Appendix F

Option Development Process
ARSP Modeling and Analysis
of Lake Levels and River Flows

- **ARSP Base Case**
- **ARSP Case One**
- **ARSP Case Two**

Birds Mill Dam

THE DISTRICT MUNICIPALITY OF MUSKOKA

70 PINE STREET, BRACEBRIDGE, ONTARIO P1L 1N3
Telephone (705) 645-2231 Fax (705) 645-5319 1-800-461-4210 (705 area code)
www.muskoka.on.ca

Water Management Plan

Bird's Mill Dam

1.0 Introduction

In October 2004, The District Municipality of Muskoka (Muskoka) received a "NOTICE OF INTENTION TO MAKE AN ORDER" from the Ministry of Natural Resources (MNR). This notice was presented under subsection (1) of section 23.1 of the Lakes and Rivers Improvement Act, and requires Muskoka to prepare a management plan for the site of the Bird's Mill Dam in accordance with the "Water Management Planning Guidelines for Waterpower", approved by the MNR on May 14, 2002.

Subsequently, Muskoka confirmed, in writing, that a water management plan would be prepared.

2.0 Plan Purpose and Objectives

This Plan has been prepared in accordance with the Water Management Planning Guidelines derived in partnership with and under the direction of a Planning Team with members from both the public and private sectors.

The primary purpose of the Water Management Plan (WMP) is to identify and detail the roles of the authors of the WMP in monitoring and reporting on their operations related to meeting water level and flow requirements as approved by the MNR.

Objectives of the WMP include the following:

- Mandatory water flow and level requirements must be clearly identified as such in the WMP;
- Uncertainties in hydrology are to be recognized and accommodated;
- Provision must be made for the compliance and monitoring components of the approved WMP to be identified and for the required information to be provided to the Ministry of Natural Resources (MNR) to facilitate inspections or audits.

3.0 Bird's Mill Dam Background

The dam was originally constructed in 1892 to provide electrical power to a tannery. A building housing a generator was erected on the west bank of the river.

In 1894, the Town of Bracebridge bought the building and generator and became the first municipality in Canada to operate a Municipally owned generator. At the same time, the Town installed a water wheel driven pump to supply water to the community.

In 1902, a new generating station was installed at the foot of Bracebridge Falls and the existing generator in Bird's Mill was replaced with another pump to meet the increasing water demand for the Town.

Today, the Bird's Mill Pump House operates as a museum as it has been designated a Bracebridge Historical Site. The Pump House has also been designated as a Canadian Waterworks Landmark by the American Waterworks Association. The dam is currently operated for recreational purposes only, with a focus on maintaining an appropriate water level, within this reach of the Muskoka River.

4.0 Location

The dam is located in the Town of Bracebridge on the north branch of the Muskoka River. It is actually situated below the Bird's Mill Bridge on Entrance Drive or Muskoka Road No. 37, approximately 100 metres from the intersection at Manitoba Street.

The next dam upstream is at Wilson's Falls and the next downstream dam is at Bracebridge Falls. Both of these dams are owned and operated by Lakeland Power Distribution Limited.

Location maps "A" and "B" are attached.

UTM Zone	UTM East	UTM North
17	633335	4988588

5.0 Dam Structure Description

The dam is primarily a masonry structure and makes efficient use of the natural rock outcrops within the river. It resembles an "L" shape and is comprised of three (3) sluiceways as detailed on the attached plans. Each sluiceway is fitted with twelve-inch square stop-logs as follows:

1. Dam #1 – 8 logs with a clear span of 6.15 metres (20 feet, 2 inches)
2. Dam #2 – 9 logs with a clear span of 3.66 metres (12 feet)
3. Dam #3 – 7 logs with a clear span of 3.63 metres (11 feet, 11 inches)

On the west bank of the river, adjacent to Dam #3, a short channel has been constructed to direct a portion of the river flow through the Bird's Mill Pump House. This flow drives the wheels operating the water pumps which is still operational today, although it's use is restricted to a tourist attraction. This channel takes its shape from an existing concrete retaining wall which is tied in to Dam #3 at the south end and an existing rock outcrop to the north. The rock outcrop is also linked to Dam #2. There are also two (2) minor natural spillways, one on either side of the concrete pier for the Bird's Mill Bridge between Dam #1 and Dam #2.

Placing and removing the logs within the masonry sluiceways is a manual operation; achieved through the use of winches.

6.0 Mandatory Compliance Statements

- Approval of this WMP does not relieve the owner/operators from their responsibility to comply with any applicable legislation.
- The owner/operator must report to MNR all incidents of failing to meet the compliance flow and water level requirements of the plan, if any. MNR will from time to time carry out compliance inspections of the site as provided for in section 20 of the Act.
- Nothing in this WMP precludes the Minister from making further Orders under the Lakes and Rivers Improvement Act.
- In instances where, due to unscheduled facility imperatives (e.g. emergency maintenance etc.), MNR will consider requests from the owner/operator for temporary relief from the plan expeditiously and be considerate of relative priorities.
- Mandatory provisions of this Plan will be waived, as appropriate, when the Plan holder and MNR are requested to do so by a police agency or other recognized emergency organization.

7.0 Purpose, Owner and Operator of the Dam

Purpose : The majority of the dam structure was once used in the production of hydroelectricity. A small section of the dam was once used to divert river flow to water driven pumps that were, in turn, used to pump potable water to the citizens of Bracebridge. Also, at the turn of the 20th century, the dam was used to assist in log transportation.

The dam is no longer used for these or any other purposes relating to the production of goods or services.

Owner: Muskoka does not have and never has had any jurisdiction over or interest in the production of hydroelectricity. However, since 1975, Muskoka has had jurisdiction over the supply and distribution of potable water, although Muskoka has never used the dam for these purposes. Also, the dam is located under a bridge on a road owned by Muskoka. Therefore, although Muskoka has no past or present interest in the continued presence or performance of the dam, for the purpose of this Plan, Muskoka may be taken as the owner of the dam.

Operator: The Water and Sewer Operations Division of Muskoka's Engineering and Public Works Department.

8.0 Operating Procedures

The Bird's Mill Dam has no power generating facilities and its principal role is to facilitate nearby recreational uses (navigation, fishing, etc.). The streamflow through the dam is entirely dependent upon the water that is available in the natural flow of the river.

The main objective of the dam operation is to regulate water levels within the reach of river from Bird's Mill Dam to Wilson's Falls. In actual fact, the greatest effect of the dam on water level is limited to the area between Bird's Mill Dam and a natural rock outcrop within the river, some 1000 metres upstream of the dam, known locally as "Bass Rock".

Water levels are controlled by the placement or removal of stop-logs within the three (3) sluices. Gradual logging will take place to reduce the impact at the Bracebridge Falls facility downstream. The dam is typically operated in response to seasonal flow changes and information provided by the MNR, a reaction to high flow events or diminishing flows. Despite the use of the dam to facilitate recreational activities an over-riding consideration in operating the dam is the avoidance of flooding on River Road. To a great extent, the spillways naturally regulate water levels.

Fall Operation

- River flows can vary substantially during this period and water levels are controlled in response to flow information provided by the MNR.
- Sluiceway operation is usually limited to Dam #1 and Dam#2.

Winter Operation

- Normally the dam is not operated in winter.
- Most of the stop-logs are in place.

Spring Operation

- River flows due to spring runoff usually warrant the removal of most, if not all of the stop-logs in all three (3) sluiceways.
- As the river flow decreases, stop-logs are set back in place to maintain desired water levels.

Summer Operation

- Normally the dam is not operated during the summer.
- Most of the stop-logs are in place.
- An attempt is made to have the water level at a point where the river flow cascades over the concrete retaining wall (spillway) between Dam#2 and Dam#3, for aesthetics.

9.0 Water Level Monitoring and Operating Range

The operating range is based upon two (2) factors – to facilitate recreational use of the river reach and to avoid flooding of River Road. No historical information is available on water levels.

The elevation of the top of a catchbasin grate on River Road is 243.08. In determining the upper level, a 0.3 meter freeboard from this grate is desirable. The lower level is exclusively dependent upon the natural flow of the river. Suggested lower level could be 0.3 meters below the concrete retaining wall (spillway) between Dam #2 and Dam #3 (elevation = 242.076 meters).

Operating Range
Upper Level – 242.7 meters

Lower Level – 241.7 meters

10.0 Exceptional Operating Circumstances

The MNR recognizes that there may be exceptional circumstances which can affect the ability of each operator to maintain flows and water levels within the desired ranges as noted above. Natural and mechanically induced occurrences may result in levels or flows outside the normal operating range. Operators will not be considered out of compliance with their WMP when they operate outside the operating range as a result of a high or low water condition. Reporting of these "out of range" occurrences will take place as noted below:

1. Significant rain or drought events which exceed the high or low water triggers established. Reporting of high and low water triggers to the central WMP "reporting line" shall be undertaken at the beginning and the end of the event.

2. Large scale dam operations by MNR during high flow periods which cause an exceedance of the dam's trigger high water trigger. Reporting of these events shall be undertaken as per section 12.0.

3. Failure of mechanical equipment or structures may result in the facility going outside its normal operating zone. Such events will be reported to the local MNR office as well as the central WMP "reporting line".

4. Icing of physical structures may result in the loss of operating capability with that equipment. MNR will be notified of these situations and the expected return to service time/date.

11.0 Monitoring and Recording

11.1 Record-keeping

The operator shall ensure that logs or other record-keeping mechanisms are provided to record information concerning the operation of the dam as follows:

- The date and time of day shall be recorded for each operation
- The names of all operators on duty
- All operating procedures
- Any special instructions that were given to depart from normal operating procedures and the person who gave the instructions
- Any unusual or abnormal conditions that were observed and any action that was taken and any conclusions drawn from the observations
- Any equipment that was taken out of service or ceased to operate and any action taken to maintain or repair equipment

Data records will be maintained for 5 years.

11.2 Monitoring

A water level staff gauge is installed on the Bird's Mill Dam. Water levels will be recorded weekly in the logbook.

12.0 Reporting

12.1 Incident Reporting

A dedicated phone number will be established to facilitate communication between the proponents of the WMP. A dedicated phone line will also be established to MNR's central reporting department. Incidents outside the Normal Operating Zone shall be reported to MNR within 24 hours of the time that the operator becomes aware of the incident. A full written report containing the following information will be provided within 30 days of the occurrence :

1. Nature of Non-Compliance (e.g. Water level out of range)
2. Why it happened (e.g. Rainfall event)
3. What is being done to correct it
4. How long before return to compliance (ex. 24 hours, already back in compliance).

12.1 Data Reporting

The operator will provide an annual operations report to MNR on January 31 of the following year.

The report will indicate water level data including Average Weekly Water Levels and corresponding dates.

13.0 Reporting By MNR

MNR will notify operators of dam operations that change flow by more than ____ cubic meters per second within the downstream reach. Operators will be notified of the change by means of a telephone call to the Muskoka's, Engineering and Public Works Department at (705) 645-6764 during normal work hours. After hours calls may be made to the 24-hour emergency number (705) 645-5699. Under unusual circumstances (i.e. a flow change that exceeds the high or low water triggers), the call will also provide immediate notification and provide the opportunity to develop joint strategies to deal with the situation.

Bird's Mill Dam Operating Level Criteria

