Ontario Power Generation

Proposed Coniston Generating Station Life Extension Project

Socio-Economic Technical Support Document

January 2023

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Executive Summary

Ontario Power Generation (OPG) is proposing to redevelop the existing Coniston Generating Station (GS). Constructed in 1905, the existing Coniston GS is over one hundred years old and is at the end of its life and OPG intends to redevelop the site. Two of the three generating units are no longer functional, and all the equipment is aged and in poor condition.

The original GS had a capacity of 4.75 megawatts (MW) with a plant discharge flow of 44 m^3/s. The proposed GS will have a capacity of 6.0 MW based on a plant discharge flow of 43.5 m^3/s. As such, the GS will produce more clean renewable power than the original and existing facility while utilizing roughly the same amount of water.

The proposed Project is located in the City of Greater Sudbury, Ontario. The Project involves the demolition of the existing powerhouse and penstocks and the construction of a new powerhouse with other ancillary facilities.

This Technical Support Document (TSD) assesses the potential social and economic effects of the Project, as well as effects on local land use and resource policy.

The proposed Project is expected to result in the creation of approximately 150 to 200 person years of work over an approximately two-year construction period. This employment will be distributed across a wide variety of professions and trades typically associated with a heavy construction project. Recent OPG experience in constructing hydroelectric projects in Northeastern Ontario demonstrated that approximately 60% of the total labour requirement for the on-site work was met by the labour market in northeastern Ontario. It is anticipated that most of the labour would come first from the Greater Sudbury area and secondly central and northeastern Ontario.

Economic and business activity effects are associated with sub-contracting opportunities to the DB Contractor. This also includes the indirect and induced economic effect associated with the proposed Project on existing local businesses and the regional economy. These opportunities will develop via contracting work, as well as local project purchasing and expenditures by workers in the local and regional economy. OPG and its DB Contractor, will also facilitate economic opportunities for any First Nations/Indigenous peoples and specifically Wahnapitae First Nation through training, employment and sub-contracting opportunities.

OPG anticipates that the re-developed GS will result in payment of $156,000 per annum to the Province in Gross Revenue Charges which consists of $32,500 in property taxes and $123,500 in water rental charges.

The proposed Project is in conformity with the existing land use policy for the area. OPG has had initial consultations with the City of Greater Sudbury on municipal issues. Further discussions are required but there are no major issues of concern.

As the proposed Project merely replaces the existing 100-year-old GS it results in no changes to the character of the area or any nearby land and resource uses.

OPG will continue to operate the Coniston GS and the other plants on the Wanapitei River in full accordance with all flow and water level targets and compliance conditions in the Wanapitei River Water Management Plan (WRWMP), including the summer conditions. Overall, the proposed GS will not result in significant changes to recreational use upstream or downstream on the river.

1 Introduction

1.1 Regulatory Framework and Environmental Assessment Process

In Ontario, proposed waterpower facilities are subject to the *Environmental Assessment Act* (*EA Act*). The Ontario Waterpower Association (OWA, 2018) developed the Class Environmental Assessment for Waterpower Projects (OWA Class EA) process which was approved by the Ontario Minister of the Environment and the Lieutenant Governor in Council in 2008. The *EA Act* formally recognizes the OWA Class EA process which outlines the requirements for Environmental Assessment (EA) approval. The proposed Coniston Station Re-Development Project (CSRP) has been carried out according to the eighth edition of the OWA Class EA. While a ninth edition of the OWA Class EA was recently approved by the MECP (2022), the environmental impact assessment process, the Environmental Report and TSDs have been carried out according to the eight edition of the OWA Class EA because OPG had been actively carrying out the project and this environmental assessment since 2019. Under the OWA Class EA eight edition, the proposed CSRP is classified as a “Project Associated with Existing Infrastructure”.

1.2 Other Environmental Approvals

Other permits, approvals and clearances will be sought as the proposed Project moves into the construction stage. Section 7.2.4 and Table 7.2 of the Environmental Report (ER) identify a range of possible approvals required during construction and or operations; however, specific permits and approvals will likely be required under the provincial *Lakes and Rivers Improvement Act* (*LRIA*), *Environmental Protection Act* (*EPA*) and *Ontario Water Resources Act* (*OWRA*).

1.3 Overview of the Socio-Economic and Land-Use Technical Support Documents

This Socio-Economic Technical Support Document (TSD) is the product of close to three years of extensive study and consultation. The ER and the associated TSDs were prepared by Arcadis Canada Inc. with the assistance of Ontario Power Generation (OPG) and KGS Group.

Data sources used to document the existing environment included published and unpublished literature, government files, personal interviews, public open houses and field studies. Where possible, existing data sources were used; however, extensive field studies were required to complete the study.

This Socio-Economic TSD is organized into five chapters:

- Chapter 1.0 – introduces the proposed Project, outlines the EA process and other environmental approvals, and lays out the various chapters;
- Chapter 2.0 – provides a detailed project description;
- Chapter 3.0 – provides a description of the existing socio-economic environment;
- Chapter 4.0 – provides an overview of socio-economic effects and mitigation measures during construction and operations, and discusses the significance of effects; and
- Chapter 5.0 – provides the References.

2 Project Description

Ontario Power Generation (OPG) is proposing to re-develop the existing Coniston Generating Station (Coniston GS) and replace it with a new approximately 6.0 megawatt (MW) generating station with two generating units. The Project involves the demolition and removal of the existing powerhouse and construction of a new powerhouse.

The Project will be constructed by a Design Build Constructor that has not yet been retained. OPG is advised by KGS Group (the Owner's Engineer) and Arcadis (the Environmental Consultant).

2.1 Project Location

The existing Coniston GS is located within the City of Greater Sudbury about 16 km east of the city centre of Sudbury. Greater Sudbury is a large regional municipality that includes the former City of Sudbury, several former towns and villages and large rural areas. The Coniston GS is situated between and slightly south of two of these former villages, Coniston and Wahnapitae, on the shore of the Wanapitei River (see Figure 2-1).

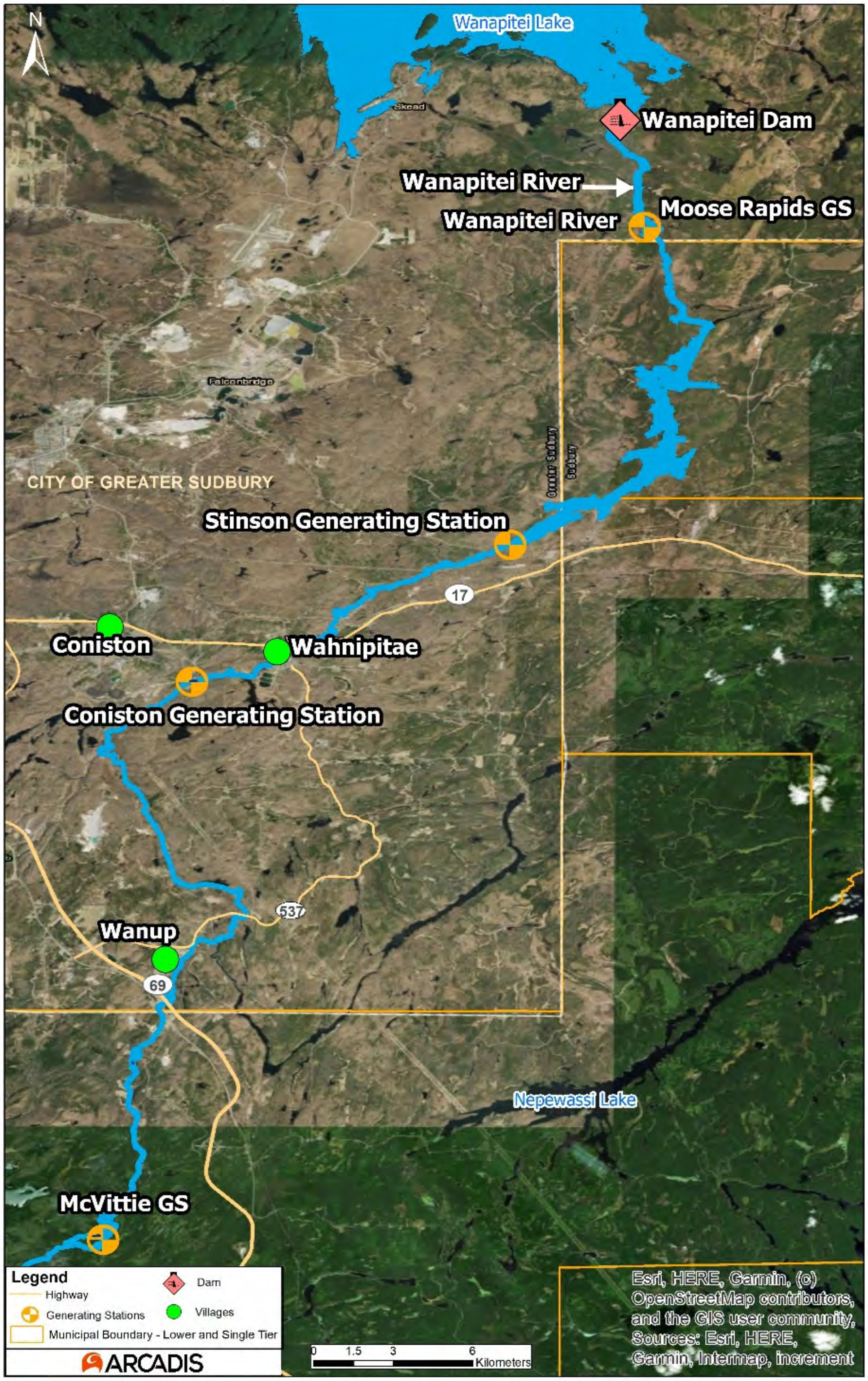


Figure 2-1 Location of the Coniston Generating Station

The Wanapitei River is a tributary to the French River. The headwaters of the Wanapitei River consist of a network of streams and lakes located in northeastern Ontario, north of the City of Greater Sudbury. The river has a general southward direction and is 167 km long where it drains into the French River. Its drainage area covers over 3,341 square kilometers. OPG owns the Wanapitei Control Dam (which controls outflows from Wanapitei Lake), and three generating stations on the River at Stinson, Coniston and McVittie. A fourth hydroelectric generating facility located at Moose Rapids, just south of the outlet of Lake Wanapitei, is owned by Trans-Alta.

As shown in Figure 2-1, Coniston GS is located approximately twenty-five kilometers south of the Wanapitei Dam that controls levels on Wanapitei Lake and flows down the river. The Coniston GS is situated between two other GSs. Stinson GS is operated by OPG and is located ten kilometers upstream of Coniston GS. McVittie GS is operated by OPG and is slightly over 20 kilometers downstream of Coniston south of Wanup.

The Coniston GS is located just outside the Village of Wahniptae and is accessed by the Trans-Canada Highway (Highway 17) and then the approximately 2-kilometer-long gravel Coniston Hydro Road. That road is gated at the OPG entrance to the Coniston GS site. If there are improvements that need to be made at the Highway this would involve a joint Ministry of Transportation/City of Greater Sudbury review. Any improvements to Coniston Hydro Road should also be brought forward to the city for discussions. OPG is of the opinion that the only road improvements required for the project are those that are internal to its property.

2.2 Existing Coniston Generating Station

2.2.1 History

Coniston GS was built by the Wahnapitae Power Company in 1905. At the time, this station was known as the upper plant or Plant No. 1. Unit 1 was placed in service that same year, while units 2 and 3 did not come into service until 1907 and 1915, respectively. In 1913, the GS supplied the Coniston Smelter with some of its electric power. With the location of the smelter, Coniston grew from a village to a town within the Township of Neelon and Garson. In 1929, The International Nickel Company (INCO) consummated a merger with the Mond Nickel Company. The Wahnapitae Power Company operated three generating stations (Coniston, McVittie and Stinson) and furnished power to the Mond Nickel Company at Coniston, the Treadwell Yukon Company, Falconbridge Nickel Mines and the City of Sudbury. The first hydroelectric power used by the Mond Nickel Company was supplied by this company. Power was furnished to the mine and smelter of the British American Nickel Corporation and to the Moose Mountain iron mine while those properties were operating. Control of the Wahnapitae Power Company's properties was acquired by the Hydro-Electric Power Commission of Ontario (later Ontario Hydro) in 1929. From February 1929 until April 1930, the company continued as a joint stock company with the Commission's operating department controlling the operation of the three generating stations and transmission lines, the frequency being 60 Hz. In 1930, the Commission completed the purchase on behalf of the Provincial Government, and all the generating stations and transmission lines formerly owned by this company were included in the Sudbury area of Northern Ontario properties. Assets were transferred to OPG on April 1, 1999 (MNR, *et al*., 2011).

2.2.2 Existing Station

The existing GS has three double Francis units operating at a head of 16.5 m, with capacities of 0.9 MW (Unit 1 in 1905), 1.15 MW (Unit 2 in 1907) and 2.7 MW (Unit 3 added in 1915). The station has a total installed capacity of 4.75 MW, with a plant discharge flow of 44 m^3/s at maximum plant flow and 33 m^3/s at peak efficiency. The facility is old having been constructed in 1905 and the turbine units have reached the end of their service life. Two of the units are no longer running and the remaining unit is currently operated in a “run-to-fail” mode. The remaining unit is Unit #3 and has a capacity 2.7 MW. The Unit #1 penstock has collapsed while the Unit # 2 penstock was taken out of service due to being unsafe in its current condition based on its thickness, vibration and movement. The remaining penstock is in poor to fair condition.

While OPG intends to extend the life of the power production component of the Coniston GS, most of the other features and equipment at the site pertaining to water management will remain as is. Figure 2-2 below shows an aerial image of the Coniston GS and key surrounding features.

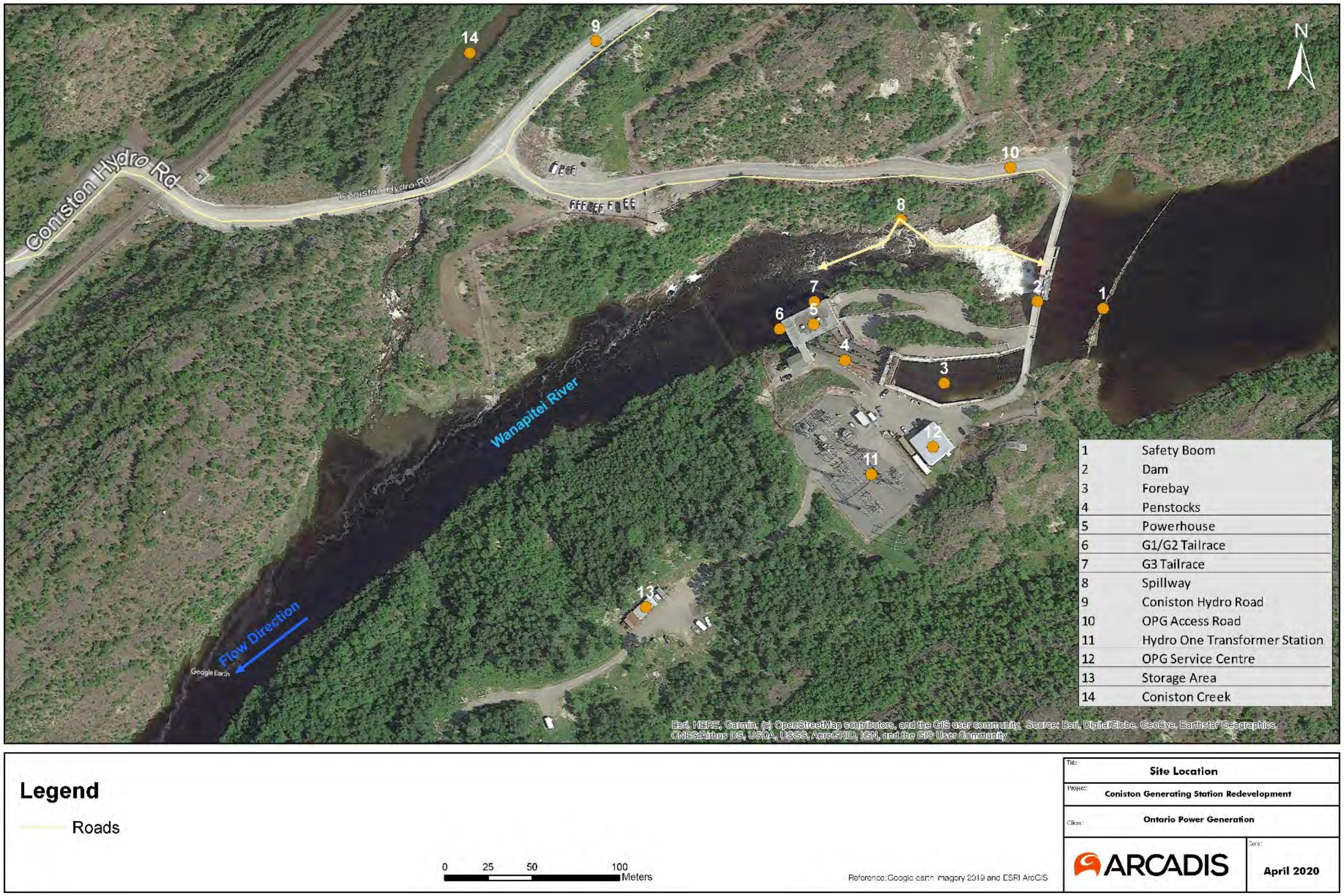


Figure 2-2 Coniston Generating Station Site Location Features and Facilities

The various features and facilities at the Coniston Generating Station are described below and depicted on Figure 2-2.

- #1 – Upstream Safety Boom;
- #2 – Main Dam;
- #3 – Forebay;
- #4 – Penstocks;
- #5 – Powerhouse;
- #6 – G1/G2 Tailrace;
- #7 – G3 Tailrace;
- #8 – Spillway;
- #9 – Coniston Hydro Road;
- #10 – OPG Access Road;
- #11 – Hydro One Transformer Station (currently has been decommissioned and removed);
- #12 – OPG Service Centre;
- #13 – Storage Area;
- #14 – Coniston Creek.

With respect to the existing facility the following is a short description of some of the key features.

Water-retaining structures include a main dam with sluiceway (total five bays) and inlet to the forebay canal, north forebay wall and head works for the powerhouse. The station is controlled from the Ontario Power Generation, Northeast Control center in Timmins. The concrete dam comprising of five sluiceways was constructed in 1938 and rehabilitated in 1955 and 1992. There are two mechanical gates and three stop log sluices. Each sluice has an individual discharge capacity of 88.3 m^3/s, for a total dam discharge capacity of 441.5 m^3/s. OPG will be reviewing the IDF capacity of the main dam as part of its overall dam safety assessment program.

The inlet and bridge structure was constructed in 1938 and consists of two bridge spans with a central pier. The centre pier is constructed on rock and divides the water passage into 2 sections temporarily. The bridge is currently load restricted and requires repair.

A coarse trashrack is located upstream of the bridge for removal of large logs. The concrete is original and new handrails have replaced the existing timber wheel guards.

The forebay canal walls were originally constructed in 1905 of ashlar masonry. A new concrete liner for the walls was constructed in 1982. Repairs to the headworks structure were also undertaken at the same time. A concrete cap, head walls, piers, base slab and gains were constructed upstream of the existing ashlar masonry headworks. The headworks structure now consists of four (4) outlets that are equipped with gates and hydraulically operated hoists (WSP, 2016).

The penstocks are original to the station and consist of riveted steel plates supported by concrete saddles. The Unit 1 penstock collapsed in February 2013 while dewatering due to a vacuum created in the penstock caused by the freezing of its air vent. It is no longer in service. Unit 2 is fed by a single penstock and Unit 3 is fed by two (2) penstocks that converge into a single penstock just downstream of the headworks. The Unit 2 penstock was taken out of service due to unacceptable thickness of the material, vibrations and movement. Each penstock has vertical air vents mounted at the upstream end of the penstocks, downstream of the headworks (WSP, 2016).

The powerhouse is the oldest structure at the site, constructed in 1905. A major repair to the powerhouse superstructure that included the replacement of the original timber pitched roof with a concrete flat roof was completed in 1954 (WSP, 2016). The existing generating units are double camelback Francis units that utilize a combined maximum flow of 44.3 m^3/s. Unit 1 and Unit 2 have an installed capacity of 0.9 MW and 1.15 MW, respectively. Unit 3 has an installed capacity of 2.7 MW.

The new Coniston GS will be located across the road from the new 44 kV switchyard which is connected to Hydro One 44 kV M1 Feeder. The original HONI 22 kV switchyard was decommissioned in 2019. The 44 kV switchyard contains new equipment including Main Output Transformer and other 44 kV equipment, which will retained. The new Coniston GS will be connected to this switchyard.

The Coniston Production Centre, constructed in 2005, is a pre-engineered steel building comprised of metal siding, insulation and liner. The building houses offices, a lunchroom, a locker room and a mezzanine level over top. The remaining space is an open area used for maintenance purposes.

The site access roads have precast jersey barriers installed in 2013 to prevent vehicles from veering off-course.

2.2.3 Operations

The Wanapitei River Water Management Plan (WRWMP) describes the operational requirements for the Coniston GS. As per the WRWMP (MNRF *et al*, 2011), the Wanapitei River is operated to optimize flood mitigation, recreation and aquatic needs as the highest priorities within the watershed. Power generation occurs as a secondary benefit. As part of the development of WMP, operating limits were established for each control and power generation facility in the watershed.

OPG owns the Wanapitei Control Dam (which controls outflows from Wanapitei Lake), and three generating stations on the River at Stinson, Coniston and McVittie. A fourth hydroelectric generating facility located at Moose Rapids, just south of the outlet of Lake Wanapitei, is owned by Trans-Alta. Except for Wanapitei Lake, there is very little water storage capability on the Wanapitei River and specifically in the reservoirs above each of the four GSs. As such, the Wanapitei River's four GSs operate in a cascade form of a system where water isn't retained for long above each facility but quickly passed on to the next (when there is sufficient water). The WRWMP does refer to the system as a run-of-the-river system (Figure 5-3 of the WRWMP) and defines the term, although the term can be interpreted differently. Flows on the Wanapitei River are generally controlled by the operation of the Wanapitei Lake Dam, which regulates water levels on Wanapitei Lake. The operation goal for the dam is to maintain proper balance between power production and impacts of flooding downstream with the effects of upstream high-water levels on lake residents. In general, the dam is opened gradually over the winter to lower the lake level in anticipation of the spring thaw. At the onset of the freshet, flow through the dam is closed off. The dam is reopened once inflows to the lake and river have subsided. Monthly average and maximum flows are shown on Figure 2-3 below. This data is generally reflective of the Wanapitei Dam operating strategy described above. During the winter months, flows are fairly steady as the dam is opened to draw the lake level down. The average flow for April drops notably compared to winter flows, as the dam is closed to prepare for the freshet. Largest flows occur in May and June as freshet flows pass through the system. The lowest flows occur in the late summer and early fall as water is held in Lake Wanapitei for recreational purposes (KGS, 2022).

For Coniston, the legal flow requirement is for 3 m^3/s (calculated as a daily average). The control dam at Lake Wanapitei (which is also operated by OPG) is also required to maintain the 3 m^3/s. It is OPG's understanding that the minimum flow requirement of 3.0 m^3/s exists at the Coniston GS as a recommendation from MECP. This 3.0 m^3/s daily average minimum flow is in place to dilute the metal concentration of inflows from Coniston Creek, downstream of Coniston GS (MNR, *et al.,* 2011). The current operating regime at Coniston GS does not have any seasonal limits.

Coniston also has legally required water ranges upon which it manages through the reach of the river above the facility. The minimum lower limit is 236.62 CGD (Canadian Geodetic Datum) and a maximum upper limit of 237.17 CGD.

Hydrologic data for Coniston Generating Station was provided by OPG. The flow and water level data consisted of daily averaged headwater levels, tailwater levels, and inflows between 1951 and 2017. The recorded tailwater levels were used to generate a tailwater rating curve for the plant. Figure 2-3 below displays the monthly minimum, 10^{th} percentile, 50% percentile, 90^{th} percentile and maximum average flows for 1951 to 2017.

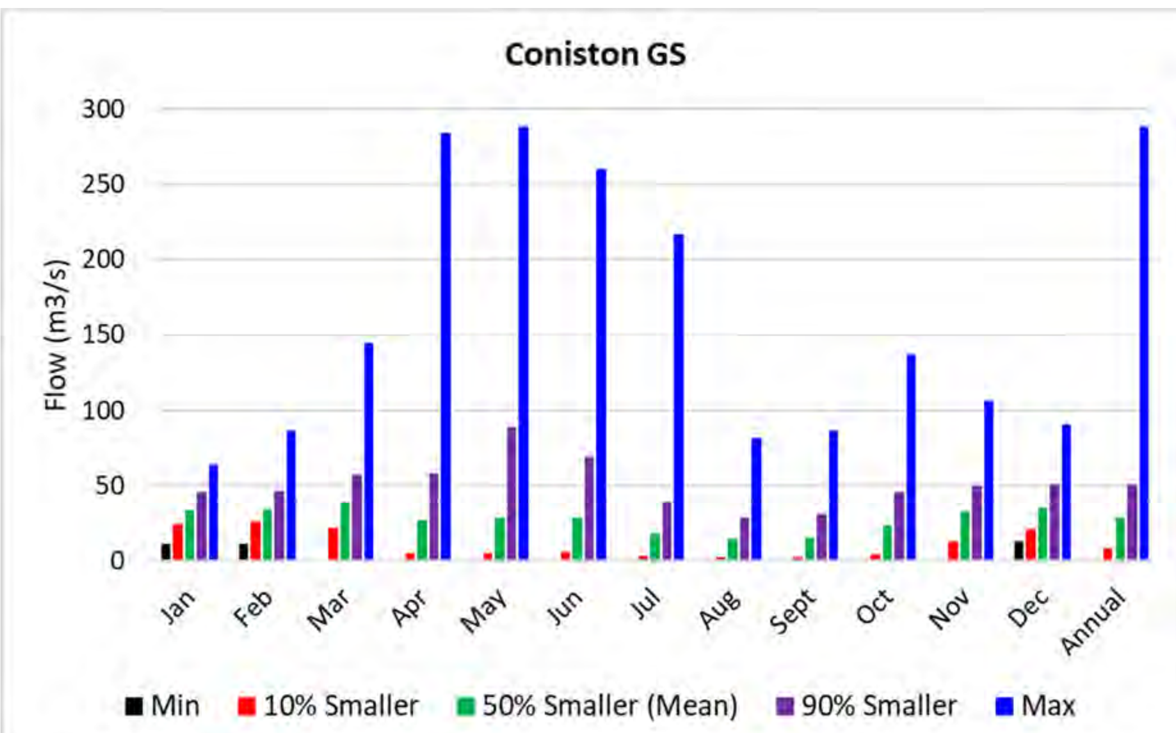


Figure 2-3 Monthly Flows at Coniston GS (KGS Group 2022)

OPG tries to operate its generators within the plant at peak efficiency thereby producing the greatest amount of hydro-electricity with the flows available. However, throughout the year, flows in the river may not be enough to operate the generators efficiently and the facility may vary flows through the unit(s), but a daily 3 m^3/s average is maintained. This may result in minor fluctuations of downstream flows over a relatively short period of time. OPG attempts to maintain a continuous flow throughout the day. At times, it may be necessary to shut down all turbines during very low flows, but a daily 3 m^3/s average is maintained. The existing WRWMP rules are always followed. The operating rules were set up recognizing the ecological conditions of the river and were the culmination of a multi-year planning process involving numerous stakeholders and government agencies examining various conditions and issues on the river.

2.3 Alternatives Analysis

OPG examined three alternatives for the life extension of the Coniston GS.

2.3.1 Alternatives

The following were the alternatives considered.

2.3.1.1 Alternative 1 – Redevelopment of Site with a New Powerhouse

Under this alternative an entirely new station would be constructed, likely just upstream of the existing powerhouse in the vicinity of the existing intake structure and penstocks. The existing powerhouse, intake structure and penstocks would be demolished. The new station would have two vertical units that are expected to produce just over 6 MW. Implementation of this alternative would involve the following components.

- Construction of a new powerhouse, with all new water-to-wire equipment and an integrated intake structure.
- Removal of all existing power equipment and demolition of the existing powerhouse.
- Demolition of the existing intake structure and penstocks.
- Partial reconstruction of the intake canal to facilitate tie in of the new structure and minor rehabilitation of the remaining intake repair any deficiencies.
- Removal and replacement of the existing forebay bridge.
- Connection to existing substation.

2.3.1.2 Alternative 2 – Refurbishment of the Existing Powerhouse

Under this alternative, major modification and civil work would occur within the powerhouse to replace the current units with two new units in two of the existing bays. The existing intake structure and penstocks would be replaced. The upgraded station will have two units that would be expected to produce approximately 5.5 to 6.0 MW. Implementation of this alternative would involve the following components.

- Excavation and civil work to remove existing units and expand two of the existing bays to accommodate new units.

- Installation of new turbine/generator equipment into the existing powerhouse, including all new electrical and balance of plant equipment.
- Modifications to the powerhouse superstructure to allow for new units, including removal of mezzanine, construction of hatches in the existing roof to lift in new equipment and alteration of wall openings where penstocks enter the building.
- Demolition of existing intake structure and penstocks and replacement with new.
- Partial reconstruction of the intake canal to facilitate tie in of the new structure and minor rehabilitation of the remaining intake repair any deficiencies.
- Removal and replacement of the existing forebay bridge.
- Connection to existing substation.

2.3.1.3 Alternative 3 – Overhaul of the Units in the Existing Powerhouse

This alternative would involve like for like replacement of end-of-life equipment in the station to extend the life of the Unit 3 and bring Units 1 and 2 back into service. The existing intake structure and penstocks would be replaced. The upgraded station would restore the capacity of the station back to the original 4.75 MW. Implementation of this alternative would involve the following components.

- Replacement of end-of-life equipment including turbine runners, generators and most electrical and balance of plant equipment.
- Demolition of existing intake structure and penstocks and replacement with new.
- Partial reconstruction of the intake canal to facilitate tie in of the new structure and minor rehabilitation of the remaining intake repair any deficiencies.
- Removal and replacement of the existing forebay bridge.
- Connection to existing substation.

2.3.2 Alternatives Selection

OPG’s Engineer, KGS Group, completed conceptual designs and high-level cost estimates for the alternatives. OPG financial evaluation of the alternatives was undertaken and included consideration of construction costs, operating and maintenance costs, energy produced and station life. The analysis showed that Alternative 3 was not a feasible option, as it was inferior in terms of lifecycle cost per energy produced and service life of the asset as compared to the other two alternatives. Alternatives 1 and 2 were both deemed to be feasible.

A qualitative analysis was completed for the two remaining options, comparing the benefits and risks of the redevelopment and refurbishment alternatives. The assessment considered twenty-two qualitative factors, grouped into 3 broad categories: (1) Environmental Considerations, (2) Operations and maintenance benefits, and (3) Construction advantages and risks. While Alternative 2, Refurbishment, did provide some environmental advantages in that the footprint of the construction may be slightly smaller (and retention of the original powerhouse), overall Alternative 1, Redevelopment, scored better in the assessment. In particular, constructing a new generating station eliminates the construction risks associated with modifying a building that is greater than 100 years old. It also enables the design to incorporate many operational and maintenance benefits that will improve energy generation, safety and water management for the life of the new station. As a result, Alternative 1 was identified as the preferred alternative.

2.4 General Layout and Description

2.4.1 Characteristics

As already explained the GS will have an effective capacity of approximately 6 megawatts with two turbines. The re-developed GS will have the following characteristics (these could change slightly depending on the final Turbine-Generator selected):

- Effective Capacity of 6 MW;
- Estimated Annual Energy Generation of 30 MWh (P50);
- Number of Units – 2;
- Station Flow – 43.5 m^3/s;
- Minimum Operating Flow – 8.7 m^3/s;
- Minimum Operating Flow per unit – 5 m^3/s;
- Average Annual Flow – 30 m^3/s; and
- Average Head of 16.5 m (range of head from 13 m to 17.5 m).

2.4.2 General Layout – Site Plan

The proposed site plan for the new GS is shown below in Figure 2-4. This site plan labelled as General Arrangement Plan Final Conditions shows what the re-developed Coniston Generating Station will look like following the completion of the construction.

The existing access road, **Coniston Hydro Road** will still be used for access. There are various points available for parking near the entrance of the site before Coniston Hydro Road crosses the Main Dam.

The existing **Main Dam and Sluiceway** will be largely unaltered. A **New Bridge** south of the Main Dam will be built in the alignment of the existing bridge. The centre pier and other submerged features will be removed. The coarse trash rack at the upstream extent will be removed.

The existing **Work Centre** and **Switchyard** which are depicted in the southeast corner of the site exist today and will not be impacted by the re-development.

A new **Powerhouse** (which contain the equipment to generate power) will be constructed approximately 30 metres from the existing Powerhouse. That old powerhouse will be demolished and removed as its area will become part of the tailrace/river. The tailrace area will be excavated to the existing river and the existing tailrace channel beyond the old powerhouse will be excavated or dredged to remove debris which has accumulated since original construction.

Some work will be required on the intake canal, specifically **New Channel Walls** and a **New Intake Structure** are required where water enters the powerhouse. Excavation will be required within the canal and alongside its southern bank as well as upstream of the bridge to provide suitable velocities for fish in the vicinity of the bridge structure where the existing channel geometry is narrowest. This will also require the removal of the existing bridge pier and submerged concrete trashrack sills.

To facilitate the construction of the new powerhouse, excavation, fill, rock stabilization and new **Retaining Walls** will need to be constructed. Access to the new powerhouse will be made north of the intake channel and will require placement of fill and the construction of retaining walls to suit the new powerhouse location.

Access roads on the south side of the intake channel will be improved to permit construction access to the existing parking and **Parking, Storage and Turnaround** area created from the decommissioned HONI 44 kV substation.

The existing **Communications Tower** and **Safety Boom** will remain in their current conditions and locations.

The **Construction Laydown Area** will be reclaimed and revegetated if the area is not needed. A portion of the laydown area will likely remain as it exists now providing storage for OPG equipment.

Other smaller improvements will be made to the site which may include relocation of the existing diesel generator to a new location onsite, construction of small ancillary buildings, construction of duct banks and overhead power/communication lines, and improvements to drainage and road safety onsite.

Figure 2-4   Proposed Site Plan for the Coniston GS – Permanent Facilities

Figure 2-5 shows the Site Plan with the permanent and construction stage features. This Site Plan labelled as the General Arrangement Plan Construction Conditions shows the re-developed Coniston Generating Station but also shows where some temporary construction features are required, and temporary construction works will occur.

In front of the **Forebay Bridge** and downstream of the **Powerhouse**, **Cofferdams** will be required to hold back water while construction is undertaken in predominantly dry conditions. The cofferdams are important features to allow safe construction of the project. The cofferdams will allow the Intake and tailrace Channels to be dewatered and excavated during construction as well as allow the demolition of existing structure in the dry.

In the middle of the drawing and around the existing and proposed powerhouses the area will need to be extensively excavated and regraded to ensure the stability of the area. Rock excavation will need to occur in the riverbed to allow for construction of the tailrace and is contemplated to be completed from behind a cofferdam. The existing powerhouse will be demolished in the dry behind the cofferdam to allow for construction of the new powerhouse to occur in the dry. Some rock excavation will need to occur in the existing riverbed behind the cofferdam to allow for construction of the Tailrace. All work in the river and on the site will be done according to required permits and approvals and all necessary legislation. On site environmental management will be a key requirement for the construction period. In the southwest corner of the site there will be a large temporary **Construction Laydown and Material Stockpile** area for the constructor to temporarily store materials, equipment, trailers and other items required for construction. This area is already used for this purpose but may be expanded during construction. Areas not needed in the future will be re-vegetated.

Figure 2-5 Proposed Site Plan for the Coniston GS – Permanent and Construction Stage Features

Figure 2-6 shows the General Arrangement of the New Powerhouse and two units with the Final Access Road. The figure also shows the Grading Plan and Profile. Elevations of various features are provided. Water is conveyed to these two units from the existing canal which will have new canal walls near the powerhouse. A new bridge will be constructed over the widened canal. Temporary cofferdams will need to be constructed immediately upstream of the main dam and downstream of the existing powerhouse as shown in Figure 2-7. Vehicular access to the powerhouse will be from a newly constructed access road on the new south side of the building. New retaining walls will be constructed.

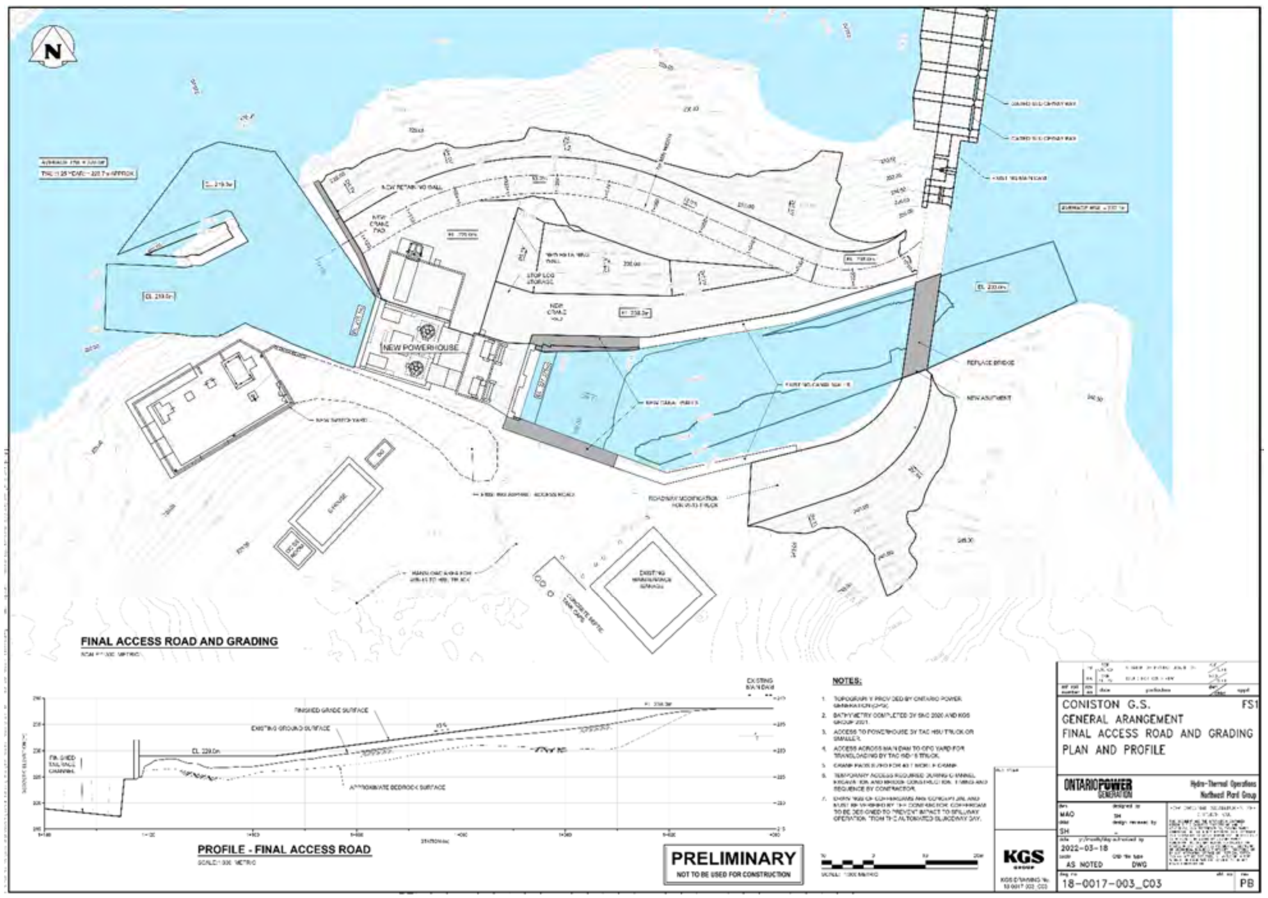


Figure 2-6 Proposed Powerhouse Arrangement Final Access Road and Grading Plan and Profile

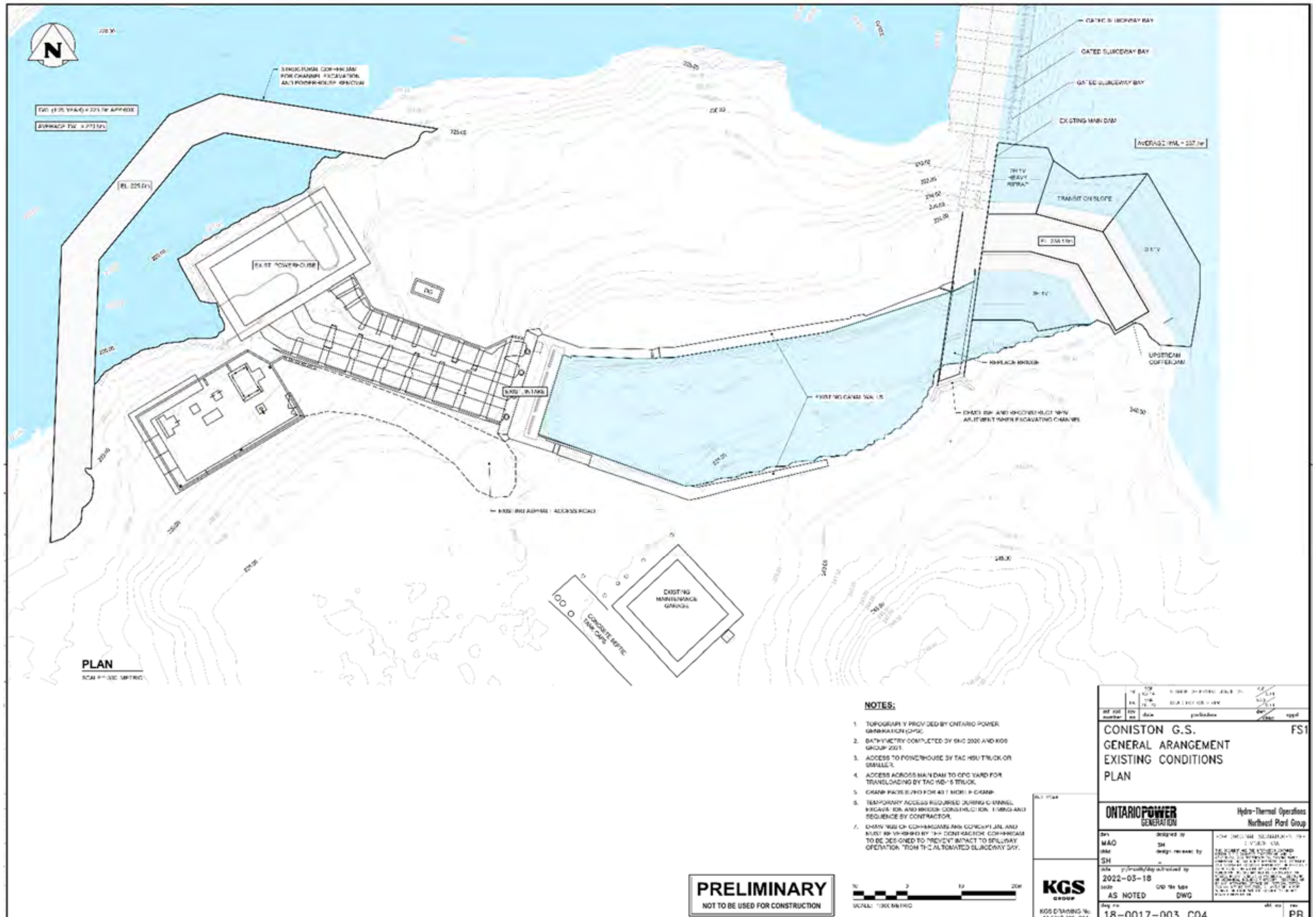


Figure 2-7 Existing Conditions and Cofferdam Arrangements

Figure 2-8 shows the Proposed Powerhouse Arrangement for the Intake and the Powerhouse at a plan level above 228 metres above sea level (MASL). From right to left, the Drawing shows the trashracks, stoplogs, intake gates and hoist house, turbines, the powerhouse floorplan and equipment at this level staircases and draft tube gates. The figure also shows the access doors into the powerhouse and the crane in the upper left corner of the drawing.

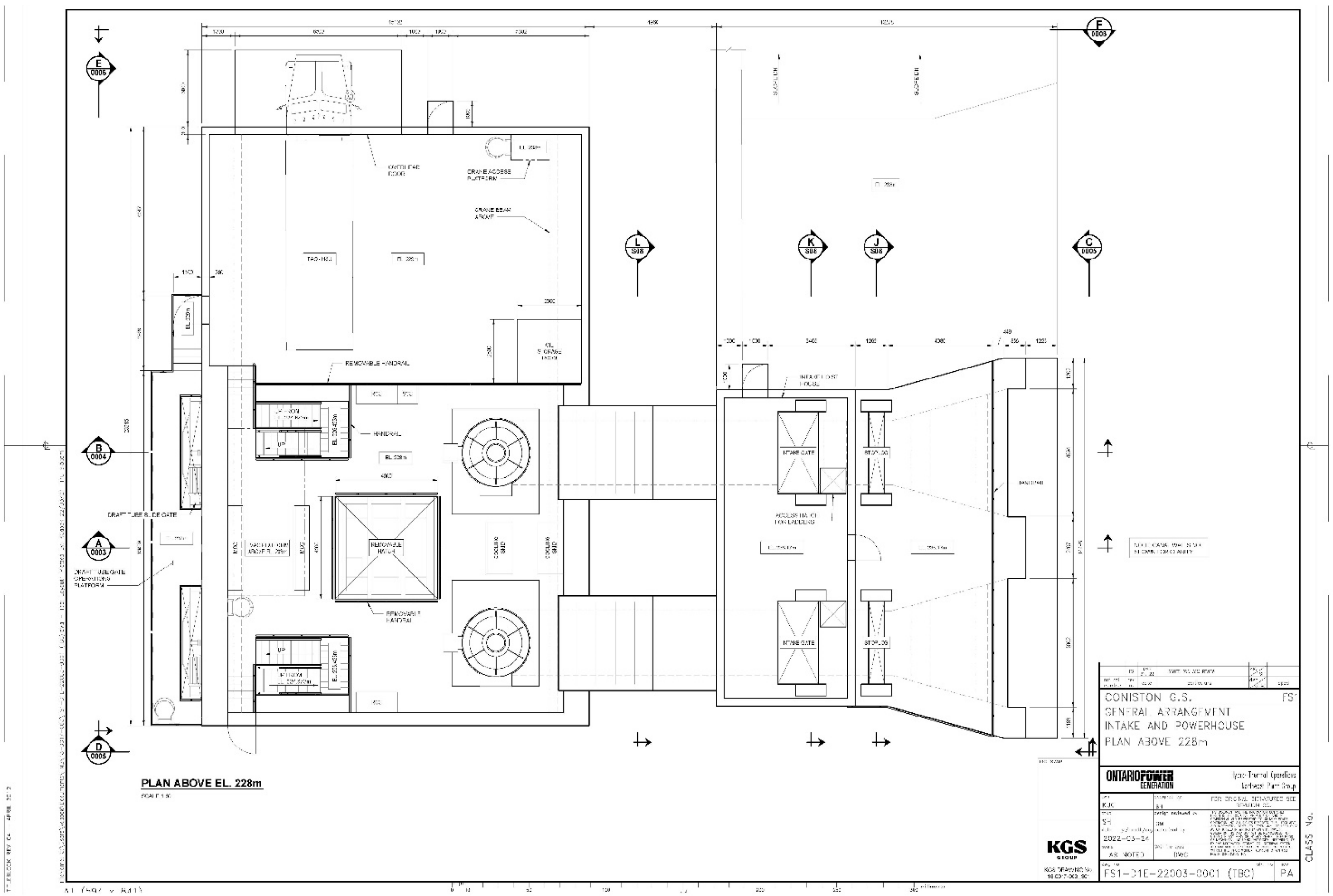


Figure 2-8 Proposed Powerhouse Arrangement for Intake and Power at Plan Level Above 228 MASL

Figure 2-9 shows a longitudinal section for the Intake and Powerhouse Section through the centre of the station through the Sump Pits. These pits will contain the equipment to safely dewater the equipment for maintenance as well as include an oil water separator to process station drainage and spills to prevent environmental contamination.

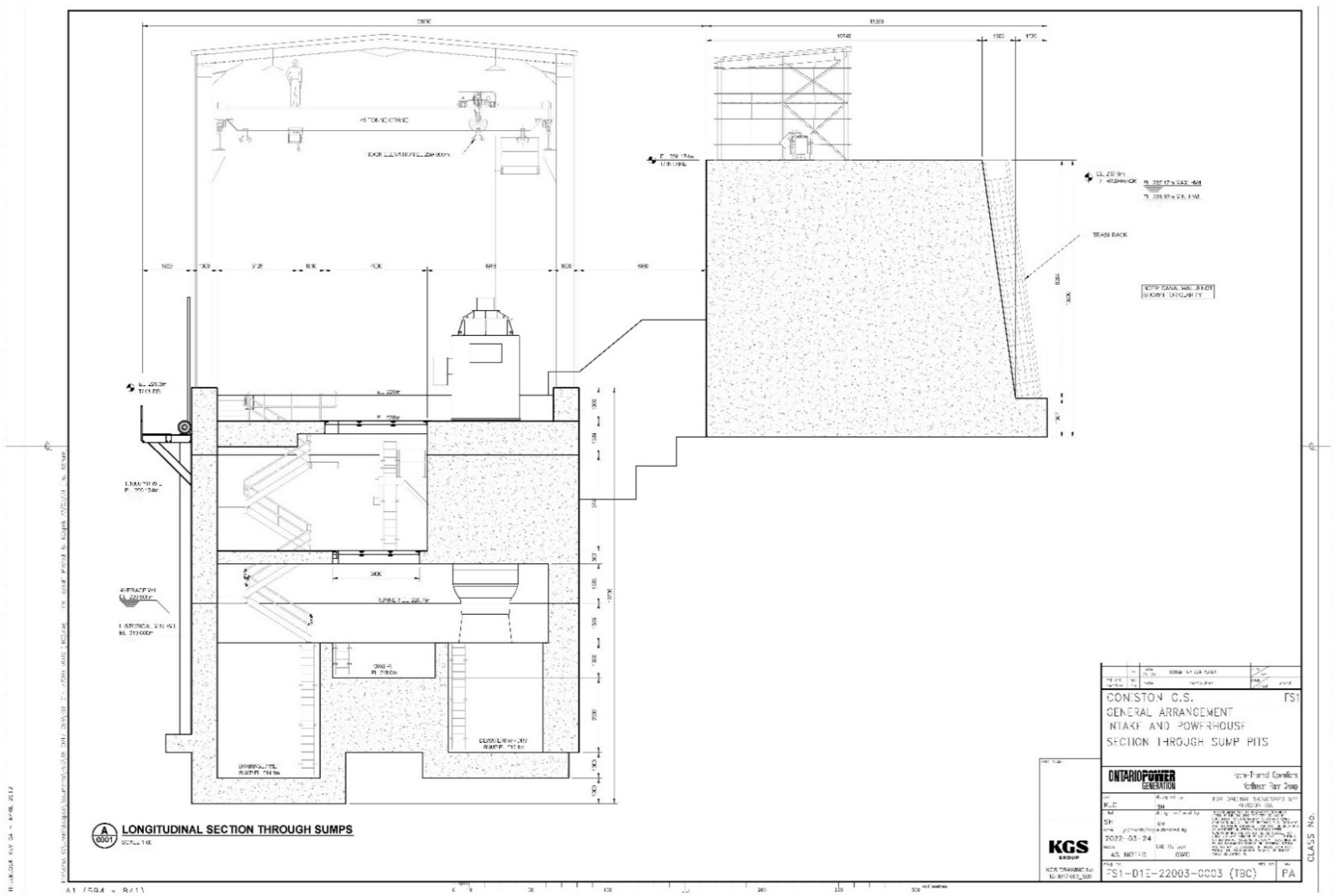


Figure 2-9 Proposed Powerhouse – Longitudinal Section for Intake and Powerhouse through the Sump Pits

Figure 2-10 shows the longitudinal section of the Intake and Powerhouse through one of the units. From right to left it shows the inclined trashracks, stoplogs, intake gate and hoist house, the turbine, water passage, access arrangement for all levels and the draft tube gate. It also shows the crane and a general concept of the powerhouse superstructure.

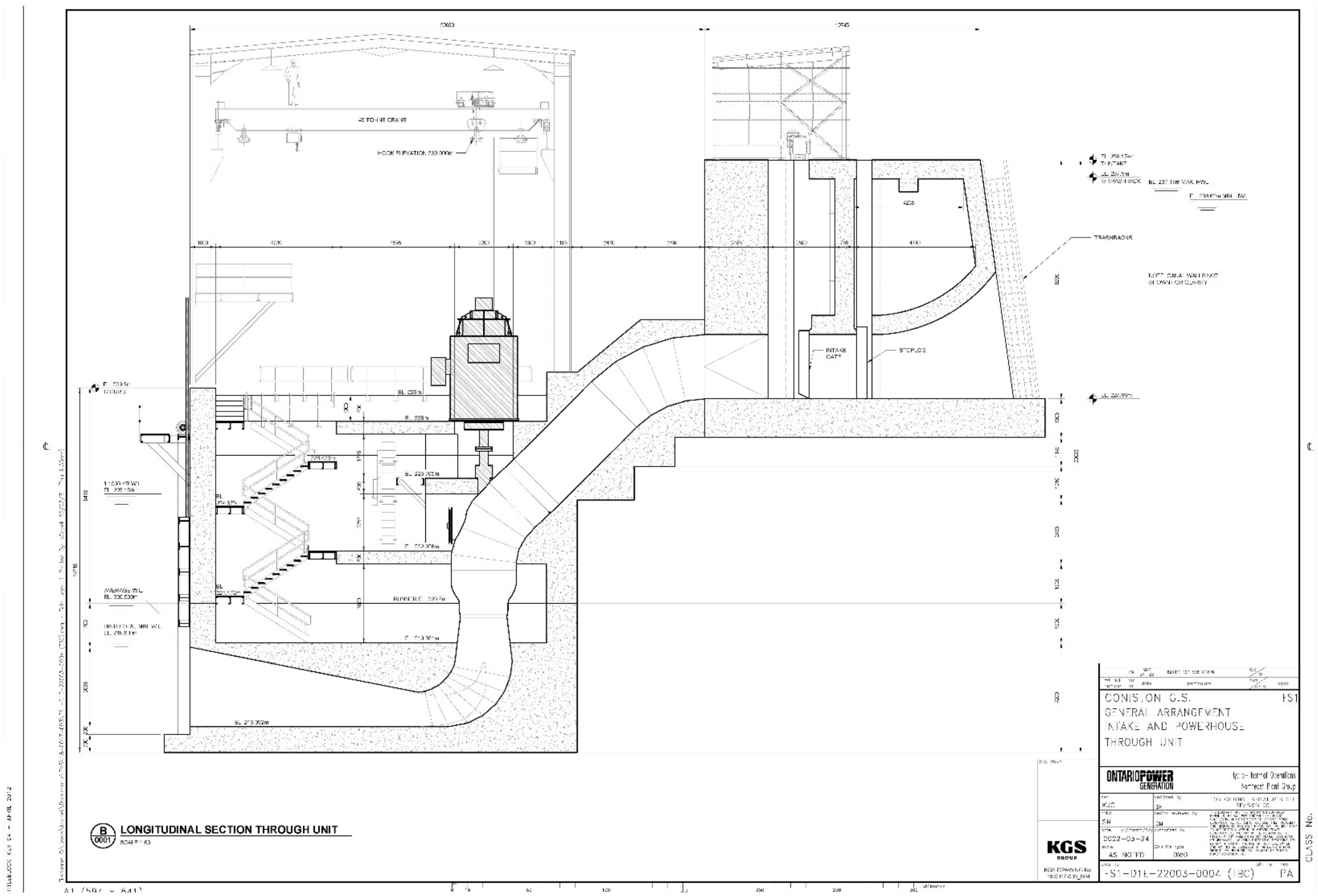


Figure 2-10 Proposed Powerhouse Longitudinal Section of Intake and Powerhouse Thorough Unit

Figure 2-11 shows various exterior elevations of the intake and powerhouse. The elevations for the intake show the trashracks with 50 mm clear spacing.

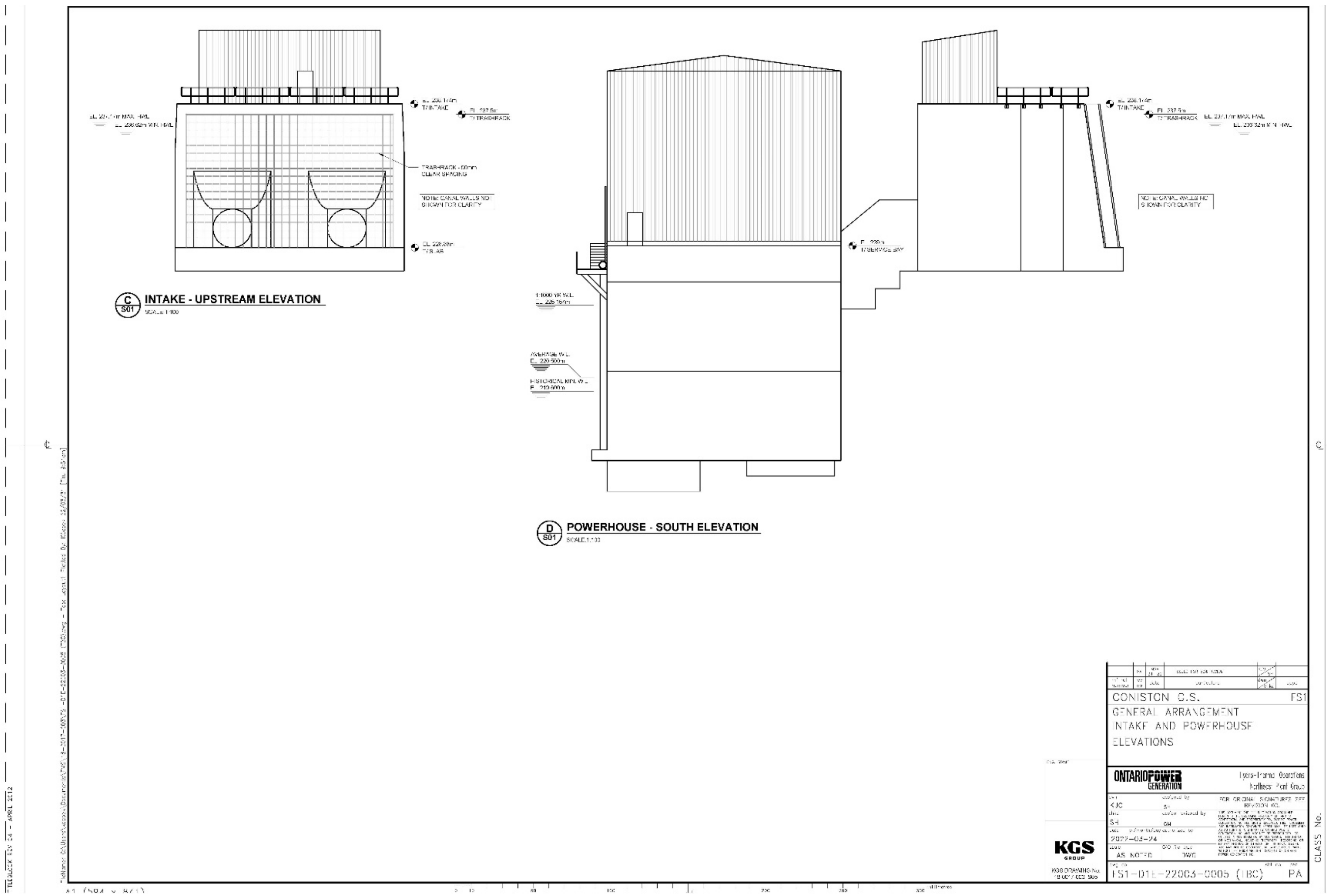


Figure 2-11 Proposed Intake and Powerhouse Various Elevations

2.4.3 Construction Sequencing

While a DBC has not been retained at this time, OPG and KGS are of the view that the construction of the new GS will be undertaken sequentially in the following general stages as shown below.

Stage #1

The first stage of the work will involve preparing the site for construction.

Vegetation will be removed on all areas to be constructed on including laydown areas. This clearing will be outside of the breeding bird and bat seasons (clearing to occur between October 1st to April 1). Merchantable timber belongs to the Crown, although the amount of such material is minimal on site. Should the MNRF be amendable, wood and plant resources will be offered to WFN or other local First Nations for their use.

Any access improvements (road and parking upgrades) required at the site will be undertaken.

Erosion and sediment controls (including turtle exclusion fencing) will be established on the site.

Construction facilities such as trailers will be brought and established on site. Laydown areas will be set up, and trailers, equipment and materials organized into appropriate areas. Establishing laydown areas may mean placing temporary fill material on certain areas.

The upstream cofferdam will be constructed to allow for work on the canal to occur in the dry. This will include building a short access road to facilitate construction of the cofferdam.

A structural cofferdam will be constructed downstream of the proposed powerhouse and tailrace to permit demolition of the powerhouse and excavation of the tailrace in the dry. The downstream cofferdam will be constructed at periods of low river flow while respecting in water work restriction. The existing equipment within the powerhouse will be removed as will the existing penstocks and intake structure.

Stage #2

Stage #2 will involve major excavation and grading at the site in order to ensure proper site conditions for the construction of the powerhouse and any ancillary facilities. The existing intake bridge and pier would be removed. A temporary bridge structure will be constructed to allow channel rock excavation and construction work to be carried out. A permanent bridge would then be constructed and the temporary bridge structure removed.

Water infiltration into the worksite from the cofferdam, overland runoff and seepage through the rock will be managed by the Contractor per their approved sediment control plan. This will include monitoring and treatment of the water from excavations to remove suspended sediments to an acceptable level prior to discharge to the water course.

During this time the existing intake, penstock and portions of the canal walls would be demolished, and the major excavation would be carried out to permit construction of the new powerhouse, intake, canal walls and all retaining walls.

Stage #3

Stage #3 will involve construction of the new powerhouse, intake structure and other structures. Once the powerhouse and intake structure are completed, a significant portion of site regrading would be completed to permit access to the structures. Once access is complete the superstructure of the powerhouse would be completed followed by construction of the interior features and installation of the equipment.

Channel excavation would continue at this time in the Intake Channel and Tailrace. Once all Intake Channel excavation outside of the cofferdam footprint has been completed a rock pad will be constructed to permit blasting under and behind the upstream cofferdam where the new Channel overlaps with the cofferdam.

Stage #4

Stage #4 will involve final installation of all the powerhouse and intake equipment to prepare the station for commissioning and service. Specifically, the draft tube gates for the powerhouse and the stoplogs in the intake will be installed.

Once the intake gates and stoplogs are installed the intake canal will be watered up in a controlled fashion and the remaining Intake Channel blasting completed from the constructed rock pad in the wet. Mitigation measures will be implemented to protect fish and the newly constructed structures. Following blasting the upstream cofferdam will be removed in the wet.

The downstream excavation within the tailrace would also be completed during this stage. Following completion of the excavation the Tailrace will be watered up in a controlled fashion and the downstream cofferdam removed.

Final site grading work would be completed.

Stage #5

Stage #5 would involve the commissioning of the powerhouse and its associated equipment and placing the station into service to generate power. During this time the final clean-up of the site including removal of all temporary construction features and equipment would occur.

Areas planned for re-vegetation will be either re-planted and seeded once the areas have been stabilized, temporary materials such as fill are removed, and overburden/topsoil is replaced.

2.4.4 Major Components

2.4.4.1 Forebay, Bridge Canal and Intake

The existing canal will be dewatered during the construction period to allow the construction of the new powerhouse and intake in the dry. As well, the existing bridge needs to be replaced and the existing bridge pier and concrete trash rack sills removed. As such, a large cofferdam as shown in Figure 2-5 will be constructed. This cofferdam may incorporate a temporary access road during construction while the existing bridge gets removed and replaced. The cofferdam shown is concept only and could be constructed of granular materials or potentially a steel pile and sheet pile arrangement.

Once the cofferdam is constructed the canal will be dewatered (and fish transferred out). The area immediately upstream of the proposed intake will be excavated. Most of the canal walls will be reused and refurbished while canal walls at the intake will be rebuilt.

Further channel excavation will also be carried out upstream of the bridge and in the vicinity of the channel.

A new intake structure will be constructed and tied into the existing canal walls.

The intake channel consists of bedrock and vertical concrete walls. Upstream of the bridge there is a submerged excavated bedrock channel leading to the forebay which currently has some wood debris accumulation due to the concrete trashrack sill present at the bridge. The area has not been investigated in full to date, but this work is planned and should give OPG a better idea on substrate in this area before construction is initiated.

Following construction, the intake canal will remain a bedrock and concrete lined channel. The area upstream of the bridge as shown on Figure 2-6 will be reprofiled for hydraulics and consists of a slightly wider and deeper channel excavated in bedrock. The existing wood debris accumulation and sediment would be removed but is anticipated to develop over time.

The new powerhouse intake will be integrated with the new powerhouse and will be constructed of reinforced concrete. The intake will be equipped with trashracks, suitably sized and with bar spacing to mitigate in as much as possible, fish entrainment. The trashracks will cover the complete area of the turbine water passage intakes. The new trashrack bar spacing will remain consistent with the trashrack spacing at the existing Coniston GS, with 50 mm clear space between the trashrack bars. The new trashracks will be periodically cleaned with rakes as well as using mobile equipment, with space provided on the intake deck for a future trash rack cleaning machine, however, a trash rack cleaning machine will not be provided at this time. Stoplog slots will be provided downstream of the trashracks to provide a means to perform periodic inspections and eventual repairs and servicing of the downstream emergency closure gates in the future. The intake will also include emergency close vertical lift intake gates operated from the intake deck. The intake and the trashrack of the new powerhouse have been designed to minimize potential entrainment of fish with a trashrack velocity of less than 0.9 m/s (at a distance of 75 mm in front of screen).

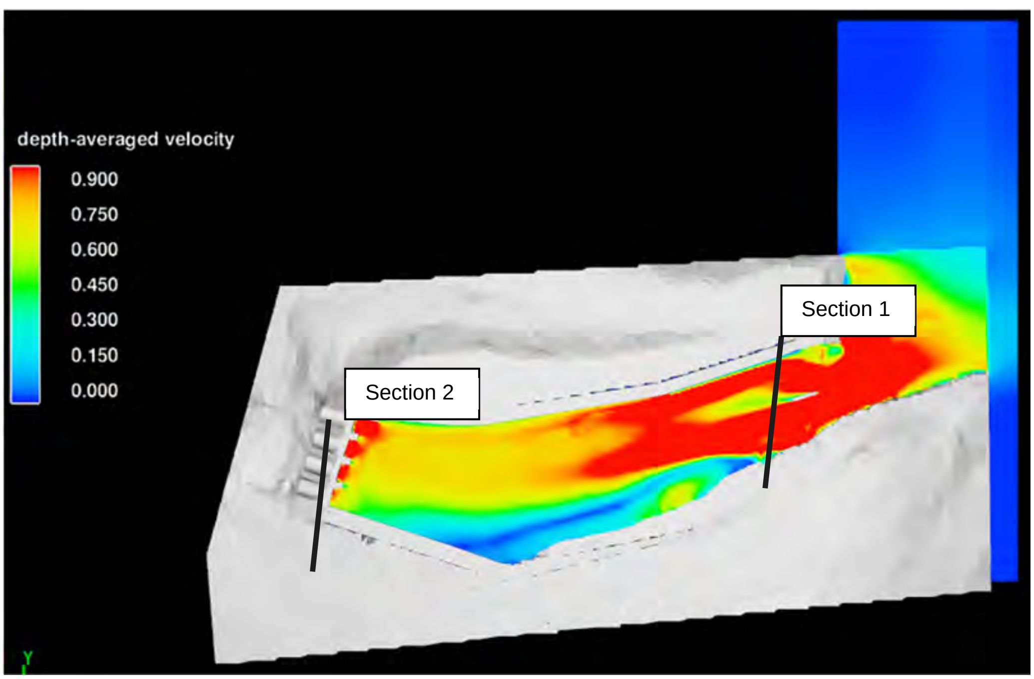
2.4.4.1.1 Approach/Intake Velocities

For the purposes of design, OPG gives direction to its OE and DBC in order to minimize impacts on the aquatic environment.

Trashracks will be designed for a maximum approach velocity (velocity measured 75 mm upstream of the trashracks) of 0.9 m/s at the normal minimum reservoir level.

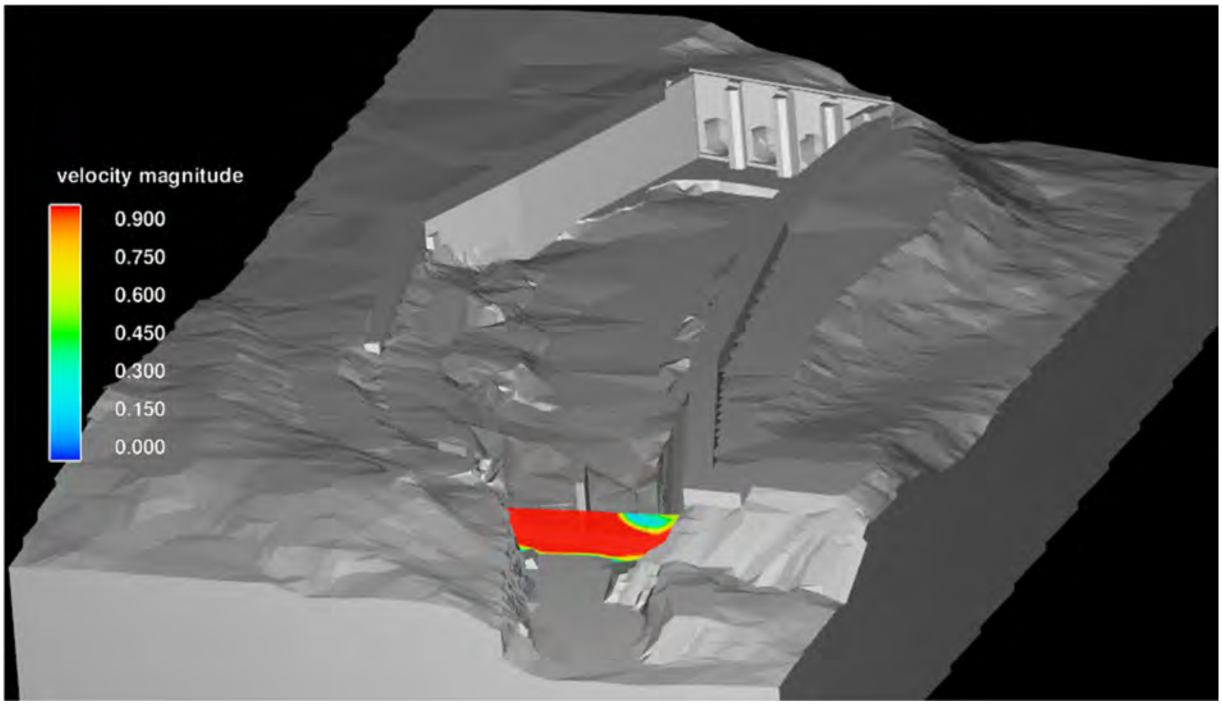
The target average velocity for the Forebay Canal must be less than 0.9 m/s at the lowest level of the reservoir in conjunction with the greatest possible rate of release through the turbines, to ensure that during operation potential ice present in the channel or frazil ice accumulation will not significantly increase head losses in the channel. Increase to the target velocity may only be revised provided that hydraulic, environmental and economic analysis proves that a higher limit is acceptable to OPG. Any proposed increases to the target velocity for the Forebay Canal will be reviewed with OPG for acceptance.

The following Figure 2-12 shows the depth averaged velocity in the existing intake canal operating at 44.3 m^3/s (existing station capacity) at the lowest operational water level of 236.62 m. The figure shows average velocity at or greater than 0.9 m/s in the vicinity of the upstream bridge and no acceptable slower portions of the flow path connecting the intake channel to the forebay area. Based on Figure 2-13, which shows flow velocities upstream of the bridge and trashrack sill, it was determined that channel modification would be required to prevent the entrainment of fish into the forebay channel and that there is currently no escape path for fish in the vicinity of the existing intake bridge. This will require removal of the existing bridge pier, removal of the submerged concrete trashrack sill and rock excavation to widen and deepen the channel through the bridge and upstream to remove the channel constrictions. Additionally, some reprofiling of the canal downstream of the bridge is required.



* The velocity contour has been capped at 0.9 m/s to clearly show the areas of the model that exceed the specified target velocity of 0.9 m/s

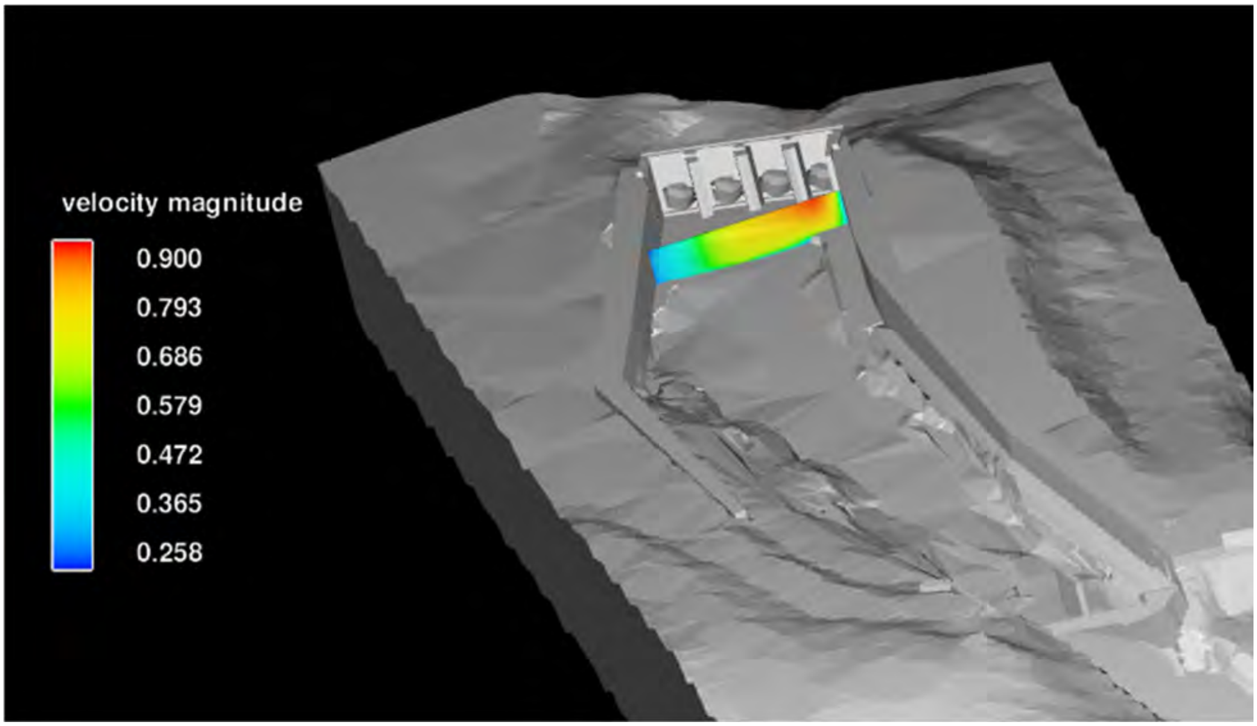
Figure 2-12 Depth Averaged Velocity of Existing Approach Canal



* The velocity contour has been capped at 0.9 m/s to clearly show the areas of the model that exceed the specified target velocity of 0.9 m/s

Figure 2-13 Existing Flow Conditions Under Bridge (Section 1 Figure 2-12)

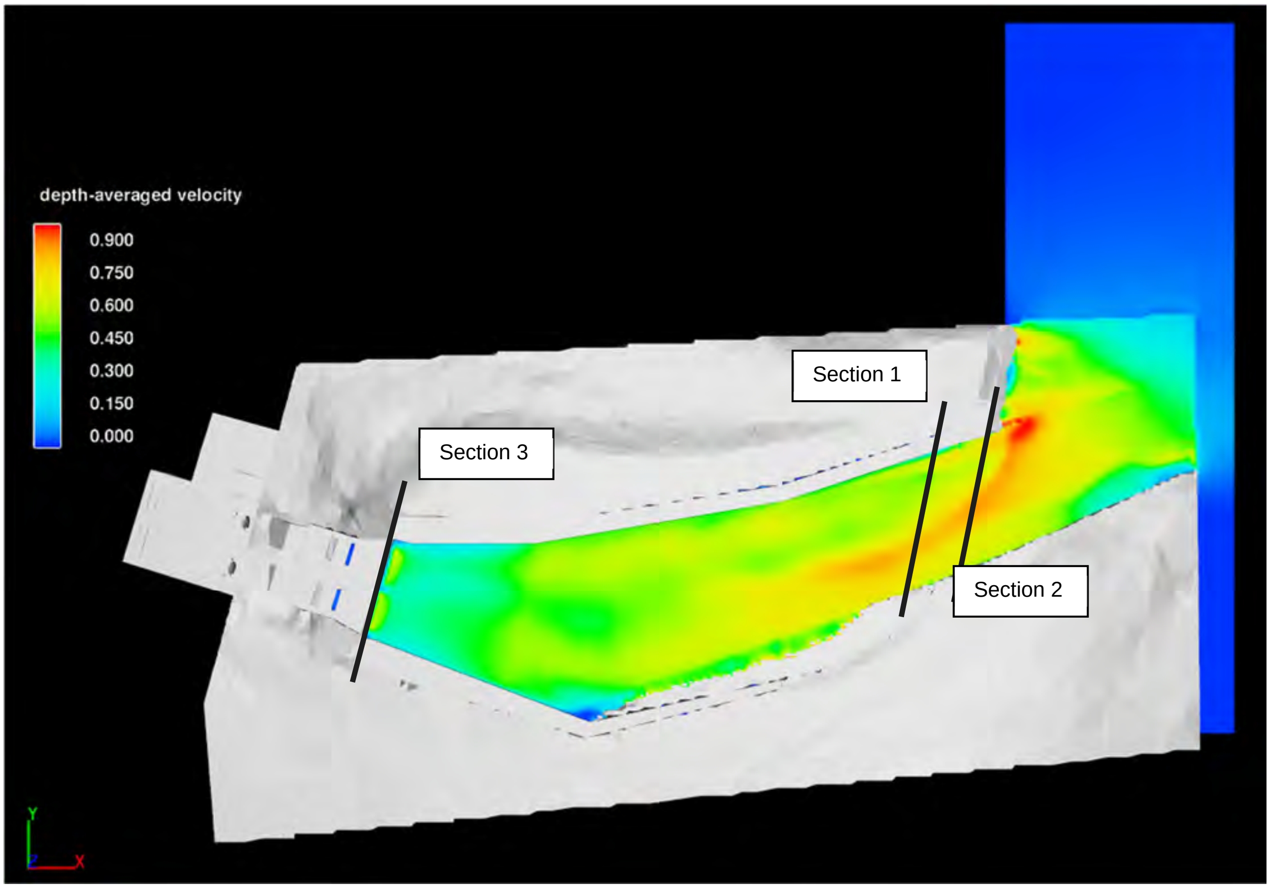
Figure 2-14 shows the velocity in front of the existing intake structure and shows velocity ahead of the trashrack is generally less than 0.9 m/s but is approaching higher velocity near the surface towards the right of the canal for the intakes to the existing G3 with its higher inflows.



* The velocity contour has been capped at 0.9 m/s to clearly show the areas of the model that exceed the specified target velocity of 0.9 m/s

Figure 2-14 Flow Conditions Near Existing Intake (Section 2 – Figure 2-12)

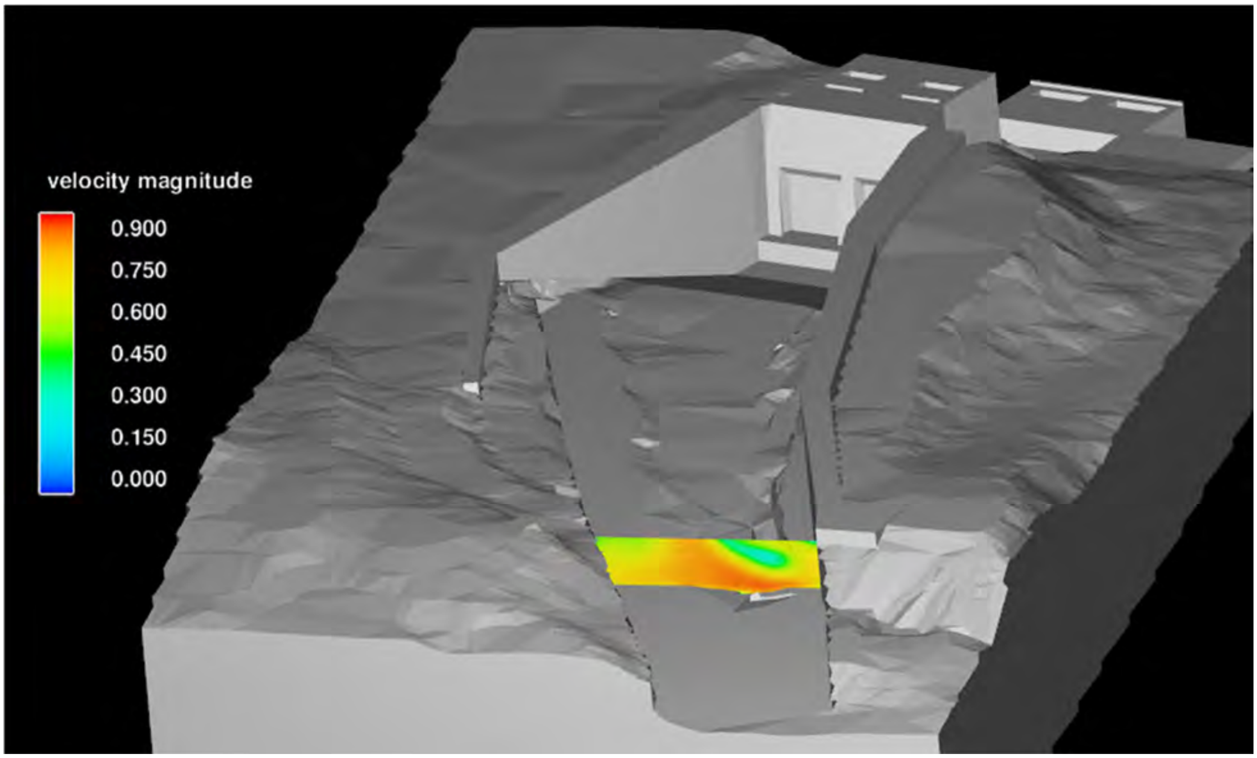
Figure 2-15 shows the depth averaged velocity in the modified intake channel operating at 44.3 m^3/s (note existing capacity was maintained for modeling and the proposed station capacity is slightly lower at 43.5 m^3/s) at the lowest operational water level of 236.62 m. The canal contains the new intake structure and local excavation at its entrance and reprofiling of the channel in the vicinity of the bridge as well as downstream. The figure shows average velocity is overall below 0.9 m/s with the exception of some concentrated velocities at the northern side of the canal at the north bridge abutment.



* The velocity contour has been capped at 0.9 m/s to clearly show the areas of the model that exceed the specified target velocity of 0.9 m/s

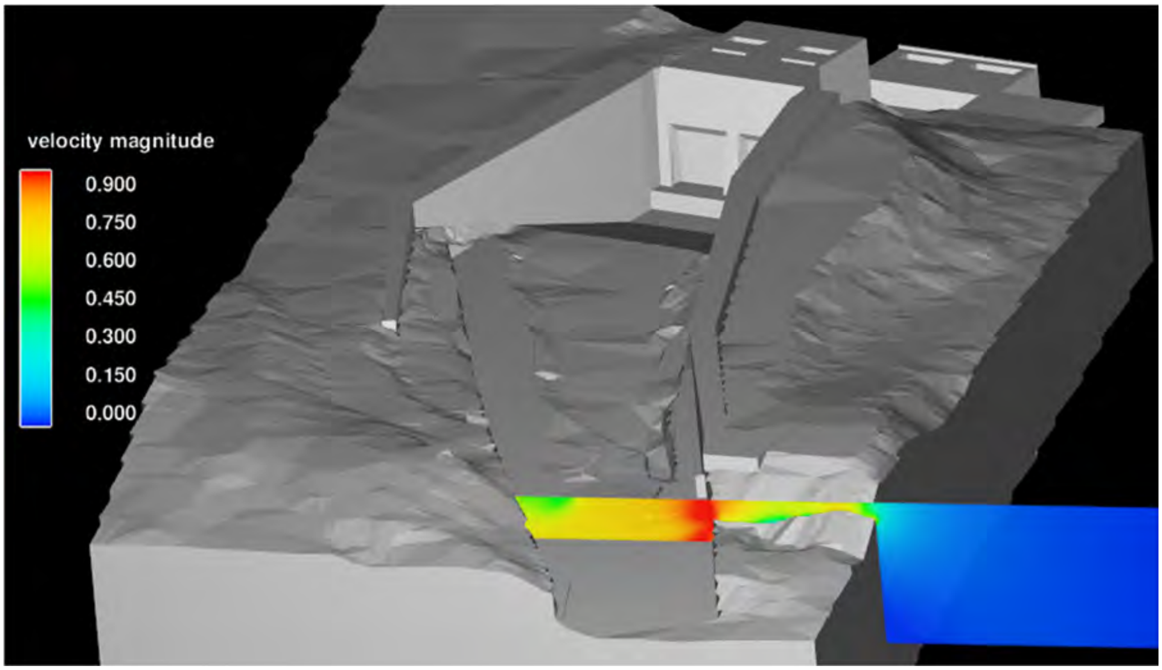
Figure 2-15 Depth Averaged Velocity of New Approach Canal

Figure 2-16 shows the velocity profile under the bridge location and through the upstream channel following the channel modification and indicates that velocities are less than 0.9 m/s. Figure 2-17 shows flow conditions just upstream of the existing bridge following the new tailrace excavation. The section is cut in the vicinity of the higher velocities shown in Figure 2-15 and shows the higher velocity shown concentrated along the north of the canal and shows that the majority of the excavated canal is still below 0.9 m/s and provides an escape path for fish in the canal. At the average operating level in the reservoir conditions would be further improved.



* The velocity contour has been capped at 0.9 m/s to clearly show the areas of the model that exceed the specified target velocity of 0.9 m/s

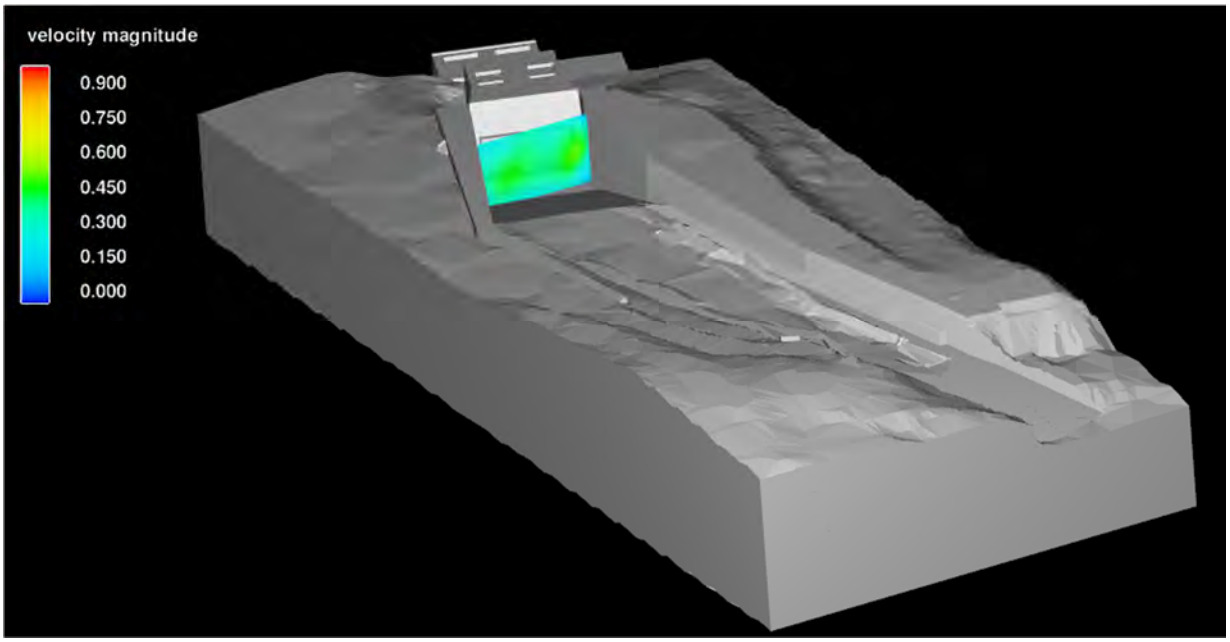
Figure 2-16 Flow Conditions Under Bridge in New Approach Canal (Section 1 – Figure 2-15)



* The velocity contour has been capped at 0.9 m/s to clearly show the areas of the model that exceed the specified target velocity of 0.9 m/s

Figure 2-17 Flow Conditions upstream of Bridge in New Approach Canal (Section 2 – Figure 2-15)

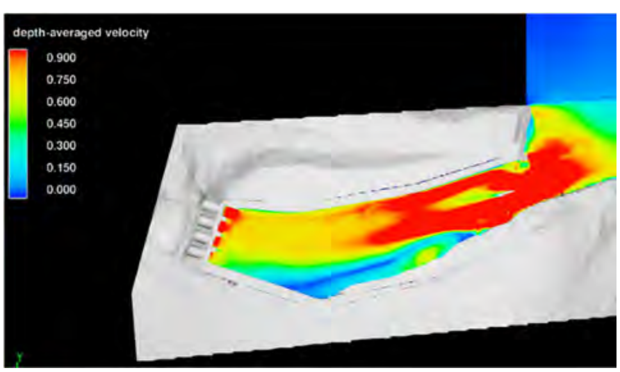
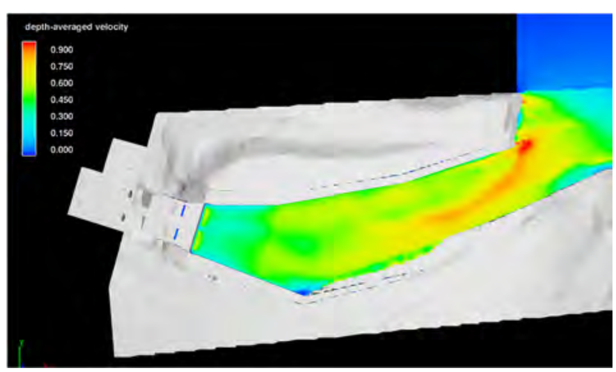
Figure 2-18 shows the flow conditions just upstream of the trashracks at the new intake which shows velocities less than 0.9 m/s throughout the water column.



* The velocity contour has been capped at 0.9 m/s to clearly show the areas of the model that exceed the specified target velocity of 0.9 m/s

Figure 2-18 Flow Conditions at New Intake (Section 3 – Figure 2-15)

The below Figure 2-19 shows a comparison of the pre project and the proposed post project conditions. The figure shows that there is a notable reduction in overall depth average velocity within the channel and that the majority of the new channel now operates below 0.9 m/s. Velocity that presented the potential to entrain fish in the existing channel has been largely eliminated and approach velocity at the trashracks to the unit intakes has been reduced to below 0.9 m/s reducing the potential for impingement as compared to the existing plant.

Existing Canal	Proposed Canal
	

* The velocity contour has been capped at 0.9 m/s to clearly show the areas of the model that exceed the specified target velocity of 0.9 m/s

Figure 2-19 Comparison of Velocities – Existing and Proposed GS

Modifications to the intake canal have changed the wetted area of the Intake Canal and Forebay as follows in Table 2-1. The changes are the result of the excavation required to provide velocities low enough prevent fish entrainment into the intake canal as well as minor modification within the canal as a result of the position and width of the proposed intake.

Table 2-1 Changes to Wetted Area in the Intake Canal

Location	Existing Arrangement	Proposed Arrangement	Notes
Canal (Downstream of Bridge)	1634 m^2	1628 m^2 (-6 m^2)	Changes noted to position of intake, narrowing of approach to intake, and widening of canal under bridge
Forebay (Upstream of Bridge)	Not calculated	+ 45 m^2	Due to channel excavation on south shore upstream of bridge.
Total Change		+39 m^2	Bedrock Substrate

2.4.4.2 Powerhouse and Intake

The proposed new powerhouse will be situated approximately 30 metres upstream of the existing powerhouse in the footprint of the existing steel penstocks. The powerhouse will be approximately 24 metres by 16 metres structure and will be 30 metres tall from the invert of the excavation to the top of the superstructure roof. The powerhouse will be excavated to a depth of approximately 16 metres to allow for proper submergence settings of the turbines and the provision of dewatering sumps. It is currently anticipated that the powerhouse structure will be comprised of a cast-in-place concrete substructure and a metal clad steel superstructure. The intake portion will be located within the footprint of the existing intake structure upstream of the powerhouse and will be approximately 24 metres by 16 metres structure and will be 11 metres tall from the invert of the excavation to the top of the concrete deck. Hydraulic passages, both upstream and downstream of the units, will be appropriately sized to maintain machine performance. The powerhouse will be connected to the existing switchyard with a duct bank. To save space in the powerhouse, a modular electrical building will be located in the northwest of the decommissioned HONI yard alongside the relocated backup diesel generator. Vehicular access to the new powerhouse will be from the north side of the building by a road along the north side of the intake channel similar to the existing arrangement.

2.4.4.3 Turbines

As previously indicated, the powerhouse will include the installation of two vertical-axis SAXO type turbines with a combined total discharge capacity of 43.5 cms. Each turbine will be capable of producing approximately 3 MW for a combined total capacity of 6 MW. Each unit will be capable of passing a flow of 21.75 cms with a minimum operating flow of 3 cms. The turbine is capable of operating from a minimum gross head of 13 m to a maximum gross head of 17.5 m. Each turbine runner will have 5 blades and will operate at 277 rpm.

2.4.4.4 Tailrace

The existing channel downstream of the new powerhouse will be excavated to form the new tailrace (see Figure 2-20). The new tailrace channel is anticipated to be in the order of 13 to 24 m wide along its length and will connect the powerhouse within the downstream river reach. The tailrace will be excavated through the existing powerhouse location and connect to the existing tailrace channels with the channel splitting and wrapping around the bedrock outcrop that the existing powerhouse was partly founded on. The tailrace channel will be excavated in bedrock for the entirety of its length from the new powerhouse to where it connects to the existing tailrace channel excavations in the river. Limited overburden excavations are expected near surface in between the existing and new powerhouse. Bedrock will be excavated in vertical cuts and any remaining overburden will be sloped or retained by retaining walls and protected against erosion and sloughing. Retaining walls will be constructed along portions of the tailrace to retain fill placed to form the crane pad, turn around and laydown area adjacent to the powerhouse on the north side to the channel and to preserve access to the switchyard to the south.

The existing tailrace channels beyond the existing powerhouse have become infilled with rock debris over time due to natural process or the collapse of a suspect existing submerged timber crib structure created during the original construction of the powerhouse. Portions of these remaining channels will have material that may need to be excavated to install the proposed cofferdams or to profile the tailrace excavation. Further dredging or excavation of the material beyond the proposed new tailrace is not envisioned.

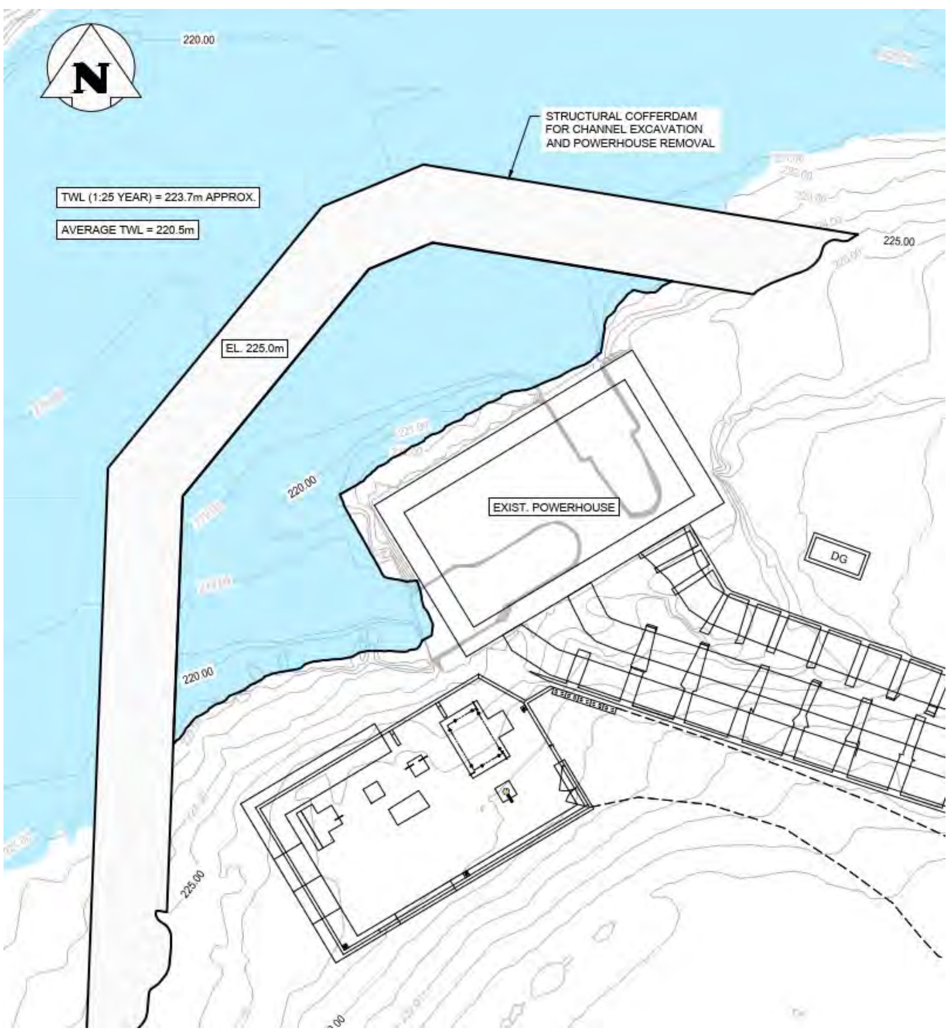


Figure 2-20 Plan of Tailrace and Cofferdam

During final design the tailrace geometry will be optimised to reduce head losses, reduce costs, reduce the risk of frazil ice formation and reduce or prevent impacts to existing fish habitat and spawning areas.

The Aquatic TSD contains a detailed discussion of existing and proposed tailrace habitat conditions under various flow scenarios. The modelling results are summarized in Figure 2-21 and illustrated in Appendix B of the Aquatic TSD. There is an increase in the total amount of habitat (i.e., total wetted area) following redevelopment for all flow scenarios. This is largely a consequence of the excavation of the new tailrace. There is small increase in the area of habitat that is most suitable for Walleye spawning and a small decrease in the amount of habitat that is suitable for Walleye spawning at low (10th percentile) flow. At median flow there is an increase in the amount of both most suitable and suitable habitat for Walleye spawning. At maximum plant flow, which corresponds approximately to the 69th percentile, there is a decrease in both most suitable and suitable habitat for Walleye spawning. At high flows there is little Walleye spawning habitat present within the modelled area, due primarily to high velocities, regardless of whether there is flow through the powerhouse or not. It should be noted that areas of suitable substrate extend downstream from the modelled reach, and these may be used, particularly during years when flow is high.

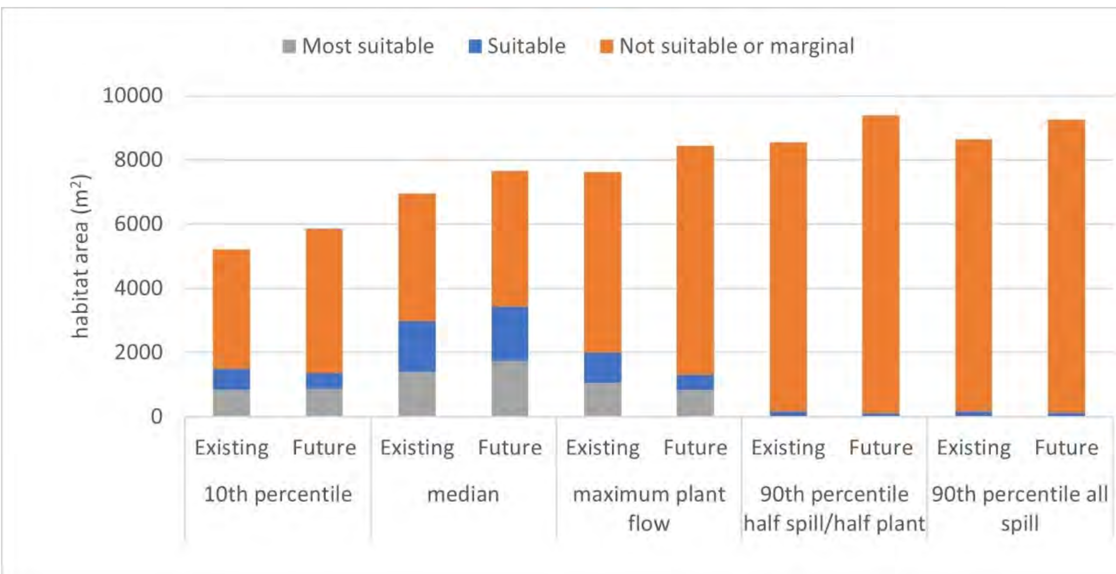


Figure 2-21 Tailrace Habitat Suitability

Tailrace Construction

The construction of the tailrace is proposed to occur in the dry using a structural cofferdam to allow the removal of the existing powerhouse in the dry and to undertake the rock excavation in the dry. However, further refinement of the tailrace and review by DBC may result in an earthen cofferdam and/or portions of the excavation to be completed in the wet outside of the cofferdam limits. Any portion of the tailrace constructed under or outside of the proposed would likely be completed by the construction of a rock pad to permit access for excavation equipment. If required, small areas of blasting would be carried out through the rock pad.

The downstream extent of the tailrace area may require riprap to locally protect against erosion of the new powerhouse fill against higher water levels and flows and sloughing of any overburden encountered; however, it is currently envisaged that the bulk of the tailrace excavation will be rock.

The shift of moving the powerhouse approximately 30 metres upstream along with the elimination of penstocks and expansion of the tailrace will increase the amount of downstream aquatic habitat by approximately 639 square metres which will consist of excavated rock surfaces.

Due to the overlap of the new tailrace excavation with the existing tailrace channels and their substrate the following changes to substrate are noted in **Error! Reference source not found.**. At total of 322 square metres of boulder/cobble, cobble boulder, cobble gravel and gravel cobble is anticipated to be converted to bedrock substrate.

Table 2-2 Changes to Tailrace Area and Substrate

Substrate	Change (m^2)
Bedrock	**962**
Boulder/Cobble	**-127**
Cobble/Boulder	**-144**
Cobble/Gravel	**-44**
Gravel/Cobble	**-7**
Altered Habitat	**322**
Created Habitat (bedrock)	**639**

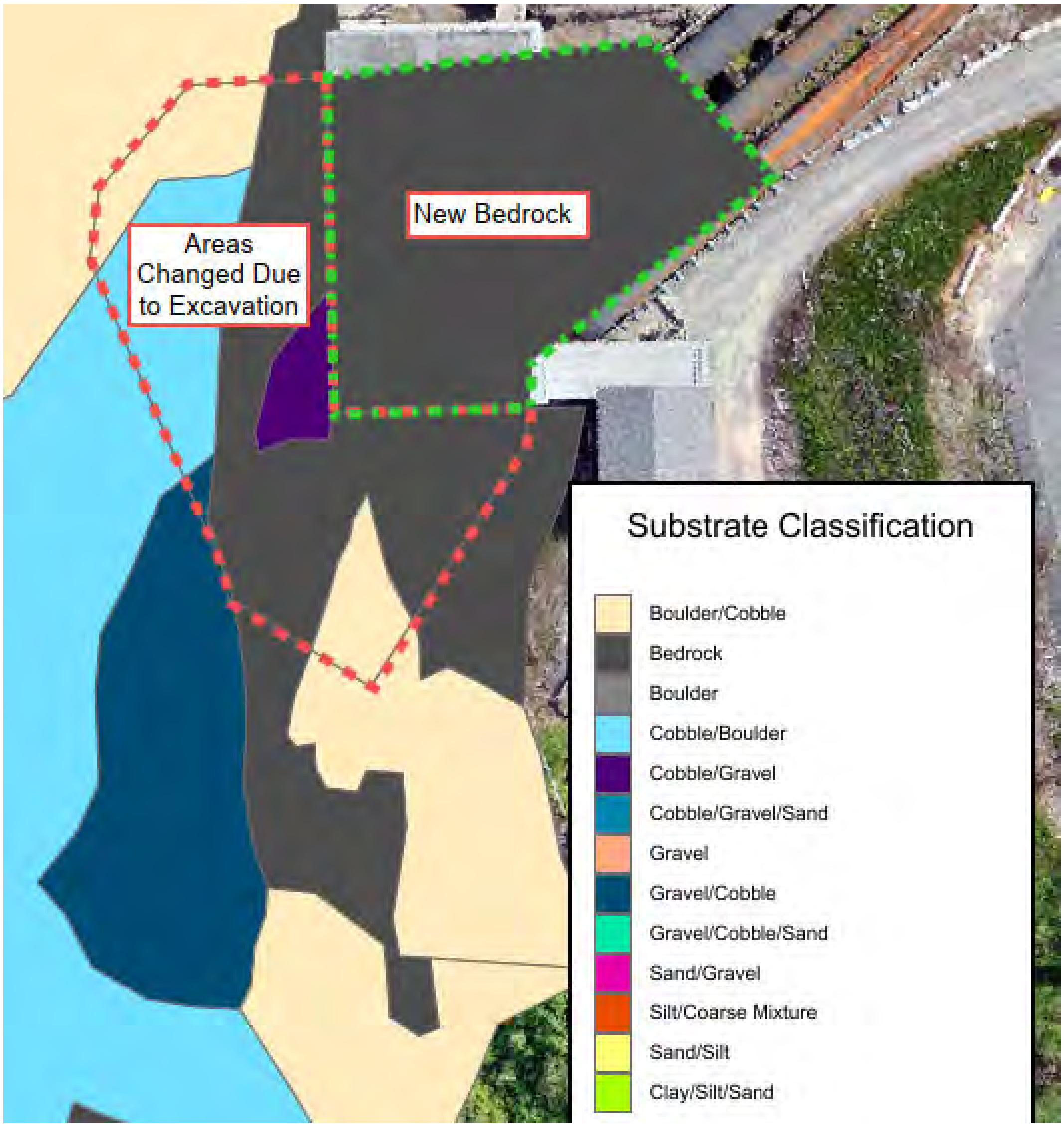


Figure 2-22 Changes to Tailrace Substrate

2.4.4.5 Transmission

The new Coniston GS will be connected to the HONI Martindale TS via the existing 44 kV M6 feeder. The existing 44 kV switchyard is located to the south of the existing powerhouse contains the main output transformer (MOT) and the 44 kV interconnection to the M6 feeder that was constructed in 2019. A teleprotection communication tower was also constructed in 2019 and is located on the north end of the site off the Access Road. All of this existing equipment will be retained, and the station will be connected to the existing switchyard via buried duct banks and/or overhead lines.

2.4.4.6 Off-Site Communication

All existing off-site communication will be retained and upgraded as required. There will be no changes to the existing communication tower on site and no plans to construct additional communications infrastructure.

2.4.4.7 Water Control Features

The MNRF has in place *Lakes and Rivers Improvement Act* Technical Bulletins that detail the Ministry requirements for the safe operations of dams. The Technical Bulletins were initially issued in 2011. OPG will be reviewing the IDF capacity of the main dam as part of its overall dam safety assessment program. No major work is proposed on the main dam as part of the Coniston Life Extension Project.

2.4.4.8 Other Features

Other features of the Coniston GS will remain unchanged from the current situation. Safety devices such as buoys, signage and booms will remain unchanged from the current situation.

The existing Work Centre will remain on site and unchanged.

The large Hydro One Switchyard on site was decommissioned in 2019 and replaced by the current switchyard. The area will be used as laydown and storage during the project. To save space in the powerhouse, a modular electrical building will be located in the northwest corner of this area alongside the relocated backup diesel generator.

2.5 Construction Features

Figure 2-5 shows the Coniston site with a variety of construction stage features. These are each described below.

2.5.1 Site Access, Roads and Parking Areas

The primary access road to the site will remain as the Coniston Hydro Road, a gravel road that is sufficiently wide to accommodate the proposed construction. That road provides access to the Trans-Canada Highway (or Highway 17).

Improvements to site access are contemplated on OPG property at either end of the main dam and to the north of the intake canal to permit access to the generating station. Rock excavation and regrading will be completed to widen the turning radius at either end of the dam to permit access by larger tractor trailer vehicles for maintenance and construction. Rockfill will be placed north of the canal to raise the grade around the new powerhouse and improve the slope of the access road to the powerhouse.

During construction temporary access roads will be constructed on OPG's site as required for site access and construction purposes but these will generally be limited to the proposed footprint of the powerhouse area and regrading north of the canal. Temporary access roads would also be required to service the abutments of the upstream and downstream cofferdams and within the laydown and storage area to facilitate stockpiling and material handling as indicated in Section 2.5.2.

At this point no modifications are anticipated to the entrance at the Highway. However, should modifications be required these would be subject to review and approval by the City of Greater Sudbury and the Ontario Ministry of Transportation. Prior to construction, the DBC will meet with the City of Greater Sudbury and the Ministry of Transportation to discuss any relevant concerns.

The City of Sudbury noted that municipal permits are required for extra-long/large loads.

2.5.2 Laydown and Storage Areas

The Site Plan shown as Figure 2-5 shows that the existing OPG storage area will be slightly expanded as a laydown area for use by the DBC. This area will be cleared of vegetation, graded and a pad placed in order to allow for the orderly storage of equipment and material. That laydown area has been sited to avoid steeper slopes near the river. The total area of this newly cleared laydown area is 2.7 hectares.

The newly cleared laydown area will be used in combination with the area of the decommissioned HONI switchyard for temporary site offices, parking, material storage and delivery, stockpile of granular materials, onsite refuelling, concrete washout facility, small grout plant, equipment to facilitate the processing of excavated material for reuse on site (screens and potentially a crusher), washrooms, and other miscellaneous equipment or activities to suit product needs. A detailed plan for the laydown area will be prepared by the DBC once they are retained which will respect all environmental requirements.

2.5.3 Cofferdams

As already explained, one upstream cofferdam is required to isolate the canal and safely allow work in the dry and one downstream for the removal of the existing powerhouse and the excavation and clearing of the tailrace in the dry.

The final cofferdam designs will be the responsibility of the DBC with its alignment, design and footprint specified to suit the finalized tailrace and intake excavations, required construction sequence and scheduling limitations.

Several types of cofferdams are considered possible and could include granular cofferdams with geomembrane liner, granular cofferdams with cement bentonite core, cellular sheet pile cofferdams or similar.

The upstream cofferdam will be required for the majority of the construction duration (24 months) and would be installed at the earliest available opportunity to dewater the intake canal and the area upstream of the existing bridge. This cofferdam would not be removed until the intake structure and the powerhouse are complete and the turbine and flow control equipment in the intake area ready to receive water as part of wet commissioning. The approximate area dewatered behind the upstream cofferdam assuming an average head pond elevation of 237.1 m is 2,330 m^2, this includes 1634 m^2 within the existing canal and 693 m^2 in the forebay. The footprint of the proposed cofferdam shown is 1112 m^2 but is noted could vary based on cofferdam construction and refinement to the proposed intake canal excavation.

The downstream cofferdam will be required to facilitate removal of the existing powerhouse substructure and the excavation and clearing of the tailrace. The cofferdam will need to be constructed and removed during lower flow conditions in the river while respecting in water work restrictions. These features would be installed after the completion of the upstream cofferdam once these conditions area available. The anticipated duration of the downstream cofferdam is (24 months). The approximate dewatered area behind the downstream cofferdam to the existing powerhouse assuming an average tailwater level of 220.5 m is 830 m^2. The in-water footprint of the proposed cofferdam shown is 870 m^2 but is noted could vary based on cofferdam construction and refinement to the proposed tailrace canal excavation. Of note, the cofferdam has been shown as a structural cofferdam due to concerns of restricting the spillway channel during construction as well as impacting potential fish habitat. However, construction of an earthen structure depending on the final tailrace configuration is not precluded and could increase the footprint of the cofferdam significantly. All areas, durations and the cofferdam configuration are subject to refinement, change and additional detail pending involvement of the DBC, finalization of the design and development of a detailed construction schedule.

Cofferdams should be constructed by adhering to the DFO Interim Code of Practice: Temporary Cofferdams and Diversion Channels (2020).

2.5.4 Excavation

Overburden and rock excavation will be required to construct the new powerhouse and intake. It is anticipated that some of the total quantity of rock excavated can be re-purposed on the site as fill for access road improvement following processing minimizing material imported or exported off-site.

The area to the north of the intake canal will be cleared of the existing fill by excavators and truck to permit exposure of the bedrock. This fill is known to consist of a variety of materials dating to original construction and work done at the site over time. The existing overburden consist of sand and gravel fill, rockfill and sandy silt. Material will be excavated and the existing rockfill will be salvaged, if possible, for general fill or for building temporary access roads.

The remainder of the excavation at site will be in rock and predominantly carried out by the drill and blast method in the dry. To complete blasting, drills will be employed to drill holes in the rock to delineate the excavation area as well as for placing explosive charges. The excavation will be carried out in multiple smaller blasts planned and designed by engineers and contractors specialized in this trade. Each blast will be planned and controlled to prevent damage to the existing structures and to the environment by utilizing controlled and timed blasting charges, reducing blast sizes and by employing blast matts or covering fill to reduce fly rock. Blasting would be preferably carried out to create rock sizes that are suitable for use as construction materials such as general rockfill and rip rap. To use the materials some degree of onsite processing by excavator and screens will be required. Crushing and further processing would need to be employed if excavated material is intended for use as engineered fill or for use in cofferdams and embankments.

Some blasting is anticipated within the footprint of the upstream cofferdam and would be carried out through in water blasting through a rock mattress behind the proposed cofferdam. Any blasting in the wet by use of rock pad would employ protections for fish and existing structure through implementing DFO guidelines for blasting which include but are not limited to warning blasts and protective bubble curtains.

2.5.5 Rock and Soil Deposition Areas

Overburden materials will be inspected and sorted for potential reuse and stored on site if applicable. All other excavated overburden will be disposed of off-site.

Rock will be temporarily stored on site following excavation to facilitate processing for use on site where possible. As indicated above it is intended that some of this material can be re-purposed at the site for site development purposes including grading and shaping stable contours to the land.

Some rock and/or overburden may be permanently stockpiled on the GS site for future use, in areas that are to be disturbed for the project, provided all materials are clean and managed to prevent erosion, sedimentation and according to all regulations.

All other material will be disposed of off-site.

2.5.6 Site Grading and Re-Vegetation

Following construction, the areas will be revegetated to suit the surrounding environment. This may involve seeding, planting or natural re-generation by placement of topsoil and with an appropriate seeding or planting. Discussions could be held with the Wahnapitae First Nation or other First Nations on appropriate vegetation.

2.5.7 Workforce and Traffic

The redevelopment of hydroelectric facilities requires a wide number of professions and trades that change at various stages during the project cycle. The first phases of the work involve more civil work including setting up the construction site, excavation, removal of rock and general civil work. Once the powerhouse is constructed, labour needs shift more to the installation and connection of equipment. As such, labour needs evolve over the course of the project. It is anticipated that anywhere from 40 to 120 workers may be on the site at any one time during the approximately two-year construction period.

Workers will be generally responsible to get themselves to the worksite. The project will generally operate on a one shift per day basis meaning that there would be likely 80 to 240 vehicular movements per day on Coniston Hydro Road associated workers coming and leaving the site each day.

During cofferdam construction, excavations, demolition of existing structures and cofferdam removal activities heavy truck traffic will be present on Coniston Hydro Road and the Trans Canada Hwy in the vicinity of the site as all excess materials are to be removed from site.

Other traffic movement would be associated with deliveries of concrete, other construction materials, and the permanent equipment. These traffic movements will likely vary from a handful each day (under 20) to up to over 200 per day during excavation and demolition activities. Increases in truck traffic would also occur on certain days from week to week to support concrete pours as material will be brought in from off site. A small number of oversized loads are also expected during the course of construction.

2.5.8 Construction Schedule and Strategy

Construction is planned to commence in late 2023. The proposed new GS is expected to go into operation during the second half of 2025.

The placement of cofferdams and other in-water work (if needed) will adhere to any fisheries windows. Vegetation clearing will adhere to windows for breeding birds and bats.

2.6 Proposed Coniston GS Operations

The proposed Coniston GS is expected to operate in a similar fashion to the existing GS. The WRWMP describes the operational requirements for the Coniston GS.

- For the River reach above the dam, throughout the year, there is a 0.55 m operating range with a lower limit of 236.62 m and a maximum limit of 237.17 m.
- Coniston has a legal flow requirement of 3 m^3/s (calculated as a daily average). The minimum flow requirement of 3.0 m^3/s exists at the Coniston GS as a recommendation from MECP. This 3.0 m^3/s daily average minimum flow is in place to dilute the metal concentration of inflows from Coniston Creek, downstream of Coniston GS (MNR, *et al.,* 2011).
- The current operating regime at Coniston GS does not have any seasonal limits.

OPG will operate the new GS within the current operating regime of the WRWMP. The new 6 MW powerhouse will operate with a maximum proposed flow of 43.5 m^3/s which is slightly less than the same historical maximum flow of 44.3 m^3/s. The existing WRWMP rules have and will continue to be followed. The operating rules were set up recognizing the ecological conditions of the River and were the culmination of a multi-year planning process involving numerous stakeholders and government agencies examining various conditions and issues on the River.

The only change in water management operations will be that with new functional units, the station will be able to pass more flow to generate power rather than at present. However, that will merely restore the flow regime that existed prior to the failure of the units.

The plant was and will remain a part of the cascading system on the Wanapitei River (referred to in the WRWMP as a run-of-the-river GS), only passing what flow is available from natural inflow due to the very little storage capacity in the reservoir and will continue to be operated according to the same WRWMP operating rules. Units will be utilized to suit the natural available inflows with excess flow being spilled (beyond plant capacity) through the spillway. OPG has limited storage and a limited operating range (0.55 m), and as such, peaking style operations are not possible.

2.7 Proposed Decommissioning

Decommissioning involves the permanent removal of the hydroelectric facilities, with the resultant loss of the site as a renewable source of electricity generation. Rather than decommissioning, redevelopment of a facility that is at the end of its designed service life could be a viable option. A number of OPG owned hydroelectric facilities that were built in the early 1900s have been redeveloped in the last 15 years. These include Wawaitin GS, Sandy Falls GS and Lower Sturgeon GS on the Upper Mattagami River and Hound Chute GS on the Montreal River.

Once the Coniston GS Redevelopment Project has reached the end of its service life in 90 years or more, additional redevelopment, rather than decommissioning, would be an option that should be considered again to further extend the life of this plant.

3 Description Of the Existing Socio-Economic Environment

This chapter describes the existing socio-economic environment around the proposed Project.

3.1 Location and Municipal Organization

Coniston GS is located within the boundary of the City of Greater Sudbury, near the village of Wahnapitae. The GS is located on the Wanapitei River 16 kilometers (km) east of the city centre of Sudbury. The Wanapitei River is a tributary of the French River and has its headwaters north of Coniston with the first large waterbody being Wanapitei Lake. The Coniston GS is downstream of OPG's Stinson GS and upstream of McVittie GS (see Figure 3-1).

Figure 3-1 Location of the Coniston GS

3.2 Local and Regional Socio-Economic Composition

Information on the population, demographic, identity, housing, employment and income characteristics of Greater Sudbury is provided to gain a better understanding of the local and regional populations.

Table 3-1 provides population and demographic information on the City of Greater Sudbury based on the 2016 Census of the Population.

Table 3-1 Population and Demographic Characteristics of the City of Greater Sudbury

Population and Demographic Characteristics	Greater Sudbury	Ontario
Population		
2016 Total Population	161531	
2011 Total Population	160274	
Percent Change	0.8%	4.6%
Age of the Population		
Average Age of the Population	42.2	41.9
Median Age of the Population	43.3	42.4
Household and Family Characteristics		
Average Household Size	2.3	2.6
Average Size of Census Families	2.8	2.9
Aboriginal Identity		
Aboriginal Identity	14960	
Non-Aboriginal Identity	143705	
% Aboriginal Identity	9%	

Source: Statistics Canada, Census of the Population, 2016.

The total 2016 population of the City of Greater Sudbury was 161,531, with a 0.8% positive change since 2011. In 2021, the population decreased to 157,857. The average and median ages of the population are 42.2 and 43.3 which almost mirror the provincial average and mean (41.9 and 42.4). The average household size is 2.3 persons, slightly less than the provincial average of 2.6. The average size of families is 2.8 again very similar to the provincial average of 2.9. Approximately, 9% of the population self-identifies as Aboriginal Identity.

Table 3-2 provides housing information on the City of Greater Sudbury based on the 2016 Census of the Population.

Table 3-2 Housing Characteristics of the City of Greater Sudbury

Housing Characteristics	Greater Sudbury	Ontario
Total Private Dwellings	75029	5598391
Private Dwellings Occupied by Usual Residents	69152	5169174
Percent of Dwellings not Regularly Occupied (i.e. seasonal, recreational)	8%	8%
Year Round Dwellings by Housing Type		
Single Detached House	42580	
Other	26570	
Private Households by Tenure		
Owned	45575	
Rented	23675	
Average Number of Rooms per Dwelling	6.3	6.3

Source: Statistics Canada, Census of the Population, 2016.

The total number of private dwellings in Greater Sudbury is 75,029 of which only 8% are not regularly occupied. Approximately two-thirds of the housing stock in Sudbury are single detached homes (42,580) with only 26,570 being other types (e.g., apartments, townhomes). Similarly, approximately two-thirds of the housing stock is owned. The average number of rooms per dwelling is 6.3 which is the same as the provincial average.

Table 3-3 provides income and economic information on City of Greater Sudbury based on the 2016 Census of the Population.

Table 3-3 Income and Economic Characteristics of City of Greater Sudbury

Census Variable	Greater Sudbury	Ontario
Income Characteristics		
Median Total Income in 2015 Among Recipients	$ 37,896	$ 33,539
Average Employment Income in 2015 for Full-Time Workers	$ 67,538	$ 68,628
Median Total Income of Households	$ 71,805	$ 74,287
Composition of Total Income		
Market Income	87%	89%
- Employment Income	70%	73%
Government Transfers	13%	11%
Participation in the Economy		
Participation Rate	62.6%	60.6%
Employment Rate	57.4%	56.1%
Unemployment Rate	8.3%	7.4%

Source: Statistics Canada, Census of the Population, 2016.

With respect to income and economic characteristics, the City of Greater Sudbury generally resembles Ontario averages. The average income in 2015 for full-time works is $67,538 which is only slightly less than Ontario's at $68,628. With respect to composition of income it is again similar to Ontario with 87% of the population relying on market income compared to 89% for Ontario. The participation rate, employment rate and unemployment rates are very similar but only slightly higher than the provincial averages.

In summary, the City of Greater Sudbury has demographic, housing and economic characteristics very similar to provincial averages. The exceptions to this would be a higher percent of the population that self-identifies as Aboriginal and a much lower population growth rate. These differences are typical of Northern Ontario.

3.3 Local and Regional Economy

The City of Greater Sudbury's historical development is rooted in the mining industry. Interestingly, the Coniston GS's own historical development is tied directly to the development of mining in Sudbury. In 1913, the GS supplied the Coniston Smelter with some of its electric power. With the location of the smelter, Coniston grew from a village to a town within the Township of Neelon and Garson. In 1929 the International Nickel Company (INCO) consummated a merger with the Mond Nickel Company. The Wahnapitae Power Company operated three generating stations (Coniston, McVittie and Stinson) and furnished power to the Mond Nickel Company at Coniston, the Treadwell Yukon Company, Falconbridge Nickel Mines and the City of Sudbury. The first hydroelectric power used by the Mond Nickel Company was supplied by this company. Power was furnished to the mine and smelter of the British American Nickel Corporation and to the Moose Mountain iron mine while those properties were operating (MNR, *et al.,* 2011).

Sudbury's economy is still today tied intricately to the mining industry today as described by the City of Greater Sudbury Economic Development Corporation.

> "Once dominated by operating mines and smelters, the sector has expanded to include the most dynamic mining supply and services cluster in the world, exporting Sudbury products, services and expertise. With an estimated 14,000 people employed in Greater Sudbury's mining supply and services sector and $4 billion in annual activity, not to mention ten operating mines, two mills, two smelters and a nickel refinery, we are arguably the hard rock mining capital of the world." (City of Greater Sudbury Economic Development Corporation, p. 7)

The City of Greater Sudbury's economy has become more diversified with the development of northern Ontario's largest health and educational institutions:

> "We are no longer simply a mining community. Our city is home to Health Sciences North (HSN), northern Ontario's hub for health care. HSN is the city's largest employer with 3,900 employees and 250 physicians, handling over 500,000 patient visits per year. As northeastern Ontario's sole tertiary care centre, HSN has developed a 21st century approach; delivering the highest quality patient care, research, teaching and learning to our region and beyond. No longer simply a hospital, HSN is a network of integrated facilities and programs working together for the benefit of our patients, community, physicians, researchers, staff and learners in the areas of prevention, diagnosis, treatment and care. HSN is home to leading regional programs in the areas of cardiac care, oncology, nephrology, trauma and rehabilitation, making us the health and life sciences capital of northern Ontario.
>
> With our trio of outstanding post-secondary institutions including Laurentian University, Cambrian College and Collège Boréal, Greater Sudbury has matured as the educational capital of northern Ontario. Laurentian University is Ontario's first designated bilingual university and the only one with a tri-culture mandate. Laurentian is also home to the eastern campus of the Northern Ontario School of Medicine, the first school of architecture built in Canada in over 40 years, the Goodman School of Mines and the Bharti School of Engineering. Collège Boréal is the north's only French-language community college and has six satellite campuses, including Toronto. Cambrian College was recently named one of Canada's Top 50 Research Colleges, the only college in Northern Ontario to make the list. These institutions are providing training and education to more than 25,000 students, many of whom are moving here from communities across Ontario, Canada and abroad." (p. 7)

An Economic Bulletin put out by the City of Greater Sudbury in December 2019 indicated that in November 2019 the unemployment rate in Sudbury was 5.9% just slightly higher than the provincial average of 5.4%. That same Economic Bulletin profiled employment in Sudbury by industrial classification as the following for 2018.

- Manufacturing – 3,200
- Construction – 6,800
- Primary and Utilities – 8,200
- Wholesale and Retail Trade – 11,900
- Transportation and Warehousing – 3,300
- Information and Cultural Industries – 1,500
- Finance, Insurance, Real Estate, Business, Building and Other Supporting Industries – 6,900
- Professional, Scientific and Technical Services – 4,600
- Educational Services – 6,300
- Health Care and Social Assistance – 13,500
- Arts, Entertainment and Recreation – 2,400
- Accommodation and Food Services – 4,500
- Other Services (except public administration) – 2,500
- Public Administration – 5,800
- Total – 81,400

As the above section has demonstrated Sudbury has diversified its regional economy but remains strongly concentrated in the mining and mining services sector.

3.4 Land and Resource Use

This section of the Report describes relevant land and resource use in the area as well as describe provincial and local policy with respect to land use in the area.

3.4.1 General Description of the Area

Coniston GS is situation on the Wanapitei River approximately three kilometers downstream of the village of Wahnapitae. As previously indicated, the GS is located within the limits of the City of Greater Sudbury. While situated within the City's limits the surrounding area to the GS is predominantly rural and resource extractive in character. There are no nearby homes or residences.

3.4.2 Provincial Policy Direction

Provincial policy was also considered when examining the proposed Calabogie GS Redevelopment Project. The Provincial Policy Statement (PPS) (OMMAH, 2020) was examined.

Section 1.6.11 of the PPS (OMMAH, 2014) encourage increased energy supply from waterpower resources:

> "Planning authorities should provide opportunities for the development of energy supply including electricity generation facilities and transmission and distribution systems, district energy, and *renewable energy systems* and *alternative energy systems*, to accommodate current and projected needs."

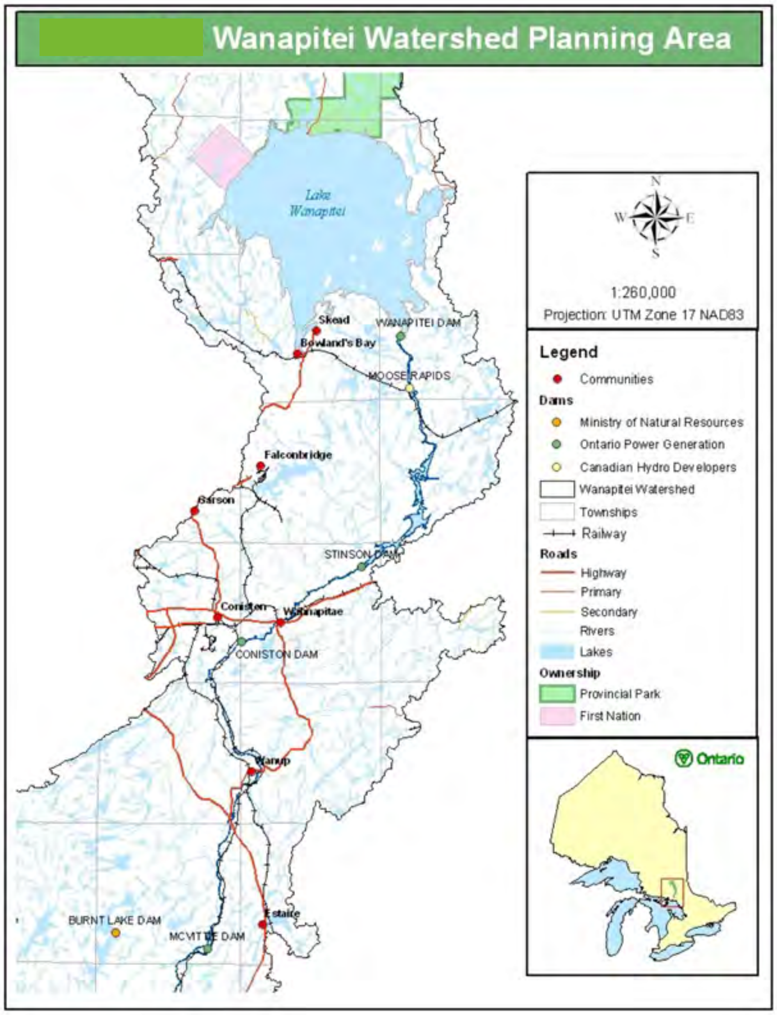
In summary, provincial policy currently encourages projects, such as the proposed Project.

3.4.3 Water Management Plan and Source Water Protection Planning

As indicated in chapter 2, a WMP is in place for the Wanapitei River.

Figure 3-2 below shows the Wanapitei Watershed Planning Area and more specifically Lake Wanapitei and the Wanapitei River. As per the WMP, the headwaters of the Wanapitei River consist of a network of streams and lakes located in northeastern Ontario, north of the City of Greater Sudbury. The river has a general southward direction and is 167 km long where it drains into the French River. Its drainage area covers over 3,341 square kilometers. OPG owns the control dam, and three generating stations at Stinson, Coniston and McVittie. A fourth hydroelectric generating facility located at Moose Rapids, just south of the outlet of Lake Wanapitei, is owned by Canadian Hydro Developers (now Trans-Alta).

Figure 3-2 Wanapitei River



As per page 2 of the WRWMP (2011), the river is operated to optimize flood mitigation, recreation and aquatic needs as the highest priorities within the watershed. Power generation occurs as a secondary benefit. As part of the development of WMP, operating limits were established for each control and power generation facility in the watershed. For Coniston, the legal flow requirement is for 3 m^3/s (calculated as a daily average). The control dam at Lake Wanapitei (which is also operated by OPG) is also required to maintain the 3 m^3/s.

It is OPG's understanding that the minimum flow requirement of 3.0 m^3/s exists at the Coniston GS as a recommendation from MECP. This 3.0 m^3/s daily average minimum flow is in place to dilute the metal concentration of inflows from Coniston Creek, downstream of Coniston GS (MNR, *et al.,* 2011).

Coniston also has legally required water ranges upon which it manages through the reach of the River above the facility. The minimum lower limit is 236.62 CGD (Canadian Geodetic Datum) and a maximum upper limit of 237.17 CGD.

For a description of how the Coniston GS operates please see section 2.2.3.

For the City of Greater Sudbury there is a Source (Water) Protection Plan in place. A review of that Plan indicated that the Coniston GS is not in a Source Protection Area (Nickel District Conservation Authority, 2014).

3.4.4 Existing Land Use

As a provincially owned entity, OPG's facilities do not need to be subject to municipal regulation.

The existing Coniston GS is over 100 years old, and the facility pre-dated any form of municipal land use plan for the area.

According to the current City of Greater Sudbury Official Plan the area of the GS lies in a Rural Open Space with a *Rural Area* Designation. According to section 5.2, policy 1 (g) of the Official Plan this designation specifically allows for hydroelectric generation sites:

> "*Rural Areas* contain a variety of land uses, such as farms, woodlots and forests, small industry, and clusters of rural residential development. These areas also provide for outdoor recreation opportunities such as snowmobiling, skiing, hiking, canoeing, and other activities in natural areas … **g. public uses including hydroelectric generation and associated facilities**; and …"

With respect to zoning, the City of Greater Sudbury's Zoning By-law 2010-100Z, establishes and regulates the use of land by implementing the policies of the City's Official Plan. The Zoning By-law provides the City with the legally enforceable means of regulating land use, scale and intensity of development. The City of Greater Sudbury's Zoning By-law 2010-100Z came into effect on September 29, 2010. It contains several zones for land uses such as residential, industrial, commercial, rural and other zones. For each zone there are provisions that control the location, scale and form of land uses. The Zoning By-Law does define an electric power generating station as:

> "A facility that generates electricity, but does not include a solar collector, solar farm, wind turbine or wind farm." (p. 3-15)

According to the Interactive Zoning By-Law map the Coniston GS appears to be in both a RU Rural Zone and an M3 Industrial Zone (https://sudbury.maps.arcgis.com/apps/webappviewer/index.html?id=57094561875b4260b719f9e6caaf4154). More of the station lines in the RU Zone than the M3 Zone but this may be a projection/mapping error. In the Zoning By-Law section 4.40 "Uses Permitted in All Zones" it is noted under 4.40.1 Institutional and Public Zones that: (p. 4-39 – p. 4-40)

> "Nothing in this By-law shall apply to prevent or otherwise restrict in any way any of the following: …. b) The installation or maintenance of any part of: … iv) An overhead or *underground* electrical, cable television, telegraph or telephone line and any associated tower, transformer or other related installation including, except in a Residential (R), Commercial (C) or Institutional (I) Zone, an *electric power generating station*."

A meeting was held with officials from the City of Greater Sudbury Building and Planning Services Divisions. These officials re-iterated the point that assuming that OPG is a provincial entity it does not necessarily need to be subject to municipal regulation. The Planning Department agreed with the interpretation with respect to the Official Plan. With respect to the issue of the zoning by-law map appearing to cut through the Generating Station, the Planning Department undertook some research and identified that this mapping error pre-dates the current Official Plan and what is currently depicted dates to mapping in the Official Plan for the original Village of Wahnipitae. It is not clear how or why that mapping was applied.

In summary, as a provincial entity OPG does not need to be subject to municipal regulation; that the GS pre-dated any municipal planning in the region and therefore would be a legally established used; and lastly that it is in conformity with the Official Plan and appears to be in conformity with the zoning by-law.

3.4.5 Local Socio-Economic Features and Uses

A variety of local socio-economic features and uses occur within relatively close proximity to the Coniston GS and our described here in order to better understand the potential for impact on them.

3.4.5.1 Roads and Access

The Coniston GS is located just outside the Village of Wahnapitae and is accessed by the Trans-Canada Highway and then the Coniston Hydro Road. That road is about 2 km in length and is gated at a point along the road. This is a gravel road.

3.4.5.2 Source Water Protection Areas and Municipal Intakes and Outflows

As previously indicated, there is a City of Greater Sudbury Source (Water) Protection Plan in place. A review of that Plan indicated that the Coniston GS is not in a Source Protection Area.

The Wanapitei Water Treatment Plant is located off Highway 17 directly across from Coniston Hydro Road. West of the village of Wahnapitei, north of the Trans-Canada Highway. As indicated below, the water is drawn from a flooded intake well. That Plant is described below:

> “A large portion of the drinking water supply (51%) for the City of Greater Sudbury is obtained from the Wanapitei River. Sudbury’s water intake on the Wanapitei River is a flooded intake well (no pipe) with an elevation of 232.56 m (CGD). At maximum, only 0.63 cms is extracted from the river as per the MOE certificate of approval. The City of Sudbury’s water needs were identified in the WMP process and it was determined that water levels will not impede the City of Sudbury’s water intake well.
>
> The Wanapitei Water Treatment Plant is located off Highway 17 directly across from Coniston Hydro Road (approx. 1 km from Coniston Generating station).” (p. 4-1)

A sewage treatment plant and lagoons are located further downstream on the Wanapitei River. It discharges periodically into the Wanapitei River during high flow periods in the spring and fall, as per its conditions in the Ministry of Environment (MOE) Certificate of Approval. (OPG, WMP, p. 4-1)

3.4.5.3 Municipal Infrastructure

OPG is not aware of any other municipal infrastructure that is located near the Coniston GS.

3.4.5.4 Water-Based Recreational Uses

As previously mentioned, the Coniston GS is located within the City of Greater Sudbury but in an area that is general rural and resource extractive in nature. Discussions with OPG staff have indicated that recreational use near the GS is limited but does occur. This would include recreational boating and fishing.

4 Socio-Economic Effects Assessment

The socio-economic effects of the proposed undertaking with respect to regional and local effects are presented in this chapter.

4.1 Regional Socio-Economic Effect

4.1.1 Construction Phase

The proposed Project will have a positive economic impact on the province, northeastern Ontario and City of Greater Sudbury.

The proposed Project is expected to result in the creation of approximately 150 to 200 person years of work over an approximately two-year construction period. This employment will be distributed across a wide variety of professions and trades typically associated with a heavy construction project. Large labour needs will include engineers; equipment operators, labourers, drillers, cement workers, ironworkers/rodmen, electricians, welders, carpenters, etc.

Recent OPG experience in constructing hydroelectric projects in Northeastern Ontario demonstrated that approximately 60% of the total labour requirement for the on-site work was met by the labour market in northeastern Ontario. OPG would expect that employment needs for the site would be first met by labour supply in the Greater Sudbury Area and secondarily from northeastern and central Ontario. Direct employment from outside the region may occur for specialty trades and disciplines and/or if there is a large demand for certain trades within Greater Sudbury itself at the time of construction.

For a construction project, OPG requires that all labour associated with the proposed Project be members of the unions which it has collective agreements in place. The Electrical Power Systems Construction Association (EPSCA) negotiates and administers collective agreements with the Building Trades for OPG and all contractors performing trades work on OPG projects.

The unions covered under the EPSCA agreement vary from highly specialized workers such as electricians to more generalist trades such as labourers. Local individuals who are qualified to do work but are not union members would be required to join the union that represents their trade.

As part of the ongoing commitment to work closely with local Indigenous Communities OPG has been working with local Indigenous communities to encourage community members and businesses to capitalize on employment opportunities on the Project, should it receive the necessary approvals to proceed to the construction phase. During the environmental assessment stage of the Project, OPG has been working with the environmental department of the Wahnapitae First Nation in facilitating training and employment opportunities at the site. More opportunities could be provided during the construction stage should there be interest.

The Project team will work cooperatively with the relevant Indigenous communities after the EA and into the Construction period should the Project receive its necessary approvals to move forward.

Additional indirect and induced employment will also be created as a result of the proposed Project, particularly in sectors associated with the supply of construction materials and the recent provision of goods and services to the Project and associated workforce. Based on other recent OPG hydroelectric projects in northern Ontario, for every direct job associated with the Project another 0.65 person years of indirect and induced employment will be generated elsewhere in northeastern Ontario.[1] The overall economic benefit will not change with the selection of one particular contractor but it is possible the geographical origins of some of the workers may be different depending on the selected contractor.

Economic and business activity effects are all the economic effects associated with sub-contracting opportunities on the proposed Project to the DB Contractor and also the indirect and induced economic effects associated with the Project on the regional economy. Opportunities for existing local businesses and the regional economy will come via contracting work, as well as local project purchasing and expenditures by workers in the local and regional economy.

Some of the more common businesses or sectors in the local and regional economies that will benefit from the proposed Project will include the following.

- Other construction and construction supply (e.g., building or aggregate supply) companies.
- Local accommodation suppliers (e.g., motels) as short-term workers on the Project visit the area.
- Business, professional and personal services companies that are likely going to experience increased levels of activity.
- Transportation related companies that are likely to experience an increased level of business.
- Local and regional retail (e.g., convenience stores, grocery stores, drug stores) and food services industries (e.g., restaurants, grocery stores) that will benefit from worker expenditures at these at these businesses.

For other socio-economic studies on hydroelectric projects in northern Ontario, it was estimated that the sales multiplier associated with the proposed Project was $1.50, i.e., for every dollar expended on the Project and additional $0.50 would have be spent in northern Ontario.

In a study for OMNRF, *Economic Impact of Waterpower Projects on Crown Lands in Ontario*, AECOM (2012), described the economic impact of forty-one hydropower development projects in Ontario. While the local and regional results of that work aren't relevant to this project the provincial level economic multipliers would be similar. In that study it was determined through use of the Inter-Provincial Input-Output Model that the following multipliers would occur for a standard $1 million investment in hydropower. Therefore, for every $1 million invested in waterpower development (construction) about 4.35 full-time equivalent direct jobs would be created as would 2.66 indirect jobs and 2.06 induced jobs. These are multiplier estimates at the provincial level only.

[1] These regional multiplier are taken from Arcadis estimates of OPG hydroelectric projects in Northeastern Ontario and were derived from the use of an economic impact model use in Timmins and Kapuskasing. Direct effects are initial changes in employment, income and output from initial spending. Indirect effects are subsequent changes in all economic sectors that support those sectors that are directly affected. Induced effects are subsequent changes in all economic sectors as a result of income spending by employees in the direct and indirect sectors.

The much larger provincial multipliers versus local and regional multipliers is a standard economic phenomena that demonstrates the nature of hydropower development and the geographical nature of economic inter-dependency.

Little to no effect is excepted on the population, demographic or social composition of the City of Greater Sudbury. This is because OPG does not anticipate a large number of workers moving into the region for this temporary work. It is likely most of the workers will just commute from their existing residences in or near Greater Sudbury. It is possible that some specialized workers will need to temporarily locate to the region on an occasional basis and depending on the construction work required. Sudbury has a large accommodation sector with ample hotels to cover any temporary accommodation needs.

4.1.2 Operations Phase

As OPG already operates the Coniston GS, OPG does not anticipate any major changes with respect to staffing for the Plant Group that oversees Coniston GS.

OPG anticipates that the re-developed GS will result in payment of $156,000 per annum to the Province in Gross Revenue Charges which consists of $32,500 in property taxes and $123,500 in water rental charges.

4.2 Local Socio-Economic Effects

4.2.1 Land Use

OPG is planning on using the Coniston GS, for the same purpose of which it has been used for the last one hundred plus years. As indicated previously, as a provincial entity OPG does not need to be subject to municipal regulation; that the GS pre-dated any municipal planning in the region and therefore would be a legally established used; and, lastly that it is in conformity with the Official Plan and appears to be in conformity with the zoning by-law.

As the Coniston GS has been in place for one hundred plus years surrounding land uses and landowners recognize the GS as part of the land use character of the area. No public concerns have been raised with respect to its compatibility.

The city has in place a Noise By-Law that will need to be adhered to during the construction period by the DB Contractor.

Discussions with the Conservation Sudbury indicated that the MNDMNRF is still the lead under *Lakes and Rivers Improvement Act* and project elements within their scope of review would not be duplicated by the Conservation Authority. Any ancillary works, not within the MNDMNRF scope but within the Regulated Area of the CA, would be items where the Conservation Authority might engage further (Jorgenson, 2021).

Based on conversations with the City of Greater Sudbury, it is at OPG's discretion as to whether or not it wishes to have the project subject to the City's building permit process.

4.2.2 Access and Transportation

As indicated in Chapter 3, the Coniston GS is accessed from Coniston Hydro Road and the Trans-Canada Highway (Highway 17).

The redevelopment of hydroelectric facilities requires a wide number of professions and trades that change at various stages during the project cycle. The first phases of the work involve more civil work including setting up the construction site, excavation, removal of rock and general civil work. Once the powerhouse is constructed, labour needs shift more to the installation and connection of equipment. As such, labour needs evolve over the course of the project. It is anticipated that anywhere from 40 to 120 workers may be on the site at any one time during the approximately two-year construction period.

Workers will be generally responsible to get themselves to the worksite. The project will generally operate on a one shift per day basis meaning that there would be likely 80 to 240 vehicular movements per day on Coniston Hydro Road associated workers coming and leaving the site each day.

During cofferdam construction, excavations, demolition of existing structures and cofferdam removal activities heavy truck traffic will be present on Coniston Hydro Road and the TransCanada Highway in the vicinity of the site as all excess materials are to be removed from site.

Other traffic movement would be associated with deliveries of concrete, other construction materials, and the permanent equipment. These traffic movements will likely vary from a handful each day (under 20) to up to over 200 per day during excavation and demolition activities. Increases in truck traffic would also occur on certain days from week to week to support concrete pours as material will be brought in from off site.

A small number of oversized loads are also expected during the course of construction. Preliminary discussions have been held with the City of Sudbury with respect to land use planning that also briefly touched on access and transportation issues.

The total number of traffic movements can likely be estimated with greater accuracy once a DBC is retained on the project. A meeting could be held with the City of Sudbury once more detail is known.

The City of Sudbury noted that municipal permits are required for extra-long/large loads. As well the city noted that if there are road improvements that needed to be made at the intersection of Coniston Hydro Road and the Trans-Canada that would involve a joint Ministry of Transportation/City of Greater Sudbury coordinated review. The city can coordinate a meeting with MTO if required.

4.2.3 Social and Economic Uses

4.2.3.1 Upstream and Downstream Recreational Use

OPG does not plan on altering any of the level or flow requirements in the WRWMP. As such, there is no proposed effect on recreational use.

OPG will temporarily mark out a portage route during the construction process should the permanent portage not be available.

4.2.3.2 Municipal Services, Issues and Infrastructure

As indicated in Chapter 3, there is a sewage treatment plant and lagoons also located upstream on the Wanapitei River. As the proposed GS does not plan to alter the approved levels and flows in the WMP there is no effect on these facilities.

No other municipal services or infrastructure are anticipated to be impacted by the proposed project.

4.3 Summary of Mitigation, Enhancement and Monitoring Measures

Table 4-1 summarizes potential construction and operation effects, the recommended mitigation/remedial measures to minimize or obviate these effects and the net effects of the proposed Coniston GS Re-Development Project.

Table 4-1 Potential Construction and Operation Effects

Effect/Activity	Recommended Mitigation/Remedial/ Enhancement Measures	Net Effect
Construction		
Positive Economic and Employment Impacts	• Project team is working with Indigenous communities to maximize employment and economic opportunities. • Project will work with local suppliers to create opportunities wherever possible.	Positive
Positive Gross Revenue Charges	• Project will result in significant gross revenue charges for the Province.	Positive
Noise	• Adherence to noise by-law. • Use of well-maintained equipment and noise silencers (as required) from Terrestrial Environment TSD.	Negligible
Traffic, Access and Transportation	• If requested an additional meeting could be held with the City of Sudbury to discuss traffic and road issues.	Negligible
Public Concerns/Complaints	• OPG has also agreed to include in their environmental management plan a process for communicating with Indigenous communities and the public. Part of this would include information on how public concerns/complaints are managed during the construction process.	Negligible

4.4 Conclusions

The proposed Project represents an excellent opportunity to re-develop the existing Coniston GS which has reached the end of its service life. The Project will involve construction of an approximately 6.0 MW powerhouse, slightly increasing the energy production of the facility when it was at full capacity. This is enough power for approximately 6,000 homes in Ontario. This will ensure the continued use of the existing water resources at this site.

The proposed Project is expected to result in the creation of approximately 150 to 200 person years of work over an approximately two-year construction period. This employment will be distributed across a wide variety of professions and trades typically associated with a remote heavy construction project. Most of the on-site employment is expected to be drawn from the Greater Sudbury Area and to a lesser extent central and northeastern Ontario. Additionally, there are potential training, employment and sub-contracting opportunities for First Nations and other Indigenous peoples who are interested in the work.

Economic and business activity effects are all the economic effects associated with sub-contracting opportunities on the proposed Project to the DB Contractor and also the indirect and induced economic effects associated with the Project on the regional economy. Opportunities for existing local business will exist through the spending of the DB Contractor and its employees and by OPG itself. It should also be noted that OPG anticipates that the re-developed GS will result in payment of $156,000 per annum to the Province in Gross Revenue Charges which consists of $32,500 in property taxes and $123,500 in water rental charges.

The proposed Project is consistent with the existing land use policy for the area. OPG has been working co-operatively on issues of mutual interest with the City of Greater Sudbury. These are few but might include transportation and traffic issues.

As the proposed Project merely replaces the existing 100-year-old GS it results in no changes to the character of the area, or any nearby land and resource uses.

OPG will continue to operate the Coniston GS and the other plants on the Wanapitei River in full accordance with the WMP. Overall, the proposed GS will not result in any significant changes to recreational use upstream or downstream.

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6 Acronyms And Abbreviations

Coniston Generating Station	Coniston GS
Coniston Station Re-Development Project	CSRP
Design-Build Contractor	DB Contractor
Electrical Power Systems Construction Association	EPSCA
Environmental Assessment	EA
Environmental Assessment Act	*EA Act*
Environmental Protection Act	*EPA*
Environmental Report	ER
Generating Station	GS
Independent Electricity System Operator	IESO
Lakes and Rivers Improvement Act	*LRIA*
Megawatt	MW
Megawatt Hours	MWh
Ministry of Environment, Conservation and Parks	MECP
Ministry of Natural Resources and Forestry	MNRF
Wanapitei River Water Management Plan	MRWMP
Ontario Power Generation	OPG
Ontario Water Resources Act	*OWRA*
Ontario Waterpower Association	OWA
Technical Support Document	TSD
Water Management Plan	WMP

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