BIG BAR LANDSLIDE UPDATE

MARCH 22, 2021

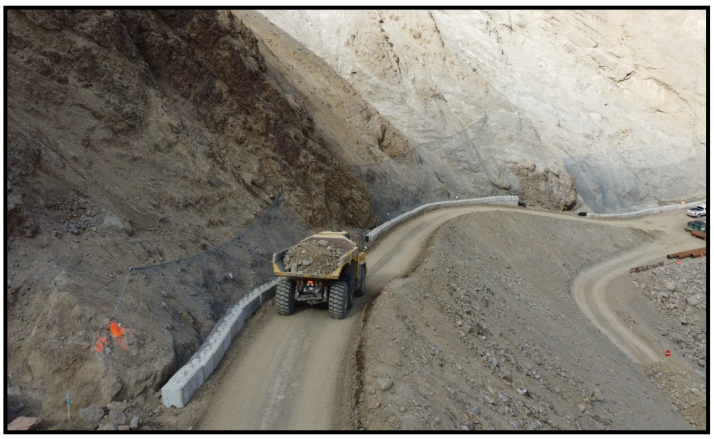
Response Webpage BC River Forecast

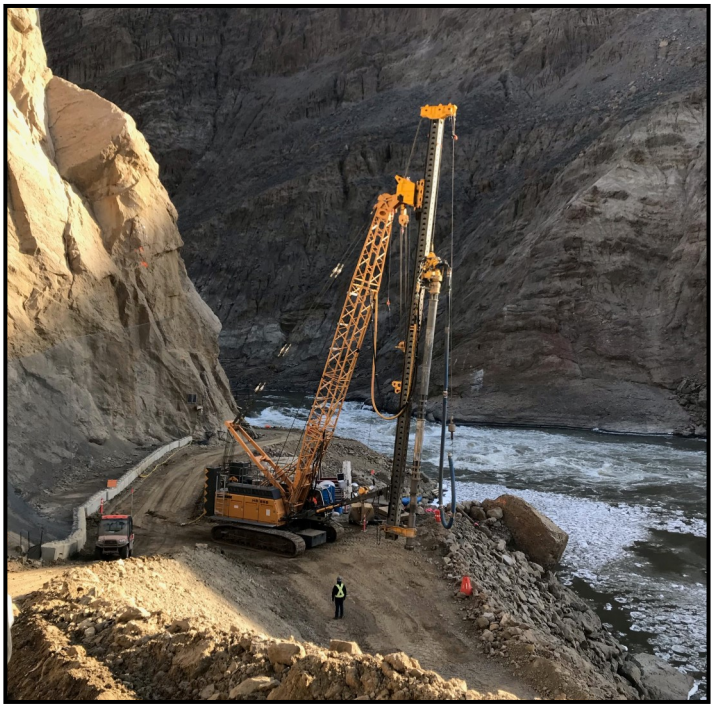
EVOLVING SITE CONDITIONS SHIFT FOCUS TO "NATURE-LIKE" FISHWAY PREPARATION

Operating within the bounds of an unpredictable and temperamental rock face has always been one of the biggest challenges for the Big Bar landslide response team. Successive freeze-thaw cycles in the last three weeks have resulted in sudden rock falls in the area, including two at West Beach within the job footprint, despite the myriad of protection measures in place. Crew members were only on-site for one of the events and no one was injured. A broader review is underway to further assess the slope conditions. Regular scaling, rock bolting and grouting occurs on this face along with continuous monitoring using high tech drones, Light Detection and Ranging (LiDAR) scanners, survey prisms and manual surveys. Much of the slope is covered in drape mesh, secured with bolts, posts and wire rope. A large canopy also protects a portion of West Beach.

To ensure the safety of the crew and in anticipation of the upcoming spring freshet, piling work for the permanent fishway has concluded for the 2020-21 winter season. Crews are shifting their focus to other priorities ahead of freshet, including the construction of the "nature-like" fishway and preparation of alternative fish transport systems.

Workers are excavating blasted material from the Razorback, with the rock being processed for rip rap and shot rock. Rip rap is essential for constructing the "nature -like" fishway, and the shot rock is used to build up the grade below the rip rap. This helps reduce the amount of rip rap needed for the fishway, as well as minimize disturbance at the Razorback, an area of rich cultural significance.





TOP: Trucks haul excavated material down to the West Beach for use in the "nature-like" fishway construction.
BOTTOM: Crews have started to 'walk' the piling rig off site for the season, in advance of spring freshet.

UPDATE CONTINUES ON PAGE 2

BRITISH COLUMBIA Canada

BIG BAR LANDSLIDE UPDATE

MARCH 22, 2021

Response Webpage BC River Forecast

(continued from page 1) The camp site at KM 96 of the West Pavilion road also saw progress this past week with further archaeological assessments, topsoil stripping and site grading.

Similar to 2020, offsite teams are focused on planning for the truck transport of fish upstream to French Bar Creek, and preparing for emergency enhancement and a monitoring program for the 2021 migration season.

MAINTAINING SAFETY REMAINS PARAMOUNT AT BIG BAR

Since 2019, safety at Big Bar has been a critical element for the landslide response. Understanding the overall slope stability is critical to accurately assessing the hazards associated with rock movement and ensuring appropriate mitigation measures are in place so work proceeds safely.

Prior to operations commencing in January 2020, Kiewit submitted a site-specific Health and Safety plan that addressed risks onsite according to the contracting requirements. This plan was updated upon mobilization to site and again under the current contract awarded in November 2020. It is routinely reviewed and revised based on conditions at site.

Rock fall safety is a significant focus in all activities at Big Bar and includes rock scaling, installing rock fall protection mesh and slope monitoring to proactively address concerns:

- **Rock scaling** involves dedicated crews who repel down the cliff face, removing loose rock to ensure the protection of the workers and equipment below.
- **Rock fall protection mesh** includes the installation of steel mesh onto the cliff face above where crews will be working. Rods are drilled into the rock walls and the metal mesh is attached, smothering or catching falling rock.
- **Rock bolts** involve anchoring potentially loose blocks of rock to the competent rocks behind them using steel-threaded anchors.
- **Weather monitoring** involves onsite weather stations to record temperature, humidity, air pressure, wind speed, wind direction and precipitation. Rock fall risk increases during and following specific environmental conditions. Collecting the data at the site allows real-time monitoring to either permit or prevent crew access to the site based on recent environmental conditions.
- **Slope monitoring** includes scanning the cliff face using LiDAR technology to detect the movement of markers embedded on the rock walls. Slopes are also visually inspected each day. Combined, these methods provide an assessment of stability for the cliffs above work areas.

In the past two weeks, extreme temperature fluctuations have occurred onsite, which affects how some rocks hold fast to the cliff face. To mitigate this, crews scale the rock faces and install additional rock fall protection during the day, while limited operations critical to supporting the “nature-like” fishway occur at night and on swing shifts.

The volatile conditions at Big Bar are a persistent challenge; they cannot be easily anticipated or simply addressed. Being vigilant and cognizant of these conditions is critical as they could result in a shift in project execution, temporary suspension of work or the need for additional safety measures.