



# Sea-to-Sky Highway Improvement Project Community Update

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## Darrell Bay rock cut a huge technical challenge

"It was quite a trick to fit a four-lane highway with median barrier between the CN Railway line and a 7-metre no-go zone around hydro towers along the bluffs between Darrell Bay and Gonzales Creek," says Jean-Sebastian Lambert, drill and shoot engineer.

The improved highway alignment just south of Shannon Falls will provide smoother curves, better sightlines and 1.5 metre wide shoulders in addition to the extra lanes and median barrier. Lambert finds it quite a change from his previous work for Hydro Quebec in James Bay. "Though you had to live in the bush in a camp, you didn't have worries about traffic, hydro towers, power lines, or the railway," he says. "You could use any size of blast, rather than limiting them as we must to protect these things, and having to use blast mats to guard the highway or railway."

The steep cut shaves off close to 80,000 cubic metres of rock upslope of the highway. Lambert says, "Imagine about 500 railway boxcars, and that will give you an idea of the volume of material we are removing here." The material is being processed and graded in a nearby portable crusher, and then used to create a mechanically stabilized earth (MSE) wall below the highway, and for fills within a kilometre of the work site.

"We do most of our work at night because there is less traffic," says Lambert. "Small blasts allow us to meet our production targets without the queues that result from longer traffic delays."

See more photos of the Darrell Bay rock cut on page 4.



Crews begin removal of rock at one of the largest rock cuts on the project at Darrell Bay. The target is to remove 5000 cubic metres (equivalent to 33 railway boxcars) of rock each week.



With 22 years' experience in mines in Saskatchewan, driller Brad Railton likes the challenges and variety each job site presents. "Young people can just apply and start training," he says, "and there is opportunity to innovate. This excavator-driller was designed by workers on this project. It gives you a longer reach and much more flexibility in terms of setting the angle of the drill."



## Sea-to-Sky Project a family affair

The Sea-to-Sky Highway Improvement Project is a family affair for the Hall family, and their motto, "Work is work and home is home," makes them successful because they keep the two separate. Sherry and Ken have been married for 26 years, working for Peter Kiewit Sons in Golden, BC. Ken was a carpenter foreman, and Sherry a level-three first aid attendant and laborer. Since coming to the Sea-to-Sky project, Ken has risen to a general supervisor and Sherry is now a safety manager. Their daughter works as a project surveyor, often in her dad's section. She recently married a carpenter on the project. Sherry's other daughter may join the family, since her husband is now on the Sea-to-Sky project. Their youngest son is a very skilled hockey player in Squamish. If he doesn't make the NHL, he would someday love to operate an excavator with Kiewit.

## Former gravel site now hard rock quarry for quality asphalt

Randy Marks, Peter Kiewit Sons processing and crushing manager for the Sea-to-Sky Highway Improvement Project says, "We chose the Rayonier quarry from several possibilities to provide the asphalt rock for the project, largely because quarried rock makes much better asphalt than gravel sources. The material in the Rayonier quarry has very consistent quality and there is plenty of it." He explains that the project is also using some high-tech paving asphalt commonly called Superpave. "This advanced asphalt requires rock that will break into cubical shapes, and most of the gravels won't do that."

The Rayonier quarry, located in Squamish, is one of several project aggregate operations. It will produce over 400,000 tons of asphalt rock and depending upon demand, anywhere from 50 to 150,000 tons of base rock for the construction segment that runs from Britannia Beach north to Garibaldi Highlands. Marks explains that base rock is a specific size of rock laid down as the base for asphalt. "It acts as a levelling pad, a drainage pad under the asphalt, so it doesn't deteriorate over time."

Previously an active gravel source, the Rayonier quarry has been transformed to a hard rock quarry to meet the requirements of the project. Crews blast once every six to eight weeks. Marks says, "Out on the roadway, blasts must be relatively small, so as to keep it open to traffic with minimal delay. Here we're trying to crush as much material with explosives as we can, so we shoot fairly large shots, giving us a lot of rock breakage in the blast."

The crushing operation is fed by a rubber-tired loader. "We built a 10 metre high bulkhead, allowing the loader to drop its bucket of blasted rock into a 42 x 48 inch jaw. The jaw is powered by a 250 horsepower motor that breaks it down and feeds the processing stream."

Marks says, "We separate the material into 100mm 'plus' and 100mm 'minus' sizes. Then we get rid of the natural 'fines' – silt, clay and other material. What we get is very consistent, high-quality, pure rock aggregates, and our quality remains constant from day to day, month to month." The rock is separated and goes by conveyor belt to three secondary crushing units. "With the three secondary units and three additional screens we're able to separate the material into three products for asphalt. The largest is 19 x 12.5 mm, followed by 12.5 X 5 mm and 5 mm minus."

By separating into the three streams, and maintaining a consistent product, the plant is able to then blend them back together in different ratios so the asphalt plant is able to make conventional hotmix asphalt, open grade friction course and Superpave. "We stockpile material for the asphalt plant and, when required, the plant starts up and can produce 3000 tons per day, about 120 truck loads."



*Overview of the crushing operation at the Rayonier quarry located in Squamish.*



*The asphalt plant adjacent to the crushing operation.*



*Raw material being fed into the crushing plant "jaw", beginning the process to create three sizes of aggregate.*



First of the 35 conveyor belts that move the rock into the separation and additional crushing process. The Rayonier quarry crushing operation has over 1200 feet of belts. The single-operator control booth is located to the right.

### Kiewit veteran keeps the rock moving

"I'm a second-generation construction guy," says Randy Marks. "My father worked for Kiewit for 35 years, predominantly on the U.S. west coast." For Marks, that meant a lot of moves. "Six months in one place was a long time when I was growing up," he says. He continued his education, finishing with a civil engineering degree. "It was an easy decision to follow in my dad's footsteps and I have been working for Kiewit steadily since 1974."

Marks has worked all over North America on Kiewit projects. He was part of the Kiewit-led joint venture to mobilize and construct the infrastructure for the Diavik Diamond mine, 300 air miles northeast of Yellowknife, in the Northwest Territories. He has worked on infrastructure required for the Prudhoe Bay oil fields and the Alaska pipeline. "All these projects have different challenges, but each is rewarding and for me, they are fun."

The greatest challenges on the Sea-to-Sky Highway Improvement Project are logistics. "Typically what I am used to is going into a highway or freeway job where we have options of alternate routes. We can shut down lanes or re-route traffic to maximize our construction efforts. With the Sea-to-Sky job, we must keep the traffic moving, and that is a logistical construction challenge."

Marks and his family call Vancouver, Washington home, but he lives on his boat in the Squamish area for the duration of the Sea-to-Sky project.

## Safety improvements highlighted on new northern section

"A newly-completed section has added 5km of alternating passing lanes between Cheakamus Canyon and Rubble Creek," says Rob Ahola, Sea-to-Sky Highway Improvement Project construction director. With this new section in operation, 25 of the 44 km between Brackendale and Whistler's Function Junction now has alternating passing lanes.

"Not only does this improve traffic flow but the increase in passing opportunities also reduces conflict between slower- and faster-moving vehicles," says Ahola. The Cheakamus-to-Rubble Creek section also has shoulder and centreline rumble strips which are proven to reduce off-road and crossover accidents by up to 20 percent. Ahola adds that the new section also has many other safety improvements including wider shoulders, improved pullouts and chain-up areas, softer curves, better sightlines and an improved intersection.

He explained, "There was a significant amount of rock work required in this section. Along with removing rock to make room for the highway widening, crews also improved the stability of the slopes above the road by removing loose rock and using rock bolts to keep rock in place." Ahola says improved rock catchments and meshing have also been used to keep any rock that does come loose from reaching the road.



The new Cheakamus to Rubble Creek section has improved pullouts, 5 km of new passing lanes, wider shoulders and improved sightlines.

## Construction gallery – Darrell Bay rock cut



*In this view from Darrell Bay Road, the crew is using a crane to place a drainage culvert from a ditch on the upper side of the highway. Temporary retaining walls are in place until the MSE wall between the highway and the CN rail line is constructed.*



*Taken from the Darrell Bay Road intersection with the highway, this view gives a sense of the size of this cut, the equivalent of 500 railway boxcars or 80,000 cubic metres of rock. It extends east to the entrance to Shannon Falls Provincial Park.*



*Crews are especially cautious working in and beside the narrow highway with live traffic. Drivers must be especially careful through the work zones, particularly at night.*



*The Darrell Bay rock cut is complicated by adjacent highway traffic, the CN Rail line, hydro transmission towers and a 40 metre high steep bluff.*

### **For further information:**

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### **Construction Delay or Closure Information:**

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