

**Jordan River Water Use Plan:  
Physical Works Terms of Reference  
Water Release Mechanism at Elliott Dam**

**July 14, 2006**

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## List of Appendices

**Due to confidential nature of BC Hydro dam schematics, the following appendices are not included for this Terms of Reference**

Appendix A:	Project Costs – Phase I
Appendix B:	General Arrangement As Built Drawing - Phase I
Appendix C:	Miscellaneous Metal Work As Built Drawing - Phase I
Appendix D:	Project Plan - Phase II
Appendix E:	Civil Drawing 1 - Phase II
Appendix F:	Civil Drawing 2 - Phase II
Appendix G:	Civil Drawing 3 - Phase II
Appendix H:	Mechanical Drawing - Phase II
Appendix I:	Elliott Fish Water Dam Safety Memo

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## 1.0 Summary

### 1.1 Background

The Jordan River is located within the Capital Regional District, along the southwest coast of Vancouver Island, approximately 72 km by road from Victoria, B.C. The 25 km long river flows southwesterly between the Sooke Hills and the Seymour Mountain range into the Juan de Fuca Strait at the community of Jordan River. The current facility consists of three dams, two reservoirs, one headpond, and a tunnel and penstock system that supplies water to the powerhouse on the lower Jordan River. A map of the Jordan River facility is provided in Figure 1.

The Elliott Dam is located on Jordan River approximately 8 km upstream of the powerhouse. The concrete dam has an uncontrolled freeflow overflow weir and spillway and a low level outlet gate. The Elliott Headpond located immediately upstream of the dam is the intake for the Jordan River powerhouse. Water is not normally released past the Elliott Dam into the Jordan River. Occasional uncontrolled spills (1-2 times/yr.) can occur during high inflows after the reservoirs in the system are filled to capacity.

The Jordan River water use planning process was initiated in April 2000 and completed in November 2001.

The Jordan River Water Licence and Order were issued by the Comptroller of Water Rights (CWR) on 20 July 2004. The Order, in addition to operational and monitoring requirements, specified that one physical works be undertaken.

### 1.2 Physical Works

The Comptroller of Water Rights has ordered BC Hydro to submit detailed design plans for Phase II of the water release mechanism at Elliott Dam.

**Table 1: Summary of Phase I and Phase II Cost for the water release mechanism at Elliott Dam**

<b>Project Name</b>	<b>Estimated Schedule</b>	<b>Estimated Implementation Cost<sup>1</sup> (in 2006 dollars)</b>
Phase I	Implemented in summer of 2004	\$110,300
Phase II	Implementation by summer of 2007	\$592,500

<sup>1</sup> The costs shown do not include direct management.

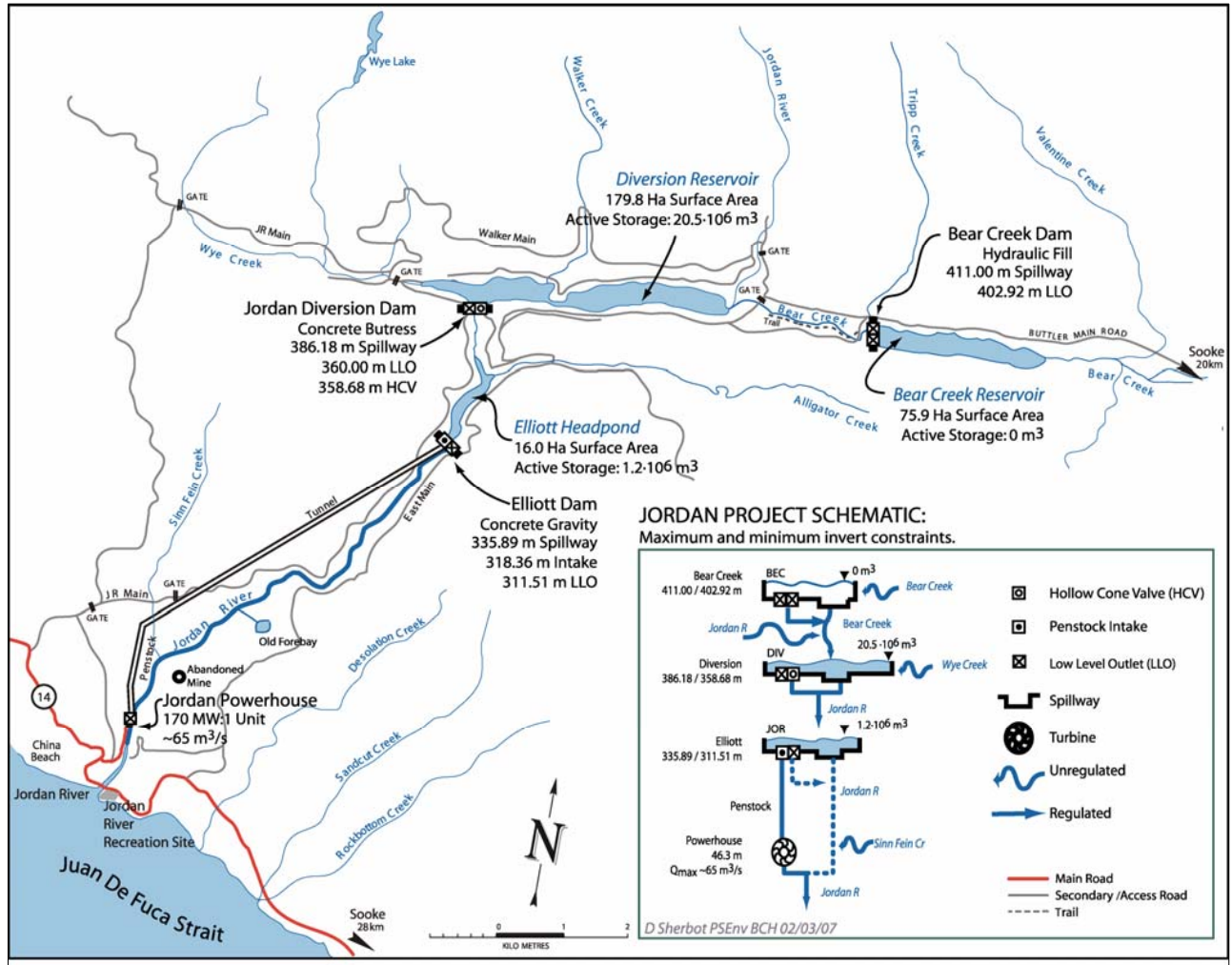


Figure 1: Map of Jordan River

## **2.0 Works #1: Water Release Mechanism at Elliott Dam**

### **2.1 Introduction**

This Terms of Reference is submitted in response to the Jordan River Order (File No. 0281532), received from the Comptroller of Water Rights on 20 July 2004. As per the Order, this terms of reference provides the plans for the alteration of works to enable a minimum flow release of 0.25 cubic metres per second into Jordan River through Elliott Dam.

### **2.2 Background**

During the Consultative Committee process the committee agreed to an objective to maximize fish populations in the Lower Jordan River below Elliott Dam. Currently no base flows are provided below the dam and therefore the committee considered a number of alternatives for releasing base flows. It was agreed to release a base target flow of 0.25 cubic meters per second year-round through the dam. It is expected that the increased base flow will result in improved ecosystem condition and an increase in habitat for fish from the mouth of the river, up to and including the river 300 m below Elliott Dam.

The base flow will be released by installing a flow release mechanism through the dam. Phase I of the project, which included inserting a pipe through the upstream end of the dam was completed in 2004. BC Hydro took the opportunity to complete Phase I during a maintenance period when the head pond was drained. Phase II of the project will involve inserting the downstream end of the pipe through the dam and joining up to the pipe inserted during Phase I construction.

Three monitoring studies are currently underway on the lower Jordan River which will allow for the collection of critical flow information that will help to confirm expected benefits and improve future decision-making. The studies include the collection of 2 years of baseline flow information prior to releasing the flow through the dam. After 2 years the flow will be released and the effects of the flow will be monitored for 4 more years.

The Terms of Reference for the monitoring studies was approved by the Comptroller's Office on 30 June 2005. Competitions were then held to select qualified contractors to undertake the studies. The field data collection commenced as follows:

- July 2005 - Lower Jordan River Fish Index Study
- September 2005 - Lower Jordan River Spawning Assessment and Enumeration Study
- December 2005 - Lower Jordan Inflow Monitoring

The Order (Item 6) states that the flow release will commence after the works have been altered per conditions 1 and 2, namely approval of design plans for alternation of works by the Comptroller of Water Rights and alteration of works in line with the approved plans.

### **2.3 Scope**

This project includes the design and construction of a water release mechanism to be installed at Elliott Dam in order to ensure a minimum base flow of 0.25 cubic metres per second from the dam. The project consists of two phases; Phase I and Phase II.

Phase I of the project took advantage of a planned reservoir draw down in the summer of 2004. A hole was cored from the upstream face of the dam to the low level outlet gallery within the dam. A twelve inch (12") stainless steel pipe was grouted into the cored hole, with an intake fitting on the upstream end and a valve on the downstream end.

**Phase I** costs and as built drawings are provided in the following appendices:

- Appendix A: Project Costs - Phase I
- Appendix B: General Arrangement As Built Drawing - Phase I
- Appendix C: Miscellaneous Metal Work As Built Drawing - Phase I

**Phase II** design details are provided in the following appendices:

- Appendix D: Project Plan - Phase II
- Appendix E: Civil Drawing 1 - Phase II
- Appendix F: Civil Drawing 2 - Phase II
- Appendix G: Civil Drawing 3 - Phase II
- Appendix H: Mechanical Drawing - Phase II
- Appendix I: Elliott Fish Water Dam Safety Memo

The Phase II implementation includes the installation of the downstream components for a water release mechanism at Elliott Dam. Upon approval of the design by the Comptroller of Water Rights, BC Hydro will proceed with the construction.

## 2.4 Deliverables

Phase II will include the following deliverables:

- Supply and installation of piping from the existing valve flange to the downstream face of the dam
- Supply and installation of a flow meter providing local and remote flow indication
- Supply and installation of a flow control system. System shall be low maintenance and suitable for water conditions (High Turbidity, pH < 7.0). System shall allow for local flow adjustment.
- Completion of electrical and protection and control design
- A Final Construction Report, available to the Comptroller of Water Rights and other relevant parties, detailing the as-built schedule and costs for the work.

## 2.5 Schedule

The schedule for the project implementation is summarized as follows:

- |  |                   |
|--|-------------------|
| • Dam Safety Review  | Complete          |
| • Review/Issuing/Stamping Drawings   | August 31, 2006   |
| • BC Hydro Generation Line of Business<br>Implementation Phase Approval            | October 15, 2006  |
| • Leave to Commence by Comptroller of Water Rights                                 | October 15, 2006  |
| • Prepare Summary of Requirements for<br>BC Hydro Construction Business Unit (CBU) | October 31, 2006  |
| • Equipment tendering complete   | December 15, 2006 |
| • Supplier Procurement of Control System   | March 31, 2007    |
| • CBU Procurement of Civil Materials   | March 31, 2007    |
| • Installation by CBU complete   | July 15, 2007     |

## 2.6 Cost Objectives

It is expected that all costs for the implementation of this project will be incurred by the fall of 2007. The table on the following page provides a breakdown of the estimated costs.

**Table 2: Cost Objectives<sup>2</sup> for the design and implementation of Works #1 Water Release Mechanism at Elliott Dam**

<b>Task Description</b>	<b>Total</b>
<b>PHASE I</b>	
<b>Design</b>	
<b>Equipment Procurement</b>	
<b>Construction</b>	
<b>PHASE I TOTAL</b>	<b>\$ 110,300</b>
<b>PHASE II</b>	
<b>Design</b>	
Definition Design	\$ 25,000
Detailed Design	\$ 109,000
Contingency	\$ 27,250
Sub Total	<u>\$ 161,250</u>
<b>Equipment Procurement</b>	
Materials Purchase	\$ 91,000
Contingency	\$ 22,750
Sub Total	<u>\$ 113,750</u>
<b>Construction</b>	
Construction Contract	\$ 254,000
Contingency	\$ 63,500
Sub Total	<u>\$ 317,500</u>
<b>PHASE II TOTAL</b>	<b>\$ 592,500</b>

## 2.7 References

BC Hydro 2002. Consultative Committee Report: Jordan River Water Use Plan. Prepared for and by the Consultative Committee for the Jordan River Water Use Plan.

BC Hydro 2003. Jordan River Water Use Plan.

BC Hydro 2004. Monitoring Program Terms of Reference: Jordan River Water Use Plan.

<sup>2</sup> The costs shown do not include direct management.