less vegetation clearing). Therefore, amount of vegetation clearing could increase slightly for Alternative 1A if TML lands are not made available for temporary construction use. It is Swift River's intention to only remove trees if absolutely necessary. It is generally felt that no removal of mature trees will be required for construction.	Possible net increase in amount of vegetation clearing required for this option.
	Use/storage of hazardous materials (e.g., fuel, lubricants).	Loss of vegetation due to accidental spills and malfunctions.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	Construction activities resulting in fugitive dust emissions.	Adverse impacts on plant photosynthesis and growth due to dust deposition.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None

Environmental Component	Sources of Effect	Potential Effect	Comparison Between Alternative 2D in the ES/RR and Alternative 1A	Net Effect of Alternative 1A
Wildlife	Facility construction.	Loss of wildlife habitat due to vegetation clearing.	• Revised Project layout results may result in reduced wildlife habitat loss due to increased vegetation clearing if TML lands are not made available for temporary construction use.	Possible net adverse effect due to increased vegetation clearing for this option.
	General Construction Activities.	Disturbance to breeding wildlife populations.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
	General Construction Activities.	Effects to wildlife as a result of spills of contaminating materials.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Public Use and Access	General Construction Activities.	Construction activities will restrict access to the immediate construction zone and the areas required for laydown, storage or storage. Boaters will no longer have the dock at Purk's Place Boat House and Marina available for berthing.	• Positive change for Purk's Place Boat House and Marina since it will remain available for berthing throughout the construction period. Restriction of activities due to laydown and storage areas will still apply to the modified option. • Negative change due to restriction in public use on south side of North Bala Falls due to powerhouse construction and north side of North Bala Falls at Burgess Park and at Diver's Point, if these areas used for access, temporary works and/or laydown areas.	Negative effect due to restrictions on public use of land around North Bala Falls and at Diver's Point during construction. Positive effect for Purk's Place
Public Health and Safety	General Construction Activities.	Construction of the proposed development poses public safety concerns, as the area is heavily used for both aquatic and land-based activities. Possible impacts include injury from construction equipment or activities such as blasting.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Construction Site Safety	General Construction Activities.	Potential injury to workers on site.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Local Traffic – Highway 169	General Construction Activities.	Increased local traffic and temporary disruption along routes used, resulting in delays to the local community traffic, and increased traffic on Highway 169. During construction of the project there may also be activities that require temporary disruption to traffic flow on Highway 169 including the delivery of large equipment to the site, and the construction of the temporary Bailey bridge.	• Periodic traffic disruption on MR-169 will still be required at various points throughout the construction period. However, no temporary Bailey Bridge, nor the anticipated lane and road closures of MR-169 and the north end of Bala Falls Road, will be required for Alternative 1A. It is therefore anticipated that traffic disruption required for Alternative 1A will be less than would have been required for Alternative 2D.	Positive effect due to lesser amounts of traffic disruption on MR- 169.
Local Traffic – Bala Falls Road	General Construction Activities.	Approximately 20 m of Bala Falls Rd will be closed and unavailable for public use. This area is between Highway 169 and Burgess Memorial Church.	• This section of Bala Falls Road will not require temporary closure for Alternative 1A. Therefore, this is a positive effect.	Positive net effect since no closure of Bala Falls Road required.
Noise and Vibrations	General Construction Activities.	Noise and vibrations generated by equipment and blasting activities.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Aesthetics	Presence of signage and fencing in or around restricted access areas; presence of construction equipment; removal of vegetation in construction area.	Interruption of aesthetically pleasing landscapes.	• Alternative 1A results in potentially more visual disturbance due to the use of additional areas at Burgess Park and Diver's Point as necessary construction laydown areas.	Increase in visual disturbance during construction.
Tourism and Recreation	General Construction Activities.	Interruption of scenic views; loss of public access in some areas in the vicinity of North Bala Falls; temporary increase in local traffic and traffic delays during construction activities.	• Access to Burgess Park and Diver's Point would now be restricted during construction due to use of those areas as temporary construction laydown and/or access areas. • Reduced scenic view of north Bala falls if temporary bridge required for construction access.	Decreased public access to Burgess Park and Diver's Point during construction. Reduced aesthetics from temporary bridge.
Local Businesses	General Construction Activities.	Direct effects on two local businesses in the construction zone, i.e., Purk's Place Boathouse and Marina and the antique store in Burgess Memorial Church.	• Alternative 1A will have a positive effect on local businesses, compared to Alternative 2D since construction will no longer be required on the land on which Purk's Place is situated and Bala Falls Road (where the antique store in Burgess Memorial Church is located) will not require temporary closure during construction.	Positive net effect during construction.
Employment	General Construction Activities.	Construction of the project will employ both skilled and unskilled labour originating locally and non-locally based on qualification. It is estimated that the project will generate approximately 4000 to 6000 person days of	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply. Note an Economic Impact Study (EIS) was completed for this project and submitted to MOE subsequent the ES/RR. Conclusions from the EIS support the ES/RR findings.	None

Environmental Component	Sources of Effect	Potential Effect	Comparison Between Alternative 2D in the ES/RR and Alternative 1A	Net Effect of Alternative 1A
		labour requirements extending over a 12 to 18-month period.		
Economic Benefits	General Construction Activities.	Employment income and local expenditures on materials, equipment, and services (food, accommodation, gas).	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply. Note an Economic Impact Study (EIS) was completed for this project and submitted to MOE subsequent to the ES/RR. Conclusions from the EIS support the ES/RR findings.	None
Waste Management	General Construction Activities.	Solid wastes generated during construction will include domestic waste such as food and sanitary waste and construction waste such as material packaging and scrap material. Sanitary facilities on site will include portable self-contained toilets and washroom facilities in a crew trailer. Minor amounts of liquid and hazardous waste may also be generated (e.g., waste oils, hydraulic fluids).	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None
Local Cultural/ Heritage Resources	General Construction Activities.	Potential damage to two historic structures (Purk's Boathouse and Marina and Burgess Memorial Church), as determined in the Stage 1 Archaeological Assessment to be significant heritage resources, worthy of preservation. Potential damage to property currently being considered for designation (Portage Landing on Moon River – i.e., Township land on which Option 2D powerhouse would be located / immediately south of land on which Option 1A would be located.)	No change. Mitigation measures identified for Alternative 2D in ES/RR still apply. Blasting will be limited to west side of MR-169, therefore significantly further away from two historic structures thereby reducing likelihood of impacts to these buildings. If the Project uses the Township land immediately south of the project site for staging construction, there could be damage to a property currently under consideration for heritage designation for Option 1A. For Option 2D, the powerhouse would be located on this property currently under consideration for heritage designation.	None Less impacts with Option 1A as impacts would be temporary. No permanent impacts from construction.
Archaeological and Heritage Impact Assessment	General Construction Activities.	Deeply buried heritage resources or human burials can exist on site and were not identified during a standard archaeological assessment.	• No change. Mitigation measures identified for Alternative 2D in ES/RR still apply.	None

Lake Muskoka

Dock

Bala South Control Structure

Bala Falls Rd.

Diver's Point Gravel Parking Area

Crown Land

Rock

Rail Road Bridge

Canadian Pacific Railway

Flow

Crown Land

Portage Landing Parking Lot

Existing Safety Boom

Upstream Vertical Bulk-head

Dock

Boat House

Flow

Crown Land

Bala Falls Rd.

The Stone Church

Muskoka Road 169 Bridge

Parking Area

Upstream Vertical Bulk-head

Intake Channel

District Road No. 169

Municipality

P.i.n. 48029-0638

P-2157-77

Flow

Crown Land

Shield Parking Lot

Bala North Control Structure

Powerhouse

Crown Land

Burgess Park

Crown Land

Municipality

P.i.n. 48029-0638

Flow

Tailrace Channel

Spawning Habitat Enhancement

Base of North Bala Falls

Water Level 219.40

Cellular Cofferdam

Building

Building

0 15 30 45 60 75 Metres

Scale 1:750

Note:

The Existing Safety Boom location shown represents a proposed relocation plan provided by MNR and approved by Transport Canada in 2011, that is scheduled to be implemented by MNR in 2012. Also note that MNR has stated that it will be installing new safety / warning signage around the dam site as part of its own dam safety program, during this same period of time. This boom relocation and additional signage by MNR is not part of this project, however, since it is schedule to be completed well before construction of this project, it has been labelled as "Existing"

Legend

Temporary Aquatic Habitat Impacts

Permanent Aquatic Habitat Impacts

Figure 5.1

Swift River Energy Ltd.

North Bala Small Hydro Project

Aquatic Habitat Impacts Due to Temporary and Permanent Structures

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However, these changes are still considered harmful alterations under the Fisheries Act, as they could adversely affect the productivity capacity of the area.

The ES/RR and subsequent Letter of Intent issued to DFO (provided in Appendix D) included the following mitigation measures to account for the potential loss in habitat productivity associated with Alternative 2D:

- a total of 150 m^2 of coarse substrates (i.e., individual pockets or cross channel ditches filled with excavated rock) at the outer ends of the intake and tailrace channels
- two benthic habitat/spawning shoals totalling 82 m^2 adjacent to the proposed tailrace
- an approximately 64-m^2 area of enhanced walleye spawning habitat at the mouth of the South Channel adjacent to the Highway 169 road embankment.

In order to mitigate for the net increase in aquatic habitat alteration associated with Alternative 1A (i.e., 146 m^2), the size of the benthic invertebrate/spawning habitat shoals adjacent to the tailrace channel will be enlarged by 146 m^2, to a total area of 228 m^2, as shown in Figure 5.2. These shoals will provide benthic invertebrate and small fish habitat (e.g., baitfish and young-of-the-year game fish such as Smallmouth Bass (*Micropterus dolomieui*)) and potential spawning habitat for Walleye (*Sander vitreus*) and sucker species (*Catostomus sp.*). The proposed habitat is anticipated to have a higher productive capacity than the non-specific habitat that would be adversely altered above the dam by this project. As discussed in the ES/RR, additional information on the spawning shoals will be finalized during the detailed design period and will be provided to DFO as part of the application for approval under the Fisheries Act.

The proposed location for the Alternative 1A tailrace is not within an area that was identified as providing spawning habitat (as discussed in the ES/RR), nor is it located in close proximity to any spawning areas created under the Community Fisheries Involvement Program. Therefore, no adverse effects on specific spawning habitat for walleye and sucker species will occur due to the footprint of the Alternative 1A tailrace location.

The orientation of Alternative 1A compared to Alternative 2D is approximately 20 degrees farther to the north (see Figure 5.3). This will result in the main flow path being more closely aligned with the main flow direction in Bala Reach, although this is a deep water section with relatively slow flows. No adverse effects on aquatic habitat are predicted from this altered flow path. The altered flow path is not anticipated to have any adverse effects on existing walleye spawning areas at the base of the North Bala Dam and outflow channel from the South Bala Dam, including those areas created by the Community Fisheries Involvement Program. In addition, as discussed in Section 6.2.1, the proposed change in tailrace location and the modified operational regime will not affect the original DFO Letter of Intent commitment to provide 9.5 m^3/s of flow over the North Bala Dam during the walleye spawning period.

5.2.2 Public Access and Use of Land During Construction

Areas where public access will be restricted during construction are shown in Figure 5.4.

During construction, public access to the south side of North Bala Falls will be restricted due to construction of the proposed powerhouse and associated works as it was for the Alternative 2D plan.

The Crown-owned public park area on the north side of North Bala Falls (Burgess Park) may be used as a temporary construction laydown area and access point, as shown in Figure 5.4. Should use of this area be required, public access would be restricted for safety reasons. This would also be a negative effect to overall public access compared to Alternative 2D, since no temporary use of this area was required to construct this option. Note that access and parking will be maintained throughout the construction period for MNR dam operations personnel to access the North Bala Dam from its north end as required.

Finally, the Crown-owned area at Diver's Point (adjacent to the South Bala Dam east of the Project site) may also be used as a temporary construction laydown area. This area was not proposed for use in Alternative 2D, therefore, potential use for Alternative 1A represents an overall negative effect on public access and land use during construction. Note that access and parking will be maintained throughout the construction period for MNR dam operations personnel to access the South Bala Dam from its north end as well as the water gauge station.

Purk's Place Boathouse and Marina will be able to remain operational throughout the construction period, since Alternative 1A does not encroach on the land owned/leased by this commercial facility. Alternative 2D would have required the permanent loss of the docks associated with Purk's Place and reduced access to the building during construction. The Crown land currently used for parking may be used as a temporary construction laydown area, therefore, access will be restricted during construction for safety considerations.

Additional construction areas that would be restricted for public access may include all or part of the parking areas located on the east side of Highway 169 south of the south channel (Shield Parking Lot) and the north of the north channel (Portage Landing Parking Lot).

5.2.3 Local Traffic

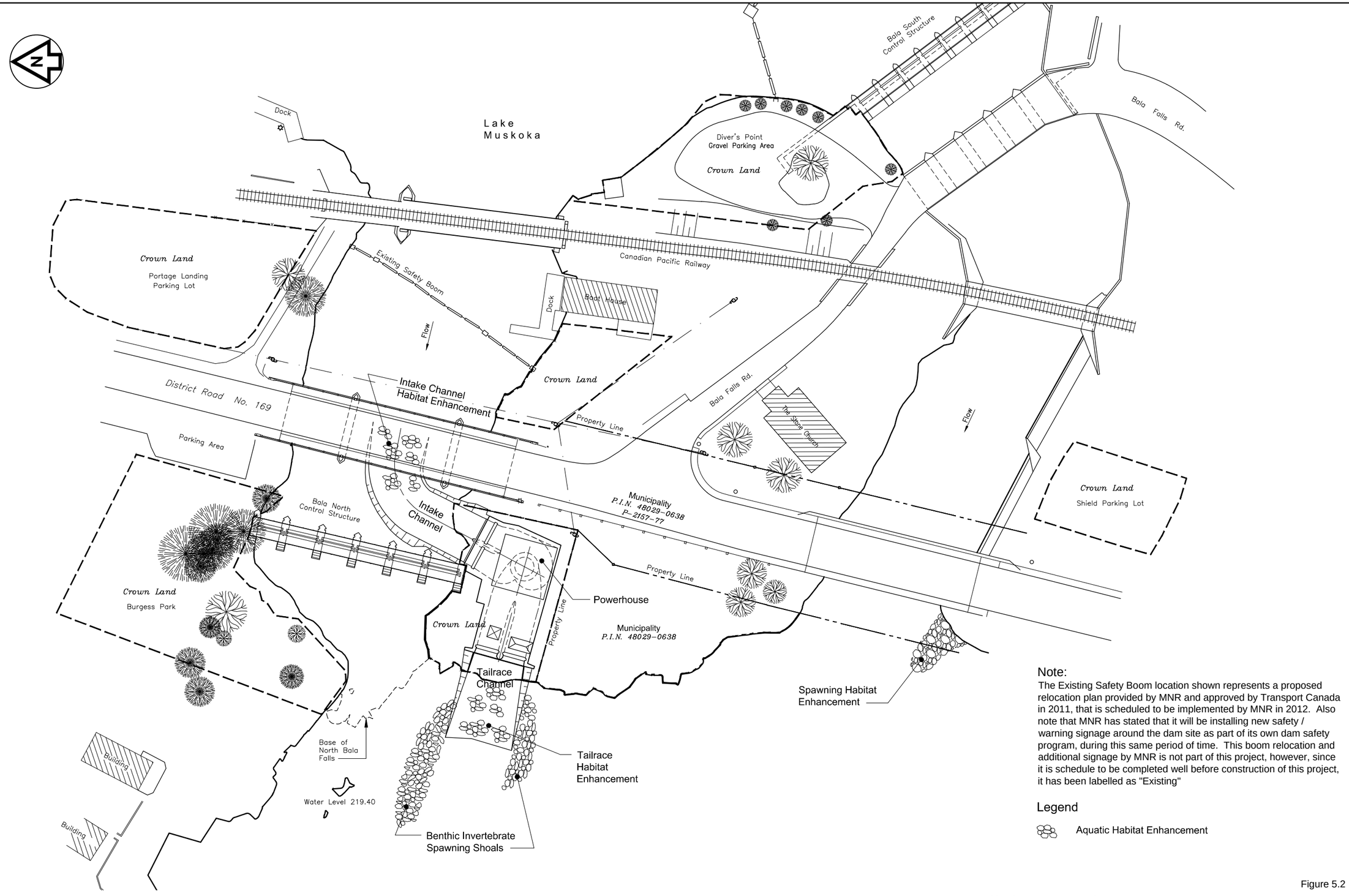
Alternative 2D required short-term lane closures and road closures of MR-169 and limited access to the north end of Bala Falls Road to accommodate excavation and construction of the project water conveyance structure under MR-169 for the period of mid-October through mid-May. These impacts to local traffic will not be required for Alternative 1A. Therefore, there is a positive benefit to local traffic on these roads for Alternative 1A.

5.2.4 Navigation

Alternative 2D required the relocation of the upstream existing safety boom in the north channel to be relocated upstream of the CP Rail bridge prior to construction of the intake structure, thereby reducing navigation during construction, and in particular restricting use of the existing docks at Purk's Place. Since there will be no in-water construction required upstream of the existing navigational safety boom, there will be no impact to navigation upstream for Alternative 1A. Therefore, there is a positive benefit to navigation in the north channel for Alternative 1A.

5.3 Significance of Net Adverse Effects

Where net adverse effects were identified in Table 5.1 due to the proposed Alternative 1A, they were carried forward into Table 5.2 for an assessment of significance. The criteria for assessing significance were those identified in the ES/RR.



Note:

The Existing Safety Boom location shown represents a proposed relocation plan provided by MNR and approved by Transport Canada in 2011, that is scheduled to be implemented by MNR in 2012. Also note that MNR has stated that it will be installing new safety / warning signage around the dam site as part of its own dam safety program, during this same period of time. This boom relocation and additional signage by MNR is not part of this project, however, since it is schedule to be completed well before construction of this project, it has been labelled as "Existing"

Legend

Aquatic Habitat Enhancement

Figure 5.2

Swift River Energy Ltd.

North Bala Small Hydro Project

Aquatic Habitat Enhancement

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Table 5.2 Assessment of the Significance of Net Adverse Effects Due to Alternative 1A During Construction

Environmental Component	Residual Effect	Value/ Importance	Magnitude	Geographic Extent	Duration/ Frequency	Irreversibility	Ecological/ Social Fragility	Likelihood of Effect
Natural Environment								
Aquatic Habitat	Increase in temporary loss of habitat in intake area	Moderate	High	Low	Low	Reversible	Moderate	High
	Increase in permanent loss of habitat and compensation requirements	Moderate	Moderate	Low	High	Irreversible	Moderate	High
Public Use and Access	The residual effect of the project on public use and access will be restricted public access to construction and laydown areas	Moderate	Moderate	Low	High	Reversible	Moderate	Moderate

The net increase in temporary aquatic habitat loss during construction of the proposed Alternative 1A intake channel will be a temporary, short-term, low magnitude effect. No additional mitigation is proposed to prevent this effect from occurring, since dewatering of the area is required for construction. Temporary loss of the area will not affect any critical aquatic habitat values (specific spawning or nursery habitats). Overall, this effect is not significant. In addition, Alternative 1A does result in a slight decrease in the amount of temporary habitat loss in the tailrace area compared to Alternative 2D.

Alternative 1A will result in a small, long-term increase in the amount of habitat that is affected by the permanent project components compared to Alternative 2D. Additional mitigation/ compensation have been specified to account for this increase. Alternative 1A will not have any adverse effect on the existing spawning areas for walleye and sucker species, including those created by the Community Fisheries Involvement Program, due to footprint effects or changes in flow velocity or vector.

Restriction of public access during construction will have an adverse effect on public access to North Bala Falls, Burgess Park, Diver's Point, the Crown land between Purk's Place and MR-169, the Shield Parking Lot and possibly Portage Landing Parking Lot. However, the effect will be short term in nature and other lands providing similar opportunities for public use will remain available in the regional area.

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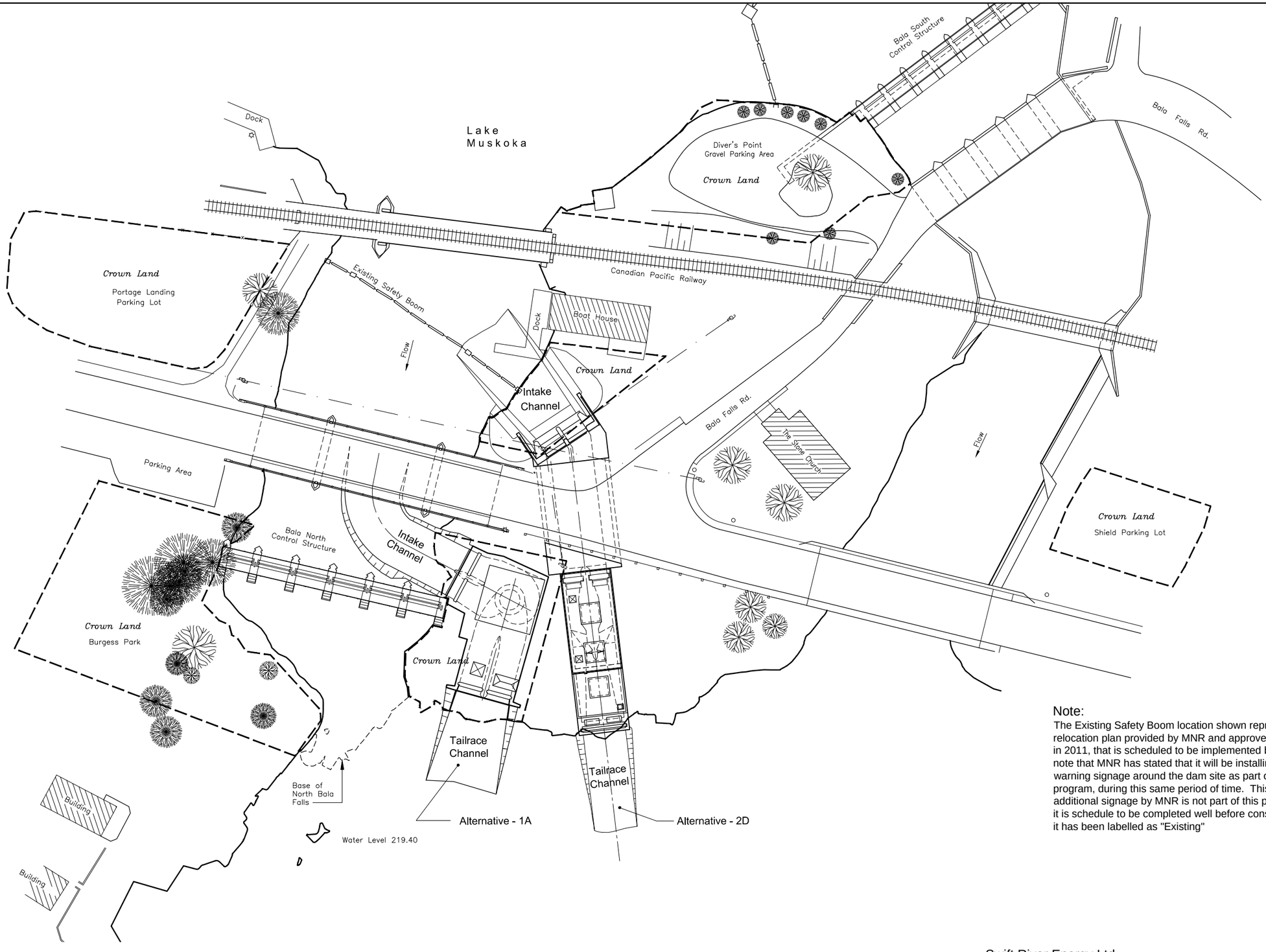

Note:
The Existing Safety Boom location shown represents a proposed relocation plan provided by MNR and approved by Transport Canada in 2011, that is scheduled to be implemented by MNR in 2012. Also note that MNR has stated that it will be installing new safety / warning signage around the dam site as part of its own dam safety program, during this same period of time. This boom relocation and additional signage by MNR is not part of this project, however, since it is schedule to be completed well before construction of this project, it has been labelled as "Existing"

Figure 5.3

Swift River Energy Ltd.
North Bala Small Hydro Project
Alternatives - 1A & 2D

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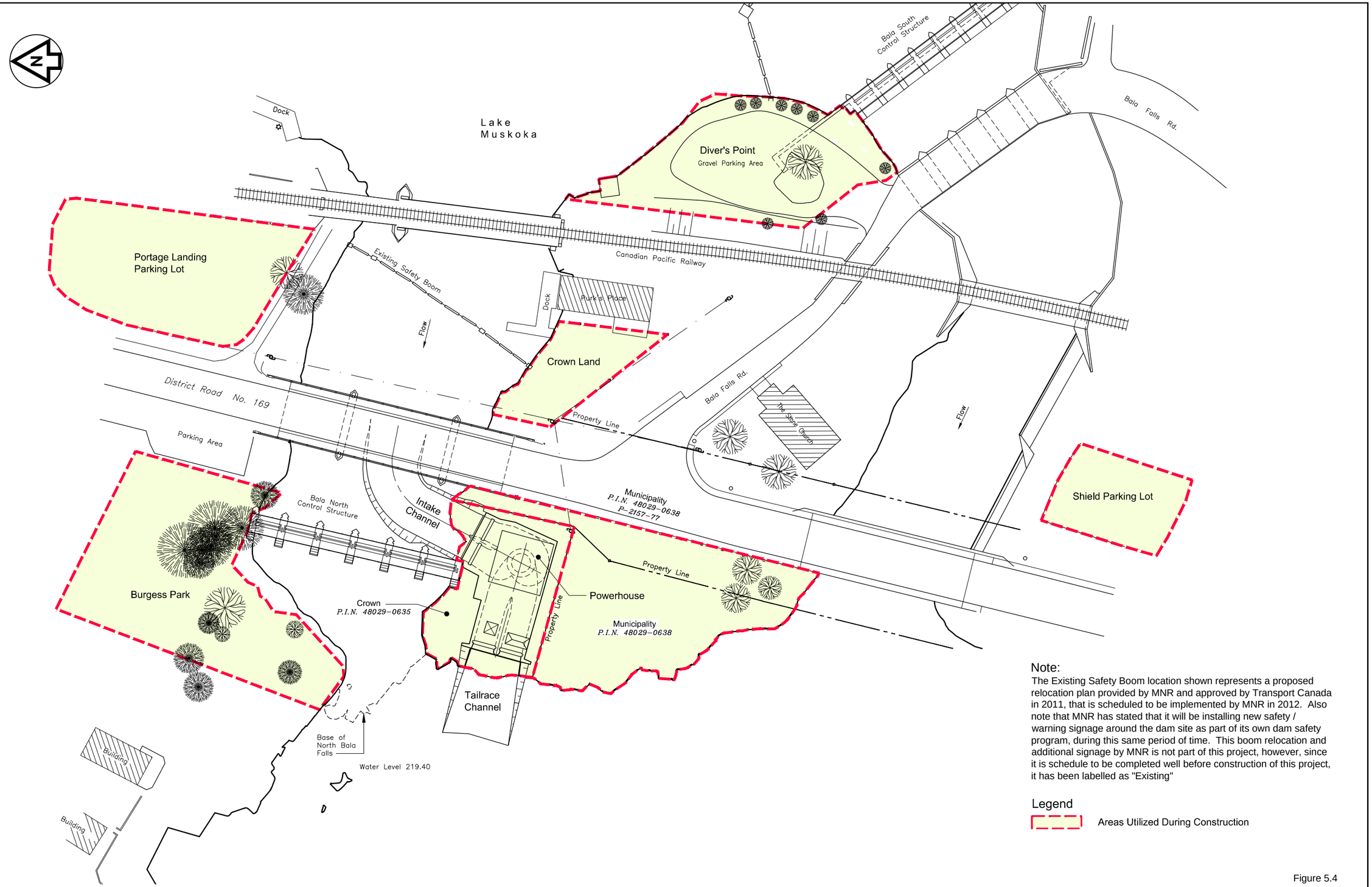

Note:

The Existing Safety Boom location shown represents a proposed relocation plan provided by MNR and approved by Transport Canada in 2011, that is scheduled to be implemented by MNR in 2012. Also note that MNR has stated that it will be installing new safety / warning signage around the dam site as part of its own dam safety program, during this same period of time. This boom relocation and additional signage by MNR is not part of this project, however, since it is schedule to be completed well before construction of this project, it has been labelled as "Existing"

Legend

Areas Utilized During Construction

Figure 5.4

Swift River Energy Ltd.

North Bala Small Hydro Project

Areas Utilized During Construction

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6. Operational Effects, Mitigation and Residuals

6.1 Identification of Potential Effects

Table 6.1 in the ES/RR summarized the potential adverse effects, mitigation measures and residual effects organized by environmental component, due to operation of the proposed facility. For the purposes of this Addendum, this table has been modified and utilized to identify where differences in potential adverse effects exist between the original Project as proposed in the ES/RR and the proposed modifications, which are the subject of this addendum.

6.2 Discussion of Net Adverse Effects

Where a net adverse effect associated with the proposed modifications is present or where additional discussion regarding the assessment of effects was necessary to justify the results of the assessment, as identified in Table 6.1, it is discussed in more detail in the following sections.

6.2.1 Aquatic Habitat and Biota

6.2.1.1 Potential for Effects on Existing Spawning Habitats

Existing spawning areas downstream from the North and South Bala Dams are documented in the original ES/RR. As discussed in Section 5, the footprint of the Alternative 1A tailrace will not affect any of the existing spawning habitats. The minor change in angle and location of the outflow from the powerhouse is not predicted to have any adverse effects on flow, water depth and velocity over the existing spawning areas, therefore, no adverse effects on the suitability of the existing habitat for spawning are predicted to occur. Finally, the proposed modified operational regime will not occur during the walleye spawning period, as identified in the Terms and Conditions of the EA approval from the Minister. Therefore, SREL will still be providing 9.5 m^3/s of flow over the North Bala Dam during the walleye spawning period to maintain habitat suitability, per the commitment in the original DFO Letter of Intent. Therefore, overall, the modifications to the project are not predicted to have any adverse effects on the existing spawning areas, including those areas created under the Community Fisheries Involvement Program.

6.2.1.2 Effects Due to Water Level Changes During Cycling Operations

6.2.1.2.1 Lake Muskoka

The water level in Lake Muskoka would be fluctuating a maximum of 2 cm/d under low flow conditions when cycling is occurring, and cycling will only occur once per day at a maximum. This variation is less than what could be seen due to wind or wave movement on such a large body of water and therefore the impact of this on shoreline habitats and biota would be undetectable/ negligible.

6.2.1.2.2 Bala Reach

The Bala Reach is the forebay for the Ragged Rapids Generating Station. The water level in this lake-like reach can be maintained within the Normal Operating Zone (NOZ) by the Ragged Rapids Generating Station and the Moon Dam, both owned by OPG, up to a flow of approximately 85 m^3/s. At higher flows the water level rises above the NOZ as a result of the natural river channel characteristics. During higher flow periods (greater than 85 m^3/s) the Bala Reach acts like a river and can experience water level fluctuations of more than 1.0 m.

Water level fluctuations are kept to a minimum, especially during the summer recreation season, by the operations of the two OPG facilities. The cycling operations will have no affect on OPG's ability to maintain water levels within the NOZ as the intended flow release is 26 m^3/s. Thus, there will be no change in water level fluctuations in Bala Reach, as long as the operations of OPG and SREL are coordinated as agreed in the weekly flow plan. Therefore, no adverse effects on aquatic habitat or biota within the Bala Reach will occur due to water level management during cycling operations.

6.2.1.3 Fish Entrainment Due to Cycling Operations

When the facility is temporarily shut down during cycling operations, there will be no flow going through the intake facility, creating a low velocity zone within the intake channel. Fish may then move into this intake zone to forage or find refuge. Upon facility start-up, commencement of flow through the turbine will induce a flow velocity within the intake channel. The predicted flow velocity that would occur at the intake at a flow of 14 m^3/s is 0.22 m/s, which is generally below the swimming capability of most fish species. However, depending on the rate of increase in velocity (i.e., the "ramping rate"), some fish, particularly small fish with weaker swimming capability and those in very close proximity to the intake, could potentially be entrained through the facility and subject to the turbine mortality estimated in Table 6.6 of the ES/RR. Cycling operations will be resulting in restarting the turbine once per day during periods when cycling is in effect, which, due to the factors noted previously, could potentially result in more fish mortality than originally predicted in the ES/RR.

Several options exist to mitigate this potential mortality, as described briefly in the following sections. The preferred option will be selected during the detailed design process in consultation with DFO and MNR, and commitments made will be incorporated into the DFO Authorization for the Project.

The first option would be to implement a ramping rate restriction during the turbine start up process, such that velocity changes at the intake occur over an extended period, to allow fish time to notice the change in velocity (i.e., from around 0 to 0.22 m^3/s) and leave the intake area, as opposed to very rapid increases in velocity, which could entrain fish before they have a chance to react. The normal start-up time in the absence of ramping rate restrictions would be on the order of 5 to 7 seconds. The ramping rates that are feasible will depend on the final design of the turbine and its associated controls, but it should be possible to slowly increase from the no flow condition to the minimum turbine flow over duration of 1 minute or more without damaging the turbine, which will result in a slower velocity increase. The adherence to those ramping rates will be part of the operational approval conditions. All operations, including the cycling will be covered by the operational plan that must be approved by MNR under the Lakes and Rivers Improvement Act (LRIA) prior to commencing commercial operations. Given that facility start-up is only anticipated to occur once over a 24-hour period when cycling operations are in effect, the minor increase in flow velocity during turbine start-up is not anticipated to have any significant effect on fish entrainment at the intake.

A second option would be to use an underwater infrasound generator to emit a sound that would scare fish away from the intake immediately prior to turbine start-up, such that fish are not caught within the intake flow velocity. This technology has been used at other water intake locations to minimize fish entrainment. This option would primarily be implemented if slowly ramping up

turbine flow is not possible due to the design characteristics of the turbine selected during detailed design.

Given the uncertainty associated with the potential for fish congregation at the intake area during cycling operations, the third option would be to implement an adaptive management program to assess effects and implement mitigation (such as the sound generator) if necessary to mitigate impacts. This would involve monitoring actual fish use of the intake area and the entrainment that occurs during cycling operations once the facility is commissioned. Monitoring could be undertaken by underwater camera, sonar or some other technology. Results would be discussed with the agencies and mitigation would be implemented if required.

Given implementation of one of these options, as determined through further agency consultation, it is not anticipated that cycling operations will have any significant adverse effects on fish due to entrainment.

6.2.1.4 Fish Mortality Due to Turbine Passage

Potential fish mortality due to passage through the proposed Alternative 2D turbine was assessed in the ES/RR using a formula to assess the mortality of various size classes of fish. The formula includes net head, turbine diameter and number of blades as variables.

The variables input for Alternative 2D were 5.3 m of net head, 3.9-m diameter turbine and four blades. The turbine proposed for use in Alternative 1A has the same net head and number of blades but a slightly smaller turbine diameter (3.75 m). To assess the potential fish mortality associated with Alternative 1A, the variables for the turbine were input into the formula for the same size classes of fish assessed in the ES/RR. The estimated mortality by size class for fish passing through the Alternative 1A turbine compared to passing through the Alternative 2D turbine is summarized in Table 6.2.

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Table 6.1 Comparison of Potential Effects between Alternative 2D and Alternative 1A During Operations Phase

Environmental Component	Sources of Effect	Potential Effect	Comparison Between Alternative 2D in the ES/RR and Alternative 1A	Net Effect of Alternative 1A
Air Quality	Periodic back-up diesel generator use.	Emission of diesel combustion by-products during operation.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
Surface Water Hydrology	Diversion of flow for power production.	Diversion of up to 96 m^3/s through the powerhouse will decrease flows over the North and South Bala Dams.	• The proposed cycling operations during low flow periods will result in alterations in the normal amount of flow being released from Lake Muskoka. Minimum flows through the North and South Bala Dams and through the Burgess GS, as identified in the ES/RR, will continue unchanged at all times.	Alteration in Lake Muskoka outflows when cycling operations are in effect.
	Lake Muskoka water level regime.	Potential changes in water level regime due to operation of the facility.	• Depending on flow rates, cycling operations may cause a daily water level fluctuation of up to 0.02 m (2 cm) during periods when cycling operations are in effect.	Minor alterations in Lake Muskoka water level when cycling operations are in effect.
	Bala Reach and farther downstream reach water levels (Moon River, Musquash River, and Go Home Lake).	Potential changes in water level regime due to operation of the facility.	• There will be no change in water level fluctuations in Bala Reach, compared to existing conditions, as long as the operations of OPG and SREL are coordinated as agreed in the weekly flow plan.	None
	Diversion of flow for power production.	Changes in local hydraulics downstream from the dams and tailrace.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
Groundwater	Accidental spills.	Groundwater contamination.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
Surface Water Quality	Water management practices.	Impaired water quality due to changes in flow management.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
	Increased impervious surfaces around facilities.	Increases in surface water runoff.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
	Hazardous materials use at powerhouse.	Potential for water quality impairment due to accidental spills	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
Aquatic Habitat and Biota	Hazardous materials use at powerhouse.	Impacts on aquatic biota due to accidental discharges of hazardous materials.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
	Flow diversion for power production – altered flows in bypass reaches.	Decreased wetted area and altered hydraulics in North and South Dam rapids reaches.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
	Flow diversion for power production – altered hydraulics.	No adverse effects on walleye spawning habitat at base of North Bala Dams due to provision of prescribed flow (as per SREL Letter of Intent to DFO) during the spawning period. Path of flow exiting powerhouse is closer to the falls and more to the north than ES/RR option (~20° more to the north).	• No change. Flow regime proposed for walleye spawning as identified for Alternative 2D in the DFO Letter of Intent will apply. Cycling operations will not be conducted during walleye spawning period. Spawning period each year will be determined through consultation with MNR and will be based on site specific variables (e.g., flow, water and air temperature, photoperiod). The timing of the spawning period may vary on a yearly basis and period for provision of spawning flows will vary accordingly. • No change. Altered flow path is more in line with main flow direction in Bala Reach. Deep water habitat in this area is not predicted to be adversely affected by altered alignment of the tailrace flow path. No change in shoreline stability is anticipated to occur due to minor changes in flow vector.	None
	Water management on Lake Muskoka.	Alterations in aquatic habitat availability due to water level management during cycling operations.	• No change during most flow periods. Mitigation measures identified for Alternative 2D in ES/RR will apply. • Cycling operations will result in daily water level fluctuations of up to 2 cm in Lake Muskoka. No adverse effect on aquatic habitat or biota anticipated to occur.	None
	Water level management in Bala Reach	Alterations in aquatic habitat availability due to water level management during cycling operations.	• There will be no change in water level fluctuations in Bala Reach, compared to existing conditions, as long as the operations of OPG, MNR, and SREL are coordinated as agreed in the weekly flow plan.	None
	Water Management.	Alterations in flow at Moon Falls and potential impacts on walleye spawning.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
	Intake and turbine operation.	Impingement of fish on trashracks and potential for mortality in turbines.	• Insignificant increase (<0.5% for 500 mm fish) in fish mortality predicted to occur using standard fish mortality formulas based on several turbine characteristics (see Section 6.2.1). • Cycling operations have the potential to result in an increase in entrainment and mortality, since a low velocity zone will be created upstream from the intake during periods of no flow when the facility is shut off. When operations commence, depending on the rate of velocity increase and the magnitude of the velocity increase, fish within the immediate vicinity of the intake may be entrained through the facility and subject to the mortality rates noted above. Ramping rate restrictions will be in place to minimize the rate of velocity increase. The velocity at the predicted cycling flow rate is only 0.22 m/s, which is well below the swimming capacity for most fish species, therefore, species should be able to escape entrainment, even at full cycling flow.	Potential for minor increase in entrainment and mortality due to periodic cycling operations.

Environmental Component	Sources of Effect	Potential Effect	Comparison Between Alternative 2D in the ES/RR and Alternative 1A	Net Effect of Alternative 1A
	Cycling operations and altered hydraulics downstream from facility.	Potential impacts on benthic invertebrate use of shoals installed beside the facility tailrace due to hydraulic changes during cycling.	• Some minor adverse effect on benthic use of habitat shoals may occur during periodic low flow cycling operations. Alterations in flow velocity over the shoals may induce benthic drift for species not adapted to very low velocity conditions. This may locally reduce the invertebrate abundance on the inside faces of the shoals, but the drifting organisms will become part of the forage base for the local fish community.	Minor changes in invertebrate productivity on localized portions of the shoals during periodic cycling operations.
Terrestrial Biota/Vegetation	Water management on Lake Muskoka.	Vegetation community change or wildlife/habitat disruption as a result of water level fluctuations.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
	Facility operation.	Retreat of wildlife species from immediate vicinity of facility due to noise disturbance.	• No change. Mitigation measures identified for Alternative 2D in ES//RR will apply.	None
	Maintenance activities.	Disturbance of wildlife species as a result of human presence within project area.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
		Accidental spills of hazardous materials may damage biota.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
Public Use and Access	Facility Operation.	Following the completion of construction activities, access to the north side of North Bala Falls will continue to be available but access to the south side will be restricted. Public access will be available to the powerhouse deck to provide additional viewing opportunities. There will be some areas which will be restricted from public access (via signage and floating safety booms) during operation of the facility.	• Public access to the south side of North Bala Falls will be restricted under Alternative 1A, whereas access would have been possible with Alternative 2D. Access will remain to the north side of the falls. • MNR recently received approval to relocate the upstream safety boom further upstream. Under Alternative 1A, the boom would be able to remain at this newly approved location. Therefore, it will be located further downstream under Alternative A1 than proposed for Alternative 2D. Therefore, there will be a decrease in restricted area upstream of the facility. • There will be no change in public access to other areas (i.e., downstream safety boom areas and powerhouse deck) between Alternative 1A an Alternative 2D.	Loss of public access to the south side of North Bala Falls. Reduced restricted area upstream of facility due to floating safety boom being located further downstream (stays in existing location).
Navigation and Riparian Rights	Facility Operation	Location of the intake could impact riparian rights for adjacent property, in particular Purk's Place / CP Rail. Loss of portage put-in/take-out.	• The location of the Alternative 2D intake created an impact to the riparian rights for the private CP Rail property on which Purk's Place is located. These riparian rights would not be impacted under Alternative 1A, therefore, Purk's Place docks could remain operational. • Alternative 1A would not require the relocation of the upstream safety boom in the north channel from the newly approved location (by MNR and TC). This new location is downstream of the proposed location for Alternative 2D, therefore, there will be less impact on navigation for Alternative 1A. • Existing portage area will remain under Alternative 1A.	Positive impact to Purk's Place and CP Rail riparian rights. Positive impact to navigation in north channel. Positive impact to portage.
Public Safety During Plant Operation	Facility Operation.	Potential risk to public safety within the boomed/restricted areas in the intake/tailrace.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
	Cycling operations	Potential risk to public safety due to rapid velocity changes upstream from the intake during cycling operations.	• Changes in velocity will occur following facility start-up during cycling operations. Velocity increases could create potential safety concerns, if velocity changes and magnitude were of such a rate that vessels or swimmers get entrained within the flow. However, velocity at the cycling flow will be around 0.2m m/s, which should not result in any adverse effects on public safety. Safety booms and mitigation to warn upstream users of operational start up as proposed in the ES/RR will continue to apply to the modified operational scenario.	None
Worker Safety During Plant Operation	Facility Operation.	Potential risk to workplace safety during the operation of the project.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
Sound Levels	Facility Operation.	Effect on nearby receptors.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
Aesthetics - Flow Over North Bala Falls	Facility Operation.	Reduced flows over falls possible.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None

Environmental Component	Sources of Effect	Potential Effect	Comparison Between Alternative 2D in the ES/RR and Alternative 1A	Net Effect of Alternative 1A
Aesthetics – Flow Via the South Dam	Facility Operation.	Reduced flows via South Dam possible.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply.	None
Aesthetics – Powerhouse and Site	Facility Operation.	Visual impact of powerhouse and site.	• Powerhouse associated with Alternative 1A will be higher and closer to the North Bala Falls, and will therefore be more visible from a number of vantage points around the area. This may be perceived as a negative effect. • Transformer will be located within the powerhouse and the distribution line from the facility to the interconnection point will be buried for Alternative 1A, which is the same as for Alternative 2D, so there will be no change in the visual impact due to these project components.	Potential negative effect due to higher visibility of the Alternative 1D powerhouse
Tourism and Recreation	Facility Operation.	Reduction in area available for in-water activities within boomed areas.	• The restricted in-water area will be reduced upstream as the upstream safety boom will remain at the recently approved new location by MNR and TC – downstream of the Alternative 2D location. There would be no change downstream. Mitigation measures identified for Alternative 2D in ES/RR still apply.	Positive
		Interference to public use of site.	• Public access to the south side of North Bala Falls will be restricted under Alternative 1A, whereas access would have been possible with Alternative 2D. Access will remain to the north side of the falls. • There will be a reduction in restricted areas upstream of the powerhouse as the fenced in intake will no longer be located east of MR-169. • There will be no change in public access to other areas (i.e., downstream safety boom areas and powerhouse deck) between Alternative 1A an Alternative 2D. Higher powerhouse will provide better sight lines/views from viewing platform on roof.	Loss of public access to the south side of North Bala Falls. Reduction in restricted area upstream of powerhouse at site of Alternative 2D intake
		Changes in navigation due to the cycling operations.	• Changes in velocity will occur following facility start-up during cycling operations. Velocity increases could create potential safety concerns, if velocity changes and magnitude were of such a rate that vessels or swimmers get entrained within the flow. However, velocity at the cycling flow will be around 0.2m m/s, which should not result in any adverse effects on navigational conditions. Safety booms and mitigation to warn upstream users of operational start up as proposed in the ES/RR will continue to apply to the modified operational scenario.	None
		Changes in navigation due to location change of facility.	• Since the intake will be located further downstream for Alternative, the floating safety boom can remain in its current location downstream of the Purk's Place Boathouse and Marina. This is a reduction in impact to Purk's Place docks, CP Rail riparian rights to its upstream bridge, and to the public docks located at the northeast corner of the north channel. • Public access should remain at existing portage location adjacent to Purk's Place.	Positive
Local Cultural/ Heritage Resources , Heritage Impact Assessment	Facility Operation	Potential impact to property currently being considered for designation (Portage Landing on Moon River – i.e., Township land on which Option 2D powerhouse would be located immediately south of land on which Option 1A would be located). Project would be visible from two properties currently being considered for heritage designation (Bala Township Dock on Lake Muskoka and Township Dock on Moon River).	• Alternative 1A will not be located on property currently being considered for heritage designation. • Alternative 1A would be visible from two properties currently being considered for heritage designation (Township Dock on the Moon River and Portage Landing on the Moon River).	Positive Less impact on Bala Township Dock on Lake Muskoka.
Employment and Economic Opportunities	Facility Operation.	Employment opportunities and other benefits to local and provincial economy.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply. Note the Economic Impact Study completed subsequent to the ES/RR supports the ES/RR findings with respect to employment and economic opportunities.	None
Infrastructure – Downstream Hydroelectric Facilities	Facility Operation.	Effects to the five control structures downstream (and therefore hydroelectric generation) at Moon Dam, Ragged Rapids Dam, Big Eddy Dam, Go Home Lake Control Dam, and Go Home Lake Filter Dam.	• No change. Mitigation measures identified for Alternative 2D in ES/RR will apply. Note the Economic Impact Study completed subsequent to the ES/RR supports the ES/RR findings with respect to employment and economic opportunities.	None

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Table 6.2 Estimated Fish Mortality Due to Turbine Passage

Size Class (mm)	Estimated Fish Mortality Due to Turbine Passage (%)	
	Alternative 2D	Alternative 1A
200	4.4	4.5
300	6.0	6.3
400	8.0	8.3
500	10.1	10.6

The turbine proposed for Alternative 1A results in marginally higher estimated mortalities, ranging from a 0.1% increase for 200-mm fish to 0.5% increase for 500-mm fish. This increase is considered to be within the margin of error for the formula, and no change in fish mortality is predicted between the Alternative 1A and 2D turbines.

6.2.1.5 Planktonic Organisms

The following sections assess the potential for water level and flow changes, turbine operation, and water quality changes resulting from the proposed operational modification (e.g., cycling operations) to have adverse effects on small aquatic organisms such as ichthyoplankton (early life forms of fish), zooplankton, phytoplankton and smaller microorganisms, as well as fish eggs.

Flow and Water Level Changes

The project will not result in any significant adverse effects on planktonic organisms (i.e., ichthyoplankton, zooplankton and phytoplankton) or microorganisms (e.g., smaller planktonic organisms, bacteria) due to water level or flow changes. Downstream movement of planktonic organisms within the water column will continue to occur from Lake Muskoka into the Bala Reach. Under most operational flow scenarios, the volume of water passing through the Bala area will not be different due to operation of the facility; therefore, the planktonic organisms in the water column will continue to be transported downstream in similar abundances. During periods of low flow, some cycling of flow will occur, resulting in periodic times when outflow from Lake Muskoka is lower than would naturally occur. However, the short duration of each flow cycle (24 hours) will ensure that, over the course of several days, outflow, and hence the volume or planktonic organisms moved, will continue to be similar to pre-existing conditions. Therefore, no significant change in the volume or organisms moving from Lake Muskoka to Bala Reach is anticipated to occur.

Changes in flow path due to the presence of the facility may result in some redistribution of planktonic organisms that are being carried within the water column as the river flows, such that more organisms flow through the proposed facility as opposed to over the North and South Bala Dams. This redistribution of flow itself will not have any adverse effect on planktonic organisms, as they will continue to move into the downstream reach (see Turbine Entrainment and Mortality section for potential effects). Changes in flow vector downstream from the facility will result in some redistribution in planktonic life forms in the reach, since areas of standing water and flowing water will be altered, but this will not have any adverse effect on overall plankton populations.

Water level fluctuations as a result of facility operation will be very small (as summarized in Section 6.2.1.1). Planktonic organisms and other microscopic species are most often neutrally

buoyant and carried in the flow and are not generally susceptible to adverse effects due to dewatering from these very minor water level fluctuations.

Entrainment and Turbine Mortality

The potential for adverse effects on planktonic organisms due to turbine passage is dependent on the probability of (i) organisms being entrained into the intake flow and through the facility, and (ii) the potential for mortality due to passage through the facility.

The probability that organisms will be entrained into the intake flow is dependent on the probability that organisms will be present with the zone of influence of the intake flow. The aquatic habitat within the intake area is non-specialized habitat and is not used for any specialized spawning or nursery areas that would congregate eggs and ichthyoplankton. Species that are known and/or would be expected to be present within the intake zone, such as various sunfish species (e.g., Pumpkinseed, Smallmouth Bass) typically nest in slower moving waters and spawning would not be expected to occur to any significant degree within the channel between Lake Muskoka and the North Bala Dam. If nesting is occurring, these species typically deposit eggs in a protected nest, or eggs are adhesive and adhere to substrates (rocks, woody debris) and are not broadcast in the water column.

Travnichek (1993) assessed the quantity of ichthyoplankton and fish eggs moving through a hydroelectric facility downstream from a large reservoir. They found that entrainment of larvae was limited to only several fish species that were typically present within the intake area and they indicated this was likely due to the habitat conditions in the area, which were not conducive to spawning or nursery. A similar situation is present upstream from the proposed North Bala GS, where the majority of the fish in Lake Muskoka would not be spawning within the zone of influence and hence, large numbers of eggs and ichthyoplankton are not anticipated to be present.

Therefore, it is not anticipated that there is a high probability of significant movement of ichthyoplankton and fish eggs through the proposed facility. However, it is likely that some movement will occur and therefore, the potential for mortality due to this passage is used to determine the overall potential for adverse effects.

The extremely small size of plankton and other microorganisms makes the potential for physical damage to individual organisms from turbine impact extremely low. Studies such as Cada (1991) show that ichthyoplankton mortality rates due to turbine passage are typically less than 5% and for most larval fish are less than 2%. Further, Cada (1991) indicates that the shear stresses and pressure changes in low head, bulb turbine installations such as the proposed Bala facility are insufficient to cause high mortality. Cada (1991) notes that a 1-mm diameter fish egg has a 0.1% chance of being struck by a turbine blade. Mortality rates for smaller zooplankton, phytoplankton and microorganisms would be expected to be lower than larger ichthyoplankton. Therefore, minimal levels of mortality on plankton and microorganisms are anticipated due to turbine passage.

Given that negligible changes in the movement of planktonic organisms are anticipated to occur due to the presence of the facility, that entrainment of ichthyoplankton should be relatively low given the habitat conditions at the site, and that mortality for organisms that are entrained is low, no significant effects are anticipated to occur. Travnichek (1993) concluded that ichthyoplankton that passed through the turbine in their study would likely recruit to downstream populations, and it is anticipated that this will be the case for the North Bala site as well.

Water Quality Changes

As discussed in the ES/RR and this Addendum, the facility will not result in any long-term adverse effects on water temperature or water chemistry, so the conditions for growth and survival of plankton and other microorganisms will not be adversely affected.

Potential for short-term changes in water chemistry during construction due to accidental spills or erosion and sedimentation does exist and this could potentially have localized adverse effects on planktonic organisms. However, general environmental protection mitigation measures during construction (e.g., sediment and erosion control, spill prevention and response) and operations (minimum flow requirements) will prevent changes in the environment that could have potential effects on plankton and microorganisms.

6.2.1.6 Effects Due to Altered Tailrace Hydraulics During Cycling Operations

The tailrace shoal habitat proposed in the screening report will be designed to be wetted at all times, based on the known water level regime of the Bala Reach, with only the velocity over the shoals varying due to changes in flow through the facility. This constant wetting will not change with cycling. The cycling would lead to a variation in flows and velocities over the shoals during the time when cycling is occurring. Cycling will typically be limited to the summer season when flows and velocities in the area in the Bala Reach are typically at their lowest, with the majority of the reach relatively slow moving with little noticeable flow velocity.

It is not anticipated that cycling of flows on a daily basis during the time periods noted above will have any significant adverse effects on benthic productivity within the shoal area. A variety of benthos species will colonize the area, each with different tolerances to flow velocity. During periods of cycling, some highly localized drift of less-tolerant benthos may occur from the shoal area in response to changes in velocity. However, given the generally high abundance of benthos on the surface and within the interstitial spaces of shoal rocks (e.g., typically in the range of 1000's per m^2), drift loss is only anticipated to occur in a relatively small proportion of the population within the localized shoal area. Further, drift loss will likely only occur along the inside face of the tailrace shoal structures (the area subject to velocity changes), limiting loss to a smaller proportion of the shoal area. The drifting invertebrates will become part of the forage base for the local fish community, so the area may develop into an important foraging location during periods of cycling. It is anticipated that benthos will recolonize areas that have been vacated by other drifting organisms. Therefore some drift may occur during periods of cycling, but it is not anticipated that this drift will have any significant effect on overall production on the shoal area. During the other time periods of the year when cycling is not occurring, the facility will be operated continuously, resulting in the relatively constant hydraulic conditions discussed in the ES/RR. Therefore, conditions will facilitate abundant benthic production.

The shoal structures will be designed to be stable at the velocities that will occur at the maximum plant outflow rate, so movement/erosion of the substrate will not occur. Cycling flows as well as full flows during the spring period will continue to cleanse the shoals to keep them free of fine sediments. Therefore, cycling will have no adverse effects on the physical integrity of the shoal structure and its suitability as benthic habitat.

Minimum flows of 1 m^3/s over the North and South Bala Dams will occur at all times, such that during periods of cycling, some flow passage will continue into the Bala reach to prevent stagnation of flows, which may have some mitigating effects on benthos on the shoal areas.

Therefore, the cycling operation may result in some change in benthic utilization during the periods when cycling operations are in effect, but it is not anticipated to have any significant adverse effects on overall benthic invertebrate production on the proposed tailrace habitat shoals. These shoals will continue to produce benthos that will be a component of the local forage base for the fish community, as per the original intended function of these shoals.

6.2.2 Adverse Effects on Scenic Landscapes

Visual renderings of the proposed Alternative 2D powerhouse from two vantage points (i.e., the north shore and west shore) are provided in Figures 6.1 and 6.2, respectively and a visual rendering of the Alternative 1A powerhouse, as viewed from the north shore, is provided in Figure 6.3.

The proposed Alternative 1A powerhouse is higher than the powerhouse needed for Alternative 2D in order to house the vertical turbine. This turbine configuration is required to remain within the smaller site footprint. The increased height above the ground surface eliminates/significantly reduces the potential to implement a landscaping plan along the sides and on the top of the powerhouse as originally proposed for Alternative 2D, but the higher powerhouse will provide better sight lines/views from a viewing platform on the roof. Overall, the powerhouse structure will be more visible, and may be considered a negative effect. In addition, the powerhouse is closer to the North Bala Falls than it was for Alternative 2D. Therefore, the Alternative 1A powerhouse will be more visible from a number of vantage points including the public access area on the north side of North Bala Falls, views from cottages downstream on the Moon River and views from along Highway 169.

6.2.3 Adverse Effects on Cultural Heritage

The proposed modifications to the Project will not result in any net adverse effects to heritage buildings, structures or sites, archaeological resources, or cultural heritage landscapes. The Stage 1 Archaeological Assessment (Appendix C7 of the ES/RR) concluded that the area that would be disturbed by Alternative 1A has no archaeological potential due to presence of steep slopes and disturbed areas associated with the North Bala Dam. Therefore, no adverse effects on archaeological potential are anticipated.

However, the proposed Alternative 1A facility may have an adverse effect on aesthetically pleasing landscapes or views since it is located closer to the North Bala Falls and is a larger, more visually imposing structure than Alternative 2D. Due to the height of the powerhouse required to house the vertical turbine (required to retain facility footprint on the available Crown lands) for Alternative 1A, it is not possible to implement the landscaping plan that was proposed for Alternative 2D to minimize the visual impact of facility. The Bala Falls Cultural Heritage Landscape Study included in the ES/RR noted that an alternative to burying the powerhouse would be "to design the walls with a visual connection to the evolution of hydro-electric power at Bala Falls and /or early development of hydro power in Muskoka". This study recommended that the intake and powerhouse "be designed such that they are visually sympathetic to the cultural heritage landscape of Bala Falls". The recommendations will be considered along with recommendations by a PAC that will be appointed to assist with the final aesthetics of the building and landscaping during the detailed design stage of the Project.

It has been noted that the TML has posted a Notice of Intention to Designate six properties in Bala (5 of which are in the vicinity of the Project) on August 17, 2011, subsequent to the issuance of the ES/RR. The five properties in the Project area include

- Bala Township Dock on Lake Muskoka
- The Shield Parking Lot (adjacent to MR-169)
- The Township Dock on Moon River
- The Bala Cenotaph between Bala Falls Road and the CP Rail tracks,
- Portage Landing on the Moon River.

Several objections to these designations were received by the TML during the comment period. Unfortunately, the notice did not provide sufficient information regarding the Cultural Heritage Value or Heritage Attributes to be preserved for these properties to determine how the Project could impact these properties if designation is ultimately made. At the time of writing this Addendum, TML was still awaiting a date for a pre-hearing with the Conservation Review Board (CRB) to hear the objections.

In the absence of a decision by the CRB, the Project will not impact any of the listed properties with the exception of being visible from the following two properties:

- The Township Dock on Moon River
- Portage Landing on the Moon River.

In comparison to Alternative 2D in the ES/RR, the powerhouse would have been visible from both of these properties. The intake would have been visible from the Bala Township Dock on Lake Muskoka property as well. The powerhouse would actually have been located on the Portage Landing on the Moon River property for Alternative 2D, but will be adjacent to this property under Alternative 1A.

6.2.4 Adverse Effects on Public Access

Public access to some areas around the proposed facility will be restricted, as shown in Figure 6.4, due to safety concerns. This includes the land in the immediate vicinity of the proposed facility, and water within the upstream and downstream safety boom areas. The downstream water access restrictions will be similar to those for Alternative 2D.

MNR recently received Navigable Waters Protection Act approval from TC to move the existing north channel safety boom farther upstream. This new location, however, is not as far upstream as the proposed location for Alternative 2D. The upstream water access restrictions will, therefore, be reduced from those of Alternative 2D as there will no longer be a requirement to relocate the existing upstream floating safety boom from MNR's recently approved location. There would therefore be a net positive effect for water access associated with Alternative 1A.

The proposed restrictions on public access to the south side of North Bala Falls were not present under the Alternative 2D development scenario, since space remained between the facility and the falls. The only possible mitigation for this is the incorporation of a public accessed viewing platform from the roof of the powerhouse so the public can view the falls and downstream Moon River. This

may have adverse effects on use and enjoyment of falls for residents and tourists. Access to the north side of the falls will remain unchanged from existing conditions.

6.2.5 Adverse Effects on Navigation and Public Safety

The proposed intake channel location for Alternative 1A is downstream from the MR-169 bridge, as opposed to the Alternative 2D intake channel, which was located upstream from the MR-169 bridge. Alternative 2D required that the existing safety boom across the north channel upstream from the North Bala Dam be relocated from its current location upstream from MR-169 to a new location upstream from the CPR bridge, in order to maintain safe navigation conditions. This would have prevented navigation within the channel downstream from the CPR bridge, including navigation to the existing Purk's Place docks.

MNR has received approval from TC under the Navigable Waters Protection Act to relocate the existing boom upstream from MR-169 slightly farther upstream, to enhance navigational safety in the channel. MNR is planning on relocating the boom in the fall of 2011. The location of the relocated boom is shown in Figure 2.1. In addition, MNR will also be installing two hazard buoys upstream from the CPR bridge and a warning sign on the bridge itself, to enhance navigational safety in the area and install new safety fencing in and around the north and south dams and channels.

In order to assess the potential effect of the proposed modifications to the facility, including the change in intake location and the change in low flow operational regime (cycling) velocity in the north channel (both upstream and downstream of the North Dam) under varying flows was modelled and provided to TC for review (as provided in Appendix E). Based on this review, TC confirmed that the location of the existing safety boom (as will be relocated by MNR in fall 2011) is sufficient to maintain safe navigation conditions in the north channel. Therefore, relocating the boom upstream from the CPR bridge, as was proposed in the original ES/RR is not required for Alternative 1A.

The change in intake location will allow the location of the floating safety boom that will be installed by MNR in fall 2011 (upstream from MR-169 bridge) to be maintained, as opposed to moving it upstream from the CP Rail bridge, which was proposed for Alternative 2D.

By avoiding the requirement to relocate the boom upstream from the CPR Bridge, this alternative will allow Purk's Place to continue using their existing dock, as opposed to having to use an alternative docking location under the Alternative 2D option. MNR indicated that its relocation of the boom may restrict the use of one of the Purk's Place docks (the easternmost dock) but use of the other dock will continue unaffected. Therefore, overall, Purk's Place will continue to have a functional and safe dock at its existing location, so this is seen as a positive effect compared to Alternative 2D, which would have restricted navigation downstream to the existing Purk's Place docks.

The downstream modelling illustrates that there will be no impact to the riparian rights of the properties along the north (right) shore of the Moon River downstream of the North Bala Dam.

6.3 Significance of Net Adverse Effects

Where net adverse effects were identified in Table 6.1 due to the proposed modification to layout Alternative 1A and the Project's operational regime, they were carried forward into Table 6.3 for an assessment of significance. The criteria for assessing significance were those identified in the ES/RR.

Table 6.3 Assessment of the Significance of Net Adverse Effects Due to Alternative 1A During Operations

Environmental Component	Residual Effect	Value/ Importance	Magnitude	Geographic Extent	Duration/ Frequency	Irreversibility	Ecological/ Social Fragility	Likelihood of Effect
Aquatic Biota	Minor increase in potential mortality due to entrainment for fish and planktonic organisms	High	Low	Low	Moderate	Irreversible	Moderate	Low
Aquatic Biota	Altered benthic invertebrate use of tailrace shoal during cycling	Moderate	Low	Low	Moderate	Reversible	Moderate	Moderate
Aesthetics	Powerhouse more visible from various vantage points	High	Moderate	Low	High	Irreversible	Moderate	High
Public Safety During Plant Operation	Restricted public access to south side of North Bala Falls	High	High	Low	High	Irreversible	Moderate	Low

There is some potential for an increase in entrainment and subsequent mortality during cycling operations due to flow start-up during each cycling period. However, mitigation is proposed (e.g., ramping rates and/or monitoring) that will be finalized through discussions with MNR and DFO at the detailed design stage prior to permitting and approvals. This mitigation will ensure that any increase in entrainment and subsequent potential for mortality is minimal and acceptable to MNR and DFO.

The potential increase in localized benthic invertebrate drift is not anticipated to result in significant adverse effects. The drifting organisms will become part of the forage base, and the vacated habitat area on the face of the tailrace shoals will be colonized by other benthos. This short-term effect during cycling operations will not affect benthos over the majority of the year, when the productivity on the shoal will be as originally discussed in the ES/RR.

A more visible powerhouse does represent a long-term, potentially negative adverse effect depending on one's perception of the proposed facility, although the higher powerhouse will provide better sight lines/views from a viewing platform on the roof. The significance of this adverse effect depends on the subjective level of impact perceived by individuals.

Reduced public access to the south side of North Bala Falls will affect the use and enjoyment of this side of the North Bala Falls. However, similar opportunities will remain on the north side of North Bala Falls. Overall, public access to the falls will remain, although it will be limited to the north shore which is by far the more popular of the two access points for the falls. This reduced access to the south shore will be partially mitigated by providing a roof top viewing platform from which the public will be able to view the falls and downstream Moon River.

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Swift River Energy LTD.
North Bala Hydro Project

Visual Rendering of Alternative 2D - View from North Side of North Bala Falls

Figure 6.1

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North Bala Hydro Project

Visual Rendering of Alternative 2D - View of Downstream Side from Moon River

Figure 6.2

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Swift River Energy LTD.
North Bala Hydro Project

Visual Rendering of Alternative 1A - View from North Side of North Bala Falls

Figure 6.3

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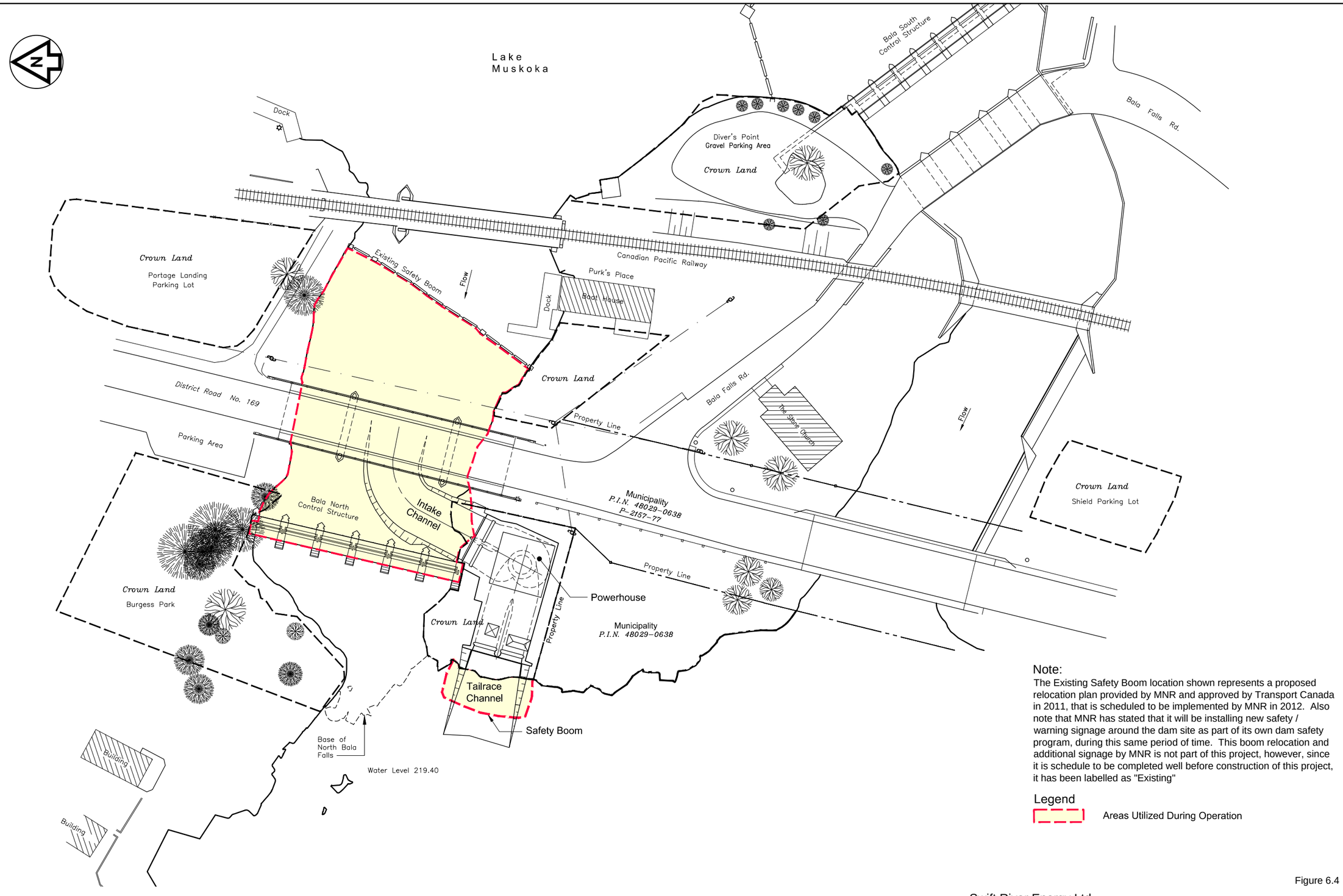

Note:
The Existing Safety Boom location shown represents a proposed relocation plan provided by MNR and approved by Transport Canada in 2011, that is scheduled to be implemented by MNR in 2012. Also note that MNR has stated that it will be installing new safety / warning signage around the dam site as part of its own dam safety program, during this same period of time. This boom relocation and additional signage by MNR is not part of this project, however, since it is schedule to be completed well before construction of this project, it has been labelled as "Existing"

Legend

Areas Utilized During Operation

Figure 6.4

Swift River Energy Ltd.
North Bala Small Hydro Project
Areas Utilized During Operation

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May 28, 2012 - 9:05am Login name: parkl10733
Drawing Number: P:\SWRT\327078\CAD\(1)-Figures\327078-Fig 6.4 Areas Utilized During Operation.dwg

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7. Cumulative Effects, Mitigation and Residuals

The ES/RR assessed the potential for cumulative effects (i.e., the net adverse effects of the Project acting cumulatively with effects from other past, present or future Projects or activities in the study area) associated with the Project. This Addendum assesses the potential for cumulative effects resulting from the net adverse effects that would occur under Alternative 1A compared to Alternative 2D and the change in operational regime, when acting cumulatively with other projects or actions in the study area. The potential for cumulative effects is assessed in Table 7.1.

The primary net effects of Alternative 1A include aquatic habitat, public access and land use and visual aesthetics.

The primary net effects on the revised operational regime include alterations in outflow from Lake Muskoka during periods of cycling operations. Minor changes in aquatic habitat and biota may occur as a result.

The project may potentially result in cumulative effects on fish and planktonic organism entrainment and mortality on a watershed basis, due to the potential minor increase in entrainment as a result of cycling operations. However, mitigation will be implemented at the proposed North Bala facility to ensure that entrainment and potential for mortality meet MNR and DFO requirements and cumulative effects on overall entrainment and mortality within the watershed will be considered during this assessment. Therefore, the cumulative effects are anticipated to be very minor and not significant.

The project will result in a cumulative adverse effect on public access and land use, since it will restrict access to the south side of North Bala Falls. Previous developments in the area, including those on private land and Crown land, have also restricted access in some areas of the Falls, as well as other sections of the Moon River. Therefore, Alternative 1A will further restrict public access to these water features. This will be partially mitigated by incorporating a roof top viewing platform from which the public can safely look at the falls and the downstream Moon River.

The project will also result in a cumulative effect on local aesthetics in the North Bala Falls area, since it will be another developed feature that will be visible from a number of vantage points that could detract upon the aesthetics of the falls, depending on one's perception. Other features that may detract include the North and South Bala Dams, Highway 169, CP Rail track, and surrounding residential and commercial developments. No mitigation is possible to prevent this cumulative effect.

Table 7.1 Cumulative Effects Assessment

Environmental Component	Project Phase	Net Residual Adverse Effects of Modified Project Compared to Project in ES/RR	Potential Interaction	Mitigation Measures	Residual Cumulative Effect
Air Quality	Construction	None	n/a	n/a	n/a
	Operation	None	n/a	n/a	n/a
Geology	Construction	None	n/a	n/a	n/a
Soil Quality	Construction	None	n/a	n/a	n/a
Surface Water Hydrology	Construction	None	n/a	n/a	n/a
	Operation	Changes in flow in Bala Reach and Lake Muskoka Water levels during periods of cycling.	Changes in flow and water level will interact cumulatively with other water management activities on Lake Muskoka and Bala Reach	Water level and flow management will continue to be in accordance with the restrictions in the MRWMP.	Some cumulative effect due to ongoing water management activities.
Surface Water Quality	Construction	None	n/a	n/a	n/a
Aquatic Biota	Construction	None	n/a	n/a	n/a
	Operation	Potential increase in entrainment during cycling operations.	Could interact cumulatively with entrainment and mortality at other hydro facilities in the watershed.	Mitigation measures will be localized at the North Bala Small Hydro facility. No specific mitigation implemented regarding cumulative effects potential.	Very minor potential for increased mortality of fish and planktonic organisms at a watershed scale due to minor increase in potential entrainment at the proposed Bala facility during cycling
		Potential temporary decrease in productivity due to invertebrate drift on tailrace shoals during cycling.	No potential for cumulative interactions with other activities.	None	None

Environmental Component	Project Phase	Net Residual Adverse Effects of Modified Project Compared to Project in ES/RR	Potential Interaction	Mitigation Measures	Residual Cumulative Effect
Aquatic Habitat	Construction	Net increase in short-term loss/alteration of habitat due to cofferdams during construction. Net increase in amount of permanent long term alteration of habitat due to intake/tailrace.	Cumulative short-term disturbance to aquatic habitat – no change in productivity anticipated following habitat creation and enhancement.	Additional mitigation proposed to prevent cumulative effect.	No cumulative long-term effects on aquatic habitat.
	Operation	None	n/a	n/a	n/a
Terrestrial vegetation, wildlife and Habitat	Construction	Net increase in amount of vegetation clearing due to modified Project location.	Cumulative loss of vegetation due to past and present developments.	Disturbed areas revegetated and rehabilitated following construction.	Minor cumulative loss of vegetation.
	Operation	None	n/a	n/a	n/a
Public Use and Access	Construction and Operation	Restricted public water access to south side of North Bala Falls.	Loss of public access to south side of North Bala Falls could act cumulatively with loss of public access associated with past and future land developments.	No additional mitigation proposed.	Cumulative loss of land available for public access and use.
Local Traffic – Highway 169 and Bala Falls Road	Construction	None	n/a	n/a	n/a
Sound Levels	Construction	None	n/a	n/a	n/a
	Operation	None	n/a	n/a	n/a
Aesthetics	Construction and Operation	Higher visibility of Alternative 1A powerhouse.	Change to aesthetics in the project area could act cumulatively with past and present structural developments along the	No additional mitigation proposed.	Cumulative change in local aesthetics.

Environmental Component	Project Phase	Net Residual Adverse Effects of Modified Project Compared to Project in ES/RR	Potential Interaction	Mitigation Measures	Residual Cumulative Effect
			shoreline to affect local aesthetics.		
Tourism/ Recreation	Construction	Increased in areas temporarily restricted access during construction.	Cumulative loss of areas for tourism/recreation in overall area due to Project interacting with other projects.	None proposed.	Short term cumulative effects on areas available for public tourism/recreation. No long term adverse effects due to modified Project.
	Operation	None	n/a	n/a	n/a
Local Businesses	Construction	None	n/a	n/a	n/a
	Operation	None	n/a	n/a	n/a
Archaeological and Heritage Assessment	Construction	None	n/a	n/a	n/a
	Operation	None	n/a	n/a	n/a

8. Monitoring Requirements

Section 10 of the ES/RR identified Environmental Monitoring Programs for the pre-construction, construction and operational phases of the proposed Project. Although Alternative 1A will differ somewhat in terms of environmental effects and mitigation requirements for some environmental components (as identified in Sections 6 and 7), no additional or altered components of the monitoring program proposed in the ES/RR are required as a result in the change in Project location.

Additional monitoring may be required to assess the potential for fish entrainment during cycling operations, depending on the final mitigation option selected. If this additional monitoring is required, it will be documented in the overall monitoring plan that will be included with the application for authorization under the federal Fisheries Act.

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9. Conclusions

Swift River Energy Limited Partnership (SREL) is proposing to construct and operate a small hydroelectric power facility on the Moon River in the Village of Bala, Ontario. This Addendum has been prepared as a result of several proposed modifications to the Project, as it was originally presented in the ES/RR. These modifications include

- a change in the preferred location of the Project to a location discussed in the original ES/RR, and
- a change in the operational regime of the project.

9.1 Proposed Modifications to Project Location

The modifications to the project identified in the ES/RR include altering the location of the proposed facility and changing the size of the powerhouse to meet the constraints associated with the smaller parcel of land available for development. This Addendum has assessed the potential for adverse effects arising from the differences between Alternative 2D, as assessed in the ES/RR and Alternative 1A.

Potential net adverse effects of Alternative 1A during construction include

- an increase in the amount of aquatic temporarily lost due to cofferdam and dewatering requirements. This will not cause a significant adverse effect and no additional mitigation is necessary.
- an increase in the amount of habitat permanently altered due to the footprint of the intake and tailrace channels. Additional habitat compensation has been proposed to mitigate this effect.
- restrictions on public access and use in laydown areas (potentially including the area on the north side of North Bala Falls, lands at Diver's Point) and on the south side of North Bala Falls. No mitigation is possible to prevent this short-term effect from occurring.

Potential net adverse effects of Alternative 1A during operation include

- the powerhouse will be higher, more visible and closer to the North Bala Falls, which may be perceived as an adverse effect. Swift River has committed to working with a PAC on the final appearance of the powerhouse and site. Due to the constraints associated with the smaller land parcel available for development, no additional mitigation is possible to prevent this potential adverse effect.
- public access to the south side of North Bala Falls will be restricted during operations due to safety concerns.

These net adverse effects were subjected to a cumulative effects assessment. The project will result in cumulative effects on visual aesthetics and public access and land use, due to the project acting in conjunction with effects of other nearby residential, commercial and infrastructure developments. No additional mitigation is possible to prevent these cumulative effects from occurring.

No additional or altered components of the monitoring program proposed in the ES/RR are required as a result of the net adverse effects of Alternative 1A.

In addition to the above potential net adverse effects, the potential net positive effects include the following:

- by locating the intake farther downstream for Alternative 1A, CP Rail and Purk's Place's upstream riparian rights will not be adversely affected i.e., Purk's Place docks may remain.
- no construction work will be required under MR-169, therefore, anticipated prolonged road disturbances will no longer be required during construction.
- the overall footprint of the proposed structures will be reduced, thereby decreasing the overall amount of land impacted by the Project.

9.2 Proposed Modification to Operational Regime

This Addendum has assessed the potential for adverse effects arising from the differences between the run-of-river operational regime, as assessed in the ES/RR and the proposed low flow cycling operations. There are no net adverse effects of the cycling operations during the construction phase of the project.

Potential net adverse effects of the low flow cycling operations include the following:

- alterations in outflow rate from Lake Muskoka during cycling operations and minor changes in Lake Muskoka water level (up to 2 cm of fluctuation) on a daily basis during periodic cycling operations.
- potential for increased fish and planktonic organism entrainment at the facility due to cycling operations. Mitigation will be implemented to minimize this potential.
- short- term changes in localized benthic invertebrate use of proposed tailrace habitat shoals during cycling operations.

These net adverse effects were subjected to a cumulative effects assessment. The project has a minor potential to result in cumulative effects on overall water management (water levels and flows) throughout the watershed as well as increased fish and planktonic organism entrainment, due to the project acting in conjunction with effects of other water management structures and hydroelectric facilities. All water management facilities will continue to be operated in accordance with the existing MRWMP.

Additional monitoring not discussed in the ES/RR may be undertaken to assess the potential for increased entrainment as a result of cycling, depending on what mitigation options are ultimately agreed to with DFO and MNR.

10. References

Cada, G.F. 1991. Effects of Hydroelectric Turbine Passage on Fish Early Life Stages. Available on-line at http://www.osti.gov/bridge/servlets/purl/5879350-POieLN/5879350.pdf.
Accessed May 6, 2011.

Hatch Energy. 2009. North Bala Small Hydro Project – Environmental Screening/Review Report. Prepared for Swift River Energy Limited. October 2009. 2 Volumes.

Ontario Ministry of the Environment (MOE). 2001. Guide to Environmental Assessment Requirements for Electricity Projects. March 2001.

Travinichek, V.H., Zale, A.V., and W.L. Fisher. 1993. Entrainment of Ichthyoplankton by a Warmwater Hydroelectric Facility. Transactions of the American Fisheries Society. 122:709-716.