



**ORDER NUMBER
G-250-25A**

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

British Columbia Hydro and Power Authority
Strathcona Discharge Upgrade Project

BEFORE:

A. K. Fung, KC, Panel Chair
E. A. Brown, Commissioner

on October 17, 2025

ORDER

WHEREAS:

- A. On June 14, 2023, British Columbia Hydro and Power Authority (BC Hydro) filed an application (Application) with the British Columbia Utilities Commission (BCUC) pursuant to section 44.2(3) of the *Utilities Commission Act* (UCA) for acceptance of each of the schedules of capital expenditures BC Hydro proposes for the Ladore Spillway Seismic Upgrade Project (Ladore Project) and the Strathcona Discharge Upgrade Project (Strathcona Project) (together, the Projects);
- B. The Ladore and Strathcona facilities form part of BC Hydro's hydroelectricity system located on the Campbell River on Vancouver Island. BC Hydro submits the Ladore and Strathcona facilities have dam safety issues related to seismic withstand and water discharge capability. BC Hydro further submits that the Projects are needed to meet regulatory obligations and good dam safety practices to reduce the risks to life, property, infrastructure and the environment;
- C. By Order G-189-23 dated July 18, 2023, the BCUC established a written hearing process and a regulatory timetable;
- D. British Columbia Old Age Pensioners' Organization et al, Commercial Energy Consumers Association of British Columbia, and Residential Consumer Intervener Association registered as interveners in the proceeding;
- E. On December 12, 2023, BC Hydro requested an adjournment of the proceeding pending a status update on cost information for the Projects;

- F. By Order G-163-24, dated June 18, 2024, at BC Hydro's request, the BCUC subsequently separated the regulatory process for the Projects, allowing the review of the Ladore Project to proceed while the review of the Strathcona Project was adjourned pending additional cost information on the latter. By Order G-263-24, dated October 22, 2024, the BCUC accepted BC Hydro's proposed expenditure schedule for the Ladore Project as being in the public interest;
- G. On May 30, 2025, BC Hydro submitted updated project cost information for the Strathcona Project (Updated Project Cost Estimate). In the Updated Project Cost Estimate BC Hydro stated the authorized cost of the Strathcona Project is \$574.5 million;
- H. BC Hydro requests that certain specified information in the Application, responses to Information Requests and Updated Project Cost Estimate (Confidential Information) be held confidential pursuant to Part IV, Rule 23 of the BCUC's Rules of Practice and Procedure on the basis they are commercially sensitive in nature or contain security-sensitive physical assets and/or cyber-security information;
- I. The BCUC has considered the Application, evidence and submissions in this proceeding and finds that the following determinations are warranted; and
- J. On October 15, 2025, the BCUC issued Order G-250-25. The present Order G-250-25A is being issued to correct a typographical error in the date for the first annual progress report in Appendix C of the decision accompanying Order G-250-25, and replaces Order G-250-25.

NOW THEREFORE for the reasons outlined in the decision accompanying this order and pursuant to section 44.2(3) of the UCA, the BCUC orders as follows:

- 1. BC Hydro's expenditure schedule for the Strathcona Project with an authorized cost of \$574.5 million is accepted.
- 2. BC Hydro is directed to file project reports as outlined in Section 9 and Appendix C to the decision accompanying this order.
- 3. The Confidential Information will remain confidential until the BCUC determines otherwise.

DATED at the City of Vancouver, in the Province of British Columbia, this 17th day of October 2025.

BY ORDER

Electronically signed by Anna Fung

A.K. Fung, K.C.
Commissioner

British Columbia Hydro and Power Authority
Strathcona Discharge Upgrade Project

DECISION

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Executive Summary

On June 14, 2023, British Columbia Hydro and Power Authority (BC Hydro) filed an application (Application) with the British Columbia Utilities Commission (BCUC) pursuant to section 44.2(3) of the *Utilities Commission Act* for acceptance of each of the schedules of capital expenditures BC Hydro proposes for the Ladore Spillway Seismic Upgrade Project (Ladore Project) and the Strathcona Discharge Upgrade Project (Strathcona Project).

The Ladore, Strathcona and John Hart facilities comprise the three main components of BC Hydro's hydroelectricity system located on the Campbell River on Vancouver Island (Campbell River System). The Campbell River System generates an average of 1,287 gigawatt-hours of energy annually, supplying about 10 percent of Vancouver Island's peak load. BC Hydro submits the Ladore and Strathcona facilities have dam safety issues related to seismic withstand and water discharge capability. BC Hydro further submits that these projects are needed to meet regulatory obligations and good dam safety practices to reduce the risks to life, property, infrastructure and the environment.

On December 12, 2023, BC Hydro requested an adjournment of the proceeding pending a status update on cost information for the two projects. At BC Hydro's request, the BCUC subsequently separated the regulatory process for the projects, allowing the review of the Ladore Project to proceed while the review of the Strathcona Project was adjourned pending additional cost information on the latter. By Order G-263-24, the BCUC accepted BC Hydro's expenditure schedule for the Ladore Project as being in the public interest. On May 30, 2025, BC Hydro submitted updated project cost information for the Strathcona Project (Updated Project Cost Estimate), triggering the continuation of this proceeding.

The Strathcona Project entails the installation of a new low-level outlet to provide the capability for deep water draw down of the Upper Campbell Reservoir and conversion of the existing spillway to a free flow overflow spillway. The project has an in-service date of May 2030. The authorized cost of the Strathcona Project, inclusive of project reserves, is \$574.5 million.

The Panel is satisfied that BC Hydro has demonstrated a need to address the Strathcona facility's identified dam safety risks. The Panel notes that failure of the Strathcona dam could trigger cascading failures in the Campbell River System, causing catastrophic flooding, potential loss of life and long-term environmental and economic harm.

The Panel finds that BC Hydro's analysis of project alternatives including the selection of the Strathcona Project as the preferred option is reasonable, noting that the preferred alternative performed best on all project evaluation criteria. The Panel is satisfied that the Strathcona Project is appropriately scoped, and its schedule and procurement approach are reasonable. BC Hydro has appropriately identified the relevant project risks and put in place adequate mitigation measures. Additionally, the Panel is persuaded that BC Hydro's Updated Project Cost Estimate is reasonable, based on its preliminary design and a Class 3 AACE estimate.

The evidence shows that BC Hydro's Indigenous consultation and public engagement on the Strathcona Project have been adequate to date. The Panel expects that these activities will continue as the project progresses.

The Panel also finds that the Strathcona Project aligns with the applicable of British Columbia's energy objectives and is consistent with BC Hydro's Updated 2021 Integrated Resource Plan.

Accordingly, the Panel accepts the expenditure schedule as filed by BC Hydro for the Strathcona Project as being in the public interest. The Panel directs BC Hydro to provide project reporting as detailed in Appendix C to this order.

1.0 Introduction

On June 14, 2023, British Columbia Hydro and Power Authority (BC Hydro) filed an application (Application) with the British Columbia Utilities Commission (BCUC) pursuant to section 44.2(3) of the *Utilities Commission Act* (UCA) for acceptance of each of the schedules of capital expenditures BC Hydro proposes for the Ladore Spillway Seismic Upgrade Project (Ladore Project) and the Strathcona Discharge Upgrade Project (Strathcona Project) (together, the Projects).

As detailed below, the BCUC initially established a regulatory process for a joint review of the Ladore and Strathcona Projects. However, as explained below, the BCUC subsequently separated the regulatory process for the Projects, allowing the review of the Ladore Project to proceed while the review of the Strathcona Project was adjourned pending additional cost information on the latter. By Order G-263-24, the BCUC accepted BC Hydro's proposed expenditure schedule for the Ladore Project as being in the public interest. Accordingly, this decision is focused on the Panel's review of the Strathcona Project.

The updated expected cost for the Strathcona Project is \$520.9 million and the project in-service date is anticipated to be May 2030. The authorized cost of the Strathcona Project, including project reserves, is \$574.5 million.¹ BC Hydro seeks BCUC acceptance of the expenditure schedule for the Strathcona Project as being in the public interest, pursuant to section 44.2(3) of the UCA.

1.1 Background

The Strathcona, Ladore and John Hart facilities (Facilities), are the three main components of BC Hydro's hydroelectricity system located on the Campbell River on Vancouver Island (Campbell River System). The Campbell River System is located on Vancouver Island, B.C., west of the City of Campbell River, a municipality with a population of about 37,500 people.² Figure 1 below provides a map of the system.³ The Facilities were originally constructed in the 1940s and 1950s and include the following main elements:⁴

- Strathcona Facility consisting of Strathcona Dam, Upper Campbell Reservoir, and Strathcona Generating Station;
- Ladore Facility consisting of Ladore Dam, Lower Campbell Reservoir, and Ladore Generating Station; and
- John Hart Facility consisting of John Hart Dam, John Hart Reservoir, and John Hart Generating Station.

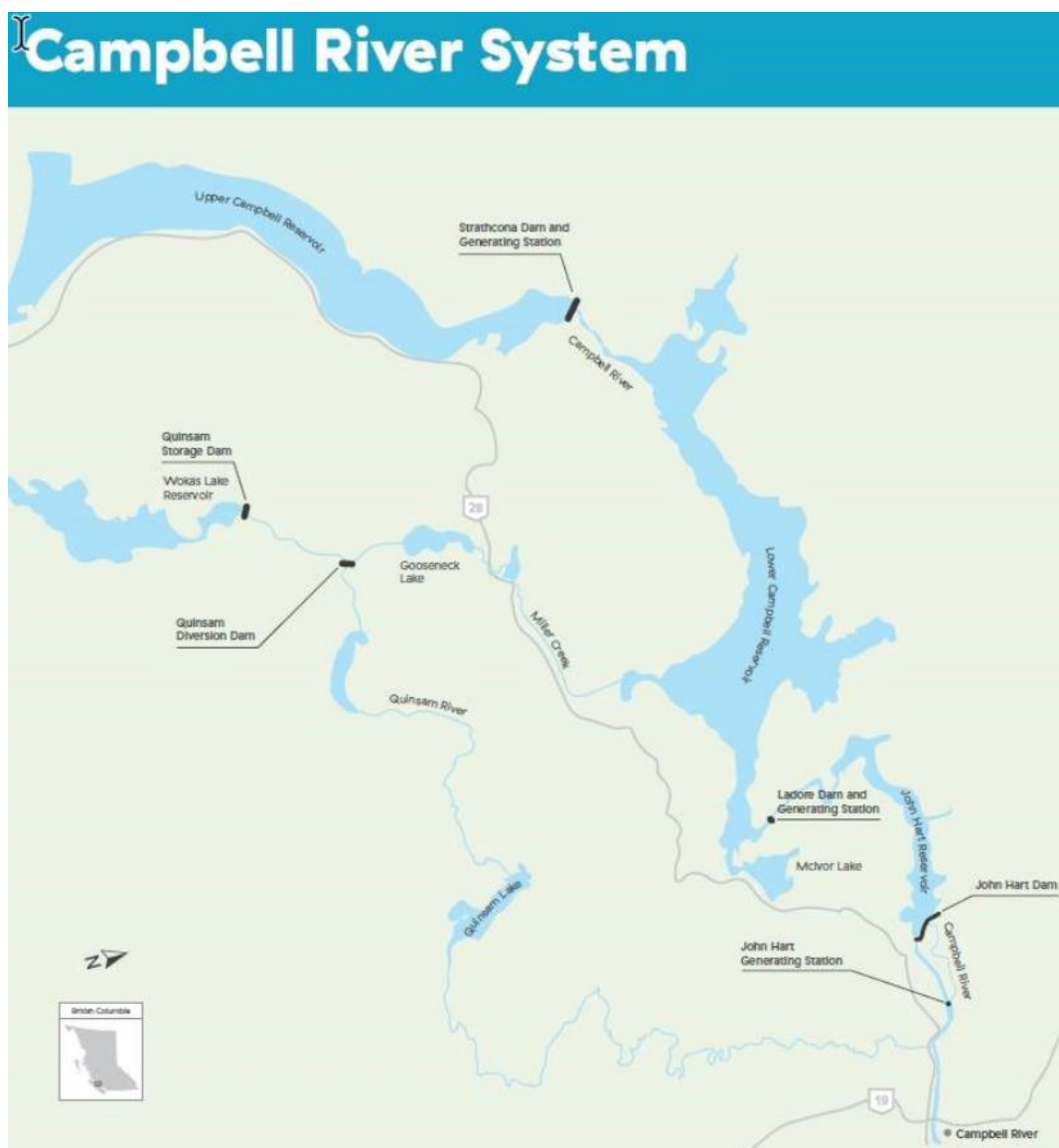
¹ Exhibit B-19, pp. 4; 13.

² Exhibit B-1, p. 2-3.

³ Ibid., p. 2-4.

⁴ Ibid., p. 2-5.

Figure 1: Map of the Campbell River System



The Campbell River System operates in a cascading configuration, requiring the Strathcona, Ladore and John Hart Facilities to remain in hydraulic balance. The Upper Campbell Reservoir, held by the Strathcona Dam, provides about 72 percent of the system's storage and is the primary facility for flood management, either storing or releasing water at controlled rates. Flows from Strathcona must pass through the Ladore Facility, which has limited storage and cannot effectively manage floods. The John Hart Reservoir is the smallest, with minimal storage and inflows, and contributes little to flood management.⁵

The Campbell River System generates an average of 1,287 gigawatt-hours (GWh) of energy annually, supplying about 10 percent of Vancouver Island's peak load.⁶ BC Hydro notes that the Campbell River System is located in one of the most seismically active regions in Canada.⁷

⁵Exhibit B-1., p. 2-7

⁶ Ibid., p. 2-3.

⁷ Ibid., p. 2-5.

BC Hydro is implementing a long-term risk reduction and phased investment strategy for the Campbell River System to ensure its safe operation for the next 50 to 75 years. Over the past two decades, BC Hydro has conducted various studies to assess the system's condition and to develop a comprehensive approach to risk reduction and investment planning.⁸ These studies identified seismic and flood control deficiencies at the Campbell River System and led to the Campbell River Systems Engineering Assessment (Campbell River System Study), completed in 2012.⁹ The Campbell River System Study supported the development of asset plans for each Facility on the system, establishing a staged investment approach to optimize risk management and guide the overall investment strategy.¹⁰

BC Hydro first presented its phased investment strategy for the Campbell River System to the BCUC in 2012 with the John Hart Generating Station Replacement Project application,¹¹ followed by the John Hart Dam Seismic Upgrade Project application in 2021. Both of those projects were accepted by the BCUC as being in the public interest.¹² BC Hydro states that the Ladore Project and Strathcona Project are a continuation of this strategy and are appropriately sequenced, further supporting BC Hydro's phased approach to addressing safety issues related to the Campbell River System which began with the two John Hart projects.¹³

BC Hydro submits that, cumulatively, these projects on its Facilities on the Campbell River System are required to address dam safety deficiencies related to their seismic withstands and water discharge capability. After an earthquake, these deficiencies could result in overtopping and failure of the Facilities' dams leading to flooding in the City of Campbell River and nearby Indigenous communities.¹⁴

1.2 Regulatory Process

By Order G-189-23 dated July 18, 2023, the BCUC established a written hearing process and a regulatory timetable. The BCUC subsequently amended the regulatory timetable.¹⁵

On May 30, 2024, BC Hydro provided an updated cost estimate for the Ladore Project and indicated it had not yet determined whether a similar cost update would be necessary for the Strathcona Project. BC Hydro requested that the BCUC proceed with the review of the Ladore Project independently and that the review of the Strathcona Project be adjourned until BC Hydro has determined whether a cost update on the latter will be necessary.¹⁶ On June 18, 2024, in accordance with BC Hydro's request the BCUC established a further regulatory process for the review of the Ladore Project and adjourned the regulatory process for the Strathcona Project.¹⁷

On October 22, 2024, the BCUC accepted the expenditure schedule for the Ladore Project as being in the public interest.

⁸ Exhibit B-1, p. 1-1.

⁹ Exhibit B-1, p. 2-24; Exhibit B-1-1, Appendix A-6-1.

¹⁰ Exhibit B-1, p. 1-1.

¹¹ Decision and Order C-2-13.

¹² Decision and Order G-107-23.

¹³ Exhibit B-1, pp. 1-1, 1-2.

¹⁴ Ibid., pp. 3-1, 8-1.

¹⁵ Orders: G-303-23 dated November 9, 2023; G-328-23 dated December 1, 2023; G-352-23 dated December 14, 2023; and G-25-24 dated January 30, 2024.

¹⁶ Exhibit B-14, pp. 1-2.

¹⁷ Order G-163-24.

The BCUC subsequently directed BC Hydro to provide updates on the status of cost information for the Strathcona Project.¹⁸ On March 27, 2025, BC Hydro stated its intent to submit updated cost information for the Strathcona Project. On April 4, 2025, the BCUC established a further regulatory process for review of the Strathcona Project. BC Hydro was directed to provide an evidentiary update for the Strathcona Project by May 30, 2025.¹⁹ On May 30, 2025, BC Hydro provided an updated cost estimate for the Strathcona Project (Updated Project Cost Estimate).

The following interveners participated in this proceeding:

- British Columbia Old Age Pensioners Association et al (BCOAPO);
- The Commercial Energy Consumers Association (the CEC); and
- Residential Consumer Intervener Association (RCIA).

1.3 Legislative and Regulatory Framework

1.3.1 Utilities Commission Act

Section 44.2(1)(b) of the UCA provides that a public utility may file an expenditure schedule with the BCUC containing a statement of capital expenditures the public utility has made or anticipates making during the period addressed by the schedule.²⁰ The BCUC must accept the expenditure schedule if the BCUC considers that making the expenditures referred to in the schedule would be in the public interest.²¹ The BCUC may also accept or reject a part of the proposed schedule.²²

Section 44.2(5.1) of the UCA further provides that in considering whether to accept an expenditure schedule filed by BC Hydro, the BCUC, in addition to considering the interests of persons in British Columbia who receive or may receive service from BC Hydro, must consider:

- a) British Columbia's energy objectives;
- b) The most recent of the following documents:
 - i. an integrated resource plan approved under section 4 of the *Clean Energy Act* before the repeal of that section;
 - ii. a long-term resource plan filed by BC Hydro under section 44.1 of the UCA;
- c) The extent to which the schedule is consistent with the requirements under section 19 of the *Clean Energy Act*; and
- d) If the schedule includes expenditures on demand-side measures, the extent to which the demand-side measures are cost-effective within the meaning prescribed by regulation, if any.

¹⁸ Order G-278-24, dated October 31, 2024, and Order G-22-25, dated February 5, 2025.

¹⁹ Order G-90-25.

²⁰ Section 44.2(1)(b) of the UCA.

²¹ Section 44.2(3) of the UCA.

²² Section 44.2(4) of the UCA.

1.3.2 Clean Energy Act

Section 2 of the *Clean Energy Act* defines British Columbia's energy objectives.²³

Section 19 of the *Clean Energy Act*, which applies to BC Hydro, addresses clean and renewable resources and provides as follows:

- 19(1) to facilitate the achievement of British Columbia's energy objective set out in section 2 (c), a person to whom this subsection applies:
- a) must pursue actions to meet the prescribed targets in relation to clean or renewable resources, and
 - b) must use the prescribed guidelines in planning for
 - i. the construction or extension of generation facilities, and
 - ii. energy purchases.

1.3.3 Guidelines

This Application engages the following BCUC guidelines:

BC Hydro's 2018 Capital Filing Guidelines

BC Hydro has submitted this Application in accordance with its 2018 Capital Filing Guidelines.²⁴ These guidelines commit BC Hydro to filing applications under section 44.2 of the UCA for capital projects that are not extensions or end-of-life facility replacements, and that have a cost estimate that exceeds \$100 million.²⁵

BCUC's Certificate of Public Convenience and Necessity (CPCN) Guidelines

The CPCN Guidelines provide general guidance regarding the information that should be included in a CPCN application and the flexibility for an application to reflect the specific circumstances of the applicant, the size and nature of the project and the issues raised by the application.²⁶

Although BC Hydro aims to follow the CPCN Guidelines when filing section 44.2 applications for BCUC acceptance of capital expenditures, BC Hydro maintains that these guidelines do not strictly apply as this Application is not a CPCN application under section 45 of the UCA.²⁷

²³ *Clean Energy Act*, section 2.

²⁴ The Panel acknowledges that at the time of the Application filing, a separate proceeding was underway to review BC Hydro's updates to the 2018 Guidelines to escalate expenditure thresholds for three types of capital projects. BC Hydro's 2024 Capital Filing Guidelines were accepted by the BCUC in Order G-218-24 on August 15, 2024.

²⁵ BCUC Order G-313-19, dated December 2, 2019.

²⁶ Appendix A to Order G-20-15, dated February 12, 2025, BCUC 2015 Certificate of Public Convenience and Necessity Guidelines (CPCN Guidelines), p. 1.

²⁷ Exhibit B-1, p. 1-32.

The BCUC's 2010 First Nations Information Filing Guidelines for Crown Utilities apply to this Application. These guidelines identify the information that must be filed by Crown Utilities (of which BC Hydro is one) to enable the BCUC to assess whether the Crown's duty to consult has been fulfilled.²⁸

1.4 Scope and Structure of Decision

The remainder of this decision reviews the Strathcona Project expenditure schedule, as follows:

- Section 2 addresses the need and justification for the Strathcona Project;
- Section 3 explores the Strathcona Project alternatives;
- Section 4 reviews the Strathcona Project description, including the scope of the project;
- Section 5 focuses on the cost of the Strathcona Project and rate impact;
- Section 6 highlights Indigenous consultation and public engagement for the project;
- Section 7 assesses the Strathcona Project's alignment with British Columbia's energy objectives, BC Hydro's long term resource plan and the *Clean Energy Act*;
- Section 8 sets out the Panel's overall determination on the Strathcona Project; and
- Section 9 details the Strathcona Project reporting requirements.

Relevant evidence and submissions from BC Hydro and the interveners are summarized in each section.

2.0 Project Need and Justification

This section reviews the need for the Strathcona Project and provides an overview of the Strathcona Facility, BC Hydro's assessment of seismic and water discharge deficiencies and the consequences of a Strathcona dam failure. BC Hydro's stated objective for the Strathcona Project is to address identified deficiencies related to the Facility's water passage capabilities and seismic withstand.²⁹

2.1 Strathcona Facility Description

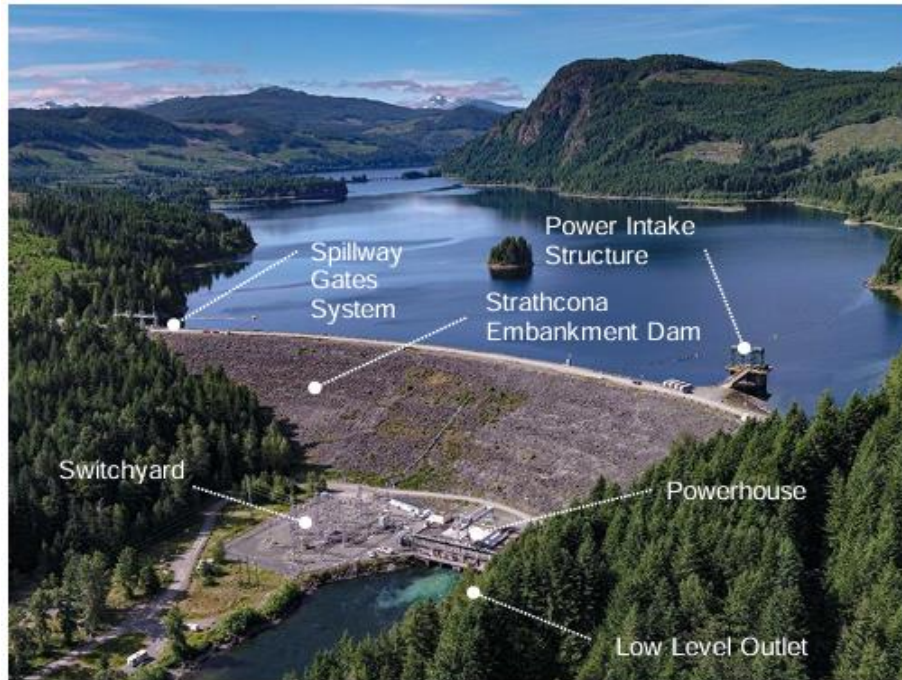
Constructed in the 1950s, the Strathcona Facility is the furthest upstream facility on BC Hydro's Campbell River System.³⁰ Figure 2 below provides an aerial photograph of the Strathcona Facility and its major components, including the Upper Campbell Reservoir.

²⁸ Appendix A to Order G-51-10, dated March 18, 2010, BCUC 2010 First Nations Information Filing Guidelines for Crown Utilities, p. 3.

²⁹ Exhibit B-1, p. 1-13.

³⁰ Ibid., p. 8-2.

Figure 2: Strathcona Facility and Upper Campbell Reservoir³¹



The Strathcona dam is a 511 metre long zoned embankment dam, which consists of three spillway gates on the right abutment (Spillway Gates System), a power intake structure, a power conduit through the dambase, two penstocks, and a low level outlet.³²

The Spillway Gates System is cut into bedrock at the right abutment and consists of three sluice bays, each with a concrete sill overflow section, a vertical lift gate, the hoist system, and the power and controls systems. The concrete spillway crest has an elevation of 214.85 to 214.88 metres, which is approximately 10.7 metres below the dam crest. Accordingly, the lowest reservoir elevation at which the Spillway Gates System can release water is 214.85 metres.³³

BC Hydro states that the Strathcona dam regulates water on the Campbell River System to maximize power generation. BC Hydro's optimization model predicts that without the Strathcona dam, total generation of the Campbell River System would decrease to somewhere between 379 to 434 gigawatt hours (GWh) per year from the current level of 1,287 GWh per year, and the dependable capacity of the Campbell River System would be reduced to 121 megawatts (MW) from the current level of 231 MW.³⁴

BC Hydro conducted an economic analysis of both the Strathcona Facility and Campbell River System, which indicated positive net present value (NPV) of \$710 million and \$1.94 billion, respectively. This analysis incorporated the Strathcona Project costs as well as planned and potential future investments in the Campbell River System. Based on this, BC Hydro submits that continued investment in the Strathcona Facility is justified and beneficial to ratepayers.³⁵

³¹ Exhibit B-1, p. 8-3.

³² Ibid., pp. 8-4 – 8-5.

³³ Ibid., p. 8-5.

³⁴ Ibid., p. 8-14.

³⁵ Exhibit B-6, BCOAPO IR 1.14.1; Exhibit B-1, p. 2-64.

BC Hydro states that in addition to its importance to the electricity supply portfolio for Vancouver Island, the Strathcona Facility also provides several reliability and environmental benefits.³⁶ More specifically, the Strathcona Facility provides voltage support to the Vancouver Island transmission system, and the Strathcona Facility is included in BC Hydro's planning for system reliability.³⁷ Further, BC Hydro states that the operating strategy for the Campbell River System is built around utilization of the active storage within the Upper Campbell Reservoir and without the Strathcona Dam, BC Hydro would not be able to operate the system within the operating parameters specified in its water use plan. BC Hydro's modelling found that without the Strathcona Dam, the water level in the Lower Campbell Reservoir would often drop below its lowest level, spills and flood control risks at the John Hart Dam would increase, and minimum river flows would be more difficult to maintain.³⁸ Consequently, recreational users of the reservoir and fish and aquatic species would be impacted, and the flood withstand of the Campbell River System would decrease to an unacceptable level.³⁹

2.2 BC Hydro's Assessment of Seismic and Water Discharge Deficiencies

As discussed in Section 1.1, BC Hydro's studies identified safety deficiencies related to seismic withstand and water discharge capability at the Campbell River System, including the Strathcona Facility. BC Hydro states that these deficiencies must be addressed to meet its safety obligations under the *Dam Safety Regulation*.⁴⁰ The *Dam Safety Regulation* requires that all dams in the province be classified in different categories based on their size, hazard potential and downstream impact. The classification system is used to determine the level of safety required and to ensure appropriate safety measures are in place for each dam. In 2011, the Comptroller of Water Rights⁴¹ revised the classification of the Strathcona Dam to an 'extreme consequence' dam, meaning that in the event of dam failure the population at risk is more than 100 persons, and there is potential for major environmental impacts and extremely high economic and infrastructure impacts.⁴²

2.2.1 Seismic Deficiencies

Both BC Hydro and the Comptroller of Water Rights primarily refer to the Canadian Dam Association's Dam Safety Guidelines⁴³ to determine what constitutes the exercise of reasonable care as required by the *Dam Safety Regulation*. The Dam Safety Guidelines recommend that a dam and all its major components should be able to withstand a certain level of seismic event without uncontrolled release of the reservoir, based on the consequence classification of the dam. The Dam Safety Guidelines establish that an extreme consequence dam, such as Strathcona, including all its major components, should be able to withstand ground motions that are expected to occur at the dam site, on average, once every 10,000 years. This frequency is referred to as the acceptable seismic withstand performance under a Maximum Design Earthquake event for the dam.⁴⁴

BC Hydro conducted several engineering studies at the Strathcona Facility to assess seismic deficiencies and spillway gates system operational reliability in controlling reservoir levels, identifying where components fall short of the Maximum Design Earthquake.⁴⁵ Table 1 below shows all major components at the Strathcona

³⁶ Exhibit B-1, p. 8-12.

³⁷ Ibid.

³⁸ Ibid., pp. 8-14 - 8-15.

³⁹ Ibid., pp. 8-15 - 8-16.

⁴⁰ BC Regulation 40/2016, issued under the *Water Sustainability Act*, SBC 2014, c 15.

⁴¹ The government agency responsible for administering the *Dam Safety Regulation*

⁴² Exhibit B-1, p. 2-11.

⁴³ Canadian Dam Association, *Dam Safety Guidelines 2007 (Revised 2013)*: <https://cda.ca/publications/cda-guidance-documents/dam-safety-publications>

⁴⁴ Exhibit B-1, pp. 2-12 – 2-13.

⁴⁵ Ibid., pp. 8-17 – 8-18.

Facility that have seismic deficiencies, as none meet the 1/10,000 annual frequency standard for Maximum Design Earthquake, and lists BC Hydro's proposed actions to address them.⁴⁶

Table 1: Seismically Deficient Components at the Strathcona Facility⁴⁷

Strathcona Facility Component	Current Seismic Withstand (Annual Exceedance Frequency)	Planned Action
Spillway Gates	1/1,100	Included in scope of Strathcona Project, to withstand the Maximum Design Earthquake
Spillway Gates Hoist Tower	1/4,500	Included in scope of Strathcona Project, to withstand the Maximum Design Earthquake
Spillway Gates Power and Controls	1/700 with interim upgrade	Included in scope of Strathcona Project, to withstand the Maximum Design Earthquake
Intake Tower	1/900 with interim upgrade	May be decommissioned as component of potential future project
Power Conduit ²³	1/900	May be decommissioned as component of potential future project.
Powerhouse	Powerhouse roof and upstream wall could collapse during or after a seismic event	May be decommissioned as component of potential future project.
Embankment Dam	Potential safety issues related to the post-earthquake performance of the Strathcona embankment dam have been identified.	Low level outlet will mitigate the dam safety risk while a multi-year deficiency investigation is underway to sample, test, and characterize the Dam's fill materials to determine the seismic withstand of the Strathcona Dam and the need for future potential upgrades.

As shown in Table 1 the decommissioning of the existing intake tower, power conduit and powerhouse, are future project elements, and are needed to address the dam safety risks of the existing infrastructure at the Strathcona Facility. However, these are outside the scope of the Strathcona Project pending further investigations which may identify other alternatives and a different preferred solution to address those risks.⁴⁸

BC Hydro also notes that the potential earthquake safety issues with the Strathcona embankment dam, identified in Table 1 above, are under review through a multi-year deficiency investigation to assess the dam's robustness and determine where future upgrades are needed.⁴⁹ Until then, the low level outlet that will be provided as part of the Strathcona Project will mitigate the dam safety risk.⁵⁰ Any decision to pursue future risk mitigation improvements at the Strathcona Facility would follow BC Hydro's capital planning prioritization process.⁵¹

⁴⁶ The "seismic withstand" of a component is the Annual Exceedance Frequency associated with the magnitude of an earthquake that the component is able to endure.

⁴⁷ Exhibit B-1, p. 8-19.

⁴⁸ Exhibit B-4, BCUC IR 1.24.2.

⁴⁹ Exhibit B-1, p. 8-22.

⁵⁰ Exhibit B-4, BCUC IR 1.24.2

⁵¹ Ibid., BCUC IR 1.3.3.

2.2.2 Water Discharge Deficiencies

From the studies undertaken to date, BC Hydro has determined that the Strathcona Facility currently has limited water discharge capability based on the current configuration and condition of the existing low level outlet, the Spillway Gates System and the power conduit.⁵² BC Hydro's assessment of the performance of these three water discharge components following a strong earthquake is provided below:

1. The existing low level outlet is susceptible to damage caused by excessive vibrations at high flow rates. To reduce the potential for damage, the discharge capacity of the low level outlet has an operational limit of 60 percent opening, resulting in a maximum discharge capacity of 80 cubic metres per second.⁵³ BC Hydro states that in contrast, a discharge rate of more than 600 cubic metres per second is required to meet the safe maximum drawdown time of 30 days. Accordingly, the existing low level outlet does not have sufficient capacity to undertake a rapid reservoir drawdown, as would be necessary during flood conditions or following a strong earthquake.⁵⁴ The new low level outlet proposed by the Strathcona Project will mitigate the seismic risk by allowing for controlled discharge and deep drawdown of the Upper Campbell Reservoir in the event of damage after an earthquake, which will enable subsequent inspection and repairs to be carried out.⁵⁵
2. Certain components of the Strathcona Spillway Gates System are deficient and may undergo unacceptable deformation or failure during an earthquake making the spillway inoperable.⁵⁶ The Strathcona Project will further mitigate seismic risk by removing the deficient spillway gates and stabilizing the spillway piers.
3. The power conduit in the dam core is a weak point, in particular where it runs adjacent to dam core material. As such, seismic-caused deformations could cause internal erosion leading to piping failure and seepage through the dam. BC Hydro is considering future decommissioning of the power conduit to address the seismic risk.⁵⁷ Since the power conduit currently provides water to both the powerhouse and the existing low level outlet, decommissioning the power conduit would leave no means to discharge water from the Upper Campbell Reservoir when the reservoir elevation is below the spillway sill elevation. BC Hydro explains that an alternative means to discharge water from the Upper Campbell Reservoir (i.e. the new low level outlet referenced above) is required before proceeding with the potential decommissioning of the seismically deficient power conduit.⁵⁸ While the Strathcona Project will not improve the seismic withstand of the power conduit, the new low level outlet will reduce the overall seismic risk and facilitate potential future projects to further mitigate that risk.⁵⁹

In short, the lack of water discharge capability at the Strathcona facility could limit BC Hydro's ability to discharge water from the Upper Campbell Reservoir following an earthquake. BC Hydro therefore submits that it is a priority to provide an alternative means to discharge water from the Upper Campbell Reservoir.⁶⁰ The Strathcona Project is designed to do this.

⁵² Exhibit B-1, p. 8-23.

⁵³ Ibid., p. 8-9.

⁵⁴ Ibid., p. 8-23.

⁵⁵ Exhibit B-4, BCUC IR 1.24.2.

⁵⁶ Exhibit B-1, p. 8-19.

⁵⁷ Ibid., p. 8-21.

⁵⁸ Ibid., p. 8-21.

⁵⁹ Exhibit B-4, BCUC IRs 1.24.1, 1.24.2.

⁶⁰ Exhibit B-1, p. 8-25.

In addition to these water discharge concerns associated with seismic withstand issues, BC Hydro has conducted a reliability assessment of the Spillway Gates System, which also identified concerns with their reliability under normal operating conditions. While BC Hydro has implemented interim measures to address the most critical operational reliability deficiencies with the Spillway Gates System, the Strathcona Project is required to address the remaining operational deficiencies.⁶¹

2.3 Consequences of Failure at the Strathcona Dam

Flood simulation and inundation modelling indicate that failure of the Strathcona dam would lead to overtopping of the downstream Ladore dam and subsequent failure of the John Hart dam, flooding in the City of Campbell River and Indigenous communities, with a potential for loss of life along with long-term adverse environmental and economic impacts.⁶²

In the worst-case earthquake scenario, the modelling predicts that failure of the Strathcona dam would cause a cascade of dam failures in the Campbell River System with a peak flow of about 32,000 cubic metres per second at the Highway 19 bridge in the City of Campbell River and would place approximately 5,200 persons at risk. Most affected areas would be flooded within about three hours from the start of the Strathcona dam failure. In addition to the risk of loss of life, BC Hydro states that an uncontrolled release could adversely impact downstream fish habitat and damage components of Campbell River's drinking water system.⁶³

BC Hydro submits that it is in the public interest to address the dam safety risks of the Strathcona Facility and the risks they pose to the public. BC Hydro maintains that as the owner of the Strathcona dam, which is classified as an extreme consequence dam, it must meet its obligations as a dam owner and exercise a duty of care in its ownership and operation, including addressing the known dam safety risks.⁶⁴

According to BC Hydro, the objectives of the Strathcona Project are to:⁶⁵

- i. Provide deep drawdown capability of the Upper Campbell Reservoir via the low level outlet to mitigate potential dam safety risks associated with seismic withstand;
- ii. Mitigate dam safety risks associated with the insufficient operational reliability and seismic withstand of the existing Strathcona Spillway Gates System; and
- iii. Enable potential future projects at the Strathcona Facility.

Positions of the Parties

BCOAPO agrees with BC Hydro that continued investment in the Campbell River System and the Strathcona Facility is justified and beneficial to ratepayers, and that there is a need to address the seismic and water discharge deficiencies.⁶⁶

Similarly, the CEC accepts that BC Hydro must address the known deficiencies at the Strathcona Facility to meet its obligations as a dam owner and to exercise a duty of care in relation to its ownership and operation of the

⁶¹ Ibid., p. 8-20.

⁶² Exhibit B-1, p. 8-25.

⁶³ Ibid., pp. 8-25 – 8-26.

⁶⁴ BC Hydro Final Argument on the Strathcona Project, p. 19.

⁶⁵ Exhibit B-1, p. 8-26; BC Hydro Final Argument on the Strathcona Project, p. 27.

⁶⁶ BCOAPO Final Argument on the Strathcona Project, pp. 7, 9.

Strathcona dam.⁶⁷ The CEC also further accepts that reinvestment in the Campbell River System is appropriate given the significant value of the system to BC Hydro and its ratepayers.⁶⁸

Like the CEC and BCOAPO, RCIA acknowledges the necessity of the Strathcona Project, but remains concerned with BC Hydro's approach to overall investment planning. RCIA submits that treating each facility upgrade in isolation has led to individual project rationales that fail to consider the system and project economics as a whole and without a unified system-wide view, it becomes questionable whether the aggregate known spending on the Campbell River System is justified by the value the system delivers to ratepayers. RCIA therefore recommends that the BCUC direct BC Hydro to present future capital project applications for integrated systems such as the Campbell River System with accompanying system-wide analysis, rather than relying on individual, project-specific justifications.⁶⁹

In response, BC Hydro submits that RCIA's recommendation should be dismissed because it had been raised and rejected in the John Hart Dam Seismic Upgrade proceeding.⁷⁰ BC Hydro suggests that, consistent with its previous decision, the BCUC should be reluctant to prescribe how and when BC Hydro should file applications related to integrated systems like the Campbell River System. BC Hydro further submits that RCIA exhibits a fundamental misunderstanding of BC Hydro's Dam Safety Program and its risk reduction and investment strategy for the facilities on the Campbell River System. BC Hydro states that it sequenced the projects on the Campbell River System based on the greatest overall reduction of dam safety risk, a strategy which the BCUC accepted in its decision on the John Hart Dam Seismic Upgrade Project.⁷¹

Panel Determination

The Panel finds that it is in the public interest for BC Hydro, as the owner and operator of an extreme consequence dam, to address the dam safety risks of the Strathcona Facility arising from its seismic and water discharge deficiencies. The Panel notes the potential severe consequences of failure of the Strathcona dam which, in the worst case earthquake scenario, would cause a cascade of dam failures in the Campbell River System and would place approximately 5,200 persons at risk. In addition to the risk of loss of life, BC Hydro has stated that an uncontrolled release could adversely impact downstream fish habitat and damage components of Campbell River's drinking water system. The Panel considers that in light of the known risks and the severity of the consequences, BC Hydro must take appropriate steps to address those risks. Additionally, all interveners acknowledge the need for the Strathcona Project to address known deficiencies at the Strathcona Facility.

The Panel notes the evidence states that the current low level outlet's drawdown rate is insufficient at 80 cubic metres per second, and is less than the 600 cubic metres per second required during flood conditions. The evidence also indicates BC Hydro's ability to pass water via the spillway is limited due to a spillway sill level of 214.85 metres, causing reliance on water passage through the low level outlet or through the generating units only. BC Hydro further notes that none of the Strathcona Facility components meet the 1/10,000 annual frequency standard for Maximum Design Earthquake for an extreme consequence dam. The Panel acknowledges, however, that while the Strathcona Project will mitigate certain risks it does not address all known seismic withstand deficiencies at the Facility, and future projects may be required as identified in Table 1 in Section 2.2.1, which will first require an alternative point of discharge from the Upper Campbell Reservoir, as provided by the new low level outlet in the Strathcona Project.

⁶⁷ CEC Final Argument on the Strathcona Project, p. 12.

⁶⁸ *Ibid.*, p. 14.

⁶⁹ RCIA Final Argument on the Strathcona Project, pp. 6-13.

⁷⁰ Decision and Order G-107-23, p. 14.

⁷¹ BC Hydro Reply Argument on the Strathcona Project, pp. 5-6.

The Panel notes that over the past two decades, BC Hydro has, in accordance with BC's *Dam Safety Regulation* and Canada's Dam Safety Guidelines, conducted various studies to assess the system's extreme consequence condition. These efforts have culminated in BC Hydro's phased investment strategy for the Campbell River System as a whole, starting with the two projects for remediation of the John Hart facility, followed by the Ladore and Strathcona Projects. As noted earlier, the BCUC accepted this approach in its decision on the John Hart Dam Seismic Upgrade Project.⁷² The Strathcona Project is a continuation of that strategy. Furthermore, these projects are consistent with the requirements of BC Hydro's Dam Safety Program and its risk reduction and investment strategy for BC Hydro's Facilities on the Campbell River System. Therefore, we find no merit in RCIA's concern about BC Hydro treating each Facility upgrade in isolation and failing to consider the system and project economics as a whole. In addition, BC Hydro has been transparent about the possibility that further investments in the system may be warranted depending on the outcome of additional investigations.

As for the RCIA's recommendation that the BCUC direct BC Hydro to present future capital project applications for integrated systems such as the Campbell River System with accompanying system-wide analysis, rather than relying on individual, project-specific justifications, the BCUC has previously rejected that recommendation in its decision on the John Hart Dam Seismic Upgrade proceeding. This phased approach is also consistent with BC Hydro's analyses in the Campbell River System Study, completed in 2012, which identified the long-term strategy for reducing risk to and investing in the Campbell River System. We further consider there is no need to be prescriptive about the manner and timing of BC Hydro's applications related to integrated systems like the Campbell River System. As owner and operator of its many facilities, BC Hydro, along with its experts, is best suited to assess the need for further capital expenditures for the continued safe and reliable operation of its facilities, subject to the BCUC's continuing oversight.

3.0 Evaluation of Alternatives

As discussed in Section 2.3, the objectives for the Strathcona Project are as follows:⁷³

- i. Provide deep drawdown capability of the Upper Campbell Reservoir via the low level outlet to mitigate potential dam safety risks associated with seismic withstand;
- ii. Mitigate dam safety risks associated with the insufficient operational reliability and seismic withstand of the existing Strathcona Spillway Gates System; and
- iii. Enable potential future projects at the Strathcona Facility.

BC Hydro states that it considered several upgrade options for the Strathcona Facility to address these deficiencies and to mitigate the dam safety risks over the short and long term, including:⁷⁴

- Installing a new low level outlet;
- Upgrading the existing Strathcona Spillway Gates System;
- Upgrading the Strathcona dam; and
- Decommissioning the Strathcona power conduit and powerhouse.

To determine the optimal sequencing of the upgrade options, BC Hydro explains that it undertook a Potential Failure Modes Analysis which examined the failure modes of the Strathcona dam. Through this analysis, BC Hydro determined that a new low level outlet would mitigate most of the failure modes compared to the other upgrade options and therefore should be implemented first.⁷⁵

⁷² Order G-107-23, p. 14.

⁷³ Exhibit B-1, p. 8-26.

⁷⁴ Ibid., pp. 9-3 – 9-4.

⁷⁵ Ibid., pp. 9-4.

BC Hydro states that, given the capacity of a new low level outlet, maintaining the existing Spillway Gates System in its current configuration is not required to provide discharge capacity. Therefore, BC Hydro explains that the Spillway Gates System can be converted to a simplified, more efficient design while also addressing its seismic and reliability deficiencies.⁷⁶

BC Hydro states that the combined discharge capability of the new low level outlet and an upgraded Spillway Gates System will ensure that water can be released from the Upper Campbell Reservoir to avoid failure of the dam and maintain flow continuity downstream. BC Hydro notes that it is continuing to study the seismic deficiencies of the Strathcona dam and these studies will inform future decisions and potential projects regarding the other upgrade options considered.⁷⁷

The following sections discuss the project design alternatives and decision making process that BC Hydro applied to select the preferred design for both the low level outlet and the upgraded Spillway Gates System.

3.1 Project Design Alternatives

BC Hydro states that given the large flow capacity required for the new low level outlet to achieve the required reservoir drawdown, as well as the need to address deficiencies with the Spillway Gates System and power conduit, it investigated the practicality of having a combined function low level outlet. BC Hydro notes that the overall cost of the necessary upgrades to the Strathcona Facility could be reduced with a new low level outlet that serves multiple functions.⁷⁸ As such, BC Hydro identified four possible design options for the new low level outlet:⁷⁹

- Option A: Construct a standalone new low level outlet designed for emergency drawdown only (deep drawdown function only). Under this option, the spillway function would remain separate from the new low level outlet and seismic upgrades to the existing Spillway Gates System would be required. A new power conduit, which may be included in the scope of a future project, would have a separate intake from the new low level outlet;
- Option B: Construct a new low level outlet designed to be combined with a future power conduit (deep drawdown function combined with power conduit function). The new low level outlet and power conduit would share an intake structure and the initial portion of the low level outlet tunnel. This option requires an additional flow control point at the bifurcation, where water would be diverted to the powerhouse. Under this option, the spillway function remains separate from the new low level outlet, and seismic upgrades to the existing Spillway Gates System would be required;
- Option C: Construct a new low level outlet, designed to provide flood discharge functions (deep drawdown combined with spillway function). The existing Spillway Gates System would be converted to a free overflow spillway and would act as a separate, passive flow control point. A future power conduit would have a separate intake from the new low level outlet; and
- Option D: Construct a new low level outlet with combined deep drawdown, flood discharge and power conduit functions (deep drawdown function combined with spillway and power conduit functions), and undertake seismic upgrades of the Spillway Gates System.

BC Hydro states that Option D was dismissed and not evaluated further as using only the new low level outlet to provide deep drawdown, spillway and power conduit functions would provide no discharge redundancy,

⁷⁶ Ibid., p. 9-5.

⁷⁷ Exhibit B-1, p. 9-5.

⁷⁸ Ibid., p. 9-7.

⁷⁹ Ibid., pp. 9-7 – 9-8.

meaning that if the new low level outlet were to fail there would be no means to discharge water from the Upper Campbell Reservoir. Additionally, Option D did not meet the project objective of enabling potential future projects at the Strathcona Facility.⁸⁰

3.2 Decision Making Process

BC Hydro developed a decision framework that used some concepts and principles similar to its Structured Decision Making process used in other capital projects to inform the decision making on the above design alternatives. BC Hydro states that its evaluation was undertaken by BC Hydro subject matter experts with input from Kohn Crippen Berger + Hatch (KCB+H), and the selected options were reviewed by BC Hydro's Dam Safety Advisory Board.⁸¹ Table 2 below summarizes the evaluation criteria and accompanying considerations used by BC Hydro to inform the selection of the preferred design alternative.⁸² BC Hydro notes that input was sought from subject matter experts including BC Hydro engineers and KCB+H engineers to define the considerations.⁸³

Table 2: Design Alternative Evaluation Criteria

Criteria	Considerations
Minimize Public Safety Risk	- How well does the option meet the design objective/technical requirements? - Is the option reliable and will it perform consistently under the design scenario? - Can the option perform as intended if some key design assumptions change or under scenarios that may exceed the expected operating conditions?
Minimize Cost	- What Is the expected scope of the project? - What are the direct construction costs?
Minimize Cost Risk	- Is the option constructable? - Does it present any special construction challenges? - Are there significant construction safety risks? - What are the life cycle maintenance requirements? - What amount of inspection and testing is required? - Does the option have the ability to respond to unexpected loading scenarios that may occur, without requiring additional investment?

BC Hydro explains that criteria such as environmental and social impacts were also considered but the evaluation outcomes were not materially different between the design options. Therefore, these potential impacts did not influence the final design decision.⁸⁴

⁸⁰ Ibid., pp. 9-8 – 9-9.

⁸¹ Exhibit B-1, p. 9-6.

⁸² Ibid., p. 9-6.

⁸³ Exhibit B-4, BCUC IR 1.25.1.

⁸⁴ Ibid., BCUC IR 1.25.1.1.

3.3 Selection of Preferred Design Alternative

BC Hydro evaluated the ability of each option to meet the criteria outlined in its decision framework. The evaluation results informed BC Hydro's decision regarding the preferred design option.⁸⁵

With respect to the Minimize Public Safety Risk criterion, BC Hydro found that all design options meet the technical requirements for power generation, flood control, and provide deep drawdown in response to a seismic event. Additionally, BC Hydro determined that Option C would be the most reliable as it would be operated frequently for flood discharge, allowing potential operational issues to be identified and addressed sooner, and would require the least intervention to operate as a free overflow spillway eliminates a flow control point that would otherwise require manual intervention.⁸⁶ As such, BC Hydro determined Option C to be the best option to meet the Minimize Public Safety Risk criterion.⁸⁷

Considering the Minimize Cost criterion, BC Hydro compared the direct construction costs of upgrading the existing Spillway Gates System to those of converting the spillway to a free overflow spillway. Costs to construct a new low level outlet were not included as this scope was common to all options. Through this analysis, BC Hydro determined that Option C has the lowest direct construction costs and represents significant savings as compared to Options A and B.⁸⁸

With respect to the Minimize Cost Risk criterion, BC Hydro compared the options based on criteria that could result in higher or lower overall total costs, including constructability, expected maintenance requirements, and responsiveness to unexpected operational scenarios without requiring additional investment. BC Hydro states that Option C resulted in significant cost savings by simplifying the spillway upgrade, providing increased reliability of the flood discharge, and reducing long-term maintenance requirements of mechanical components. As such, Option C was determined to be the best option to meet the Minimize Cost Risk criterion.⁸⁹

In summary, BC Hydro submits its preferred design, Option C, fulfils the objectives of the Strathcona Project and maximizes public safety, minimizes project cost, and is comparable with the other design options for minimizing cost risk.⁹⁰

Positions of the Parties

BCOAPO agrees that the only feasible alternative is to make investments to the Strathcona Dam to mitigate and/or address the identified deficiencies.⁹¹

The CEC recommends that the BCUC find that Option C is the appropriate alternative for BC Hydro to pursue.⁹² However, the CEC recommends that BC Hydro be required to provide quantitative analysis of options and values in future Campbell River System and capital project applications, arguing that quantified thresholds improve transparency and enable more rigorous review.⁹³

⁸⁵ Exhibit B-1, p. 9-9.

⁸⁶ Exhibit B-1, pp. 9-12 – 9-13.

⁸⁷ Ibid., pp. 9-10 – 9-11.

⁸⁸ Ibid., pp. 9-14 – 9-15.

⁸⁹ Ibid., pp. 9-15 – 9-16.

⁹⁰ BC Hydro Final Argument on the Strathcona Project, p. 35.

⁹¹ BCOAPO Final Argument on the Strathcona Project, p. 10.

⁹² CEC Final Argument on the Strathcona Project, p. 14.

⁹³ Ibid., p. 17

BC Hydro argues that the CEC's recommendation for mandatory quantitative analysis in all future project applications is unnecessary, noting the BCUC has already addressed this issue in the Ladore Project decision. It submits that qualitative analysis, as used in the Strathcona and Ladore Projects, was sufficient to identify a preferred design and allowed interveners to test that choice.⁹⁴

Panel Determination

The Panel finds BC Hydro's decision making process and selection of Option C, construction of a new low level outlet and a free overflow spillway, to be reasonable. The Panel notes that the preferred alternative performed best on all three Project evaluation criteria.

While the CEC criticizes the lack of quantifiable measures in BC Hydro's decision making process in this case, the Panel accepts that not all relevant criteria can be objectively measured or quantified. This is particularly so in respect of projects that are driven primarily by the need to address public safety risks, like the Strathcona Project. The Panel considers that ultimately, project evaluation involves both art and science and requires informed judgement, experience and analysis, and not simply the rote application of quantifiable inputs.

We note that BC Hydro's proposal to adopt Option C is supported by expert consultants and reviewed by the Dam Safety Advisory Board, strengthening our confidence in the chosen alternative. We further note that BC Hydro's Structured Decision Making methodology has been thoroughly tested in previous BCUC proceedings, has been consistently applied by BC Hydro across its major projects and generally accepted by other utilities in Canada. Accordingly, we find that no directives are needed with respect to its application by BC Hydro in future proceedings.

4.0 Project Description

The Strathcona Project scope will install a new low level outlet to provide the capability for deep water draw down of the Upper Campbell Reservoir and convert the existing spillway to a free flow overflow spillway.⁹⁵

BC Hydro states that the new low level outlet components include the following:⁹⁶

- Inlet channel, including excavation and stabilization of soil and bedrock slopes;
- Concrete intake structure, including gate openings, trash struts to prevent debris jamming and allow access for maintenance;
- Outlet channel connected with the existing spillway channel;
- Two vertical operating lift gates and one maintenance gate for isolating each operating gate;
- A hoist building atop the intake structure, housing mechanical and electrical equipment and a bridge crane;
- Four ancillary buildings for gate control and power equipment;
- Electrical power and control systems and telecommunications equipment for gate control and power supply, communications and security;
- Erosion protection of a soil slope that is present in the existing spillway channel; and

⁹⁴ BC Hydro Reply Argument on the Strathcona Project, pp. 12 – 13.

⁹⁵ Exhibit B-1, p. 10-1.

⁹⁶ Ibid., pp. 10-3 – 10-4.

- Road relocations and new access across the new low level outlet channel.

The scope of the spillway conversion will include stabilization of the spillway piers, all of which will be designed to withstand the Maximum Design Earthquake. The key spillway design features include:⁹⁷

- Removal of the existing spillway gates and screw-stem hoists, and construction of a free flow overflow spillway;
- Anchoring of spillway pier No. 1 to minimize the potential for any opening between the core of the Strathcona dam and the pier; and
- Buttressing the retaining wall upstream of spillway pier No. 1 to prevent excessive deformation of the embankment dam.

BC Hydro submits that the Strathcona Project will be constructed to meet the following technical and safety requirements:⁹⁸

- Seismic withstand of a Maximum Design Earthquake corresponding to a seismic event with an Annual Exceedance Frequency of 1/10,000;
- The combined discharge from the low-level outlet and spillway will be limited to the Ladore dam's capacity of 1,735 cubic metres per second;
- A design life of 75 years for the large civil components, 50 years for major mechanical and electrical equipment and 25 years for the electrical and instrumentation systems; and
- Gate reliability designed in accordance with BC Hydro's Gate Reliability Guidelines which stress redundancy and segregation.

4.1 Project Schedule

BC Hydro submits that the schedule for the Strathcona Project was developed targeting an in-service date of October 2028, with project activities, including the final project completion report, to be completed by July 2029.⁹⁹ BC Hydro subsequently filed an updated project schedule based on the selected bid received in response to the request for proposals for the civil contract and updated schedule risk analysis. The updated schedule moves the in-service date back by 19 months to May 2030 and the project completion date to February 2031.¹⁰⁰

⁹⁷ Ibid., p. 10-10.

⁹⁸ Exhibit B-1, pp. 10-15 – 10-16.

⁹⁹ Ibid., p. 10-22.

¹⁰⁰ Exhibit B-19, p. 13.

Table 3 below shows the key project schedule milestones.

Table 3: Updated Strathcona Project Schedule Milestones¹⁰¹

Component	Target Milestone from Application (Table 10-1)	Updated Target Milestone
BCUC Application Filed	June 2023	June 2023 (Strathcona Project Cost Estimate Update filed May 30, 2025)
BCUC Decision on the Application	June 2024	Fall 2025
Definition Phase Complete / BC Hydro Board Authorization to Proceed to Implementation Phase	August 2024	September 2025
New Low Level Outlet In-Service	November 2027	October 2029
Free Flow Overflow Spillway In-Service (Project In-Service Date)	October 2028	May 2030
Strathcona Project Completion and Evaluation Report Accepted by Board of Directors	July 2029	February 2031
Strathcona Project Closure	October 2029	May 2031

4.2 Procurement Approach

BC Hydro identified design and construction as key elements of its procurement strategy and follows a Design-Bid-Build development method for the Strathcona Project.¹⁰² In addition to the Design-Bid-Build development method, BC Hydro has implemented an early contractor involvement (ECI) process for the project's construction contract. With the early contractor involvement process, BC Hydro is seeking to incorporate industry expertise and directly involve the contractor to jointly identify risks, establish risk allocation/treatment plans, confirm pricing structures, finalize the work schedule through detailed construction planning including emergency response planning, construction methodology, logistics and other considerations.¹⁰³

BC Hydro states that it received two proposals from its Request for Proposals (RFP) for the Strathcona Project, both of which requested and were granted extensions to the RFP closing date due to the complexity of the Project scope involving multiple subcontractors.¹⁰⁴ BC Hydro ultimately awarded the construction contract to Flatiron Constructors Canada Limited.¹⁰⁵

4.3 Risk and Risk Management

BC Hydro states that its project management practices dictate that risks and the associated risk treatments have and will be identified, analyzed, monitored and reviewed over the life of the Strathcona Project.¹⁰⁶

¹⁰¹ Ibid.

¹⁰² Exhibit B-6, CEC IR 1.26.1; Exhibit B-8, BCUC IR 42.2.

¹⁰³ Exhibit B-1, pp. 10-26 – 10-27.

¹⁰⁴ Exhibit B-21, CEC IRs 57 series.

¹⁰⁵ Exhibit B-20, BCUC IR 52.2.1; 52.1;

¹⁰⁶ Exhibit B-1, p.12-1.

BC Hydro has identified two material risks to safety of workers and the public during construction. The risks include an uncontrolled release of water through the spillway or damage to the in-construction works caused by a flood or earthquake during construction and a fall from heights or working in confined spaces due to the nature of construction activities. Following risk treatment, BC Hydro has determined that the residual risk probabilities are reduced to very unlikely.¹⁰⁷

BC Hydro has identified one material risk related to delays in obtaining water licencing conditions prior to construction of the Strathcona Project. Due to the requirement of BC Hydro's Conditional Water Licence, BC Hydro must obtain a Leave to Commence Construction (LCC) from the Comptroller of Water Rights. BC Hydro has determined that the residual risk probability after the implementation of mitigation measures, is reduced to "remote-may occur".¹⁰⁸

BC Hydro has identified one material risk related to the Strathcona Project's schedule, which is associated with the Upper Campbell Reservoir water levels. Due to higher-than-expected inflows and reservoir operation requirements, a risk exists that the Upper Campbell Reservoir water level may not be low enough to complete the spillway buttress and retaining wall, postponing work for a season. BC Hydro's risk treatment will include: developing a construction methodology to allow for quickly completing work during suitable reservoir conditions, developing a contingency plan with a higher coffer dam if required and ensuring flexibility on the contractor schedule to take advantage of suitable reservoir conditions. BC Hydro has determined that the residual risk probability, following these mitigation measures, is reduced to possible.¹⁰⁹

BC Hydro has identified one material risk related to Strathcona Project cost associated with the bedrock depth. If bedrock is at a shallower depth than expected, there is a risk the silt curtain at the rock spoil area requires piles, resulting in increased costs. BC Hydro's risk treatment will include conducting field investigations to determine the bedrock elevation. BC Hydro has determined that the residual risk probability, following these mitigation measures, is reduced to fairly likely.¹¹⁰

BC Hydro has identified three material risks related to cost and schedule associated with the Strathcona Project. The risks include: geotechnical risk relating to the unpredictable nature of the soil and bedrock, environmental or existing structure damage during blasting and delays of the delivery of long-lead time equipment. BC Hydro's risk treatment will include: performing site investigations including the completion of drill holes test pits and bedrock surface mapping to confirm the bedrock depth, contractual requirements including vibration limits and blast monitoring and mitigations, engaging a blasting expert to review the submittals from the contractor if necessary and undertaking an Early Contractor Involvement (ECI) process during contract execution. Thereafter, the residual risk probabilities for the three cost and schedule material risks will be as follows: each of the geotechnical risk is mitigated to a probability of possible, environmental or existing structure damage risk during blasting is mitigated to a probability of very unlikely, and the delivery delay risk for long-lead time equipment is mitigated to a probability of possible.¹¹¹

Positions of the Parties

The CEC considers BC Hydro's details on the preferred design and risk analysis to be comprehensive, supports the ECI process and its benefits, and recommends that the BCUC accept the proposed design.¹¹² However, the CEC seeks clarity on whether contractor-requested extensions to the RFP process and the proposed work

¹⁰⁷ Exhibit B-1, pp. 12-14 – 12-16; Exhibit B-20, BCUC IR 51.1.

¹⁰⁸ Exhibit B-1, pp. 12-16 – 12-18; Exhibit B-20, BCUC IR 51.1.

¹⁰⁹ Exhibit B-20, BCUC IR 51.1.

¹¹⁰ Exhibit B-20, BCUC IR 51.1.

¹¹¹ Exhibit B-1, pp. 12-18 – 12-20; pp. 12-20 – 12-21; pp. 12-21 – 12-22; Exhibit B-20, BCUC IR 51.1.

¹¹² CEC Final Argument on the Strathcona Project, pp. 18, 20, 21, 35.

schedule increased project costs and how these were factored into BC Hydro's decision-making, recommending that the BCUC direct BC Hydro to address this in a compliance filing.¹¹³

BC Hydro submits that the CEC's request for a compliance filing on impacts of contractor-requested delays is unnecessary, as the Strathcona Project cost increases stemmed from its own adjustments to the RFP process, not from proponents' extension requests. It explains that while the two project proponents did request extensions, these were anticipated in the project schedule, did not increase costs, and were reasonably needed to ensure competitive proposals. BC Hydro also confirms that its evaluation of each bid was based in part on the proponent's proposed work program and schedule.¹¹⁴

No other interveners raised issues regarding project schedule, procurement and treatment of implementation risk.¹¹⁵

Panel Determination

Based on the evidence in this proceeding, **the Panel finds that the Strathcona Project is appropriately scoped and its schedule and procurement approach are reasonable.** The Panel is satisfied that BC Hydro has identified the relevant project risks and implemented adequate mitigation measures. As for the CEC's recommendation for a compliance filing in respect of the contractor delays, the Panel agrees with BC Hydro that this is unnecessary given BC Hydro's explanation above.

5.0 Project Cost Estimate and Rate Impact

On May 30, 2025, BC Hydro provided an Updated Project Cost Estimate for the Strathcona Project from the original estimate set out in the Application, which included:¹¹⁶

- Updated cost and schedule assumptions to reflect the proposal received and accepted from the lead proponent;
- Updated loadings (escalation, interest during construction and capital overhead) to reflect current rate assumptions;
- Review of cost and schedule risks to recalculate appropriate contingencies and project reserves; and
- Updated design information to reflect progression of design work from the preliminary design to the request for proposal stage.

The following sections discuss the Updated Project Cost Estimate and its impact on rates.

5.1 Updated Project Cost Estimate

BC Hydro's project cost estimate includes an expected cost and an authorized cost. The expected cost includes life to date costs, forecast direct and indirect construction costs, escalation, contingency, corporate overhead, and interest during construction. The authorized cost represents the sum of the expected cost and the project reserve.¹¹⁷

¹¹³ Ibid., p. 26.

¹¹⁴ BC Hydro Reply Argument on the Strathcona Project, pp. 10 – 11.

¹¹⁵ BCOAPO Final Argument on the Strathcona Project, p. 18.

¹¹⁶ Exhibit B-19, p. 4.

¹¹⁷ Exhibit B-1, p. 10-29. The expected cost is based on the P50 cost estimate whereas the authorized cost is based on the P90 cost estimate plus any special reserve amounts. P50 is defined as the cost estimate that will not be exceeded 50% of the time. P90 is defined as the cost estimate that will not be exceeded 90% of the time.

In BC Hydro's Application, the Strathcona Project had an expected cost of \$362.9 million and an authorized cost of \$473.7 million. This resulted in a project cost range of \$301.8 million to \$473.7 million. The expected cost estimate was based on the preliminary level design and conformed to an Association for the Advancement of Cost Engineering International (AACEI) Class 3 cost estimate.¹¹⁸

BC Hydro's Updated Project Cost Estimate includes an expected cost of \$520.9 million and an authorized cost of \$574.5 million.¹¹⁹ BC Hydro notes that the updated expected cost does not fall within the cost range included in the Application.¹²⁰

BC Hydro states that the Updated Project Cost Estimate, reflecting a 44 percent increase in expected cost from the Application, is still within the 80 percent threshold before the Strathcona Facility's net present value (NPV) would become negative. More broadly, BC Hydro submits that capital cost sensitivity analysis for the Campbell River System shows that overall planned investments could increase by up to \$1.9 billion (2.1 times the expected costs of the planned projects), with the combined \$327.4 million cost increase at John Hart,¹²¹ Ladore,¹²² and Strathcona falling well within this limit.¹²³

BC Hydro explains that the cost increases in the Updated Project Cost Estimate were informed by the lead proponent's proposal that was ultimately accepted for the Strathcona Project. These cost increases are attributable to a delayed construction start date and extended construction schedule, higher costs associated with design and construction of temporary infrastructure, and higher BC Hydro costs associated with the higher costs of the lead proponent.¹²⁴ These increases are offset in part by subsequent cost reductions for reserves due to greater certainty regarding project design and costs from progression of the Strathcona Project since the Application filing date.¹²⁵

5.2 Rate Impact

The Strathcona Project will affect operating costs, amortization, and finance charges within BC Hydro's annual revenue requirements.¹²⁶ Based on the updated expected cost, the increase in BC Hydro's revenue requirements from the Strathcona Project would be highest in dollar amount in fiscal 2032 at an estimated \$26.2 million, which equates to a cumulative incremental rate impact of 0.40 percent. For the updated authorized cost, the increase in BC Hydro's revenue requirements from the Strathcona Project would be highest in dollar amount in fiscal 2032 at an estimated \$29.0 million which equates to a cumulative incremental rate impact of 0.44 percent.¹²⁷

BC Hydro submits that the Strathcona Project's cost estimate, schedule, and rate impact are reasonable and appropriate for a project of its scope. BC Hydro submits that the necessity of addressing the dam safety risks by

¹¹⁸ Exhibit B-19, p. 4; Exhibit B-1, pp. 10-29 to 10-30.

¹¹⁹ Exhibit B-19, p. 4.

¹²⁰ Ibid.

¹²¹ The John Hart Dam Seismic Project expected cost increased by \$110.0 million as indicated in Project Annual Progress Report No. 2, filed December 13, 2024.

¹²² The Ladore Project expected cost increased by \$59.4 million as filed in Exhibit B-14 and Exhibit B-14-1.

¹²³ Exhibit B-19, pp. 11, 12.

¹²⁴ Exhibit B-19, pp. 5-6.

¹²⁵ Ibid., p. 4.

¹²⁶ Exhibit B-1, p. 10-35.

¹²⁷ Exhibit B-19, p. 14.

implementing the improvements included in the Strathcona Project outweighs the impact on ratepayers in BC.¹²⁸

Positions of the Parties

Interveners generally support the Strathcona Project but make various submissions regarding BC Hydro's Project planning and estimating processes as detailed below.¹²⁹ By way of an overall response, BC Hydro submits that any future projects should be evaluated in their particular contexts and that the BCUC should avoid making any findings or directions in the context of the Strathcona Project that may unduly restrict future applications.¹³⁰

As noted earlier, RCIA is concerned with BC Hydro's project-by-project planning approach and about the lack of an integrated, system-wide economic evaluation for the Campbell River System.¹³¹ RCIA further questions the reliability of BC Hydro's initial cost estimates, with the scale and frequency of cost increases across the Campbell River System projects suggesting underlying weaknesses in BC Hydro's estimating and planning processes. RCIA notes that the combined cost of the three seismic upgrade projects on the Campbell River System (John Hart Dam Seismic Upgrade, Ladore Spillway Seismic Upgrade, and the Strathcona Discharge Upgrade Project) has risen significantly from initial estimates, therefore future projects risk exceeding the economic value of the Campbell River System.¹³² RCIA provides a breakdown of the Campbell River System's costs and benefits by facility, incorporating updated capital costs for the Campbell River System projects, as well as the potential future projects at the Strathcona Facility.¹³³ RCIA's analysis indicates a negative NPV of \$1.199 billion for the Strathcona Facility and a positive NPV of \$246 million for the Campbell River System. RCIA concludes that given the additional capital projects that may be required on the Strathcona Dam, cumulative spending in the Campbell River System could exceed the economic value of the system.¹³⁴ RCIA recommends therefore that the BCUC direct BC Hydro to undertake a review of its current forecasting methods and include it and any proposed remedial action in its next general rate proceeding.¹³⁵

In reply, BC Hydro disputes RCIA's claim that its estimating practices lead to chronic cost overruns, stating that estimate updates reflect efforts to provide accurate, market-informed information to improve cost certainty and transparency rather than unexpected overruns. It emphasizes that revisions, including those for the Strathcona Project, account for market volatility and RFP outcomes and are provided so the BCUC can make informed decisions on project expenditure schedules.¹³⁶

BC Hydro also takes issue with RCIA's assessment of the NPV of the Strathcona Facility and the Campbell River System. BC Hydro submits that RCIA's NPV calculation overlooks BC Hydro's assumption that decommissioning costs remain unchanged and submits that if decommissioning costs were escalated alongside project costs, overall Strathcona Facility capital costs would need to increase by up to 546 percent before the NPV of the Strathcona Facility becomes negative. BC Hydro also notes that RCIA's NPV calculation for the Strathcona Facility is flawed because it incorrectly uses \$1.778 billion in nominal future capital costs rather than present value. BC Hydro states the correct present value of all future Strathcona capital expenditures is \$890 million, and that comparing nominal future costs to present value is invalid and leads to no meaningful conclusion. BC Hydro

¹²⁸ BC Hydro Final Argument on the Strathcona Project, pp. 51, 53.

¹²⁹ RCIA Final Argument on the Strathcona Project, pp. 13, 16; BCOAPO Final Argument on the Strathcona Project, pp. 7, 18; The CEC Final Argument on the Strathcona Project, pp. 24, 32.

¹³⁰ BC Hydro Reply Argument on the Strathcona Project, p. 3.

¹³¹ RCIA Final Argument on the Strathcona Project, p. 16.

¹³² *Ibid.*, p. 8.

¹³³ *Ibid.*, Table 3, pp. 9–10.

¹³⁴ RCIA Final Argument on the Strathcona Project, p. 11.

¹³⁵ *Ibid.*, p. 13.

¹³⁶ BC Hydro Reply Argument on the Strathcona Project, pp. 7–8.

further submits that RCIA incorrectly assumes that all potential projects will proceed is unfounded, as any such projects would require separate applications with updated analyses and therefore should be given no weight.¹³⁷

BCOAPO is satisfied that BC Hydro has adequately explained the reasons for increases in the Updated Project Cost Estimate. However, it is not clear to BCOAPO the degree to which the increase in the updated expected cost above the original cost range signals a shortcoming in how BC Hydro establishes the ranges for its Monte Carlo simulations. BCOAPO submits that the BCUC should direct BC Hydro to include in any upcoming applications for CPCN or capital expenditure schedule approvals additional details on how the ranges for the various risks considered in its Monte Carlo simulations are established and why they represent reasonable upper/lower bounds.¹³⁸

In reply, BC Hydro submits that BCOAPO's recommendation is unnecessary as BC Hydro has based its assessment of the various risks on team experience, external expertise, and a comprehensive risk workshop process to determine the appropriate ranges. BC Hydro submits that if BCOAPO believes that additional information is needed for future applications, BCOAPO can request such information from BC Hydro through the information request process at that time.¹³⁹

The CEC generally finds the Updated Project Cost Estimate to be satisfactorily explained.¹⁴⁰ The CEC submits that the rate impact from the Strathcona Project is acceptable and recommends that the BCUC find it to have reasonable value for the benefit of preserving the safety of the dam.¹⁴¹ However, the CEC is concerned about cost estimating for major hydroelectric dam projects that have been subject to significant cost overruns and how this should relate to the cost estimating being done for the Strathcona Project. The CEC submits that BC Hydro's forecast cost reserves have not adequately covered the elements that can cause significant overruns on major hydroelectric dam projects. The CEC recommends that the BCUC explicitly ensure that adequate analysis of the project's quantified benefits and values, including quantitative estimate of soft benefits, is completed.¹⁴²

In reply, BC Hydro submits that the BCUC should reject the CEC's recommendation as it is not a realistic approach to project evaluation, significantly undervalues BC Hydro's project estimating practices, and risks rendering many projects 'uneconomic' because of an unobtainable cost-benefit threshold.¹⁴³

The CEC submits that confidential redactions related to costs should arise only where it is clear they have specific value as public access to cost information can ensure bids and management are within appropriate standards. The CEC is not confident in the benefits of redactions related to certain costs, and particularly with respect to the value of cost increases when the base costs are not publicly available. The CEC recommends that the BCUC direct BC Hydro to provide prior project components of the Campbell River System redacted materials in future applications so that it is possible for interveners to make comparisons as and when they may be useful.¹⁴⁴

In reply, BC Hydro agrees that redactions should be targeted and justified and submits that it has redacted information only where it is commercially sensitive and redactions are necessary to protect BC Hydro's commercial position in this proceeding. BC Hydro submits that this recommendation is unnecessary as there are already well-established procedures for parties to access confidential documents within BCUC proceedings.¹⁴⁵

¹³⁷ Ibid., pp. 6–7.

¹³⁸ BCOAPO Final Argument on the Strathcona Project, p. 18.

¹³⁹ BC Hydro Reply Argument on the Strathcona Project, pp. 8–9.

¹⁴⁰ The CEC Final Argument on the Strathcona Project, p. 24.

¹⁴¹ Ibid., p. 32.

¹⁴² The CEC Final Argument on the Strathcona Project, p. 24.

¹⁴³ BC Hydro Reply Argument on the Strathcona Project, pp. 11–12.

¹⁴⁴ The CEC Final Argument on the Strathcona Project, pp. 29–30.

¹⁴⁵ BC Hydro Reply Argument on the Strathcona Project, pp. 9–10.

Panel Determination

The Panel finds BC Hydro's Updated Project Cost Estimate reasonable, based on its preliminary design and a Class 3 AACE estimate. The Panel considers the cumulative rate impact is reasonable and acceptable, given the enhanced dam safety benefits of the Strathcona Project.

The Panel considers that updating an initial project cost estimate after an RFP process is appropriate. After the conclusion of the RFP process, there is better cost certainty and parties should be informed of the updated cost estimate. However, the Panel appreciates the delicate balance that utilities must strike between taking the time to build cost certainty before filing an application with the need to apply for BCUC approval early thereby avoiding costly project delays. In certain cases, it may be best to use the cost information that is available prior to the conclusion of an RFP process.

Further, the Panel finds that projects driven by safety do not always turn on an economic cost/benefit analysis. While the Panel acknowledges interveners' concern about potential project cost overruns and costs going significantly higher than submitted, the BCUC continuously monitors projects through project reporting and compliance filings, which we discuss in Section 9 below, and can order prudency reviews after project completion where warranted.

As for the CEC's concerns about the extent of BC Hydro's redaction of cost information, the Panel notes that interveners are privy to that information upon signing confidentiality undertakings and are able to test that evidence in the course of the proceeding. If they are concerned about an excessive level of redaction, they have the ability to apply during the proceeding by objecting to the confidentiality request or applying to have the confidentiality associated with the information lifted in accordance with the BCUC's Rules of Practice and Procedure. The Panel considers it premature to make such determinations in advance of receiving such a request in a subsequent proceeding involving the Campbell River System.

6.0 Project Consultation and Engagement

The following subsections summarize BC Hydro's Indigenous consultation and public engagement activities relating to the Strathcona Project with potentially affected Indigenous communities, local governments and the public, followed by the Panel's determination in respect thereof.

6.1 Indigenous Consultation

BC Hydro submits that its approach to consultation on the Strathcona Project follows the successful consultation process with the same communities for the John Hart Generating Station Replacement Project, which started in 2007. The Indigenous nations in those communities agreed to continue using this approach for the Strathcona Project, the John Hart Seismic Upgrade Project, and the Ladore Project.¹⁴⁶

As part of the Strathcona Project initiation phase in 2015, BC Hydro reviewed several information sources to identify the consultative boundaries of the Strathcona Project. Based on the BC Consultative Area Database, the Strathcona Project is located within the consultative boundaries of three potentially affected Indigenous Nations: We Wai Kai Nation, Wei Wai Kum First Nation, and K'ómoks First Nation (Project Nations).¹⁴⁷

¹⁴⁶ Exhibit B-1, p. 11-20.

¹⁴⁷ Ibid., p. 11-4.

BC Hydro has provided a record of its Indigenous consultation with the Project Nations as of May 2025.¹⁴⁸ The consultation process was supported by capacity funding agreements signed with the three Project Nations at the commencement of each Project phase: a) introduction and identification of alternatives; b) feasibility design stage for preferred alternative; and c) definition and pre-implementation phase. In addition, at the request of K'ómoks First Nation, funding was provided to augment their traditional use data.¹⁴⁹

On December 21, 2021 and December 5, 2022, BC Hydro entered into Project Agreements with the Project Nations signifying their confirmation that they have been adequately consulted and accommodated in respect of any impacts from the Strathcona Project, the Ladore Project, and the John Hart Dam Seismic Upgrade Project. In addition, the Project Nations retained rights to participate in permitting and regulatory processes for the upgrade projects, including proposing measures to mitigate or avoid the impacts of the projects. BC Hydro provided letters from the Project Nations confirming these statements.¹⁵⁰

BC Hydro notes the Project Nations raised the following areas of concern regarding potential impacts of the Strathcona Project: historical and cumulative effects of the Strathcona Project in the Campbell River watershed;¹⁵¹ continued access of their members to the territory for traditional uses such as hunting, gathering and fishing;¹⁵² and archaeological potential of the Strathcona Project area.¹⁵³

BC Hydro assesses that the Strathcona Project will have an overall low impact on the rights and title of the Project Nations because it involves upgrades to existing infrastructure on and around the existing Strathcona dam.¹⁵⁴ BC Hydro states that with the implementation of the recommended mitigation measures and management plans, which were developed in consultation with the Project Nations, the residual effects on wildlife, fish and fish habitat resources are expected to be negligible.¹⁵⁵ BC Hydro expects that there will be no significant residual effects on vegetation, specifically on the availability of certain culturally significant plants, and there will be temporary impacts on Indigenous access to the territory for traditional uses during the Project construction. BC Hydro states it has identified mitigating measures and monitoring activities to minimize these impacts, which will include consultation with the Project Nations.¹⁵⁶

To date, no recorded archaeological sites have been identified in the Strathcona Project area and no negative residual effects are anticipated for archaeology and heritage resources. However, since the Project Nations have identified the area surrounding the Strathcona facility as having archaeological potential, BC Hydro states it will follow its Archaeological Chance Find Procedure if an unrecorded archaeological site is discovered during construction.¹⁵⁷ The Archaeological Chance Find Procedure outlines the actions to be taken by BC Hydro's employees or contractors if previously unknown heritage resources are encountered during construction activities.

BC Hydro confirms that as the Strathcona Project advances, it will continue to consult and engage with the Project Nations to understand and address any concerns or issues that arise.¹⁵⁸ In addition, BC Hydro continues

¹⁴⁸ Exhibit B-1, p. 11-21; Exhibit B-1-15, Appendix C-9; Exhibit B-4, BCUC IR 1.19.3, BCUC IR 1.33.3.1, BCUC IR 1.33.4; Exhibit B-19, p. 16; Exhibit B-19, Appendix 6.

¹⁴⁹ Exhibit B-1, p. 11-21.

¹⁵⁰ Exhibit B-1, pp. 11-28, 11-43; Exhibit B-6, BCOAPO IR 1.26.1 and attachment 1.

¹⁵¹ Exhibit B-1, pp. 11-14 to 11-16.

¹⁵² *Ibid.*, pp. 11-17 to 11-18.

¹⁵³ *Ibid.*, p. 11-19.

¹⁵⁴ Exhibit B-1, p. 1-19.

¹⁵⁵ *Ibid.*, pp. 1-19, 11-17 to 11-18.

¹⁵⁶ *Ibid.*, pp. 11-17 to 11-19.

¹⁵⁷ *Ibid.*, p. 11-19.

¹⁵⁸ *Ibid.*, p. 11-2.

to work with the Project Nations to refine its Indigenous procurement approach, which is intended to maximize their economic opportunities.¹⁵⁹ BC Hydro submits that the BCUC should conclude therefore that Indigenous consultation on the Strathcona Project has been adequate to date.¹⁶⁰

Positions of the Parties

Like BC Hydro, BCOAPO and the CEC submit that Indigenous consultation has been adequate.¹⁶¹ Additionally, BCOAPO notes that BC Hydro supported the consultation process with capacity funding agreements with all the Project Nations, that the record indicates that BC Hydro continued to meet and work with them, and the CEC observes the Project Nations' support for the Strathcona Project, while reserving their right to participate in the regulatory and permitting processes.¹⁶² RCIA does not provide any submissions on consultation.

6.2 Public Engagement

BC Hydro has, since 2007, engaged in public consultation with the community in the Campbell River System area on its facilities and operations, such as the Strathcona Project.¹⁶³

Since 2015, BC Hydro has engaged the public on project planning at the individual, community and local government level through presentations and meetings with the following parties: the Campbell River City Council and the Strathcona Regional District Board, the Campbell River Hydroelectric Facilities Liaison Committee, and the Campbell River Hydroelectric Facilities Discovery Centre.¹⁶⁴ BC Hydro has also provided project updates to cabin owners and homeowners along the Cedar Creek and Strathcona Subdivisions along the Upper Campbell Reservoir. BC Hydro's communications have included local and regional media coverage, project overview videos, presentations, posting of project related information on the BC Hydro project website, the Campbell River and District Chamber of Commerce website, as well as social media, and e-mails.¹⁶⁵

Since December 2014, BC Hydro, in collaboration with the City of Campbell River and the Strathcona Regional District, has been providing ongoing and proactive notice to the community on the interim downstream risks in the event of a major earthquake and potential Strathcona dam failure. This activity was postponed in 2020 and 2021 due to the COVID-19 pandemic, and took place to a limited degree in 2022.¹⁶⁶

BC Hydro states that there is strong public support for the Strathcona Project, as demonstrated by stakeholder feedback from eight organizations and individuals including the City of Campbell River, Strathcona Regional District, North Island MLA, Strathcona Park Lodge and Outdoor Education Centre, Campbell River Salmon Foundation, Campbell River Environmental Committee, Campbell River and District Chamber of Commerce, and Campbell River Downtown Business Improvement Association.¹⁶⁷ BC Hydro submits it has undertaken steps to address or mitigate issues and concerns raised. In addition, it has made commitments to further engage to address community concerns that may arise during the project planning and construction.¹⁶⁸

¹⁵⁹ Exhibit B-4, BCUC IR 1.33.4.

¹⁶⁰ BC Hydro Final Argument on the Strathcona Project, p. 66.

¹⁶¹ BCOAPO Final Argument on the Strathcona Project, p. 20; CEC Final Argument on the Strathcona Project, p. 36.

¹⁶² BCOAPO Final Argument on the Strathcona Project, p. 20; CEC Final Argument on the Strathcona Project, p. 36.

¹⁶³ Exhibit B-1, p. 11-48.

¹⁶⁴ Ibid., pp. 11-49 to 11-50.

¹⁶⁵ Exhibit B-1, p. 11-51.

¹⁶⁶ Ibid., p. 11-51.

¹⁶⁷ Exhibit B-1, pp. 11-51 to 11-52; Exhibit B-1-15, Appendix C-10-2, p. 2.

¹⁶⁸ Exhibit B-1, p. 11-52, Exhibit B-4, BCUC IR 1.21.2, Exhibit B-6, BCOAPO IR 1.27.1.

In response to information requests BC Hydro provided updates on community engagement activities as of May 2025, including past and planned meetings with the Campbell River System Hydroelectric Facilities Community Liaison Committee, activities at the Campbell River Hydroelectric Facilities Discovery Centre, meetings with the City of Campbell River, and media updates to the community.¹⁶⁹ BC Hydro submits that it has consulted with the public and has obtained wide-spread public support for the Strathcona Project. BC Hydro considers that stakeholders' concerns have been addressed or adequately mitigated. Furthermore, BC Hydro has committed to continuing its engagement activities as the Project moves forward.¹⁷⁰

Positions of the Parties

BCOAPO and the CEC submit that BC Hydro's public engagement with stakeholders has been adequate. Both interveners note the strong and widespread public support for the Strathcona Project and BC Hydro's efforts to address stakeholders' concerns to date.¹⁷¹ In addition, the CEC notes BC Hydro's ongoing public engagement activities and its commitment to fulfilling its obligations with respect to further engagement.¹⁷²

RCIA does not comment on this issue.

Panel Determination

The Panel finds BC Hydro's Indigenous consultation and public engagement on the Strathcona Project have been adequate to date. The Project Nations have entered into agreements with BC Hydro and support the Strathcona Project. Similarly, BC Hydro has undertaken public engagement with the community on the project since 2015 and has addressed or mitigated any stakeholder concerns. No party has indicated any opposition to the project. The Panel expects that BC Hydro's Indigenous consultation and public engagement efforts will continue as the Strathcona Project progresses.

7.0 Relevant Considerations for Acceptance of Expenditures Pursuant to the UCA

Section 44.2(5.1) of the UCA provides that in considering whether to accept an expenditure schedule filed by BC Hydro, the BCUC, in addition to considering the interests of persons in British Columbia who receive or may receive service from BC Hydro, must consider:

- a) British Columbia's energy objectives;
- b) The most recent of the following documents:
 - i. An integrated resource plan approved under section 4 of the *Clean Energy Act* before the repeal of that section;
 - ii. A long-term resource plan filed by BC Hydro under section 44.1 of the UCA;
- c) The extent to which the schedule is consistent with the requirements under section 19 of the *Clean Energy Act*; and
- d) If the schedule includes expenditures on demand-side measures, the extent to which the demand-side measures are cost-effective within the meaning prescribed by regulation, if any.

¹⁶⁹ Exhibit B-4, BCUC IR 1.21.1; Exhibit B-19, pp. 16-17.

¹⁷⁰ BC Hydro Final Argument on the Strathcona Project, p. 67.

¹⁷¹ BCOAPO Final Argument on the Strathcona Project, p. 20; CEC Final Argument on the Strathcona Project, p. 37.

¹⁷² CEC Final Argument on the Strathcona Project, p. 37.

7.1 British Columbia's Energy Objectives

BC Hydro states that the Strathcona Project expenditure schedule, as summarized in the table below, aligns with the following seven of British Columbia's energy objectives, set out in section 2 of the *Clean Energy Act*:¹⁷³

Table 4: British Columbia's Energy Objectives

Energy Objective	Discussion
2(a) To achieve electricity self-sufficiency;	The Strathcona Facility is a significant part of BC Hydro's generation capability and allows BC Hydro to cost-effectively meet its self-sufficiency obligations.
2(c) To generate at least 93% of the electricity in British Columbia, other than electricity to serve demand from facilities that liquefy natural gas for export by ship, from clean or renewable resources and to build the infrastructure necessary to transmit that electricity;	The Strathcona Facility relies on water from the Upper Campbell River Reservoir, which is impounded by the Strathcona Dam, to generate clean and renewable hydro electric power.
2(e) To ensure the authority's ratepayers receive the benefits of the heritage assets and to ensure the benefits of the heritage contract under the BC Hydro Public Power Legacy and Heritage Contract Act ⁵⁴ continue to accrue to the authority's ratepayers;	The Strathcona Facility is a heritage asset. The Project will assist in addressing the seismic withstand deficiencies by constructing a new low level outlet; therefore, helping to ensure that BC Hydro's ratepayers continue to receive the benefit of these assets.
2(f) To ensure the authority's rates remain among the most competitive of rates charged by public utilities in North America;	The Campbell River System and the Strathcona Facility both have positive Net Present Value to ratepayers. By addressing the seismic withstand deficiencies and constructing the new low level outlet of the Strathcona Facility, the Project will help to maintain the System so that BC Hydro's rates remain competitive.
2(k) To encourage economic development and the creation and retention of jobs;	The Project will result in contracting opportunities and positive economic benefits.
2(m) To maximize the value, including the incremental value of the resources being clean or renewable resources, of British Columbia's generation and transmission assets for the benefit of British Columbia; and	The Campbell River System and the Strathcona Facility both have a positive Net Present Value to ratepayers. The Project will aid in maximizing the value to ratepayers from the Campbell River System generation and transmission assets.

¹⁷³ Exhibit B-1, pp. 1-51 to 1-53.

2(o) To achieve British Columbia’s energy objectives without the use of nuclear power.	The Strathcona Facility does not use nuclear power.
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7.2 Application of Section 19 of the *Clean Energy Act* and Demand-Side Measures

Section 19 of the *Clean Energy Act*, which applies to BC Hydro, addresses clean and renewable resources. However, BC Hydro states that subsections 44.2(5.1)(c) and (d) of the UCA, which the BCUC is required to consider in determining whether to accept the Strathcona Project expenditure schedule, do not apply in these circumstances because there are no prescribed targets or guidelines under section 19 of the *Clean Energy Act*, and the Strathcona Project expenditure schedule does not include demand-side measures.¹⁷⁴

7.3 BC Hydro’s Integrated Resource Plan

BC Hydro filed its Updated 2021 Integrated Resource Plan on June 15, 2023, which was accepted by the BCUC on March 6, 2024.¹⁷⁵ BC Hydro states that under the revised reference forecast considered in the Updated 2021 Integrated Resource Plan, when existing and committed resources are considered, BC Hydro has a need for new energy resources in fiscal 2027 and a need for new capacity resources on Vancouver Island in fiscal 2034.¹⁷⁶ BC Hydro further explains that the Strathcona Project is required to address seismic deficiencies at the Strathcona Facility, to enable the continued use of the Ladore, Strathcona and John Hart generating stations, which are included in its 2021 Integrated Resource Plan as existing resources.¹⁷⁷

Positions of the Parties

BC Hydro submits that the Strathcona Project supports BC’s energy objectives in the *Clean Energy Act*, as outlined in the Application, and that Section 19 of the *Clean Energy Act* and demand side measure do not apply to the Application. In addition, BC Hydro submits the Strathcona Project fits within the Updated 2021 Integrated Resource Plan filed on June 15, 2023.¹⁷⁸

The CEC submits that the Project reasonably aligns with the applicable legislation.¹⁷⁹

Panel Determination

The Panel has considered BC’s energy objectives and finds that the Strathcona Project is aligned with those objectives as identified by BC Hydro. The Panel further notes that no intervener has raised any issues regarding BC Hydro’s evidence of the Strathcona Project’s alignment with BC’s energy objectives. However, as acknowledged by BC Hydro, not all of the seismic withstand deficiencies will be addressed by the Strathcona

¹⁷⁴ Exhibit B-1, p. 1-51.

¹⁷⁵ BCUC Order G-58-24, dated March 6, 2024.

¹⁷⁶ BC Hydro Final Argument on the Strathcona Project, p. 62.

¹⁷⁷ Exhibit B-1, p. 1-53.

¹⁷⁸ BC Hydro Final Argument on the Strathcona Project, p. 62.

¹⁷⁹ CEC Final Argument on the Strathcona Project, p. 35.

Project but it paves the way for future projects on the Campbell River System which may be required, pending a multi-year review.

The Panel has not considered subsections 44.2(5.1) (c) and (d) of the UCA. The Panel finds these provisions are not applicable to this Application because there are no prescribed targets or guidelines under section 19 of the *Clean Energy Act*, and the Updated Project Cost Estimate does not include expenditures related to demand-side measures.

In addition, the Panel also considers that the Strathcona Project is consistent with BC Hydro's Updated 2021 Integrated Resource Plan because the Project will enable the continued use of the Strathcona dam and generating station. Together with the Ladore and John Hart Facilities on the Campbell River System, the Strathcona Facility is an existing BC Hydro resource integral to meeting the need for future capacity on Vancouver Island.

8.0 Overall Panel Determinations

In this section, we summarize the parties' positions with respect to the Application and our overall findings.

Positions of the Parties

BC Hydro asserts that making the capital expenditures for the Strathcona Project is in the public interest.¹⁸⁰

Intervenors generally agree that the Strathcona Project is in the public interest and recommend that the BCUC accept the Project expenditure schedule. BCOAPO submits that the Strathcona Project and the proposed expenditure schedule are in the public interest and should be accepted by the BCUC.¹⁸¹ The CEC submits that BC Hydro has provided sufficient evidence across all key areas to justify the Strathcona Project and recommends BCUC approval of the proposed expenditures.¹⁸² RCIA states that it supports the Strathcona Project as necessary for seismic and flood risk mitigation, but as discussed earlier, remains concerned about BC Hydro's investment planning, cost estimation, and reporting oversight, citing implications for ratepayer affordability and regulatory accountability.¹⁸³

Panel Determination

The Panel accepts the expenditure schedule as filed by BC Hydro for the Strathcona Project as being in the public interest pursuant to section 44.2 of the UCA. All parties in this proceeding support the acceptance of this expenditure schedule on the basis that it addresses dam safety and water discharge deficiencies in the Strathcona Facility on the Campbell River System, thereby ensuring the continued ability of the facility to serve capacity needs on Vancouver Island.

¹⁸⁰ BC Hydro Final Argument on the Strathcona Project, p. 5.

¹⁸¹ BCOAPO Final Argument on the Strathcona Project, p. 23.

¹⁸² CEC Final Argument on the Strathcona Project, p. 2.

¹⁸³ RCIA Final Argument on the Strathcona Project, p. 6.

9.0 Project Reporting

In the Application, BC Hydro proposed that the BCUC direct the following reporting on the Strathcona Project:¹⁸⁴

- File annual progress reports regarding the project scope, cost, schedule, risks, and ongoing consultation and mitigation plans;
- In the event of a material change between annual progress reports that has a significant impact on the Project schedule, cost or scope, file a Material Change Report, as soon as practicable and in any event within 30 days of the date on which the material change occurs; and
- File a Project Completion and Evaluation Report, three months after BC Hydro's Board of Directors' review of same.

Subsequent to the filing of the Application, the BCUC released its decision in the BC Hydro Major Capital Project Filing Guidelines proceeding, which included general direction on BC Hydro's reporting of major projects. In its decision, the BCUC stated: "For consistency, certainty and regulatory efficiency, however, we recommend that the BCUC and BC Hydro adhere to the 2024 Updated Major Capital Project Filing Guidelines wherever possible."¹⁸⁵ In its decision approving the 2024 updated Major Capital Project Filing Guidelines, dated August 15, 2024, the BCUC encouraged BC Hydro to apply for approval of updated guidelines in five years' time should it see the need to do so.¹⁸⁶

9.1 Cost Variances and Project Reporting

Regarding reporting on cost variances related to the Strathcona Project, BC Hydro proposes that both the Strathcona Project's annual progress reports and the final report include explanations for any variances exceeding 30 percent for any row or line item listed in Table 10-2 of Appendix 2 of the Update.¹⁸⁷ BC Hydro submits that this would improve efficiency by eliminating the need to track separate thresholds or retroactively explain variances in final reporting that were not addressed in annual reporting.¹⁸⁸ BC Hydro asserts that the proposed 30 percent threshold is consistent with the BCUC's previous direction for annual reporting of variances exceeding 30 percent under the Major Capital Project Filing Guidelines,¹⁸⁹ which was found reasonable as it reflects the upper range of uncertainty for a Class 3 cost estimate.¹⁹⁰

BC Hydro acknowledges that a percentage-based threshold may result in some large dollar variances not triggering reporting but states these are generally covered by contingency funds or offset by other variances. Where cumulative variances exceed the threshold for contingency or reserve line items, BC Hydro confirms it would provide explanations in compliance reporting. BC Hydro explains that for the Strathcona Project, cost increases beyond contingency or reserves would raise the Authorized Cost, requiring BC Hydro Board approval and reporting of the increase in the Project's Authorized Cost as a material change to the BCUC.¹⁹¹

Alternatively, BC Hydro submits it is amenable to a 20 percent variance threshold for annual and final reporting on the Strathcona Project to align with its internal Project Completion and Evaluation Reports.¹⁹²

¹⁸⁴ Exhibit B-1, Section 1.4.1, p. 1-25; Exhibit B-1-1, Appendix A-2-2.

¹⁸⁵ Order G-27-24A, p. 18.

¹⁸⁶ Order G-218-24, p. 22.

¹⁸⁷ Exhibit B-19, pp. 3; 18-20.

¹⁸⁸ Exhibit B-20, BCUC IR 50.1.

¹⁸⁹ Order G-27-24A, Reasons for Decision, p. 8.

¹⁹⁰ BC Hydro Final Argument on the Strathcona Project, p. 71.

¹⁹¹ Exhibit B-20, BCUC IR 50.3.

¹⁹² BC Hydro Final Argument on the Strathcona Project, p. 71.

The BCUC has previously set variance explanation thresholds at 30 percent for annual reports and 10 percent for final reports, including for the John Hart Project and the Ladore Project¹⁹³ and BC Hydro's other major capital projects.¹⁹⁴ BC Hydro confirms that there are no instances where the BCUC has accepted a 30 percent variance threshold for the final report of a BC Hydro major capital project.¹⁹⁵

Positions of the Parties

BCOAPO submits that much of the work to support a 10 percent variance explanation threshold for the final report is already done or would be required for contingency or reserve variances. BCOAPO cautions that approving BC Hydro's proposal could set a precedent for changing past orders or future reporting requirements, and therefore recommends that the BCUC reject BC Hydro's proposal and maintain the current thresholds of 30 percent for annual reports and 10 percent for the final report.¹⁹⁶

The CEC acknowledges potential cost efficiencies from using the same variance threshold for annual and final reports but emphasizes that total project cost is the primary concern for ratepayers. Given that reallocations during the Strathcona Project could offset each other, the CEC sees little value in a lower final report threshold unless the project exceeds the Authorized Cost, in which case detailed review could help identify issues. It recommends a 30 percent threshold for individual line items and a 10 percent threshold for total project costs in the final report, unless they are materially over the Authorized Cost.¹⁹⁷

RCIA opposes BC Hydro's proposal to use a 30 percent line-item variance threshold in the Strathcona Project's final report, noting the BCUC has never approved such a threshold for final reporting and typically applies 10 percent, as is the case for the Ladore Project. RCIA argues that 30 percent would permit large variances, including over \$50 million, to go unreported, reducing transparency and increasing ratepayer risk given the project's scale, complexity, and cost escalation history. RCIA also points out BC Hydro's internal reports use a 20 percent threshold, contradicting claims that tighter standards are burdensome, and recommends retaining the 10 percent threshold consistent with past practice.¹⁹⁸

In reply, BC Hydro submits that applying a consistent 30 percent threshold for both annual and final project reports is appropriate given its experience with how variances typically arise, such as reallocation between line items that do not change overall projects costs. In BC Hydro's view, interveners' concerns that significant dollar-value variances would go unreported are unfounded, since such variances would either trigger explanations through contingency and reserve fund reporting or, if they could not be covered with those reserves, result in a material change report. Accordingly, BC Hydro maintains that its proposed 30 percent threshold is reasonable and that material variances will continue to be captured through reporting requirements.¹⁹⁹

Panel Determination

The Panel directs BC Hydro to report on the Strathcona Project based on a 30 percent cost variance threshold for annual reports and a 10 percent cost variance threshold for the final report, consistent with the approach used for other BC Hydro major capital projects and as set by the 2024 Major Capital Project Guidelines.

¹⁹³ Order G-263-24, Reasons for Decision, p. 30.

¹⁹⁴ Order G-27-24A, Appendices A, B, C, D and E.

¹⁹⁵ Exhibit B-20, BCUC IR 50.2.

¹⁹⁶ BCOAPO Final Argument on the Strathcona Project, p. 23.

¹⁹⁷ CEC Final Argument on the Strathcona Project, p. 31.

¹⁹⁸ RCIA Final Argument on the Strathcona Project, pp. 14 – 15.

¹⁹⁹ BC Hydro Reply Argument on the Strathcona Project, pp. 13 – 15.

The Panel finds that a standard approach to metrics such as project cost variance reporting is desired and appropriate, as it allows for “apples to apples” comparisons across the major projects on which BC Hydro reports to the BCUC. All other of BC Hydro’s approved major projects, including John Hart and Ladore, are currently reporting at 30 and 10 percent project cost variances for annual and final reports, respectively.

The Panel takes issue with BC Hydro’s position that a 10 percent variance threshold for the final reports is overly burdensome. BC Hydro acknowledges it already reports at a 20 percent variance to its Board of Directors, which is different from the 10 percent variance threshold required by the BCUC for final reports and also different from the 30 percent final project cost variance now being proposed by BC Hydro for the Strathcona Project.

Finally, the Panel notes that BC Hydro did not raise the issue of cost variance reporting thresholds during the 2024 BCUC proceeding to update BC Hydro’s Major Capital Project Guidelines. That proceeding was instigated by BC Hydro, took place only a year ago, involved several interveners and canvassed many issues pertaining to the guidelines. BC Hydro is welcome to apply for an update to its Major Capital Project Guidelines at any time, and as already noted, the BCUC suggested in its decision on that proceeding that a review of the guidelines at five-year intervals may be appropriate, equating to a filing in four years’ time. Until then, the Panel considers it premature to change BC Hydro’s current threshold from 10 percent to 30 percent for reporting to the BCUC on final project cost variances for the Strathcona Project as an exception. Given that BC Hydro already reports final project cost variances to the BCUC based on the 10 percent threshold and 20 percent to its Board of Directors, the Panel views that any efficiency gains in applying a common threshold only for reporting to the BCUC on annual and final cost variances on the Strathcona Project would be minimal.

Having accepted the expenditure schedule for the Strathcona Project, the Panel directs BC Hydro to provide reports on the Project as specified in Appendix C to this decision.

DATED at the City of Vancouver, in the Province of British Columbia, this 17th day of October 2025.

Electronically signed by Anna Fung

A. K. Fung, KC
Panel Chair/Commissioner

Electronically signed by Lisa Brown

E.A. Brown
Commissioner

British Columbia Hydro and Power Authority
Strathcona Discharge Upgrade Project

LIST OF ACRONYMS

Acronym	Description
AACEI	Association for the Advancement of Cost Engineering International
Application	BC Hydro's application for acceptance of the schedules of capital expenditures BC Hydro anticipates making for implementation of the Strathcona Discharge Upgrade Project
BC Hydro	British Columbia Hydro and Power Authority
BCOAPO	British Columbia Old Age Pensioners Association et al.
BCUC	British Columbia Utilities Commission
Campbell River System	BC Hydro's hydroelectricity system located on the Campbell River on Vancouver Island, within the Strathcona Regional District
Campbell River System Study	The Campbell River Systems Engineering Assessment, completed in 2012
CEC	The Commercial Energy Consumers Association
CPCN	Certificate of Public Convenience and Necessity
Facilities	The Ladore and Strathcona facilities, along with the John Hart Dam
GWh	Gigawatt hours
Haida	The Supreme Court of Canada's decision in <i>Haida Nation v. British Columbia Minister of Forests</i>
Ladore Project	Ladore Spillway Seismic Upgrade Project
LCC	Leave to Commence Construction
MW	Megawatts
NPV	Net present value

Project Nations	We Wai Kai Nation, Wei Wai Kum First Nation, and K'ómoks First Nation
Projects	Collectively, the Ladore Project and the Strathcona Project
RCIA	Residential Consumer Intervener Association
RFP	Request for Proposals
SDM	Structured decision making
Spillway Gates System	Ladore spillway gates system including the spillway gates, the hoist tower structure, the hoist system, and the power and controls systems
Strathcona Project	Strathcona Discharge Upgrade Project
Updated Project Cost Estimate	The updated cost estimate for the Strathcona Project provided by BC Hydro on April 4, 2025
UCA	<i>Utilities Commission Act</i>

British Columbia Hydro and Power Authority
Strathcona Discharge Upgrade Project

EXHIBIT LIST

Exhibit No.	Description
<i>COMMISSION DOCUMENTS</i>	
A-1	Letter dated June 28, 2023 – BCUC panel appointment for the review of the Ladore Spillway and Strathcona Discharge Upgrade Projects
A-2	Letter dated July 18, 2023 – BCUC Order G-189-23 establishing a regulatory timetable with Reasons for Decision
A-3	Letter dated August 29, 2023 – BCUC Information Request No. 1 to BC Hydro
A-4	CONFIDENTIAL - Letter dated August 29, 2023 – BCUC Confidential Information Request No. 1 to BC Hydro
A-5	Letter dated November 9, 2023 – BCUC Order G-303-23 establishing a further regulatory timetable
A-6	Letter dated November 16, 2023 – BCUC Information Request No. 2 to BC Hydro
A-7	CONFIDENTIAL - Letter dated November 16, 2023 – BCUC confidential Information Request No. 2 to BC Hydro
A-8	Letter dated December 1, 2023 – BCUC Order G-328-23 amending the regulatory timetable
A-9	Letter dated December 14, 2023 – BCUC Order G-352-23 adjourning the proceeding
A-10	Letter dated January 30, 2024 – BCUC Order G-25-24 providing adjournment update
A-11	Letter dated June 18, 2024 – BCUC Order G-163-24 establishing an amended regulatory timetable
A-12	Letter dated June 27, 2024 – BCUC Information Request No. 3 to BC Hydro
A-13	Letter dated October 31, 2024 – BCUC Order G-278-24 adjourning the proceeding
A-14	Letter dated November 20, 2024 – BCUC Panel Amendment
A-15	Letter dated February 5, 2025 – BCUC Panel Amendment and request for comments
A-16	Letter dated February 5, 2025 – BCUC Order G-22-25 adjourning the proceeding
A-17	Letter dated February 27, 2025 – Panel Amendment
A-18	Letter dated April 4, 2025 – BCUC Order G-90-25 establishing a regulatory timetable

A-19 Letter dated June 19, 2025 – BCUC Information Request No. 4 to BC Hydro

APPLICANT DOCUMENTS

- B-1 **BC HYDRO AND POWER AUTHORITY (BC HYDRO) – PUBLIC** - Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application dated June 14, 2023
- B-1-1 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix A
- B-1-2 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix B
- B-1-3 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C1 and C2
- B-1-4 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 1
- B-1-5 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 2
- B-1-6 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 3
- B-1-7 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 4
- B-1-8 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 5
- B-1-9 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 6
- B-1-10 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 7
- B-1-11 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 8
- B-1-12 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 9
- B-1-13 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 10

- B-1-14 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C3 Part 11
- B-1-15 **PUBLIC** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C4 to C10
- B-1-16 **PUBLIC** – Letter dated October 16, 2023 – BC Hydro submitting Errata No. 1 to the Application
- B-2 **CONFIDENTIAL** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application
- B-2-1 **CONFIDENTIAL** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix A
- B-2-2 **CONFIDENTIAL** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix B
- B-2-2-1 **CONFIDENTIAL** – Letter dated October 16, 2023 – BC Hydro submitting Errata No. 1 to Confidential Application Appendix B
- B-2-3 **CONFIDENTIAL** – Letter dated June 14, 2023 – BC Hydro submitting Ladore Spillway Seismic Upgrade Project and Strathcona Discharge Upgrade Project Application Appendix C
- B-2-3-1 **CONFIDENTIAL** – Letter dated October 16, 2023 – BC Hydro submitting Errata No. 1 to Confidential Application Appendix C
- B-2-4 **CONFIDENTIAL** – Letter dated October 16, 2023 – BC Hydro submitting Errata No. 1 to the Confidential Application
- B-3 Letter dated July 31, 2023 – BC Hydro submitting proof of public notice in compliance with Order G-189-23
- B-4 **PUBLIC** – Letter dated October 17, 2023 – BC Hydro submitting redacted responses to BCUC Information Request No. 1
- B-4-1 **CONFIDENTIAL** – Letter dated October 17, 2023 – BC Hydro submitting confidential responses to BCUC Information Request No. 1
- B-5 **CONFIDENTIAL** – Letter dated October 17, 2023 – BC Hydro submitting confidential responses to BCUC Confidential Information Request No. 1
- B-6 **PUBLIC** – Letter dated October 17, 2023 – BC Hydro submitting redacted responses to Interveners Information Requests No. 1
- B-6-1 **CONFIDENTIAL** – Letter dated October 17, 2023 – BC Hydro submitting confidential responses to Interveners Information Requests No. 1

- B-7 Letter dated November 29, 2023 – BC Hydro submitting extension request to file responses to BCOAPO Information Requests No. 2
- B-8 **PUBLIC** – Letter dated December 7, 2023 – BC Hydro submitting responses to BCUC public Information Request No. 2
- B-9 **CONFIDENTIAL** – Letter dated December 7, 2023 – BC Hydro submitting responses to BCUC Confidential Information Request No. 2
- B-10 Letter dated December 7, 2023 – BC Hydro submitting responses to Interveners Information Requests No. 2
- B-11 Letter dated December 12, 2023 – BC Hydro submitting Cost Estimate Update and request for adjournment
- B-12 Letter dated December 14, 2023 – BC Hydro submitting responses to BCOAPO Information Requests No. 2
- B-13 Letter dated January 25, 2024 – BC Hydro submitting update on the status of project cost information in compliance with Order G-352-23
- B-14 **PUBLIC** - Letter dated May 30, 2024 – BC Hydro submitting redacted update on the status of project cost information in compliance with Order G-25-24
- B-14-1 **CONFIDENTIAL** - Letter dated May 30, 2024 – BC Hydro submitting confidential update on the status of project cost information in compliance with Order G-25-24
- B-15 **PUBLIC** - Letter dated July 18, 2024 – BC Hydro submitting responses to BCUC and Intervener Information Requests No. 3
- B-15-1 **CONFIDENTIAL** - Letter dated July 18, 2024 – BC Hydro submitting confidential responses to Intervener Information Requests No. 3
- B-16 Letter dated October 29, 2024 – BC Hydro submitting update on the status of the Strathcona project cost estimate in compliance with Order G-163-24
- B-17 Letter dated January 30, 2025 – BC Hydro submitting project cost estimate update in compliance with Order G-278-24
- B-18 Letter dated March 27, 2025 – BC Hydro submitting project cost estimate update in compliance with Order G-22-25
- B-19 **PUBLIC** – Letter dated May 30, 2025 – BC Hydro submitting Project Cost Estimate in Compliance with G-90-25
- B-19-1 **CONFIDENTIAL** – Letter dated May 30, 2025 – BC Hydro submitting Project Cost Estimate in Compliance with G-90-25
- B-20 **PUBLIC** – Letter dated July 11, 2025 – BC Hydro submitting responses to BCUC Information Request No. 4

- B-20-1 **CONFIDENTIAL** – Letter dated July 11, 2025 – BC Hydro submitting confidential responses to BCUC Information Request No. 4
- B-21 **PUBLIC** - Letter dated July 11, 2025 – BC Hydro submitting responses to Intervener Information Requests No. 4
- B-21-1 **CONFIDENTIAL** – Letter dated July 11, 2025 – BC Hydro submitting confidential responses to Intervener Information Requests No. 4
- B-22 **CONFIDENTIAL** – Letter dated July 11, 2025 – BC Hydro submitting responses to RCIA Confidential Information Requests No. 4

INTERVENER DOCUMENTS

- C1-1 **RESIDENTIAL CONSUMER INTERVENER ASSOCIATION (RCIA)** - Letter dated August 9, 2023 – Request to intervene by Abdulrahman Abomazid
- C1-2 Letter dated August 9, 2023 – RCIA submitting Confidentiality Declaration and Undertakings
- C1-3 Letter dated September 6, 2023 – RCIA submitting Information Request No. 1 to BC Hydro
- C1-4 Letter dated November 23, 2023 – RCIA submitting Information Request No. 2 to BC Hydro
- C1-5 **CONFIDENTIAL** - Letter dated June 27, 2024 – RCIA submitting confidential Information Request No. 3 to BC Hydro
- C1-6 **PUBLIC** – Letter dated June 26, 2025 – RCIA submitting Information Request No. 4 to BC Hydro
- C1-6-1 **CONFIDENTIAL** – Letter dated June 26, 2025 – RCIA submitting Information Request No. 4 to BC Hydro
- C2-1 **BRITISH COLUMBIA OLD AGE PENSIONERS’ ORGANIZATION, DISABILITY ALLIANCE BC, COUNCIL OF SENIOR CITIZENS’ ORGANIZATIONS OF BC, AND THE TENANT RESOURCE AND ADVISORY CENTRE (BCOAPO)** – Letter dated August 16, 2023 – Request to intervene by Leigha Worth
- C2-2 Letter dated September 6, 2023 – BCOAPO submitting Information Request No. 1 to BC Hydro
- C2-3 Letter dated November 23, 2023 – BCOAPO submitting Information Request No. 2 to BC Hydro
- C2-4 Letter dated June 27, 2024 – BCOAPO submitting confidential Information Request No. 3 to BC Hydro
- C2-5 Letter dated July 26, 2024 – BCOAPO submitting Confidentiality Declaration and Undertakings
- C2-6 Letter dated June 26, 2025 – BCOAPO submitting Information Request No. 4 to BC Hydro

- C3-1 **COMMERCIAL ENERGY CONSUMERS ASSOCIATION OF BRITISH COLUMBIA (CEC)** Letter dated August 18, 2023 – Request to intervene by David Craig and Christopher Weafer
- C3-2 Letter dated August 23, 2023 – CEC submitting Confidentiality Declaration and Undertakings
- C3-3 Letter dated September 6, 2023 – CEC submitting Information Request No. 1 to BC Hydro
- C3-4 Letter dated November 23, 2023 – CEC submitting Information Request No. 2 to BC Hydro
- C3-5 Letter dated June 26, 2025 – CEC submitting Information Request No. 4 to BC Hydro

LETTERS OF COMMENT

- D-1 Strathcona Regional District (Strathcona Regional District) – Letter of Comment dated May 31, 2023

British Columbia Hydro and Power Authority
Strathcona Discharge Upgrade Project

PROJECT REPORTING REQUIREMENTS

1. Annual Progress Reports

Each annual report is required to detail:

- a. Actual costs incurred to date compared to the Strathcona Project cost breakdown table estimate provided in Table 10-2 of Appendix 2 of the Updated Project Cost Estimate,²⁰⁰ including the use of Project Reserve, if accessed, highlighting variances with an explanation of variances greater than 30 percent for any row number or line item;
- b. Updated forecast of costs, highlighting the reasons for costs that are forecast to have variances greater than 30 percent for any row number or line item; and
- c. The status of identified risks noted in Chapter 12 of the Application, highlighting the status of identified risks, changes in and additions to risks, the options available to address the risks, the actions that BC Hydro is taking to deal with the risks and the likely impact on the Strathcona Project's schedule and cost.

BC Hydro must file annual progress reports within 45 days of the end of each annual reporting period, with the first report covering the period ending November 30, 2026.

2. Material Change Reports

A material change (Material Change) is a change in BC Hydro's plan for the Strathcona Project that would reasonably be expected to have a significant impact on the schedule, cost or scope, such that:

- a. Schedule – there is a delay in the forecast project in-service date of May 2030 provided in Table 3 of the Updated Project Cost Estimate;
- b. Cost – the Authorized Cost of the Strathcona Project is forecast to exceed the BC Hydro Authorized Amount of \$574.5 million provided in row 17 of Table 10-2 of Appendix 2 of the Updated Project Cost Estimate; or
- c. Scope – there are one or more changes to the Strathcona Project deliverables and the work required to create those deliverables or the main components of the Strathcona Project scope detailed in Chapter 10 of the Application.

In the event of a Material Change, BC Hydro must file a Material Change report with the BCUC explaining the reasons for the Material Change, BC Hydro's consideration of the Strathcona Project risk and the options available, and actions BC Hydro is taking to address the Material Change. BC Hydro must file the Material Change report within 30 days of the Material Change occurring or within 30 days of the appropriate approval authority within BC Hydro being informed of a potential material change, whichever is earlier.

²⁰⁰ A public version of the table was provided in Exhibit B-20, BCUC IR 4.50.6 Attachment 1.

3. Final Report

A Final Report is due the earlier of one month after review by BC Hydro's Board of Directors, or 24 months after the project in-service date. The report is to include:

- a. The final cost of the Strathcona Project, including a breakdown of the final costs; and
- b. A comparison of the final costs to the estimates provided in Table 10-2 of the Updated Project Cost Estimate and an explanation for any material cost variances that exceed 10 percent for any of the cost items provided in Table 10-2 of Appendix 2 of the Update.