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Peace Project Water Use Plan

Physical Works Terms of Reference

GMSWORKS-19 Williston Trial Tributaries

**Addendum 2
June 27, 2017**

A2. Addendum to GMSWORKS-19 – Williston Trial Tributaries

A2.1 Background

Pursuant to the Peace Water Use Plan (WUP) Order dated August 9, 2007, Schedule A, Clause 2 (b), BC Hydro received approval to construct two trial tributaries according to the Terms of Reference (TOR) dated April 21, 2008. The purpose of this works project was to:

“improve fish access on two trial tributaries around Williston Lake reservoir and maintenance of access through a debris survey and effective debris management.”

Two sites were selected at Ole Creek (on Finlay Reach) and at Six Mile (on the Parnsip Reach) on the Williston reservoir to trial physical works aimed at tributary access improvements. These were both constructed in 2014.

A2.2 Rationale for Addendum

The purpose of this TOR Addendum 2 is to define the scope for maintenance of the trial wetlands sites as BC Hydro had committed following the construction of the works and to clarify linkages between this and other related debris maintenance projects,

This submission includes scope for structural inspections (both visual and engineering survey) and minor maintenance for a ten year period to the last field season in 2027 (which is last year of the 20-year remissions for the Peace WUP), or until the WUP Order Review (WUPOR) is complete. This scope and duration are necessary for two primary reasons:

- 1) To gather information on the durability of the trial designs over time to inform the WUP Order Review, including what type of long-term maintenance program is appropriate for these projects which are both remote and subject to the elements; and
- 2) To ensure the trial tributaries are functioning as intended and thus the land is used for the purpose granted under the Crown Licence of Occupation.

However, as these are intended to be trials, it is not expected that major structural maintenance will be undertaken as will be explained further in section A2.4.3 below.

A2.3 Linkages to other Peace WUP Projects

This project has linkages to both monitoring and other physical works projects as summarized in Table 1 and described further below.

Table 1: Linkages between GMSWORKS-19 and other Peace WUP projects

Related Project	Linkage to GMSWORKS-19
GMSMON-17 Tributary Habitat Review	Biological monitoring of the effectiveness of the constructed tributary enhancements
GMSWORKS-22 Williston Debris Removal	Annual debris management

Related Project	Linkage to GMSWORKS-19
GMSWORKS-18 Williston Debris Survey	Inventory, survey and reporting of the debris accumulations at key tributary locations
GMSMON-16 Williston Debris Trends	

The biological monitoring of the tributary projects is completed under GMSMON-17 Tributary Habitat Review project. Biological monitoring includes two control sites which are located nearby at Lamonti Creek and Factor Ross Creek.

There is also linkage to the debris projects within Peace WUP. The April 21, 2008 TOR for GMSWORKS-19 included the following deliverables:

- Planning for and implementation of removal, on site disposal, or management of an debris accumulations that are limiting tributary access; and
- Annual debris management and maintenance of tributary access for 5 years.

While this was included in the GMSWORKS-19 TOR, a similar scope is also included in the related debris projects TORs, and is most cost effective to manage through these existing debris projects. Therefore:

- The removal of debris, if required, will be managed via the GMSWORKS-22 Williston Debris Removal project; and
- The GMSWORKS-18 Williston Debris Survey project will incorporate the survey scope for Six Mile and Ole Creek locations, and if relevant, incorporate the results into the GMSMON-16 Debris Trends project.

Any relevant debris information gathered under GMSWORKS-19 from inspections of other monitoring work will also be provided to the debris projects.

A2.4 Approach to maintenance

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

1. Conduct periodic inspections of the sites;
2. Monitor and manage debris (as part of the GMSWORKS-18 and 22 projects);
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 Conduct periodic inspections of the sites

As these are demonstration sites, the sites should be inspected periodically to confirm that the structures are performing as intended and that there are no issues including erosion, scour, damage to the log booms or log boom chains, or damage to the embankment anchors.

There are two types of inspections planned:

- Periodic visual site inspections: Visual site inspections will be completed and documented. As part of the 2016 site structural inspection, the engineer developed an inspection checklist. It is not required to have a Professional engineer on site, provided the inspection checklist is followed; and
- Engineering inspections: A survey and engineering inspection was undertaken in 2016 with another survey to be completed in 2019. The final inspection will be undertaken in 2027 by a Professional Engineer and chartered surveyors. These inspections will assess the constructed works relative to the record drawings, and document the current state. The findings will be summarized in the final report (described in Section A2.4.4 below).

A2.4.2 Monitor and manage debris

Under the GMSWORKS-22 project, BC Hydro will ensure the trial tributary sites are included in the annual aerial survey. If debris is identified and concerns are raised, a site visit will assess the extent of the debris blockage. Should there be possible impacts, debris will be removed, while attempting to minimally disrupt the constructed works.

A2.4.3 Undertake minor, periodic maintenance if deemed necessary

Following inspection, it may be necessary to undertake periodic maintenance particularly in cases where fish access may be impeded and the overall objectives of the project are compromised. For example, an erosion control mat that has become buoyant and a trapping hazard for fish will be removed or broken log-boom anchor chains will be repaired.

This type of maintenance will occur opportunistically, following debris or other inspections. It may require consultation with biologists and/or engineers to determine whether the hazard would be impacting fish access. However, as there is some value for in testing the design elements, the impact to project objectives will be considered prior to undertaking the work.

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, during the duration of the monitoring, there is a significant structural failure of the works, BC Hydro will evaluate the impact and the options on a case-by-case basis and make appropriate submissions to the CWR.

A2.4.5 Summarize the findings in a final engineering report

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

- Geomorphic review of the UAV ortho-rectified aerial photographs, assessed against reservoir levels and available creek flow information;
- 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 (e.g., as a requirement of the Crown licence of occupation).

A2.5 Schedule

The maintenance schedule continues until 2027, which is the last full calendar year of the 20-year remission period, or until the WUP Ordered Review is complete.

The following is the anticipated schedule for structural inspections and maintenance.

Table 2: Schedule of structural inspections and maintenance for GMSWORKS-19

Task	Timing
Structural engineering assessment	2019 and 2027
Visual inspections	Periodic, in conjunction with GSMON-17, or other debris projects
Monitor and manage debris	Annual inspections with GMSWORKS-22, and removal as required
Undertake necessary periodic maintenance	As required
Evaluation structural maintenance on a case by case bases	As required
Final project report	Spring 2027

A2.6 Budget

Total Program Cost \$2,552,026.