



Sea to Sky Highway British Columbia Highway 99

Site Visit
August 1, 2007



Presentation developed by J. Mahoney, University of Washington



General Information

- 95 km long section of Highway 99 from West Vancouver to Whistler.
- British Columbia Ministry of Transportation (MoT) wanted to:
 - Improve safety, reliability, and capacity.
 - Complete work during 2009 (for 2010 Winter Olympics).
 - Achieve these improvements via a performance based Design-Build-Finance-Operate (DBFO) public private partnership.
- Total cost: ~ \$800 million



General Information

- S2S Transportation Group began construction August 2005 and will finish fall 2009.
- Total time to design and build ~ 4 to 5 years.
- Financing
 - Required outside financing.
 - 80% of future revenue based on lane availability.
 - 17 banks involved.



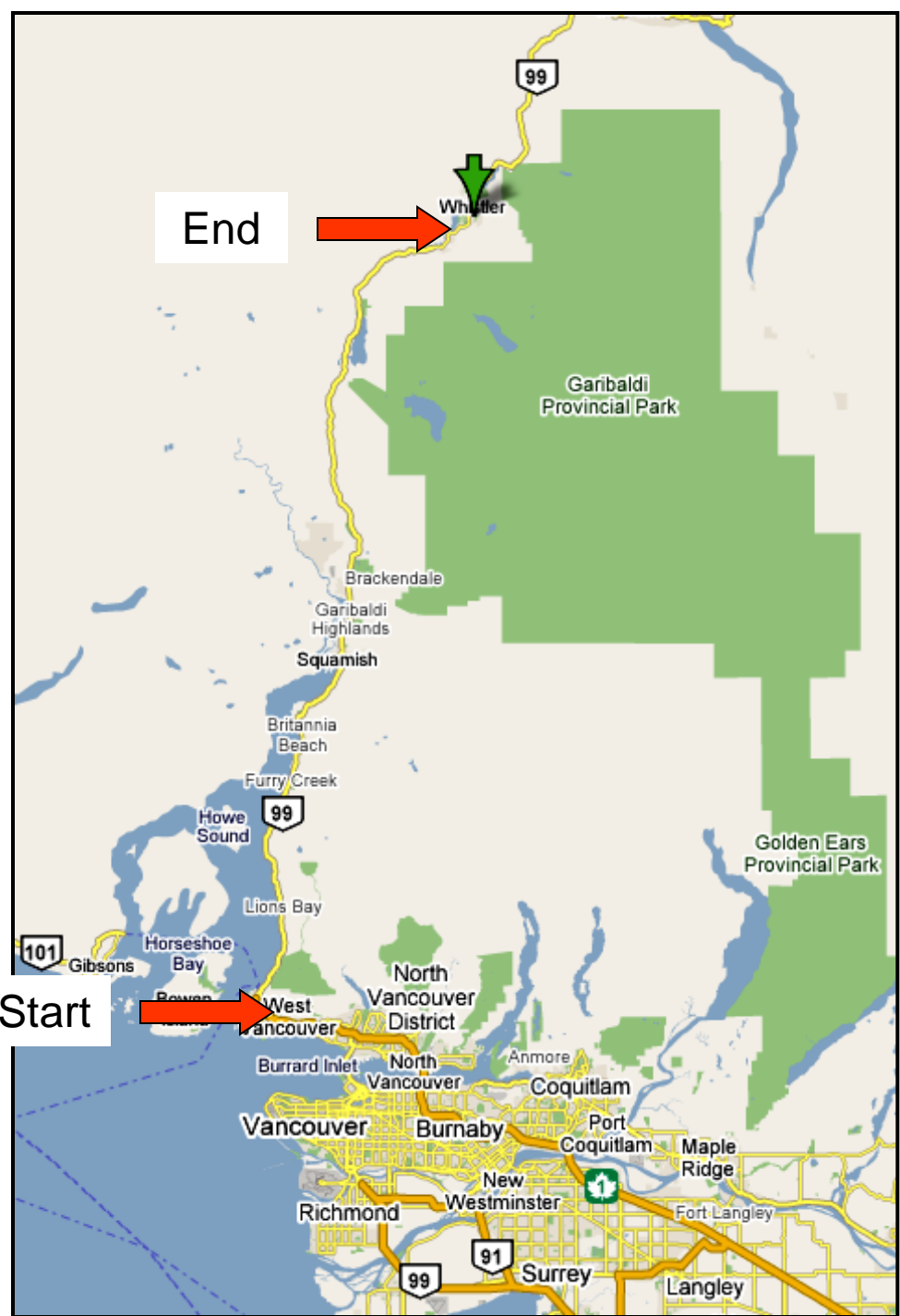
General Information

- To be added
 - 48 new bridges/interchanges
 - 219 MSE walls
 - 2.4 million m³ of earthwork
 - 450,000 tonnes of HMA (HMA design thickness is 125 mm).
- Maintenance
 - To be maintained by Miller-Capilano
 - They plan to resurface the route twice over a 25 year span.
- Kiewit spent ~ \$50 million on new equipment for this project with about 250 pieces of equipment.



Existing conditions on BC 99

- Current ADT ~ 13,000 vpd.
- Projected to be ~ 22,000 vpd in 2025.
- Route is largely 2 lanes at this time; although, some sections of the highway have been improved.



End



Whistler

99

Garibaldi
Provincial Park

Brackendale

Garibaldi
Highlands

Squamish

Britannia
Beach

Furry Creek

Howe
Sound

99

Lions Bay

Horseshoe
Bay

101

Gibsons

Start



West
Vancouver

North
Vancouver
District

North
Vancouver

Anmore

Coquitlam

Vancouver

Burnaby

Port
Coquitlam

Maple
Ridge

Richmond

Westminster

91

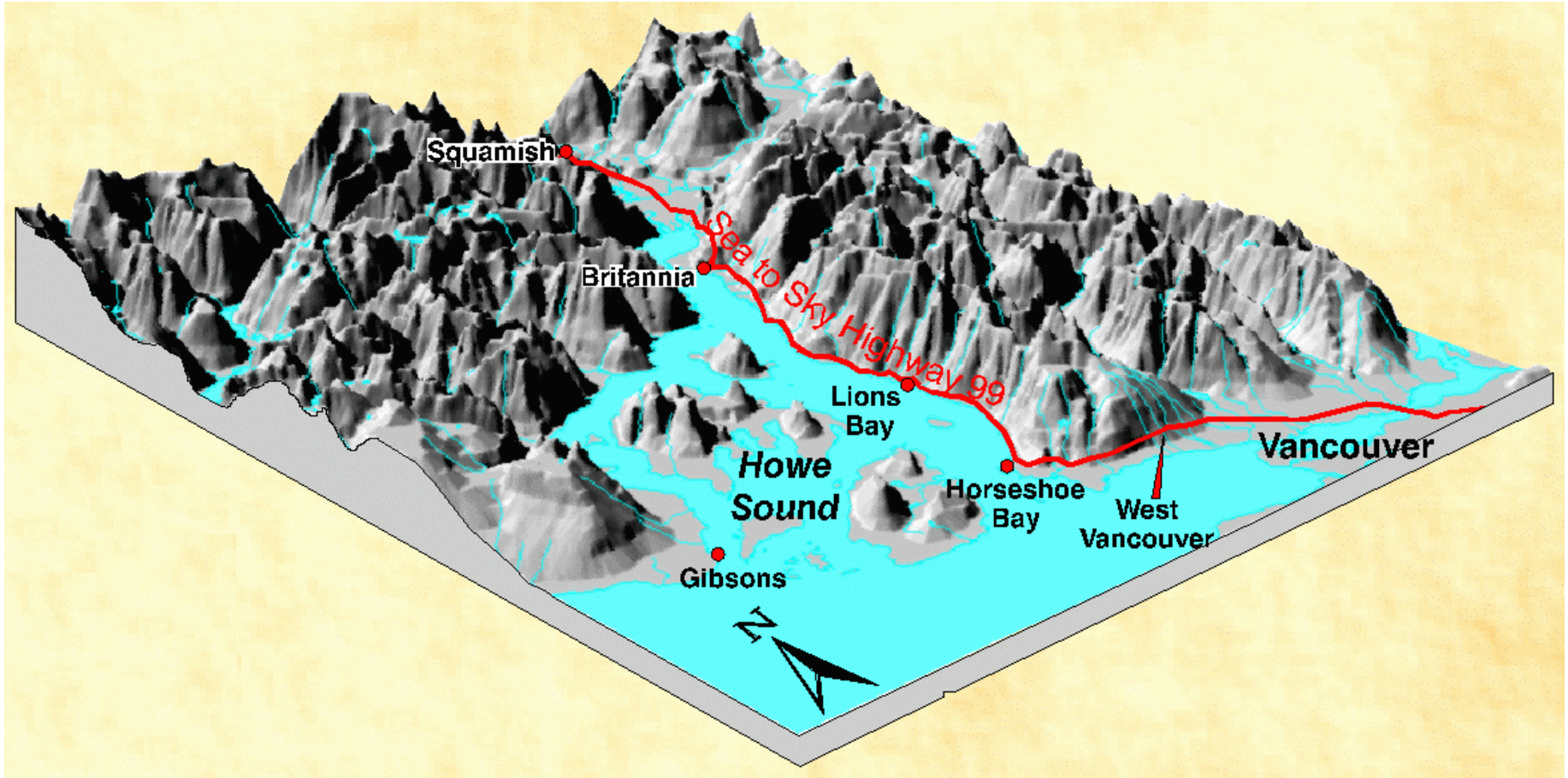
Surrey

Langley

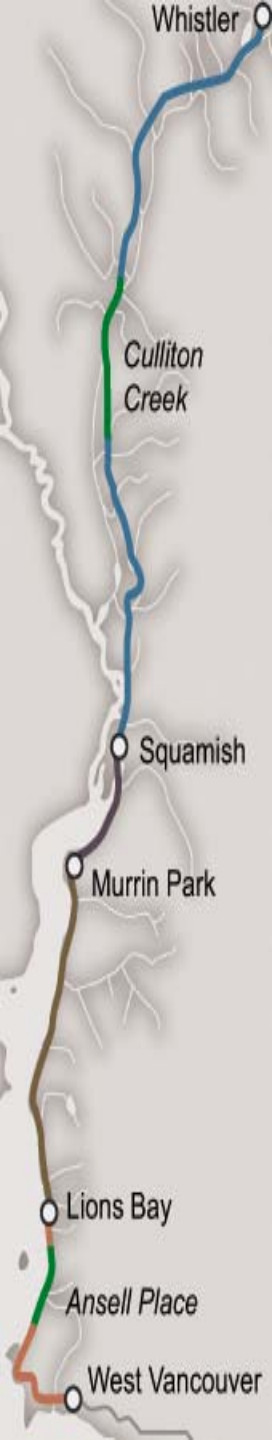
Golden Ears
Provincial Park

Highway 99 and the Coast Range

(This portion of the Coast Range is generally considered to extend from the Fraser River north to Alaska and is part of the larger Coast Belt. The rock in this belt is mostly granitic with some metamorphic—similar to the Cascades to the south.)



Sources: (1) Illustration from Natural Resources Canada at http://geoscape.nrcan.gc.ca/vancouver/images/sea3_e.gif, and (2) Mathews and Monger "Roadside Geology of Southern British Columbia," 2005.

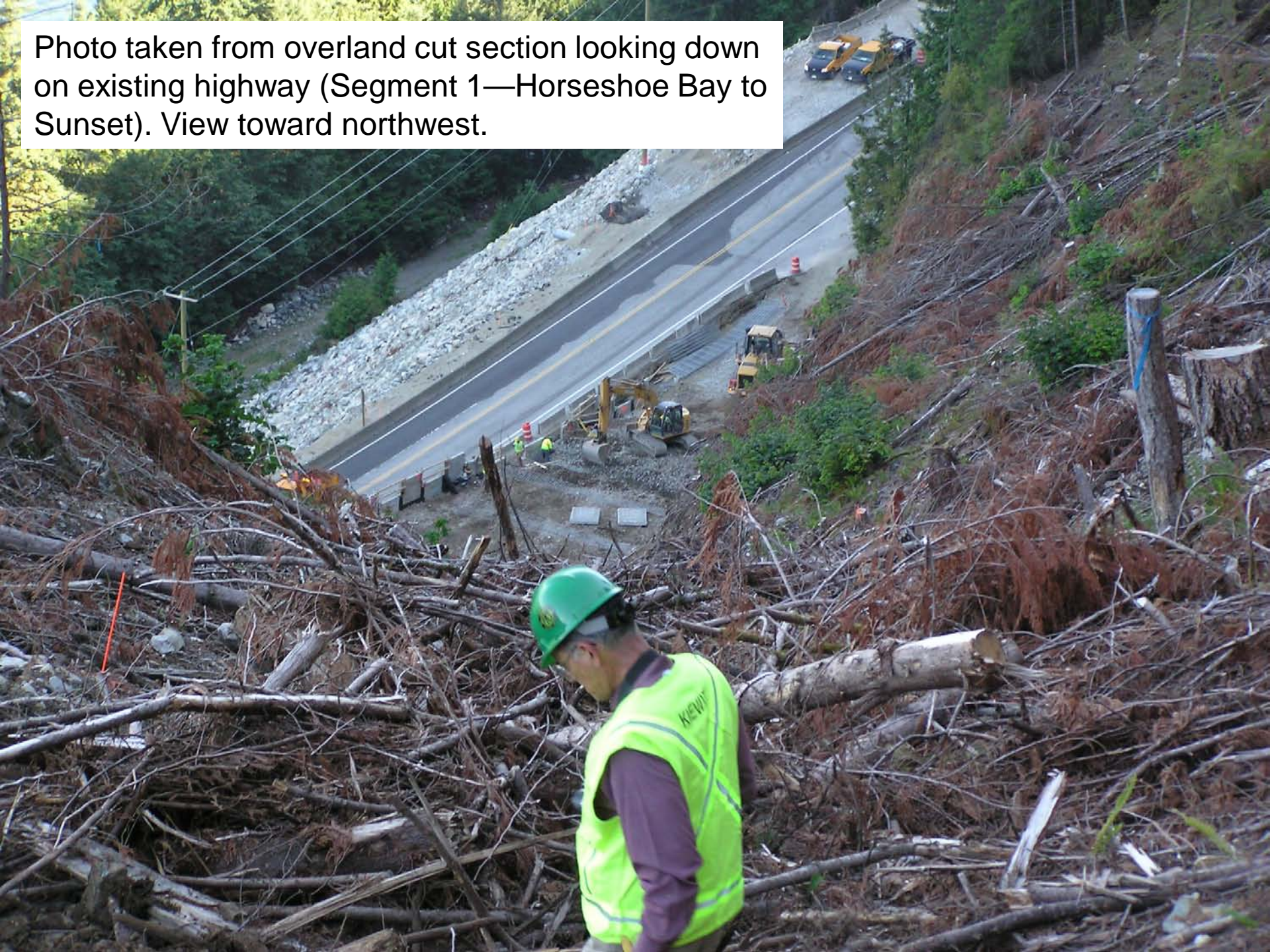


Selected Quantities for S2S Transportation Group under the current contractual arrangements (work is split into 4 segments with Segment 1 at the south end of the project and Segment 4 near Whistler)

Item	Quantity
Length	69.8 km
Rock excavation	1,130,000 m ³
Mechanically Stabilized Embankment (MSE)	58,300 m ²
Gravel	1,159,000 tonnes
Hot mix asphalt	377,000 tonnes
Portland cement concrete	32,700 m ³



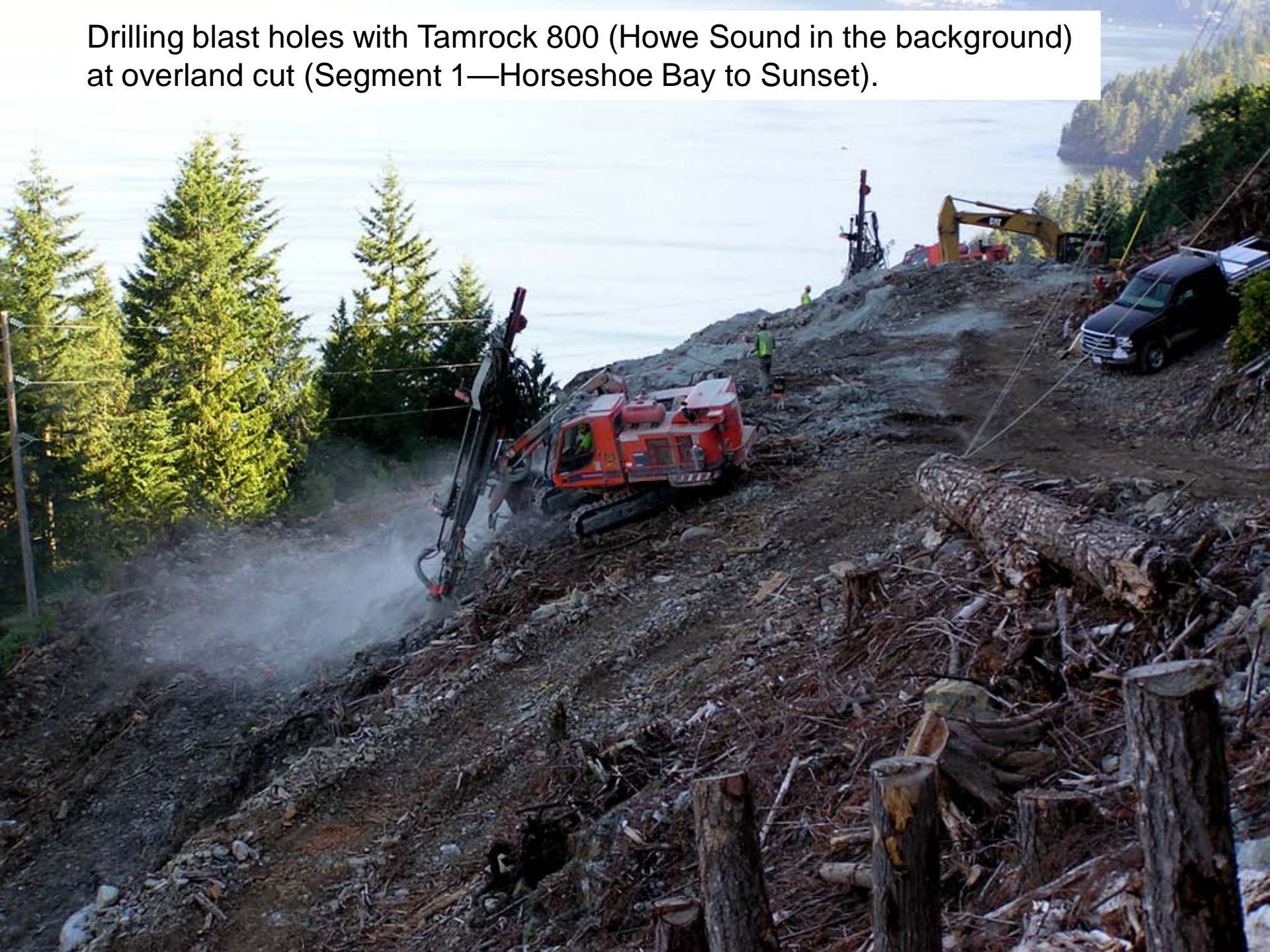
Photo taken from overland cut section looking down on existing highway (Segment 1—Horseshoe Bay to Sunset). View toward northwest.



Holes drilled—ready to load with ANFO mixture (overland cut, Segment 1—Horseshoe Bay to Sunset). ANFO: ammonium nitrate and fuel oil.



Drilling blast holes with Tamrock 800 (Howe Sound in the background) at overland cut (Segment 1—Horseshoe Bay to Sunset).





Dust collector system on the Tamrock 800.



Cat 321C backhoe



Loading and hauling in Eagleridge overland cut (Segment 1—Horseshoe Bay to Sunset)



Spreading fill and compacting in Eagleridge overland cut (Segment 1—Horseshoe Bay to Sunset). Howe Sound in the background with Vancouver Island in the distance. View toward southwest.



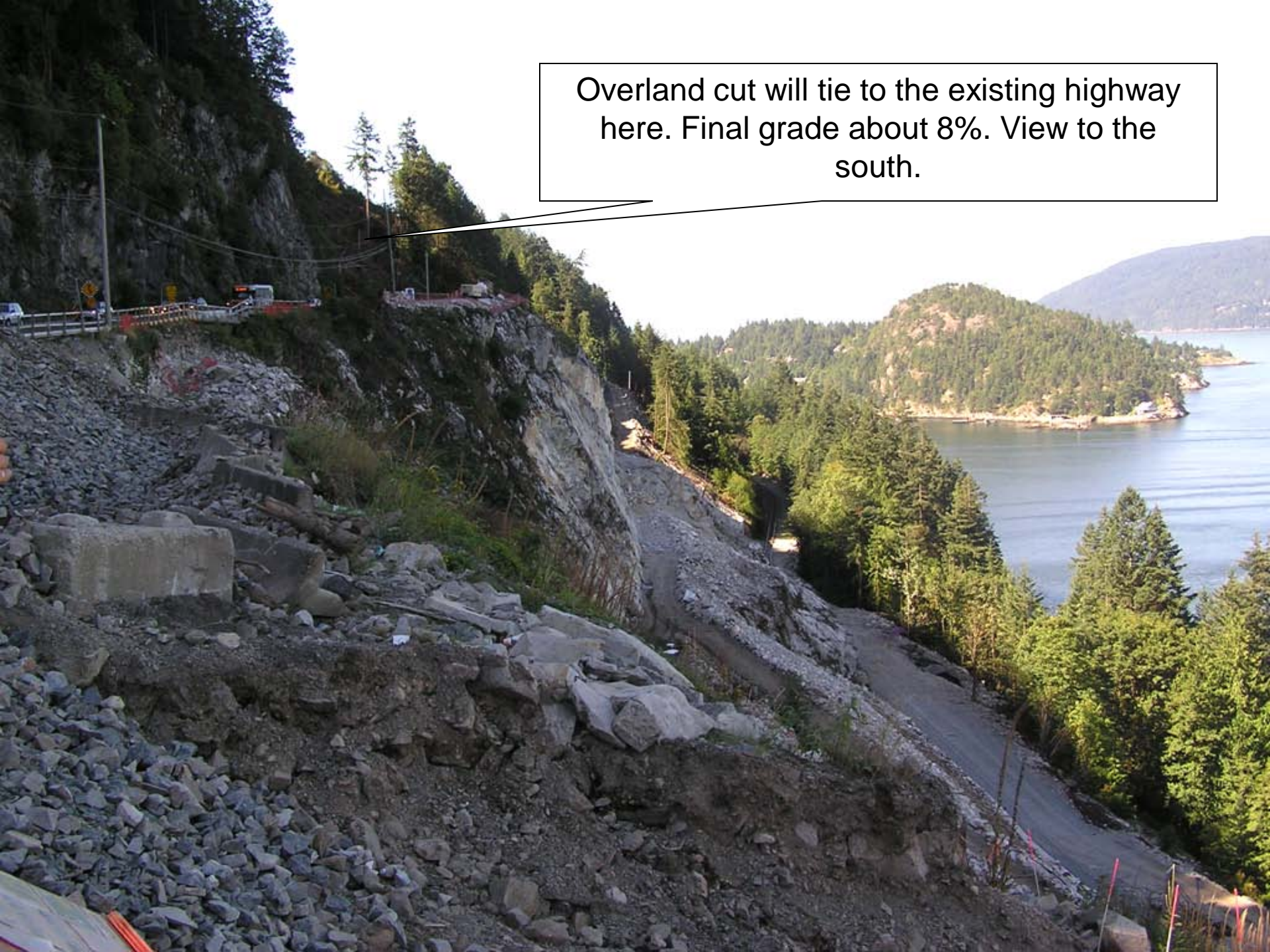
Cat CP-563D compactor in Eagleridge overland cut (Segment 1—Horseshoe Bay to Sunset).





Route down to existing highway—overland cut segment. North view.

Overland cut will tie to the existing highway here. Final grade about 8%. View to the south.





Portable rock crusher.



Close up of portable rock crusher.

A portion of the highway widening is via new bridge structures.





This photo illustrates some of the retaining walls being constructed.

Mechanically Stabilized Embankment



Mechanically Stabilized Embankment



Face rock is 6 in. plus size (with a 2 ft width). Fabric separates the face rock from the remainder of the rock fill.



Wall specification calls for no deviations more than 1 inch per 10 ft.



Majority of rock fill 6 in. minus.



Face rock.

Mechanically Stabilized Embankment



Dumping of 6" minus aggregate for MSE fill material.

Major rock cut south of Squamish



Vicinity of Squamish



Bridge expansion in Squamish. Stawamus Chief (often referred to as “The Chief”). in the distance—this rock formation is a 95 million year old magma chamber of an ancient volcano and is the world’s second largest granite monolith. Rounded shape is due to glacial action over 10,000 years ago.

Vicinity of Squamish



Bridge expansion in Squamish requires relocation of utilities—shown here are existing sewer and water lines.

Vicinity of Squamish



HMA paving near Squamish. Source of aggregate at Kiewit crushing operation just north of Squamish.

Kiewit crushing operation near Squamish



Kiewit crushing operation includes two cone crushers. Mt. Garibaldi is shown in the background. This mountain is a stratovolcano in that it is made up of layers of eruptive material (like Mt. Baker, Mt. Rainier, etc). It is composed almost exclusively of dacite. Elevation 2,678 m (8,786 ft.). View to the northeast.

Bridge construction at Daisy Lake



Kiewit Construction—Thanks to the company for the excellent orientation to their Sea to Sky Highway project. Specific appreciation is extended to Darren Seaman, Russ Constable, and Christi Pilutik from the Kiewit Vancouver, WA offices.





The End