

## SITE C PROJECT CONSTRUCTION

# NORTH BANK SLOPE STABILIZATION

Prior to the start of Site C construction, extensive geotechnical studies were undertaken throughout the project area, including an analysis of slope stability. These studies confirmed that a large excavation on the steep north bank of the Peace River was required to remove unstable overburden materials and flatten the slope for long-term stability.

### Slope stabilization activities

Work is underway to remove unstable material on the north bank to create stable slopes for eventual dam construction. Stability issues and the potential for tension cracks on the north bank were expected, which is why the slope is being excavated prior to completion of the permanent works.

Slope stabilization activities include the construction of access roads and haul roads, excavation of unstable materials and relocation and storage of excavated materials for future use in other areas of the project.

The main civil works contractor began excavation on the north bank shortly after their mobilization in mid-2016. After removing significant amounts of overburden, the project reached shale bedrock in several areas on the north bank in late 2017 and early 2018. In early 2018, the contractor began excavating benches in the shale bedrock along the north bank as part of the diversion inlet portal construction.

As of mid-May 2018, over eight million cubic metres of material (including overburden and shale bedrock) has been excavated from the north bank. That is enough material to fill the Empire State Building almost eight times or to fill 4,400 Olympic-sized swimming pools. The north bank slope stabilization activities are expected to take about five years to complete. When complete, approximately 11 million cubic metres of material will be removed from the north bank slope.

### Tension cracks

In February 2017, a 400-metre-long tension crack developed in the unstable overburden materials on the north bank, upstream of the future location of the dam. This crack emerged during the construction of a haul road and resulted in a temporary stoppage of some construction excavation activities on the north bank. BC Hydro and Peace River Hydro Partners agreed on a plan to stabilize the slope. By April 2017 the slope was stabilized with buttresses (berms) at the toe of the slope. This enabled the safe construction of the contractor's construction road in the area.



Excavation is ongoing on the north bank. The dark benched area is shale bedrock that is being excavated for the diversion inlet portal.

In May 2017, a second, smaller tension crack was observed in the temporary excavation in the unstable overburden materials above the future diversion tunnel portal. The slope was excavated to make it safe and construction has proceeded.

### **Safety is priority**

Flattening the north bank slope is part of BC Hydro's plan to construct and maintain Site C in accordance with international and Canadian safety practices to withstand unlikely events, such as an extreme earthquake.

In keeping with international best practice, the Site C's project design has been informed by advice and feedback from external Technical Advisory Board members, who are globally recognized for their technical knowledge and experience with hydroelectric projects around the world.

### **Anticipated timeline**

2015 to 2019

### **Report of the Joint Review Panel**

On May 1, 2014, the Joint Review Panel submitted its report on Site C to the federal and provincial governments, as part of the independent environmental assessment process.

The Joint Review Panel reported: *"NRCan noted that the Proponent had appropriately conducted the slope stability analysis and had established conservative impact lines. NRCan concluded that BC Hydro had adopted current standards and best practices related to slope stability for the Project."*