

Cowichan Lake

Weir Design and Shoreline Assessment Project Update



Weir Design

Project is progressing on schedule and on budget but below forecast.

Key Tasks complete to date:

- Desktop Study: review of historical reports and publicly available data understand site development history, geology, hydrological data, and seismic hazards
- Site Assessment: Desktop and in-person visual assessment of CLW project components
- Data Acquisition: Geotechnical exploration and bathymetry mapping of project site
- Site Geological Model
- Breach analyses and consequence classification assessment
- Fieldwork for the Environmental Study
- Design Basis Memorandum
- Hydraulic modelling
- Preliminary foundation design

Weir Design

- **Key Design Parameter:**
 - Fish passage and riparian environment objectives are prioritized over recreation, navigation and hydropower objectives.
- Fish Passage workshops held on July 28, Nov 2 and Nov 12 to tap into the local knowledge and DFO expertise to optimize this area of design. A matrix of fish type and maturity vs. timing of passage was developed. Essentially we need fish passage 'all the time' with a key metric being water velocity especially for juveniles.
- Two opportunities for fish passage will be created. One through the Weir Island and one through the south abutment.
- A cold water intake is also being designed to lower the temperatures to below 'lethal'. This will further optimize fish passage by keeping them healthy during critically warm periods and attracting them to move into the lake.

Weir Design

- **Key Design Parameter:**
 - Fish passage and riparian environment objectives are prioritized over recreation, navigation and hydropower objectives.
- Hydro electric Power option will be evaluated after the fishway and coldwater intake are designed. Hydraulics will determine if there is value in pursuing any further.
- Recreational Opportunities like a whitewater park (WWP) are outside the scope of the BCSRIF Grant funding. There may be enough flow to allow for a new project to pursue a WWP downstream of the weir.
- A fully accessible walkway across the weir will be designed and costed as an option. There is currently strong support for this but ultimately the future license holder and funder will need to make a final decision.

Weir Design

Preliminary Design – 80%

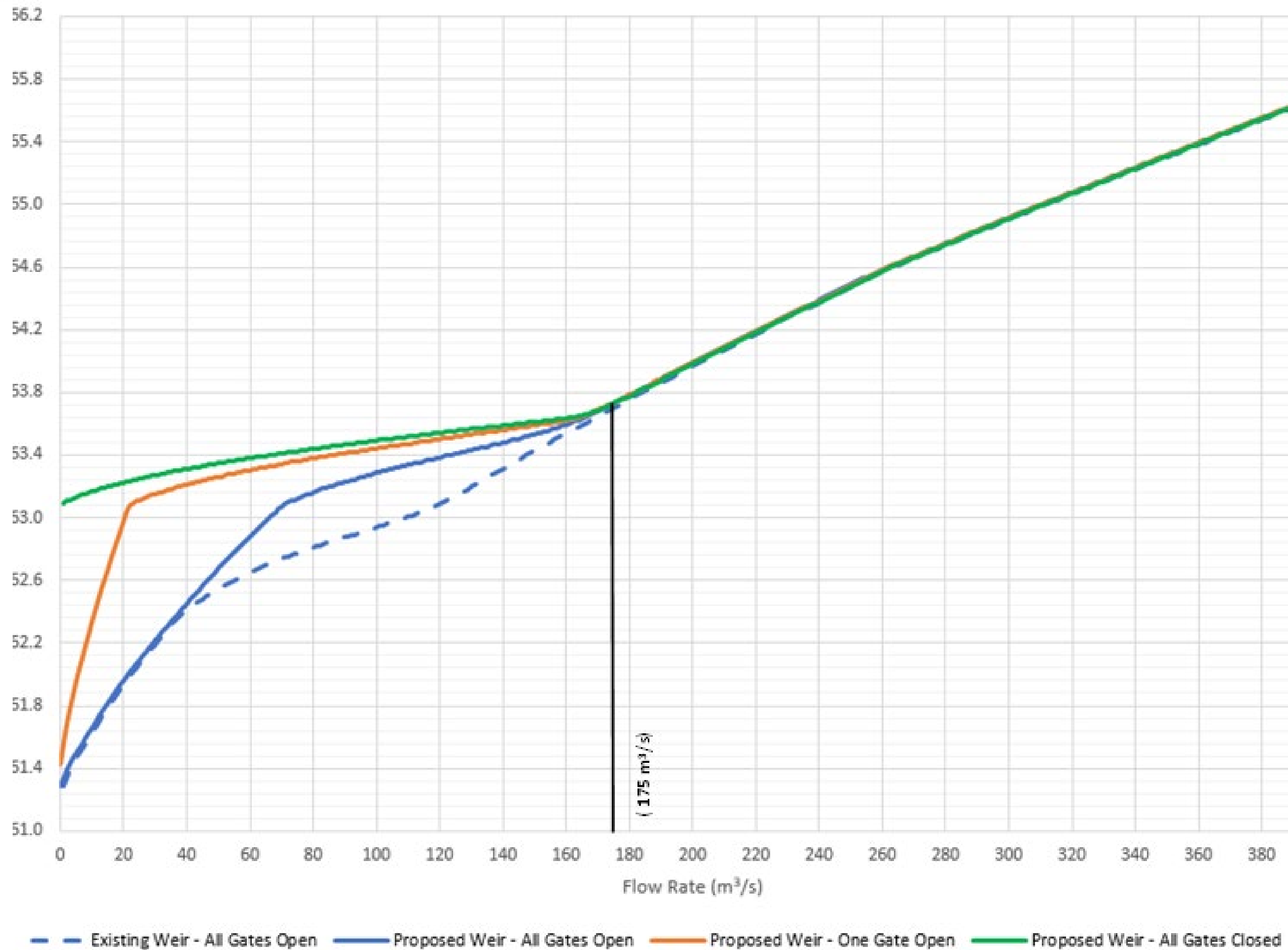
- **Location – same +/- few meters**
- **Remote operation**
- **Hydraulic analysis – 1:2 year**
- **Preliminary cost – not complete**

Reuse vs. replace? The weir has 6 key components:

- | | | |
|----|---------------------|------------------------------|
| 1. | Boat Lock | Reuse foundation? New parts. |
| 2. | Overflow Weir | Replace |
| 3. | Island Sill | Replace |
| 4. | Gated Spillway | Reuse foundation? New Parts. |
| 5. | Abutments | Replace |
| 6. | Fish Passage/Ladder | Replace |



Proposed Weir - Water Surface Elevation at Cowichan Lake



Weir Design

Next Steps:

- Public review of the Preliminary Design will be held on December 10 from 6-8 pm. Communications to go out this week. Virtual presentation.
- Move into final design in January. Consider aesthetics. Costing. Tender documents. Target completion May/June 2021.
- www.cowichanlakeweir.ca



Cowichan Lake Shoreline Assessment Project

- Awarded to Kerr Wood Leidal – Kick off meeting July 29th.
- Objectives:
 - Assess & Map Current Shoreline Conditions. Create an 'AS IS' Picture.
 - Forecast Changes to the shoreline based on a raised weir and from climate change.
 - Identify impacts to riparian access rights and use of property impact.
 - Providing supporting documentation for the Future Water License Process.

Cowichan Lake Shoreline Assessment Project

Presence of Water – How much water and how frequently is that water at particular elevations. Impacted by the weir elevation and design and environmental inflows.

The Action of water – Wave energy. Natural (wind) and unnatural (boating).

The Character of the shoreline. – What the shoreline is made of (bedrock, boulders, sand, clay, etc) and its related vegetation.

These 3 act to determine where the natural boundary lies.

Natural Boundary Definition (LTSA, Surveyor General):

"natural boundary" means the visible high water mark of any lake, river, stream or other body of water where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the body of water a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself; LAND ACT [RSBC 1996] CHAPTER 245

Cowichan Lake Shoreline Assessment Project

The Natural Boundary – the workplan

1. **Methodology Review:** Review workplan and methodology with CVRD and Stakeholders (Steering Committee established). Complete.
2. **Data Review:** Gather, collect and compile data and carry out desktop review to identify missing data or data quality issues that may need field follow up. Underway.
3. **Field Data Collection:** Complete a detailed field reconnaissance and survey of the entire shoreline using GPS/GIS based data capture platform to document current conditions. Mostly complete.
4. **Confirm Analysis Approach:** After collection of the field data is complete, reconfirm the analysis approach and suitability/defensibility of available data with CVRD prior to moving onto detailed analysis. Use GIS tools to present state of data.

Cowichan Lake Shoreline Assessment Project

5. **Hydrologic Model:** Model changes in water level frequency for the current and upgraded weir using current and future climate conditions and integrate the results into GIS.
6. **Wave Energy Model:** Model wave energy across the lake to establish water level wave energy relationships for the shoreline for both wind waves and boat wake waves.
7. **Ecology Classification:** Use field observations and mapping data to define relationships between natural boundary location and ecological characteristics and to map shoreline reaches into GIS with similar characteristics.
8. **Quantify the Changes to the Natural Boundary:** Combine all data sources within the GIS tool. Assess the likely changes to the natural boundary as a result of the various scenarios.

Cowichan Lake Shoreline Assessment Project

9. **Quantify Boundary Change:** For those shorelines with higher degree of change to the natural boundary carry out further detailed shoreline erosion modelling to quantify the degree of potential changes.
10. **Map Existing and Future Natural boundary:** Map the location of the current natural boundary and the future predicted natural boundary using GIS data and mapping tools.
11. **Lot by Lot Impact Reports:** Develop detailed lot by lot impact reports to identify impacts to each property.
12. **Report:** Report findings and review with CVRD



BC Salmon Recovery and Innovation Fund (BCSRIF) Grant (\$4M)

- **Year 1** (May 2019 – March 31, 2020): \$143K forecast
 - \$119K actual. Primarily due to the late finalization of the engineering contract.
- **Year 2** (April 1, 2020 to March 31, 2021) - Forecast is \$2.1M
 - Actual spent is \$581.3K (first half). Under budget due to late start of the Shoreline Assessment Project and due to attractive competitive bidding and awards.
- **Year 3** - Forecast is \$1.8M

End date for the grant has not changed (March 31, 2022) but there will be an opportunity to reset the schedule and budget profile in January. Costs will be much lower than the grant allowance.

Questions?

Comments?

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