



Campbell River Water Use Plan

Physical Works Recommendation Report

**JHTWORKS-2 Upper and Lower Campbell Lake Recreation Facility
Redevelopment**

Recommendation Report from Identification/Feasibility Phase

**Addendum 1
October 11, 2017**

JHTWORKS-2 – Upper and Lower Campbell Lake Recreation Facility Redevelopment – Recommendation Report Physical Works Terms of Reference Addendum 1

1.0 Introduction

The purpose of this Recommendation Report for JHTWORKS-2 – Upper and Lower Campbell Lake Recreation Facility Redevelopment is to support the recommendation for the selected recreation sites on the Upper and Lower Campbell Lake Reservoirs to proceed to Definition/Implementation stages.

This Recommendation Report provides the following information:

- (a) a summary of the history and work done to date for this project;
- (b) the sites to be upgraded as agreed upon by First Nations, government agencies and other stakeholders; and
- (c) the proposed schedule and budget for each site upgrade for the Definition/Implementation phases.

2.0 Background

During the Consultative Committee process for the Campbell River Water Use Plan (WUP) from 1999 to 2003, the Consultative Committee recommended upgrading recreation facilities so as to improve access and usability across a wider range of reservoir elevations, including the revised operating regime recommended in the WUP.

On November 21, 2012, the Comptroller of Water Rights (CWR) issued the Campbell River System Water Use Plan Order. Within the Order, Schedule C, 1, (b), and (d), and Schedule D 1 (a) and (b), requires BC Hydro to assess the feasibility of upgrading boat launches and beaches in Provincial Park sites and Forest Recreation sites in the Upper and Lower Campbell Lake Reservoirs, prioritize and upgrade as Ordered by the CWR, as well as assess the boating related recreation hazards for both reservoirs.

The CWR approved the Terms of Reference (TOR) for JHTWORKS-2 on March 2016 for the Identification/Feasibility phase. This report summarizes the recommendations arising from these early phases and makes recommendations to progress to the Definition and Implementation phases.

3.0 Identification/Feasibility Approach and Outcomes

The Identification Feasibility Phase of JHTWORKS-2 included identifying a number of candidate sites for upgrades and then proceeded to a full feasibility assessment of options at each site. Following the review of the feasibility assessments, engineer's recommendations, and engagement with the respective

parks agencies, BC Hydro determined the set of recommended sites and priority options for upgrade and to progress to Definition/Implementation.

3.1 Identifying sites

During the Identification phase, BC Hydro had several meetings and follow-up conversations with First Nations, BC Parks, Recreation Sites and Trails BC (RSTBC) and the Campbell River Monitoring Advisory Committee. Through this, a list of candidate recreation sites was identified for potential upgrades. Discussions about upgrades focused on beaches and boat ramps in BC Parks and RSTBC-managed sites throughout both the Upper and Lower Campbell Reservoirs. At the site-specific level, sites were included only if it was expected that the upgrade would increase site usability and access to the reservoir under the “preferred”¹ reservoir elevation range expected under the WUP.

In 2015 and 2016, identified sites were verified and selected to proceed to feasibility assessment after meetings and site visits with BC Hydro, BC Parks, RSTBC and First Nations. In total, eight sites were selected for further feasibility assessment, four sites on the Upper Campbell Reservoir and four sites on the Lower Campbell Reservoir, and included both a mix of boat access sites and beach or shoreline projects.

3.2 Feasibility and options for each site

Following site investigations, feasibility studies for each site were prepared by consulting engineers in May 2017. The feasibility studies included the technical engineering feasibility of different upgrade options at each site, as well as Archaeological Impact Assessments (AIA; Baseline, 2017) and Environmental Assessments (EA; Parsamanesh *et al*, 2017a, b) reports.

For all of the sites, no further archaeological work requirements were identified. Additionally, the EA’s concluded that the proposed works were not anticipated to have any significant effects on fish, fish habitat, wildlife, wildlife habitat or ecological communities at risk. However, there are environmental considerations to be managed during construction in a comprehensive environmental management plan, including the necessary permitting and approvals for construction.

The feasibility reports recommended preferred options with estimated budgets for each site (see Table 1 for a synopsis of the Engineers’ recommended options) (Moffat and Nichol, 2017; Onsite, 2017a, b, c, d, e, f, g). In making the recommendations, the engineers considered the safety of public access to the reservoir during the recreation season, enhancements to recreation values, durability, construction complexity, and environmental impact (during and post-construction).

¹ Schedule A of the Order identifies the “preferred zone” of reservoir elevation for all reservoirs in the Campbell River system.

3.3 Engagement, portfolio selection and determination

BC Hydro met with BC Parks and RSTBC in May 2017, reviewed the feasibility reports in detail and came up with a recommended portfolio of sites including the options for upgrades.

The recommended portfolio was developed considering the objectives of the Order and initial budget expectations provided in the Consultative Committee Report. Of the eight sites that went to the Feasibility stage, seven sites are recommended to proceed to Definition/Implementation (listed below):

Sites recommended to proceed to Definition/Implementation:

1. Miller Creek
2. Campbell Lake Recreation Area
3. Loveland Bay
4. Dogwood Bay
5. Buttle Lake Day Use Site
6. Buttle Lake Boat Launch
7. Karst Creek Boat Launch

During the review with BC Parks and RSTBC, the Ralph River site was dropped from the recommendations list for the following reasons:

- The preferred trail access option lies below the reservoir high water mark; therefore, BC Hydro did not endorse the option because the reservoir water levels could regularly inundate the trail potentially resulting in damage and/or ongoing maintenance requirements.
- BC Parks (land manager) prefers to focus on higher priority access sites such as upgrading the Buttle Lake boat launch and completing structural improvements to the existing Karst Creek boat launch rather than complete upgrades at the Ralph River campsite.

For the seven sites that BC Hydro recommends to proceed to construction, the recommendation from the engineers' feasibility report was either (i) fully adopted, (ii) adopted with modifications, or (iii) an alternate option adopted. Table 1, below, lists all sites that proceeded to the Feasibility stage, the engineers' estimated costs, the engineers' recommendation and the chosen alternative (i.e., the recommended option to proceed to construction). Figure 1 below shows the map of the Campbell River System and the locations of the recommended sites for upgrades.

Table 1: Summary of sites and feasibility results of JHTWORKS-2

Site	Current Issue	Options Reviewed	Feasibility Estimate Cost Range*	Engineering Recommendation	Accept Engineering Recommendation?
Lower Campbell Lake Reservoir					
Miller Creek – Approach and Dock	The existing dock doesn't provide public access to the water during the full recreation season.	(1) Dock and gangway replacement (2) As above with jetty extension	(1) \$42,000 (2) \$55,000	Option 2 recommended: allows for more boat loading; more options for launching and landing boats; plus usability over a greater range of reservoir elevations.	Yes. Endorsed by BC Hydro and RSTBC (land manager). Miller Creek is a heavily used site and the longer jetty will provide much needed moorage space while launching and landing boats.
Campbell Lake Recreation Site – Shoreline Access	High banks and eroded areas prevent safe access to the reservoir for recreationists.	Barrier options: (1) Cedar Logs (2) Douglas Fir logs (3) Stone (4) Vegetation (5) Local Wood (6) Split rail fence Access options: (1) Stone (2) Timber framed gravel & earth (3) Rough cut wood (4) Aluminum (5) Graded pathway	Barriers: (1) \$13,000 (2) \$10,000 (3) \$15,000 (4) \$7,000 (5) \$2,300 (6) \$12,300 Modified Access: (1) \$11,000 (2) \$10,000 (3) \$12,000 (4) \$23,500 (5) \$5,400	Recommend stone materials (on both barrier and access) to maximize lifespan of upgrade. This access upgrade will move foot traffic to a safe beach access point and reduce shoreline damage at "unofficial" shoreline access points.	Yes. Endorsed by BC Hydro and RSTBC (land manager). Stone barriers and stairs provide a durable surface that minimizes maintenance costs and maximizes the lifespan of these works.

Site	Current Issue	Options Reviewed	Feasibility Estimate Cost Range*	Engineering Recommendation	Accept Engineering Recommendation?
Loveland Bay – Shoreline Access	The shoreline access to the reservoir is limited and requires the development of a common area/public beach access close to the dock.	Same as Campbell Lake Recreation Site (above).	Same as Campbell Lake Recreation Site (above).	<p>Recommend stone materials to maximize lifespan of upgrade.</p> <p>This access upgrade will move foot traffic to a safe beach access point and reduce shoreline damage at “unofficial” shoreline access points</p>	<p>Yes, but endorsed with restrictions by BC Hydro and BC Parks (land manager).</p> <p>BC Parks is planning upgrades at this site. Therefore, BC Hydro to work with BC Parks to ensure that shoreline access is improved but the chosen option of stone may change depending on BC Parks’ yet-to-be defined construction plan. Costs will be fixed to the stone option.</p>
Loveland Bay – Dock Extension	The existing wooden dock is short and requires an extension to allow more access to the reservoir for boaters during low water elevations.	(1) Extend one dock length (2) Extend two dock lengths	(1) \$12,000 (2) \$17,500	Recommend Option 1: provides a balance of usability, moorage and cost effectiveness.	<p>No, BC Hydro and BC Parks endorse option 2.</p> <p>Boat congestion is a high priority issue at this site especially at lower reservoir elevations. Two dock lengths will help this issue more than option 1.</p>
Dogwood Beach – Dredging	A lagoon at the beach area becomes a stagnant pool potentially providing mosquito habitat during low water.	(1) Dredge without cap. (2) Dredge and cap with pit run sand and gravel (3) Dredge and cap with pea gravel (4) Dredge and cap with washed sand.	(1) \$17,000 (2) \$66,000 (3) \$76,000 (4) \$77,500	Recommend dredge without capping (deemed to be the simplest solution).	<p>Yes, but with modification. BC Hydro and RSTBC (land manager) endorse this option but need to include a gravel cap.</p> <p>A gravel cap will minimize erosion of works and provide longer usability of the site.</p>

Site	Current Issue	Options Reviewed	Feasibility Estimate Cost Range*	Engineering Recommendation	Accept Engineering Recommendation?
Upper Campbell Lake Reservoir					
Buttle Lake Day Use - Swim Area	Existing day use area requires users to traverse a mud flat.	Swimming Area: (1) Dock with swim boundary (2) Platform with swim boundary Trail placement: (1) Trail initiating from parking lot (2) Trail initiating from beach (3) Upgrade existing trail.	Swim platform: (1) \$66,500 (2) \$19,500 Trail: (1) \$36,500 (2) \$36,000 (3) \$29,000	Recommended dock with swim boundary; and trail option 1 plus a combination of trail option 2 or 3 for highest improvement in recreation. This mixture of options also carries the highest cost.	No. BC Hydro and BC Parks (land manager) endorse trail option 1 with swim platform and boundary. Dock is too expensive to build and maintain relative to a platform. Trail option 1 provides access for most users.
Buttle Lake Boat Launch	An existing rib style ramp at this site is damaged and may not provide public access to the water during low water periods.	2 extension Options: <ul style="list-style-type: none"> Option 1: extend by 2.2m Option 2: extend by 9.75 m Each Option has 3 cases: <ul style="list-style-type: none"> Case 1: replace 50% of ribs (i.e., concrete units) with BC Parks Standard units. Case 2: replace units with heavier precast ones. Case 3: Replace all with new precast design units. 	Estimates vary from \$164,400 - \$345,400.	Engineer recommends Case 3 (complete replacement with pre-cast units) to ensure the highest durability and allows for full compaction of underlying materials; but also has the highest up-front cost.	No. BC Hydro and BC Parks (land manager) endorse option 1 and case 2. Endorsement is for replacing all existing ribs with pre-cast heavier grid units; extending the ramp by 2.2 m; toe trenching at elevation of 215.5 m for an overall slope of 13.1%; and, armoring the sides of the ramp. This endorsed option provides the most comprehensive upgrades for the lowest cost.

Site	Current Issue	Options Reviewed	Feasibility Estimate Cost Range*	Engineering Recommendation	Accept Engineering Recommendation?
Karst Creek Boat Launch	An existing rib style ramp at this site is damaged and may not provide public access to the water during low water periods.	<p>6 extension Options:</p> <ul style="list-style-type: none"> Option 1 does not include extending the ramp further; Options 2-6 include extension <p>Each Option has 3 Cases:</p> <ul style="list-style-type: none"> Case 1: replace 50% of ribs (i.e., concrete units) with BC Parks Standard units. Case 2: replace units with heavier precast ones. Case 3: Replace all with new precast design units. 	Estimates vary from \$253,000 - \$714,400	<p>Engineer recommends Case 3 (and defers to BC Hydro on the extension);</p> <p>Case 3 provides the highest durability; but also results in significantly higher costs.</p>	<p>No. Endorsement is for Option 1 and Case 2 with additional erosion protection along the sides of the ramp.</p> <p>Extension of ramp is not endorsed because of the high cost and that recreationists can launch and land their boat safer at Buttle Lake Boat Launch at lower water elevations.</p>
Ralph River – Shoreline Access	An informal trail exists below the high water mark that allows recreationists to access a portion of the reservoir for swimming from the Ralph River campsite.	<p>Trail options:</p> <ol style="list-style-type: none"> Enhance existing trail Forest trail Trail below high water mark <p>Swim Area options:</p> <ol style="list-style-type: none"> Dock with swim boundary Platform with swim boundary Dock crossing bay with swim boundary 	<p>Trail options:</p> <ol style="list-style-type: none"> \$9,900 \$58,500 \$49,000 <p>Swim Area Options:</p> <ol style="list-style-type: none"> \$66,500 \$19,500 \$193,000 	Engineer recommends trail option 1 or 2 with no improvements to the swim area.	<p>No. Both BC Parks and BC Hydro agree not to pursue upgrades to this site.</p> <p>The trail option preferred by BC Parks would be inundated at higher reservoir elevation. The cost is high relative to recreational benefit.</p>

* Engineers estimates are assumed to be 100%/-30%.

Figure 1: Map of Campbell River System and Sites to be upgraded



4.0 Coordination with Other Projects

The Order Schedule C, Clause 1 (d) (for Upper Campbell Reservoir) and Schedule D Clause 1 (b) (for Lower Campbell Reservoir) include a requirement to assess boating related hazards for both the Upper and Lower Campbell Reservoirs. During the feasibility phase of JHTWORKS-2, we looked at the feasibility of considering hazard removal (i.e., stump removal) as an option to both improve reservoir access and to address public safety. However, we concluded that these risks would be best managed by identifying boating hazards within JHTMON-1 Upper and Lower Campbell Lake Reservoir Digital Elevation Model. The main deliverable from JHTMON-1 is intended to inform recreational users about the general location of recreational hazards such as stumps so that users can avoid those hazards.

BC Hydro also has another project JHTWORKS-3 Upper Campbell Drawdown Zone Revegetation Program that has potential overlap with JHTWORKS-2. We will ensure that there are no conflicting objectives or outcomes between projects that could compromise overall success in meeting the objectives of the WUP.

5.0 Maintenance Requirements and Associated Costs

All upgraded recreation sites will require a certain level of maintenance to ensure they are safe for the general public to access the reservoirs. Once BC Hydro has completed the upgrades, maintenance responsibilities will lie with the applicable land management agency. The feasibility reports completed as part of this project provide maintenance estimates for each site upgrade which have been shared with the appropriate land manager. In addition, the engineering firms responsible for each project will provide As-Built Drawings and Operations and Maintenance Manuals to the respective land management agency upon completion of the project.

6.0 Schedule and Budget:

As the designs are not overly complex, the feasibility design also represents the preliminary design. Consequently the Definition/Implementation stage will be combined and will include the permits and regulatory approvals, as well as a detailed design (resulting in issued for construction drawings).

The Definition/Implementation phases will be undertaken from 2017 to 2019. Construction will be timed for favourable water elevations, weather, other environmental factors, and will minimize disruption to recreationists by working during the seasons of lower recreation use. The timing of the construction for each site is shown in the budget table below; however, the exact timing for each site may be altered depending on the factors listed above.

Total Revised Program Cost: \$2,039,244.

Key Assumptions:

- Construction management costs are included in the Supply and Install budgets.
- Engineering line items include, but are not limited to: detailed design and as-built drawings, construction oversight, and completion reporting.
- Environmental/Archaeological monitoring includes, but is not limited to: Heritage and Environmental Monitors, and reporting.
- No environmental/archaeological monitoring or Engineering resources are assigned to the Loveland Bay project in 2019. BC Hydro will be working with BC Parks' monitors, engineers, etc. during BC Parks' upgrades to the recreation area in 2019. Work in 2018 at Loveland Bay is for the dock construction and installation.
- BC Hydro will upgrade Buttle Lake Boat Ramp first and then apply any unused budget from other projects to upgrade Karst Creek Boat Launch.

7.0 References

Baseline (2017). Report for the Archaeological Impact Assessment of Recreation Improvements/Developments in Campbell and Buttle Lakes. Heritage Inspection Permit 2017-0068. Submitted to BC Hydro. Copies on file at the Archaeology Branch, Victoria, BC.

Moffat and Nichol, (2017). Feasibility Study: Upper Campbell Boat Launch Ramps Upgrade Options. Prepared for BC Hydro. June 5, 2017. 185pp.

Onsite Engineering, (2017a). Buttle Lake Dady Use Swim Area Relocation. Prepared for BC Hydro. May 1, 2017. 15pp.

Onsite Engineering, (2017b). Dogwood Bay Dredging. Prepared for BC Hydro. May 1, 2017. 12pp.

Onsite Engineering, (2017c). Loveland Bay Dock Extension. Prepared for BC Hydro. May 1, 2017. 10pp.

Onsite Engineering, (2017d). Miller Creek Approach and Dock Extension. Prepared for BC Hydro. May 1, 2017. 12pp.

Onsite Engineering, (2017e). Ralph River Day Use Beach Access Trail and Swim Area Enhancement. Prepared for BC Hydro. May 1, 2017. 14pp.

Onsite Engineering, (2017f). Shoreline Access at Campbell Lake Recreation Site and Loveland Bay Campsite 18. Prepared for BC Hydro. May 1, 2017. 18pp.

Parsamanesh, A., A. Newbury, A. Harwood and D. Lacroix. (2017a). JHTWORKS-2: Upper Campbell Lake Reservoir and Campbell Lake Reservoir Recreation Facility Upgrades – Preliminary Environmental Feasibility – Buttle Lake and Karst Creek Boat Ramps. Consultant's report prepared for BC Hydro by Laich-Kwil-Tach Environmental Assessment Ltd. Partnership and Ecofish Research Ltd, April 20, 2017.

Parsamanesh, A., A. Newbury, A. Harwood and D. Lacroix. (2017b). JHTWORKS-2: Upper Campbell Lake Reservoir and Campbell Lake Reservoir Recreation Facility Upgrade Preliminary Environmental Feasibility – Loveland Bay, Campbell Lake Recreation Site, Dogwood Beach, Miller Creek, Buttle Lake Campsite, and Ralph River Campground Swim Area. Consultant's report prepared for BC Hydro by Laich-Kwil-Tach Environmental Assessment Ltd. Partnership and Ecofish Research Ltd, April 28, 2017.