



Peace Project Water Use Plan

Physical Works Terms of Reference

GMSWORKS-17 Williston Trial Wetlands

**Addendum 2
June 30, 2017**

A2. Addendum 1 to GMSWORKS-17 Williston Trial Wetlands

A2.1 Background

Pursuant to the Peace Water Use Plan (WUP) Order dated August 9, 2007, Schedule A, Clause 2 (a), the Comptroller of Water Rights (CWR) approved the Terms of Reference (TOR) on June 2, 2008 for BC Hydro to construct two trial wetlands in the Williston reservoir. Housekeeping amendments to the TOR were approved on January 20, 2010.

The inventory and feasibility study was conducted in 2010 under GMSWORKS-16 Williston Wetland Inventory project. Detailed design occurred in 2011 with permitting and planning continuing through 2012.

TOR updates were provided and approved by the CWR on May 16, 2013, and March 13, 2014. The Airport Lagoon site was constructed in May and June 2013. Beaver Pond site was constructed in May and June 2014.

A2.2 Rationale for Addendum

In the TOR submissions in 2013 and 2014, BC Hydro committed to making a submission related to maintenance following the construction of the works. The purpose of this TOR Addendum 2 is to define the scope and schedule for the structural inspections and maintenance of the trial sites (Airport Lagoon and Beaver Pond) for this GMSWORKS-17 project.

The scope in this maintenance TOR reflects both the objectives of the WUP project, and the requirements arising from the water conservation licences obtained for the water control structures at Airport Lagoon (Licence No. C130388), and at Beaver Pond (Licence No. C131348), and the related dam safety regulations.

At the time water conservation licences were issued, both the Beaver Pond and Airport Lagoon works were exempt from related dam safety regulation. Both licences required that the works are “maintained to the satisfaction of an Engineer under the *Water Act*.” With the passing of *Water Sustainability Act* (February 29, 2016) and related Dam Safety Regulation (DSR) (BC Reg.40/2015 O.C. 114/2013), the regulatory requirements for these two sites have changed.

Under the new DSR, a dam is defined as a barrier constructed for the purpose of enabling the storage or diversion of water from a stream or an aquifer, or both, plus any other works incidental to or necessary for the barrier. The extent to which the regulation applies depends on the characteristics of the dam. A Minor Dam (defined as <7.5m in height and <10,000 m³ of water impounded) is exempt from the regulation; Part 2 applies to all other dams; and for dams that meet additional criteria¹, Part 3 requirements are also applicable. In this TOR Addendum, BC Hydro has applied Part 3 to Airport

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- ¹ 1 m or in height and capable of impounding a total storage volume of water greater than 1,000,000 m³
 - 2.5 m or more in height and capable of impounding a total storage volume of water greater than 30,000 m³
 - 7.5 m or more in height, regardless of the amount of water able to be stored
 - Dams with a failure consequence classification of significant, high, very high or extreme

Lagoon, and Part 2 to Beaver Pond. For Airport Lagoon, Part 3 requirements increase the frequency of inspections and the formality of reporting.

Nonetheless, as a trial project to meet WUP objectives, there is also a need to understand the durability and suitability of the design elements given the reservoir operations, the remoteness of the location, and the exposure to the elements (wind, cold, ice, etc.). Consequently, BC Hydro will undertake maintenance to meet our regulatory requirements, but will balance any additional maintenance against the value of the testing the longevity of the structures.

These additional inspection and reporting requirements have been reflected in this TOR Addendum 2.

A2.3 Linkages to other Peace WUP Projects

This project has linkages with GMSMON-15 Williston Wetland Habitat project, which provides biological monitoring of the effectiveness of the constructed wetland enhancements.

A2.4 Approach to maintenance

The approach to structural inspections and maintenance is summarized as follows:

1. Confirm the regulatory requirements associated with each of the locations;
2. Conduct regular inspections of the sites;
3. Undertake minor, periodic maintenance if deemed necessary;
4. Evaluate major structural repairs on a case-by-case basis; and
5. Summarize the findings in a final report.

The next sections explain this approach in more detail.

A2.4.1 Confirm the regulatory requirements associated with each of the locations

Given the change in the regulations, BC Hydro must first review and develop as necessary the reporting schedule and documents for meeting compliance with Dam Safety Regulations. As the Dam Safety requirements vary depending on whether Part 3 or Part 2 is applicable to the sites, BC Hydro will be in contact with the Provincial Dam Safety Office to ensure full compliance.

The plan for the Airport Lagoon includes the following on the basis of the Part 3 DSR requirements:

- Develop of an operations, maintenance and surveillance (OMS) manual;
- Annual inspection; and
- Annual review of the emergency contacts in the DEP (Emergency Plan).

We have applied Part 2 requirements to Beaver Pond location, which requires that we properly inspect, maintain, and repair the dam in a manner that keeps it in good operating condition.

The remainder of the worksteps in this TOR reflect these requirements. Should there be a change from these requirements, BC Hydro will report such changes in the Annual Report, or make submissions to the CWR, as required.

A2.4.2 Undertake regular inspections of the sites

The inspections will assess whether the structures are performing as intended and determine if there are any issues that affect the integrity of the dam structure, and make recommendations on maintenance accordingly. There are two types of inspections planned:

- **Site surveillance/inspection (annual):** This is monitoring of the dam and the area surrounding or adjacent to the dam through visual observation. When possible, it should be scheduled for the same time as monitoring under GSMON-15. It is not anticipated that a professional engineer is required to perform this surveillance. An inspection form/summary with photos will be prepared to document the results.
- **Engineering inspections (periodic):** These periodic and more formal engineering inspections will be performed by a professional engineer and survey by chartered surveyors. The intention is to assess the constructed works relative to the record drawings, document the current state, and summarize the findings into the final report. These are planned for 2020 and again in 2027. An inspection summary report will be prepared following the 2020 inspection.

A2.4.3 Undertake periodic maintenance

Following any of the inspections, it may be necessary to undertake maintenance particularly in cases where wetland function may be impacted or where structural deficiencies have been observed. For example, if debris becomes blocked in the culvert, then it would be removed; or if log booms require repairs to chains or anchor blocks.

To determine the need and form of maintenance, it may require consultation with biologists (internally) and/or engineers. As there is some value in testing the design elements, BC Hydro will consider the impact to project objectives against the information that would be provided on the durability of the structure prior to undertaking the maintenance.

Records will be kept of all maintenance undertaken and included in the final report.

A2.4.4 Evaluate major structural repairs on a case-by-case basis

At this time, BC Hydro is not requesting a provision for major structural repairs. It is not possible to anticipate the scope or expected costs of mitigating major structural failures, or the impact to the project objectives. If there is a high risk of structural failure of the works (e.g., a large tear in the berm structure at Beaver Pond), BC Hydro will review the options on a case-by-case basis, along with the regulatory consequences, and make appropriate submissions to the CWR and other agencies as necessary.

A2.4.5 Summarize the findings in a final report

Following the final inspections, and incorporating information from any maintenance undertaken, a final engineering condition assessment project report will be produced which will include the design lessons learned from the trial.

The final report completed following the 2027 inspection should include:

- Geomorphic review of the available UAV ortho-rectified aerial photographs from GMSMON-15, assessed against reservoir levels;
- Survey drawings, digital drawings, and survey data;
- Summary of the changes and findings over the period and since construction;
- Overall condition assessment of the works;
- Photos supporting the assessment;
- Design recommendations as appropriate on the effectiveness of the design techniques;
- Estimations of ongoing maintenance requirements; and
- Possible decommissioning plan, should it be required.

A2.5 Schedule

Table 1 outlines the anticipated schedule for structural monitoring and inspections.

Table 1: Schedule of inspection and maintenance activities

Task	Timing
Confirm regulatory requirements	June to August 2017
Annual inspections	Annually, in conjunction with GMSMON-15 where possible
Periodic engineering inspections	2020 and 2027
Undertake maintenance	As required
Final project report	Summer 2027

A2.6 Budget

Total Program Cost \$2,653,060.