

*Draft Operations Plan*  
*July 2012*

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Attachments

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HEC-RAS Profile @ R-1 Weir @ 233.60 .....	5 pages

## General Intent

The general intent for the operations of this proposed facility is to establish and maintain an appropriate balance between maximum production of Electrical Energy from a Renewable Resource with minimal impact to the Natural Environment this renewable resource supports.

As encouraged by the Province of Ontario there is accommodation in this proposed Operational Strategy that provides preference to production of Electrical Energy during periods of “Demand”. Those periods are identified as “on-peak” being Monday to Friday 11am. To 7pm. excluding Statutory holidays.

An extensive series of studies has been undertaken by LCPI to establish the natural tendencies of this system within the Project Study Area (see Base Line Data subject in this document). This draft Operations Plan was developed after full consideration of the Base Line information collected, to provide a well informed scientific approach to evaluating potential positive and/or negative impacts to the natural attributes, of the area affected by the development and operation of this facility. The scientific evaluation and recommendations have been implemented in the development of this Operations Plan.

## Base Line Hydrology

LCPI has monitored the natural hydrological tendencies within the Project Study Area of the Lizard Creek system, with initial observations starting in 2005 and moving forward to more vigilant and precise tracking up to present.

LCPI currently has three data loggers in place within the Project Study Area that accurately track and document the natural (pre development) hydrological values, as follows...

Lizard Lake DL-1 The information this logger presents, provides accurate insight in to the daily lake levels with respect to top of water (TOW) geodetic elevation and the natural frequency and duration of fluctuations.

Lizard Creek DL-2 The information this data logger presents, provides accurate insight in to the daily system flows as measured in cubic meters per second (cms) at a location just downstream of the proposed Control Structure

Fox Creek DL-3 The information this data logger presents, provides accurate insight in to the daily system flows as measured in cubic meters per second (cms) at a location just upstream of the confluence with Lizard Creek at the proposed Bypass Reach.

The data collected from DL-1 and DL-2 have been interpolate and compared to determine hydrological parameters with respect to the Operational Strategies, presented in the next section of this document.

The data collected from DL-3 illustrates the potential contribution of flows from Fox Creek to the Bypass that are uninhibited by this proposed development.

## Operational Strategy

The exercise of combining and comparing data from DL-1 and DL-2 loggers provides a transparent relationship between system flows and lake levels once appropriate formulas have been applied (results shown on LCPI CHART MH 2011 & 2012). HEC-RAS models (attached) at the profile of the R-1 restriction at the outlet of Lizard Lake, also show the resulting lake levels pre and post development at various flows. The results of these exercises have then been carried forward as the basis on which to establish the hydrological parameters of the Operations Plan. For greater clarity the Operations Plan is premised on a reaction to natural flows which will automatically adjust plant flows to result in natural lake levels within the traditional parameters of fluctuation with respect to timing, frequency and duration, including fluctuations relative to “peak/off-peak” variations.

It should be noted that the parameters for Operational Control are defined by, low water level (LWL) at Lizard Lake of 233.00 and high water level (HWL) of 233.60. For greater clarity, Lizard Lake LWL is naturally controlled by the restriction at R-1 to +/- 233.00 elevation and Plant operations will have only limited effect on water levels, once water begins to spill over Control Structure at the topping elevation of the of 233.60

System flows will be determined “post development” by continuous signal from the Headpond that will be received by the Plant control system, for interpolation to in-flows by applying an appropriate formula to the rate at which the headpond water level is rising or falling and application of simultaneous flows through the Plant and Bypass. The control system will automatically ramp plant flows to adjust the Operation between Modes as shown on LCPI TABLE O/M #1 (spring /summer/fall) and O/M #2 (winter). To assist the reader, the O/M charts provided, illustrate the proposed mode of operation at given system flows in increments of 0.05 cms and the resulting effect in lake level TOW variation in millimeters. It should be noted that the maximum proposed Plant flows are reduced during periods

of low flow “spring/summer/fall” and that “winter” operations will be continuous.

### Simulated Operations

For illustrative purposes LCPI has created a simulation of projected results for comparison of pre and post development values with respect to, lake levels, Bypass flow and Tailrace flow, for the most recent 1 year cycle (see LCPI CHART H-2 2011 & 2012). The intent of this simulation is to provide an accurate account of the resulting flows and lake levels within the Project Study Area by hypothetically applying the Operational Strategies.

The measured data was condensed to weekly averages and the appropriate proposed operation modes were then applied to these measured values with the resulting simulated lake level posted adjacent to the natural (pre development) lake level to provide comparison. The resulting Bypass and Tailrace flows are also shown, to provide some clarity in these regards.

The measured data on these H-2 charts provides a snap shot of the hydrological tendencies of this system and supports previous values derived from the extended term of monitoring and observation. The results show the system is subject to significant fluctuations in flows and lake levels with respect to timing, frequency and duration. LCPI has concluded from these results that an Operational Strategy that is queued by a reaction to system flows will be most conducive to limiting negative impacts.

## Sensitive Fisheries Windows

Data collected from the Project Study Area identifies areas of concern with respect to sensitive fisheries windows that must be accommodated by special provisions to be included in the Operations Plan. This accommodation as further detailed in the Base Line Study and Monitoring Plan will include but may not be limited to, adjustment relative to manipulation of flows and or water levels. It is understood that these special conditions will be established in discussions with the Regulators during the Permitting and Approvals process and these conditions then will be incorporated in to and become a condition of the Operating License.

Sensitive timing windows identified to date are Spring Spawning window for Walleye, both at R-1 and at the Tailrace and Fall Spawning window for Salmon in the Tailrace.

## Summary

The formal Operations Plan to be implemented as commitment to the Operating License will be finalized after further review and discussion with Regulators. It is understood that the process to developing the Formal Operations Plan will include review and integration of the Base Line Study results and recommendations and further commitment to the Monitoring Plan. It is further understood that the Operations Plan will require commitment to adaptive measures should the Monitoring Plan identify unacceptable negative impacts.