Bridge-Seton Water Use Plan

Physical Works Terms of Reference

BRGWORKS-2: Seton Erosion Management Projects: Site-Specific Mitigation Physical Works

April 22, 2020

BRGWORKS-2 – Seton Erosion Management Projects: Phase 2 – Site-Specific Mitigation Physical Works Terms of Reference

1. Context

This Terms of Reference is for the feasibility, definition and implementation stages of the Seton Erosion Management Projects in Seton Lake and on the Seton River. It is submitted in response to the *Water Act Order* issued by the Comptroller of Water Rights (CWR) on March 30, 2011.

The Bridge River Water Use Plan (WUP) Order contains two sections that relate to the Seton erosion projects as follows:

- Schedule A, Clause 12 titled Seton Lake Erosion Management Program (SLEMP) is as follows:

  (a) Implement a program to develop and deliver an effective long term program for addressing moderate and high risk shoreline erosion issues for Seton Lake and along Seton River with particular reference to heritage, cultural and aesthetic resources that may be affected;

- Schedule A, Clause 13 referred to the Seton Lake Erosion Mitigation Program as follows:

  (a) Monitor what erosion sites, other than heritage or cultural sites, around Seton Lake are affected by Seton Lake fluctuations resulting from operation of the generating facilities.
  (b) Determine what actions are required to protect those sites from further erosion.
  (c) Determine what migration plans can be developed to address such erosion sites
  (d) Monitor if the actions implemented to mitigate erosion at the sites are effective.

2. Physical Works Program Rationale

2.1. Background

The Bridge-Seton Water Use Plan (WUP) Consultative Committee and the Bridge River Technical Working group recommended development of the Seton erosion projects as part of the Water Use Plan. The program is intended as cooperative effort between BC Hydro and St'át'imc for addressing moderate and high risk shoreline erosion issues for Seton Lake and along Seton River.

BC Hydro plans to deliver the above Order requirements under two projects, referred to collectively in this TOR as the Seton Erosion Management Projects.[1]

[1] Note that one or both of these projects is often referred to as “SLEMP”. While Clause 12 specifically names SLEMP in the title, Clause 13 also forms the acronym “SLEMP”. Moreover, this TOR may cover site(s) on the Seton River not reflected in that acronym. So to eliminate confusion within the TOR, we have not used the term SLEMP. However, we recognize the SLEMP may still be used in discussions about these projects.

3. Project Goals and Objectives

3.1. Seton Erosion Management Projects Objectives

The overall objective of both Seton Erosion Management Projects is to identify and manage the priority high and moderate risk shoreline erosion sites that are impacted by the operation of the Bridge-Seton Generation facilities. The erosion sites may be adjacent to heritage, cultural and aesthetic resources and other non-heritage sites on Seton Lake and Seton River. The options to manage the erosion may include monitoring or may involve mitigation – depending on the particular risks and characteristics of the site.

More specifically, the objectives of each of the two projects are as follows:

- **BRGMON-15**: To identify and prioritize shoreline erosion sites (both heritage and non-heritage) arising from BC Hydro operations (on Seton Lake and River), leading to recommendations for either mitigation and/or ongoing monitoring.
- **BRGWORKS-2:** To protect the priority sites by installing effective shoreline mitigation physical works.

3.2. Links to other related projects

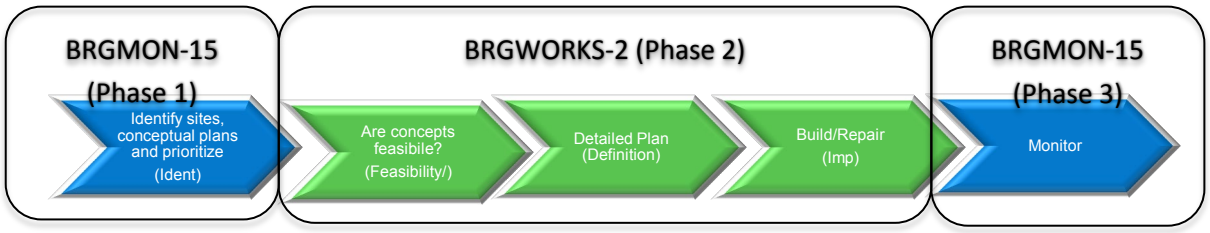
Additionally, these projects have links with BC Hydro's Reservoir Archaeology Program (RAP). The RAP program is a province-wide program intended to create archaeology management plans for each reservoir to manage ongoing risks to heritage sites. It is undertaken as a requirement under the BC Heritage Conservation Act and implemented under a Memorandum of Understanding with the Province.

As the RAP program covers the Seton Lake, relevant information from the RAP will be provided to BRGMON-15 as it becomes available. In part due to the parallel nature of these programs, iterative processes have been built in to the Approach in Section 4 below.

4. Approach

The approach and relationship of the BRGMON-15 and BRGWORKS-2 projects is shown in Figure 1. It is anticipated there may iterative processes within and potentially across the phases. A process diagram is shown in Appendix A.

Figure 1: Approach to the Seton Erosion Management Projects



Physical works projects typically progress sequentially through the following stages: Identification, Feasibility, Definition, Implementation, and Monitoring/Maintenance. BRGWORKS-2 includes Feasibility, Definition and Implementation. BRGMON-15 includes Identification and Monitoring as described further below.

BRGMON-15 (Phase 1)

1) **Identification:** This step is where the shoreline erosion sites are identified, prioritized and where shoreline mitigation is recommended, and a preliminary conceptual design is developed. This is currently undertaken as part of BRGMON-15**.** BC Hydro is working closely with St'át'imc to identify common priorities and agreement on recommendations.

BRGWORKS-2 (Phase 2)

2) **Feasibility:** This stage typically includes additional investigations and studies to determine the full feasibility of the conceptual mitigation designs identified in BRGMON-15. The outcome is a feasibility level design (also referred to as preliminary design) for the mitigation, plus a feasibility (preliminary) level cost estimate. It may also include some preliminary plans that may influence the feasibility (and cost estimates) of the proposed works.

3) **Definition:** The purpose of this stage is to refine the technically feasible option into a detailed design that can be used for construction. Additionally, it includes further planning and permitting, such as archaeological, safety, environmental, and all related permitting. BC Hydro will make additional submissions to the CWR once there is a recommended design, particularly if there are significant changes in cost, design or prioritization from what is included in this TOR.

4) **Implementation:** In this stage, the final preparations and the actual construction of the works occur. This stage typically includes the Issue for Construction (IFC) drawing, and the receipt of the final permits (initiated in previous stages). It will also include final construction planning and contracting. Following construction, it will also include construction and project completion reporting.

BRGMON-15 (Phase 3)

5) **Monitoring inspections (following mitigation):** Following the completion of the construction, a program of monitoring inspections will be developed to ensure that the physical structures function as designed.

6) **Ongoing monitoring of the site (no mitigation):** Should it be determined that mitigation is not recommended or not feasible at a site (in 1 or 2 above), ongoing monitoring may be recommended (and implemented under BRGMON-15) to monitor the site condition.

The process will be followed for each site agreed between St'át'imc and BC Hydro to take forward to mitigation, as approved by the CWR. Where possible, BC Hydro will look for efficiencies (e.g., bring forward a number of sites to feasibility design at the same time). However, it is possible that as the RAP program progresses, new sites will be identified which may require a reprioritization. Consequently, there may be multiple sites at different steps in the above process.

Additionally, the tasks described below may be combined, truncated or expanded, as appropriate for the size and scale of each mitigation. The description of tasks below does not presume any specific delivery/contractor approach.

5. Work Steps – Feasibility

In the Feasibility stage, the team will confirm the feasibility of the conceptual design(s) (identified in BRGMON-15). During this stage, there may still be some work done on other alternatives to confirm assumptions, and typically includes additional investigations, the progression of the design(s) plus early stages of developing the other relevant plans.

5.1. Task 1: Project Management

Project management will involve ensuring there is sufficient technical oversight of the each work package for each site within project, and that schedule and budget is managed and updated appropriately throughout the project. This task will be managed by a professional project manager or equivalent. The responsibilities will include (but are not limited to):

- budget management;
- work-package management (e.g., ensuring appropriate resources, and defining and accepting deliverables for each work package)
- schedule management;
- issues management; and
- risk management.

5.2. Task 2: Engineering - Feasibility Design

A professional engineer will be required:

- To define and oversee the necessary engineering investigations, as required (e.g., wind and wave technology, survey, further geotechnical investigations, hydrological modelling, etc.,);
- To develop feasibility level design with specifications and quantities; and
- To develop the cost estimate and construction schedule (typically to +50%/-15%).

5.3. Task 3: Confirm prioritization, if required

In the course of developing the feasibility design, assumptions that were made in the conceptual design may be challenged which could possibly change the prioritization of projects. Therefore, the process includes the opportunity for confirming prioritization of projects, as required, with the appropriate submissions to the CWR.

5.4. Task 4: Develop preliminary plans

At this stage, it may be necessary to begin preliminary plans that may have an impact on the feasibility of the project or that have long lead times and need to be initiated at this early stage of design development. This may include preliminary properties plans, archaeology management plans, and environmental plans. These plans are described further in the Definition stage below.

6. Work Steps - Definition

6.1. Task 5: Engineering – Preliminary and/or Detailed Design

The objective of the Definition stage is to refine the alternative developed in the Feasibility Stage to sufficient detail for completing all major project components, relevant final plans (for regulatory authorization), developing the project schedule, and refining the cost estimate to the accuracy (+15% / -10%).

6.2. Task 6: Properties plans/permissions

As the sites of shoreline erosion identified may be on private property, reserve or crown land, appropriate rights for works and access will likely be required This task involves securing the appropriate rights in time for construction (e.g., private/Canada property access agreement(s) etc.,).

6.3. Task 7: Archaeological management planning

Shoreline erosion mitigation may involve alterations adjacent to heritage sites that require the issuance permits outside the jurisdiction of the Comptroller of Water Rights, as is the case with many of the physical works projects undertaken as part of the WUP.

The expectation is that the archaeological management will follow standard project practices. That is, to the extent possible, it will include designing the mitigation to avoid registered (or culturally important) sites, include archaeological monitoring, etc., or other management recommendations agreed by the appropriate St'at'imc community and fits within the scope of the Order.

This task involves a professional archaeologist:

- To obtain the necessary archaeological permits as required (e.g., *Section 12.2 or 12.4 Heritage Conservation Act* Permits issued by the Archaeology Branch);
- To undertake a full archaeological impact assessment (as required) within the footprint of the proposed mitigation and associated work (e.g. road or water access routes); and
- To develop the appropriate management plan for the mitigation construction which will specify any archaeological requirements (areas to avoid, or other management actions) to be undertaken prior to or during construction).

In subsequent stages, appropriate archaeological monitoring will occur according to the above plans.

6.4. Task 8: Environmental management planning

A qualified environmental professional will be responsible for the following:

- To evaluate the potential for environmental impacts during construction;
- To develop the necessary environmental management/protection/restoration plans for during and post-construction to ensure potential environmental impacts associated with the work are avoided or minimized;

- To liaise with the necessary environmental regulatory agencies to determine regulatory requirements (e.g., *Water Sustainability Act* approvals, DFO, FLNRO notifications as required); and
- To prepare any required environmental management plan(s) for the necessary regulatory submissions.

In subsequent stages, appropriate environmental monitoring will occur according to the above plans.

6.5. Task 9: Other permitting and approvals

Additionally, other permits may be required such as (but not limited to) *Navigable Waters Act* permits.

6.6. Task 10: Safety management and planning

This task involves development of appropriate construction safety minimum requirements for the project, and if required, public safety plans for the construction stage of the work to ensure all workers and contractors have adequately addressed all safety hazards of the work.

In subsequent stages, all safety management plans prepared by contractors will need to be reviewed and approved prior to construction.

7. Work Steps - Implementation (Construction)

7.1. Task 11: Engineering – Detailed Design and Specifications

A professional engineer will develop the final Detailed Design allow the work to be procured and constructed in accordance with requirements (i.e., Issue for Tender (IFC) and/or Issue for Construction(IFC) drawings).

7.2. Task 12: Construction planning and management

Throughout the process, constructing planning is undertaken related to construction staging, tendering, and contracting arrangements. This planning and management task involves the planning, support and oversight of a construction contractor to ensure the project is delivered to requirements. The task includes but is not limited to:

- Constructability review and planning with contractor and archaeologist, including site visits;
- Completion of all the appropriate construction–related contracts for the delivery of the design specifications;
- Construction planning and development of construction management plan; and
- Review of contractor's archaeology management plan, safety management plan and environmental protection plan.

In the final stages, the final construction planning is done with oversight and discussions between the construction manager, the design engineer, the archaeologist, and the construction contractor.

7.3. Task 13: Construction

The following tasks will be required during construction:

- Construction management oversight on-site to construction meets with contract and design specifications;
- Appropriate archaeological monitoring and reporting;
- Appropriate environmental monitoring and reporting;
- Appropriate daily/weekly construction reporting; and
- Oversight/inspection by the design engineer (Engineer of Record (EOR)).

7.4. Task 14: Completion reporting & inspection planning

This final task involves development of the final completion records for the life cycle of the project including construction reports, as built drawings, and a recommended monitoring or inspection schedule and template.

8. Schedule

The preliminary schedule for one single mitigation site is provided below. As construction will be scheduled for the period of least risk to fish species indicated in the Provincial Regional Timing Window[2] for the area, if the other work cannot be completed in time for the next window, the construction schedule will be pushed back to the next available window.

As the plans are developed, the schedule will be updated in subsequent submissions and/or in the Bridge Annual report.

Stage	Estimated timing
Feasibility Design	Summer/Fall 2020
Definition/Detailed design and planning	Spring/Summer 2021
Construction	2021/2022

9. Budget

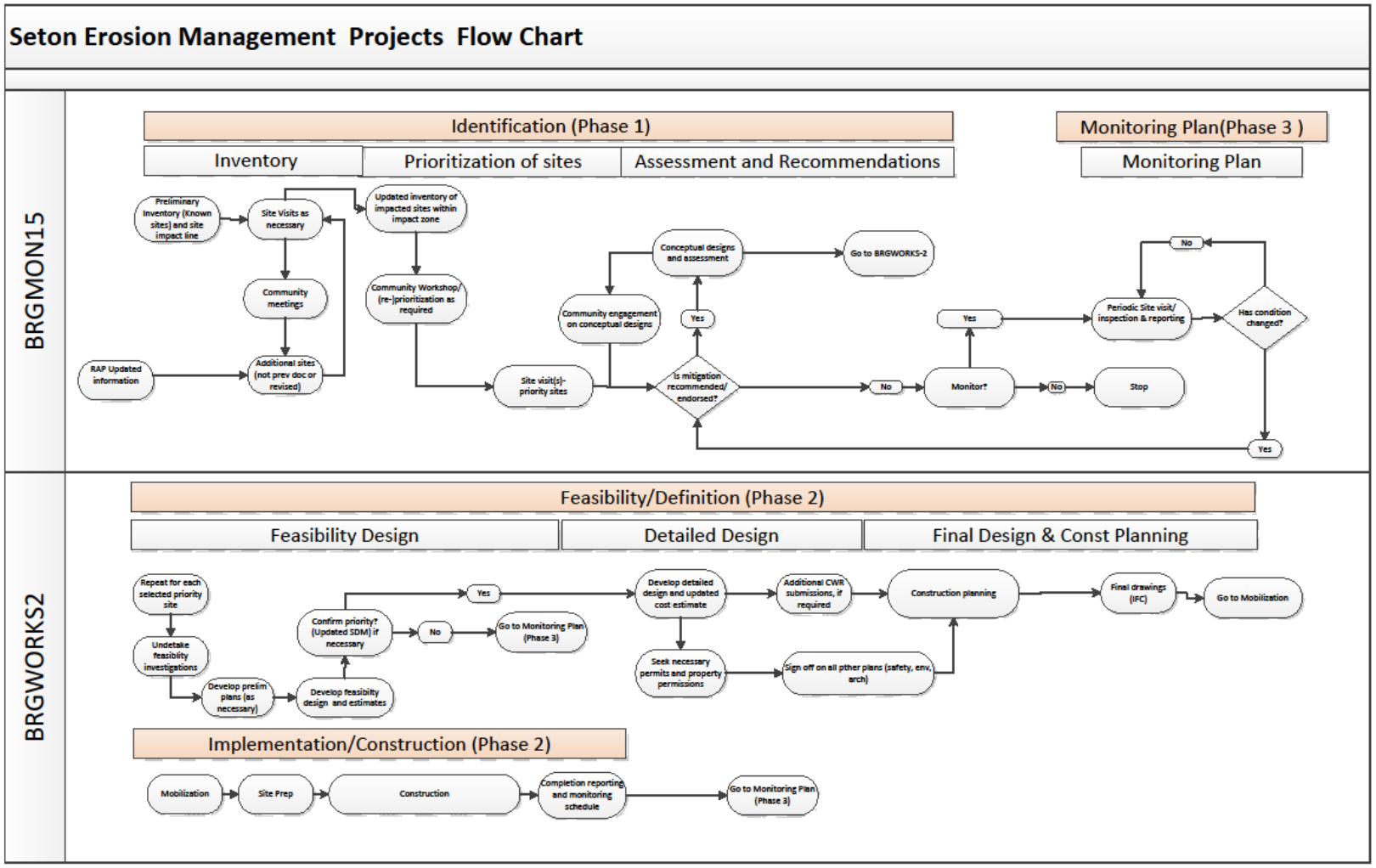
The total revised cost is *$1,005,694.*

[2] https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/working-around-water/regional-terms-conditions-timing-windows

10. References

Embark Engineering (2016), Technical Memorandum-Sekw'el'was Pithouse Erosion Mitigation Conceptual Design; Prepared for Antares Project Services. Embark File No. 13428.002-300.

Appendix A


Seton Erosion Management Projects Flow Chart
BRGMON15
Identification (Phase 1)
Inventory
Prioritization of sites
Assessment and Recommendations
Monitoring Plan(Phase 3)
Monitoring Plan
Preliminary Inventory (Known sites) and site impact line
Site Visits as necessary
Updated inventory of impacted sites within impact zone
Community meetings
Community Workshop/ (re-)prioritization as required
RAP Updated information
Additional sites (not prev doc or revised)
Site visit(s)- priority sites
Community engagement on conceptual designs
Conceptual designs and assessment
Go to BRGWORKS-2
Yes
Is mitigation recommended/ endorsed?
No
Monitor?
Yes
No
Stop
Yes
Periodic Site visit/ inspection & reporting
No
Has condition changed?
Yes
BRGWORKS2
Feasibility/Definition (Phase 2)
Feasibility Design
Detailed Design
Final Design & Const Planning
Repeat for each selected priority site
Undetake feasibility investigations
Develop prelim plans (as necessary)
Develop feasibilty design and estimates
Confirm priority? (Updated SDM) if necessary
No
Go to Monitoring Plan (Phase 3)
Yes
Develop detailed design and updated cost estimate
Seek necessary permits and property permissions
Additional CWR submissions, if required
Sign off on all pther plans (safety, env, arch)
Construction planning
Final drawings (IFC)
Go to Mobilization
Implementation/Construction (Phase 2)
Mobilization
Site Prep
Construction
Completion reporting and monitoring schedule
Go to Monitoring Plan (Phase 3)
Document Name: Seton Lake Erosion Management Program (SLEMP) Flow Chart
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