

John Hart Generating Station Replacement Project

September 2018

Community Construction Update Report #63

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Project Status

Surface works:

- Steel work at fan house (entrance to service tunnel) is complete and the façade and decking is underway; and
- Final guides installed for new power poles and lines at the main project site.

Underground:

- Office complex enclosure walls are being installed, doors and hardware are also going in;
- Generator #2 is in operational testing stage with corrections underway; and
- Generator #1 is in the dry commissioning phase, preparing for wet testing.



Project Schedule

- Ongoing: Training;
- Sept/Oct: Demobilization of operations at old Campbellton school and laydown areas underway;
- Oct: Powerhouse and fanhouse at entrance to service tunnel is complete;
- Oct: Commercial operation of the last two generators;
- Nov: Finishing touches on powerhouse completed;
- Oct-Dec: Beginnings of demolition of old powerhouse, old water intake and penstocks; and
- Feb/March 2019: Removal of Surge Towers begins

Riverites go underground at John Hart generating station

DAVID GORDON KOCH
Campbell River Mirror

Hundreds of people got a unique glimpse into the inner workings of the new John Hart generating station on Sunday during a sold-out tour.

It was the fourth – and final – in a series of annual site tours at BC Hydro's \$1.1 billion facility – and the only one taking visitors to the depths of the new power station.

Tom Helina, a Campbell River resident, was impressed by what he saw.

"Just amazing," he said. "It's above amazing. Incredible. Unreal. Spooky too."

Yellow school buses carried visitors down a bumpy tunnel road to the powerhouse cavern, with its rough-hewn walls and high-powered machinery.

The powerhouse area is the size of a football field and 10 storeys deep. Its lower levels weren't accessible to visitors, but water could be heard coursing through a water bypass valve below.

Roger LaRose, one of the visitors on Sunday morning, said he was fascinated by the size of the facility.

"Just the sheer magnitude of the underground stuff, that's pretty interesting," he said.

Stephen Watson, a BC Hydro spokesperson and tour guide, noted that some of the machinery is already active, so visitors were strictly forbidden from wandering off.

Members of the public were enthusiastic about the event, he said.

"This is what everyone wants – they want to go underground, drive down the tunnels, go into the powerhouse," said Watson. "Just to see that reaction from people is so cool."

About 1,250 visitors were expected for the one-day event. Among the visitors was Donna McCrae, who said she was curious about the technology – especially because she used to live along the Campbell River, which powers the hydro facility.

"I was always interested in the highs and lows of the river," she said.

Tickets were \$5 each and sold out immediately when the box office opened on July 11. High traffic volumes caused the website of Tidemark Theatre, which handled ticket sales, to briefly crash, said Watson.

Any trouble in obtaining tickets for the event was well worthwhile, said Susie LaRose, another underground visitor.

"It was worth it," she said. "Awesome day."

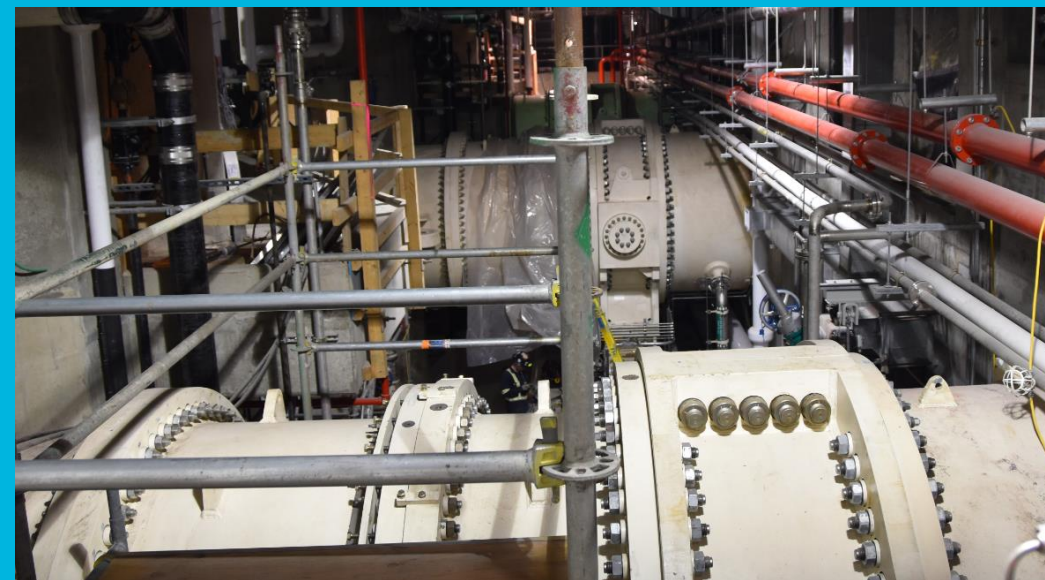
Some Campbell River residents on social media asked whether there would be another chance to check out the subterranean site. But there are no plans for another tour, said Watson.

"This was the one and only chance," he said, citing complicated logistics and safety issues.

"There was a lot of happy people who went on the tour and Sunday but were probably more than that were disappointed," he said. "I get that."

The tour took place as BC Hydro prepares to make the facility fully operational. One of three generators at John Hart are now online, and the other two come online next month.

BC Hydro opted to replace the 70-year-old power station for better strength in case of a major earthquake. The facility is also meant to be more reliable and to protect fish habitat downstream.

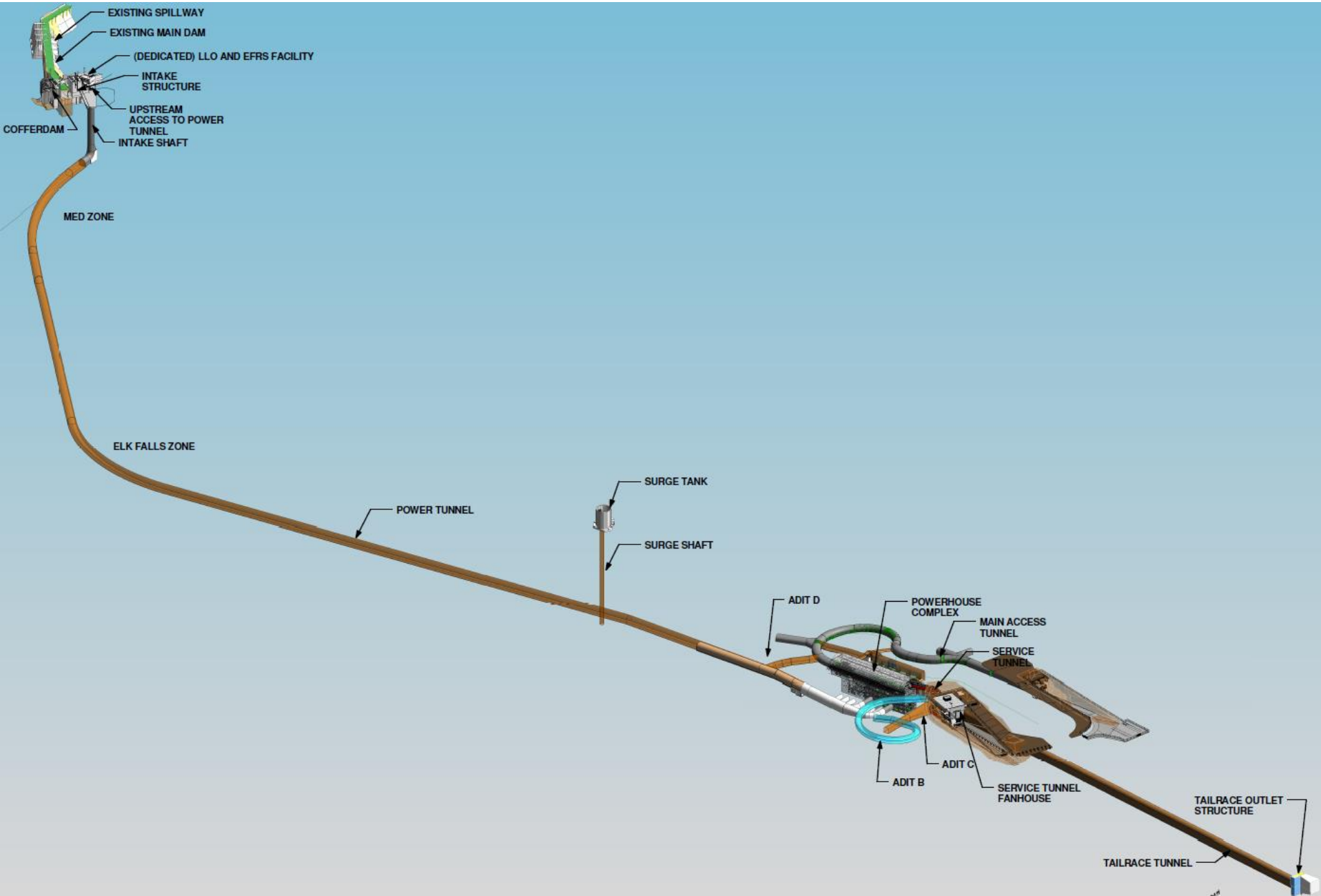


Two water inlets that lead into the turbines to the left.

Campbell River Mirror, September 19 edition.



John Hart Project Site Map





The new water intake works at the John Hart dam.

Fish habitat flow release down Elk Falls Canyon.





A closer view of the water intake structure.



The surge tank.



The fanhouse and entrance to the service tunnel.

From the very start of this project, watching for the small creatures on the John Hart site has been an ongoing priority for the project team. Frogs are still found, reported and recorded, and relocated to a safe location. One of the little guys shown below was found by project subcontractor NCE crews.



The main access tunnel entrance.



A look out of the main access tunnel entrance.



View looking down the main access tunnel. A pedestrian walkway is being constructed on the left.



John Hart Community Site Event – Underground Powerhouse Tour.

31 bus trips, carrying a total of about 1,240 people, left downtown on the 11-minute ride to the site and down the main access tunnel to the powerhouse area.



Public gets inside look at \$1.1B hydro project

CARLA WILSON
Times Colonist

After four years of construction, the \$1.1-billion John Hart Generating Station replacement project near Campbell River is set to take over from the previous facility.

One new turbine and generator are already in use. The final two generators will be ready for duty next month.

"The old John Hart generating station will be permanently shut down and operations transferred to the new facility in mid-October," Stephen Watson, B.C. Hydro spokesman, said Monday.

"By end of summer 2019, the old generating station will be removed to the ground level and the three wooden and steel penstocks will be removed and the penstock corridor will eventually be returned to forest."

The public was invited to buy a \$5 ticket for a rare opportunity to tour the generating station on Sunday. More than 1,200 people from throughout Vancouver Island and the mainland visited the underground 10-storey high powerhouse cavern.

Ticket proceeds and additional funding from B.C. Hydro will see \$7,000 donated to North Island College to support seven apprenticeship scholarships. "A perfect fit given we have three large dam safety upgrades proposed for the Campbell River system that may begin in 2021-2022," Watson said.

Campbell River Mayor Andy Adams said the project was "an impressive sight." "Years in the



Members of the public tour the underground 10-storey high powerhouse cavern of the John Hart Generating Station replacement project near Campbell River. STEPHEN WATSON, B.C. HYDRO

making, B.C. Hydro and SNC-Lavalin are to be commended for the engagement and collaboration that has brought hundreds of international specialists together with hundreds of community businesses providing a very important economic stimulus for Campbell River," he said in a statement.

The original 1947 generating station was in poor condition and needed to be replaced. Its electric-

ity output was dropping. The station and its pipelines were deemed unlikely to withstand a moderate earthquake.

John Hart Generating Station is on the Campbell River.

It uses water collected in a dam that gushes into tunnels and headlong into turbines, which generate electricity. Water is then released back into the river.

Construction started in June

2014 and the project provided jobs for hundreds of workers and saw tens of millions of dollars spent on Vancouver Island.

The new generating station is built to higher seismic standards than the old one and will be able to provide power to 80,000 homes, up from 74,000 under the current system.

InPower BC, owned by SNC-Lavalin, was contracted to build

the replacement generating station. The project's civil contractor is ASL-JV, consisting of Aecon SNC-Lavalin.

The project included building a replacement water intake at the John Hart spillway dam, replacing three 1.8-kilometre long penstocks with a 2.1-kilometre long tunnel, constructing a new generating station and water bypass facility upstream of the existing station.

John Hart Community Site Event – Underground Powerhouse Tour Handout



John Hart Generating Station Replacement Project

Underground powerhouse tour—September 16, 2018

BC Hydro and InPower BC, the project contractor, are proud to welcome you to the fourth and final annual community site event. For safety and site logistics, you must follow the directions of your tour guide. We hope you enjoy the tour!

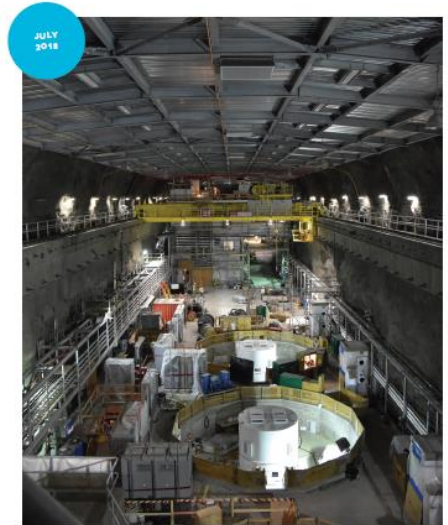
The John Hart project was initiated in 2007 to deal with three project drivers for a facility built in the 1940s: safety—the generating station and pipelines would not withstand even a low to moderate earthquake; reliability—the six generating units were in poor condition; and environment—the risk of a generating station shutdown and river flow reduction, with subsequent impacts to fish habitat. The new facility will be commissioned on schedule and on budget next month. The facility is in rock and will be seismically strong, reliability will be maintained with a new powerhouse that gets a near 10% increase in power output using the same amount of water, and the new water bypass facility within the powerhouse will maintain constant flows downstream in the Campbell River to protect fish.

Above: The completed power tunnel manifold where water from the tunnel turns 90 degrees and enters the powerhouse. The tunnel will be dewatered about every 4–5 years for maintenance and inspections.

Search 'John Hart Generating Station Replacement Project overview' on YouTube to see a system overview.



Powerhouse view from the service tunnel in September 2016. InPower BC, a subsidiary of SNC-Lavalin, consists of a team of contractors that includes Aecon Group (civil work), Frontier-Kemper (rock drilling and blasting), and General Electric (turbine/generator). With approximately 2.2 km of underground tunnels, and a powerhouse cavern that's 10 storeys high and as long as a football field, we removed about 300,000 cubic metres of rock. This picture shows the powerhouse cavern in September 2016.



The powerhouse cavern view in August 2018. The water bypass facility, located a few levels below and in front of the office complex in the background, was commissioned in May 2018. Generator 3 was the first turbine/generator to go into service in July, right on schedule, and Generator 1 and 2 will go into service in October. The control room is in the office complex, though no staff are needed—it is controlled remotely from BC Hydro's Fraser Valley Operations.

Common questions

How does the power generated get into the power grid?

The electricity flows through cables strung on trays that lead out of the service tunnel to overhead powerlines that travel a very short distance to the existing John Hart substation and on to the wider power grid.

What is the megawatt output? How many homes can this powerhouse supply?

132.5 megawatt capacity. The new powerhouse can supply power to about 80,000 homes.

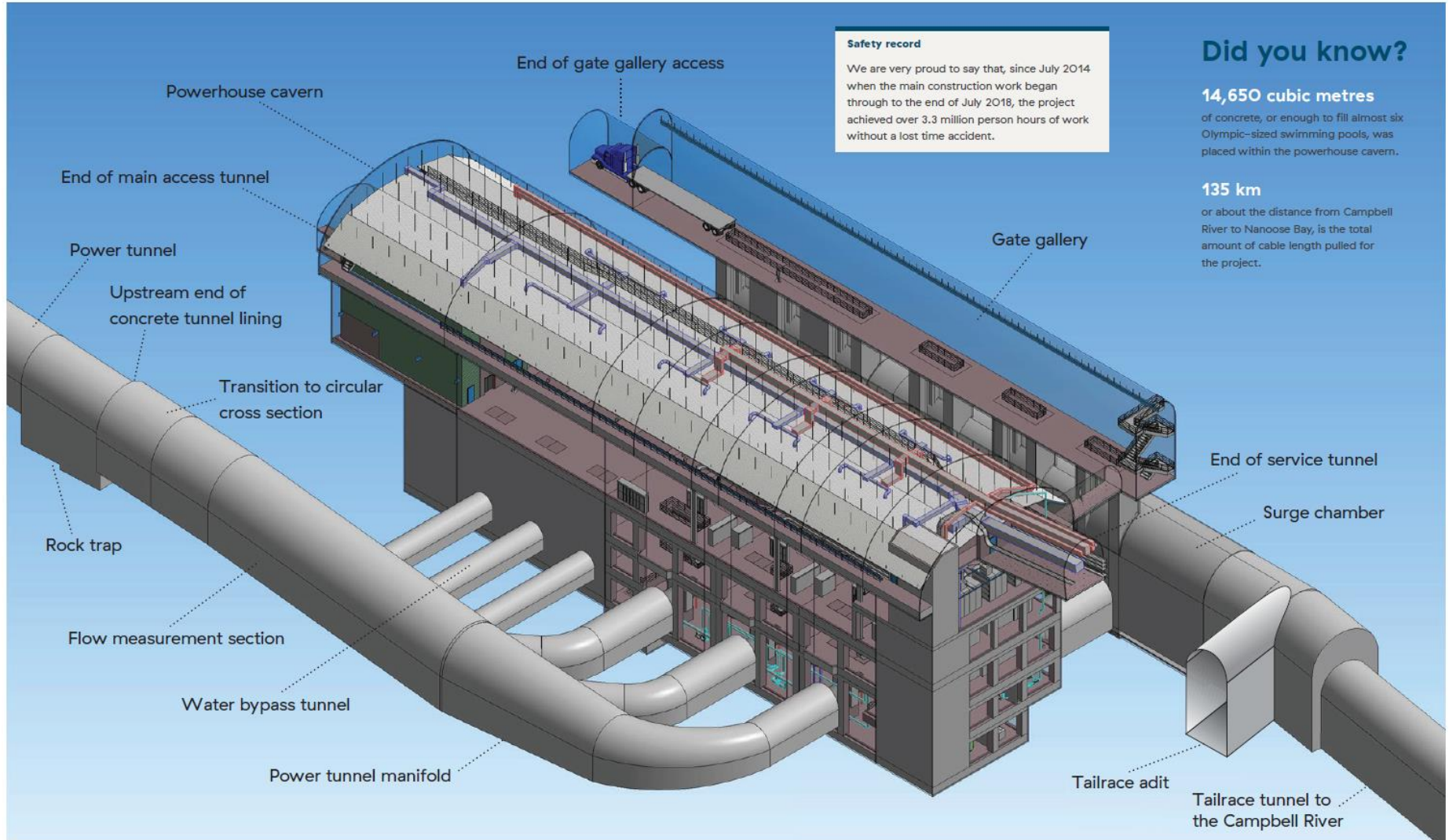
How many people worked on the project?

The number of people working on the project in Campbell River peaked at 500 jobs in June 2017.

How big are the tunnels? Did you use a bore machine? Where did the extra rock go?

The power tunnel travels 1.575 km from the John Hart reservoir to the powerhouse. The power tunnel has a rounded roof (crown), vertical walls, and a flat floor. It is over 8 metres in diameter. The surge chamber is on the downstream side of the powerhouse and is 15.6 metres high. The surge chamber and the tailrace tunnel, which is about 10.5 metres high, travel about 600 metres to a tunnel outlet and into the Campbell River. The project used the drilling and blasting method and could remove about 5 metres of tunnel length per blast. All excess rock went to First Nations to be used as they like—essentially for development purposes or to sell.

John Hart Community Site Event – Underground Powerhouse Tour Handout



A diagram of the powerhouse area. Water flow from the reservoir will pass down the power tunnel, enter the powerhouse water inlets, and cause the turbines to spin and create electricity. The water then passes into the surge chamber, below the gate gallery, and will turn 90 degrees and flow down the tailrace tunnel to the Campbell River.

After walking about 100 metres from the bus drop-off, each group would stop for an orientation near the powerhouse office complex.



The tour groups would then walk across the generator floor, up one flight of stairs to the mezzanine area, where they had this view of the powerhouse.





A tour group by the office complex and the main access tunnel entrance.

Interactions with project staff in the mezzanine area.



The tour groups then walked into the gate gallery for a brief overview and some pictures.



Walking through the gate gallery.



Getting ready to get back onto the bus and back downtown. The round trip took about 60 minutes.



The gate gallery.



The new powerline from the underground powerhouse to the upgraded substation, and the tunnel outlet to the right of the old powerhouse.



People Profile – Joe Zemanek

About Joe

Background:

As a Red Seal Carpenter, Joe has been building luxury homes, primarily timber frame, on Vancouver Island since 1998. He moved to industrial work originally with the goal of earning more money but quickly discovered there are many similarities between high-end building and projects like the John Hart project. The both have clientele with very specific needs and expectations, complex designs and incredible engineering.

Home:

Joe and his wife and moved to Campbell River in 2004 and felt like it was the ideal place to start a family – which they did.

Hobbies:

Most of his free time is spent with his wife and 2 sons (9 and 12) at soccer games, swimming lessons, trampoline and enjoying the Campbell River nature we are famous for. If he's not with his family, you can find him on his bike at Mount Washington.

Project Responsibility:

As Project Supervisor with NCE, Joe's responsibilities include logistical planning, tracking and implementation of various civil and carpentry contracts. He directly supervises and assists the foreman in the coordination of their crews on the ground.

“At the end of the day, you can stand back, with pride, and admire what has been accomplished.”



Construction – Point Of Interest

Each month, BC Hydro and InPower BC will provide a construction fact, occurrence, or situation.

A10 Friday, September 14, 2018

Campbell River Mirror

www.campbellrivermirror.com

Hydro upgrades warning siren for Campbell River

The air raid-type sound people have been hearing for decades below the John Hart hydroelectric facilities to warn people of water flow changes is getting an upgrade.

The new system will also

sound different as Hydro is moving to a whooping sound.

“We recently upgraded the Puntledge River public warning system and moved to a whooping sound that is consistent with Canadian Dam Association Guide-

lines,” said BC Hydro’s Stephen Watson. “We are going to implement that same sound at John Hart.”

The sirens are located at the dam, near Elk Falls, the old powerhouse, and downstream near the water intake for the former pulp

and paper mill. All the siren locations will be upgraded as part of the John Hart Generating Station Replacement Project.

“The most visible upgrade work will be seen at Deer Falls near Elk Falls as crews are beginning to access the area using the trails, and we will also be using helicopters to bring in two new poles and other equipment,” said Watson. “People will notice the activity and wonder what’s happening - hence this notice to the community.”

Temporary work activity awareness signage will be placed near the Elk Falls suspension bridge.

Four danger trees were removed this week to allow for the work to proceed, along with other preparation works. The upgrade on the new siren system is scheduled to begin around Sept. 24, by John Hart project contractor InPower BC, and last for a few weeks. Trail



The two new outlet valves were installed on the John Hart Dam and will provide BC Hydro with increased downstream water flow management, such as the annual fish habitat flows down Elk Falls Canyon. A new warning system to be installed by BC Hydro will alert the public to any outflow changes from the valves.

flaggers will be in place as needed. No trail closures are expected.

“The new siren system will be more reliable and up to current public safety guidelines,” added Watson. “Water flow changes down Elk Falls Canyon or below the generating station can take place at any time, whether planned

or unplanned, and it’s imperative to have a good siren system in place to properly warn people downstream.”

BC Hydro will continue to conduct the monthly John Hart spillway gate operational test and siren test once a month. The new siren system is planned to be put into service this fall.