

From: [Kneale, Tom TRAN:EX](#)
To: [Pantaleo, Samuel TRAN:EX](#)
Cc: [Wedel, Jarret TRAN:EX](#); [George, Michael TRAN:EX](#); [Case, Brent A TRAN:EX](#)
Subject: Geotechnical Assessment - Hwy 1 Cherry Creek Flooding
Date: May 6, 2018 6:25:09 PM

Sam

As requested, MoTI Geotechnical (Tom Kneale, P.Eng) completed a Geotechnical assessment of Hwy 1 near Cherry Creek. The assessment was completed May 6-18, at 1500 in the presence of yourself.

The area of concern is located to the south of Lazy Acres Road. High creek flows below the highway have caused erosion which had led to sloughing within the embankment slope below the highway. The sloughing has caused an oversteepened slope (some 10 m in height) to regress to within 4 m of the highway fog line. While on site, active sloughing was observed. This area extends for a length of about 40 m along the road. Tension cracks were also noted to extend along the slope crest immediately north of this area. There were no visible cracks within the highway surface at this location. To the south, by some 30 m, another failure scarp (10 m width) is visible below the road, of which extends me half way up the embankment. This area is also the result of erosion along the slope base at creek level.

An existing culvert has been exposed to the south of the eroded location. The culvert was dry.

The creek channel was noted to contain large woody debris as well as pieces of concrete within the vicinity of the slope erosion. A vacant house is located on the opposite side of the channel, of which the creek flows are currently against the foundations. A remnant retaining wall (segmental concrete and wire gabions) is located adjacent the house, and had been eroded and damaged. The concrete pieces in the channel appear to be from the wall. It appears that the retaining wall may be altering the flows within the channel, such that they are impacting the highway embankment.

Under the current conditions, there are concerns that the eroded embankment will regress into the highway surface. It is recommended that the highway be reduced to single lane alternating (SLAT) traffic as soon as possible and until the embankment below the highway can be stabilized. This should take into consideration the road sections encompassing both the above erosion locations. Maintain a diligent eye on the highway surface, noting any signs of tension cracking or distortion. If this is noted to occur within 3 m of the traffic lane, a further geotechnical assessment should be conducted.

It is understood that efforts were underway to get equipment across the channel to start to remove some of the debris on the channel. A small portable bridge was going to be used to cross the channel. Rock was also being brought in to rebuild the channel, and the eroded area below the highway.

The house that is being exposed to direct channel flows will have to be assessed once crews get to that side of the channel, and may need to be demolished. There would be concerns that the foundations get further eroded, thus collapsing the structure into the channel. This may in turn may cause debris to impede the channel and impact properties and infrastructure down channel.

From a high level, it is anticipated that rock sizing upwards of 500 kg class rip rap will be required to armour the channel below the highway. This will be required at both the above noted erosion locations. Once the rock has been placed above the creek level, the embankment can be re-established with smaller rock 10-25 kg class rock and pit run sand/gravel. Once we establish the rock in the channel, more defined recommendations can be provided on embankment material types and placement by MoTI Geotech.

The culvert exposed in the area will need to be reinstated during the remedial works.

Caution will be required to properly place the rock in the channel so as to not alter flows such that damage could occur downstream. It is recommended that a Hydrotechnical Engineer be consulted to come up with suitable

rock sizing and placement locations.

I hope the above provides information that is of use at this time. Please call me if you have any questions.

Regards,

Tom Kneale, P. Eng.
MoTI Geotechnical Branch

Sent from my iPhone

From: [Kneale, Tom TRAN:EX](#)
To: [Saby, Jeff D TRAN:EX](#)
Cc: [Pantaleo, Samuel TRAN:EX](#); bill.glenn@govbc.ca; [Sullivan, Mike TRAN:EX](#)
Subject: Geotechnical Recommendations - Hwy 1 Cherry Creek Erosion - Embankment Fills
Date: May 9, 2018 7:11:09 PM

Hi Jeff

Sorry I haven't had a chance to put together a formal recommendation on the embankment fills. My recommendations are as follows.

Place 1 m thick "blinding" layer directly on top of coarse rip rap pieces and lower placed fills in the creek level. This layer should be comprised of 300 mm well graded minus rock pieces. This will act as the filter layer between the rip rap and granular fills. These fills can be placed in two 0.5 m thick layers, compacted using the excavator tracks.

The remainder of the embankment fills up to road grade can be comprised of clean well graded 150 mm minus pit run sand and gravel. It's my understanding that these fills are to come from the private pit located west of the job site. The outer slope of these fills should be established at no steeper than 1.5 H:1 V. These fills should be placed and compacted as per the MoTI 2016 Standard Specifications for Construction.

Care will have to be taken to ensure surface flows aren't directed into the granular embankment fills from the road surface. Placement of an asphalt curbing along with some rock placed on the slope face should be considered to direct and accommodate flows down the slope. The rock on the slope can be 10 kg class rock placed in a 3-5 m wide drainage swale down the slope to the rip rap layer. A layer of non-woven geotextile (Nilex 4553, is equivalent) is to be placed directly under the rock swale on the slope.

I will leave it up to Hydrotech recommendations to provide a suitable elevation for the top of the rip rap fills.

Hopefully the above provides the information that you require at this time. Please call with any questions.

Regards
Tom Kneale, P.Eng.
MoTI Geotechnical Branch

Sent from my iPhone

> On May 9, 2018, at 15:52, Saby, Jeff D TRAN:EX <Jeff.Saby@gov.bc.ca> wrote:
>
> Hi Tom
> The pit material you were looking at was trammed in. This was behind where you checked. What do you think?
>
> <IMG_2316.JPG>
>
>
> Jeff Saby
> Area Manager Roads
> BC MoT
> Kamloops
> Phone: C 250-371-7726 O 250-371-3856