



FAQ: Reid Road / Jason Creek landslide hazards

May 5, 2022

**This document will be updated as required.*

Hazard and Risk – Assessment, Current and Potential Impacts

These landslides happened back in November and December of 2021. Why is there still a state of local emergency and evacuation order in place?

The emergency geotechnical assessment by Cordilleran Geoscience concluded that there is an imminent risk of further slope instability large enough to cause damage to houses and potentially cause injury or death, and that the evacuation order for the eight properties most at risk should be maintained. The subsequent peer-review report by BGC Engineering supported this conclusion based on the information available at this time, and has further concluded that a detailed hazard assessment is required to assess the actual volume, discharge and velocity of material that could come down the creek system before any update to the Cordilleran recommendation can be made. Properties further away from the apex of the fan may be at less risk, but we cannot know that until the detailed risk assessment is completed.

Moreover, field assessments in snow-free conditions supported by detailed topographic information on the watershed and fan areas are required. No detailed topographic information (LiDAR) is presently available for the Jason Creek watershed and fan. As part of the peer review, BGC Engineering commissioned remote sensing specialists to develop topographic data from satellite imagery; however, due to the heavily vegetated nature of the watershed as well as the availability of satellite images amenable to this process, the topography is still not of sufficient resolution for detailed assessment.

What is the risk to the homes under the evacuation order?

The Cordilleran Geoscience report, supported by the BGC Engineering peer review, assessed that there was imminent risk of a further event large enough to damage structures and with the potential for injuries and loss of life.

There is no structural damage to my house; why can it not be occupied?

The current Evacuation Order is related to the ongoing landslide risk on the steep slope above Reid Road. The houses on evacuation order are assessed by Cordilleran Geoscience and BGC Engineering to be located within the likely path of a larger landslide that may occur in the near future.

What is the volume of landslide material that came down on December 1st, 2021? How much material could come down in a future landslide event?

A full assessment of landslide volume on December 1st, 2021 or the potential volume of a future landslide, has not yet been conducted. A detailed risk assessment is required in order to make an informed estimation of past and potential landslide volumes.

Why are we still at the stage of studying the problem?

The atmospheric river events (i.e., severe rainstorms often associated with warm temperatures) occurred between mid-November and mid-December 2021. An initial emergency geotechnical assessment was completed by Cordilleran Geoscience at that time, and a subsequent peer review of this report was completed by BGC Engineering in mid-February 2022. The recommended next step from the peer review is to complete a detailed hazard and risk assessment. The Squamish-Lillooet Regional District (SLRD), in partnership with Emergency Management BC (EMBC), has moved forward on that recommendation and is now in the process of tendering and contracting that work. The detailed assessment will take up to 12 months to complete, and will provide a current and quantitative assessment of the magnitude, frequency and intensities of future events.

What is the SLRD doing about this issue?

The SLRD is advocating on behalf of the affected residents and working with EMBC and the Canadian Red Cross to ensure all available supports are made to people who are out of their homes as a result of the Evacuation Order. The SLRD is also working with EMBC to get the recommended detailed hazard and risk assessment completed this year so that an updated and fully informed review of the Evacuation Order can be made at that time.

Why hasn't work started on building a debris deflection berm or something similar along Jason Creek above Reid Road?

- The first step is getting the detailed hazard and risk assessment completed, so all levels of government and the property owners have the current and quantitative information about how large and how frequent future events will be and which areas they would likely be affected at what level of intensity. Without that information, any mitigation structure may not be fit for purpose. It may also increase risk to properties and infrastructure downstream of Reid Road if not designed appropriately, or not designed in concert with necessary downstream works.
- Once the detailed assessment is complete, the SLRD will discuss next steps with the provincial government. The hazard originates on Crown land and impacts provincially owned roads (Reid Road and Pemberton Portage Road). The SLRD continues to engage with EMBC and other provincial staff about both the geotechnical aspects and the evacuee support aspects of the issue, in the interim, while the detailed assessment work is being completed.

Is the culvert at Reid Road undersized?

This question falls within the purview of the Ministry of Transportation and Infrastructure. According to BGC Engineering (2022), the culvert is not appropriately sized for debris flows. In general, culverts are inadequate in conveying debris flows.

Is Reid Road safe? Why is it that the properties cannot be occupied, but the road is open?

This question falls within the purview of the Ministry of Transportation and Infrastructure.

Can the debris flow problem be fixed by putting in a box culvert or similar at Reid Road so that material doesn't back up, reroute or washout Reid Road again?

This question falls within the purview of the Ministry of Transportation and Infrastructure. For the SLRD residents downstream of Reid Road, the life safety and property risk concern is ensuring any mitigation measures taken that result in changes to the Jason Creek crossing at Reid Road do not increase or transfer risk for those properties, which were also impacted by the atmospheric river events.

Any future debris flow may also jump its bed upstream of the Reid Road crossing, thereby outflanking Reid Road irrespective of culvert size. Moreover, culverts, unless very large and steeply sloping have proven ineffective for debris flows in practice worldwide.

Why was the Evacuation Alert lifted for most properties on February 24, 2022?

The Evacuation Alert in the wider area was in connection to the stability of the road repair at Reid Road and access to the community. In winter conditions, the alternate evacuation route via the McKenzie Basin Forest Service Road is not viable so isolation of the community was a factor. The road repair proved to be stable and the peer review by BGC Engineering did not produce any additional information that would require maintaining the alert over the wider area, so the evacuation alert was lifted at that time.

What does 'imminent' mean in this context?

The use of the term 'imminent' does not have a well-established definition within the emergency and risk management context, nor in the geohazards assessment context. The best-established definition is associated with an event which has an annual probability of occurrence (aka the likelihood it will happen in a year) of 1/20 (or 5%) with a sufficient trigger. A site visit as part of the recommended detailed study is required to fully assess how imminent the hazard is.

If debris flows are seasonal, why can't I return home when it isn't raining?

Occupancy decisions that are conditional on weather need to be accompanied by a system to reliably forecast site-specific weather data and evaluate that data in relation to triggering thresholds. At Jason Creek, there are not available data, systems, or funding to develop a sustainable model for this. Such systems are also accompanied by many 'false alarms' which can reduce their effectiveness over time. The detailed study will inform next steps for long-term risk management and will consider the multiple hazards types that are present (i.e. not only debris flows). In addition, rainfall is not the only triggering event; there could also be rockslides. Jason Creek watershed is subject to a range of hazard types including rock slope failures as well as debris flows and further assessment is needed to better understand these risks.

Are there other areas within the SLRD with similar risks?

BGC Engineering has worked on developing an inventory of geohazards across the SLRD as part of work funded through the National Disaster Mitigation Program. As part of that work, BGC Engineering evaluated both the hazard and potential consequences at different sites. These two components together form the risk. BGC Engineering has also completed detailed studies at multiple sites within the SLRD. When such studies are completed, both safety and economic

risk are considered. At Jason Creek, the detailed study is needed to make an accurate comparison with any other landslide hazard area in the SLRD.

Is there a forest management plan for the terrain in this region? Is there a 10 to 25-year plan that includes an overall management plan for that area, including trail building?

There is no overall management plan for this area that includes all levels of government, agencies and ministries that have jurisdiction in this wider area. The proposed detailed geotechnical assessment will include not only the Jason Creek drainage but also other alluvial fans in the area that may have an impact on the residentially developed areas.

Can logging in the upper Mackenzie Basin affect the flow of debris and impact Reid Road properties? If so can there be recommendations or restrictions in that area?

This question falls within the purview of the Ministry of Forests. The harvesting and planting of trees does have potential to affect slope stability, as do the roads that are required for logging operations, but this depends heavily on the specific circumstances and the logging practices that are being used.

Is there a plan in place to enhance the ditch the road on the south side of Reid Road?

The Ministry of Transportation and Infrastructure has advised that maintenance crews will be working on Reid Road. In that process, they will assess ditching requirements as they relate to potential upstream and downstream effects of water runoff.

The mapping in the Evacuation Order depicts an imprecise location of Jason Creek. Does this change the location of the alluvial fan's apex and the expected path of a debris flow?

The SLRD is aware that where the creek is mapped is not correct on the ground. However, the Evacuation Order area is based on the geotechnical in-person field assessment of the actual slope to determine which properties were at imminent risk.

When the creek channels change, how does that affect private property boundaries?

EMBC has advised that a professional surveyor from the Land Title and Survey Authority of BC would need to make an assessment.

Emergency Support and Compensation

What type of emergency supports are the evacuated residents receiving?

The Canadian Red Cross, through a case manager, is working with the evacuated residents on a variety of supports, mainly focussed around accommodation support. The SLRD Recovery Manager is also in regular contact with evacuated residents and coordinating with the Canadian Red Cross, EMBC and non-governmental organizations that may also be able to provide further assistance beyond the limits of what the Canadian Red Cross is able to provide.

What will happen when the Canadian Red Cross support ends, as residents remain out of their homes?

EMBC and the Canadian Red Cross have committed to supporting the affected residents who need accommodation support for up to 12 months until end of February 2023. By that time, the detailed hazard and risk assessment will have been completed and recommended next steps will be known.

Where are the evacuated residents staying?

Those residents under Evacuation Order who have signed up for accommodation assistance are staying in the area. Those residents under Evacuation Order who have not signed up for accommodation assistance have made other arrangements for accommodation.

Why can't the evacuation order be lifted and people choose to occupy their house or not, but at their own risk?

If the SLRD lifts the Evacuation Order, emergency support services to all evacuated residents will cease. In these situations, emergency support is directly tied to Evacuation Orders.

What will happen if someone occupies their home, regardless of the Evacuation Order?

People are required by law to leave an area under Evacuation Order, and any adult refusing to evacuate does so at their own risk. The Ministry of Child and Family Development is required to be advised when minor-aged children remain in an Evacuation Area.

When will they get started to implement measures to get people back to their homes?

The first step is to understand the volume, magnitude, and potential frequency of future debris flow events, which requires a detailed geotechnical assessment. EMBC has agreed to fund this assessment, and it will take 6-8 months to complete.

Development and Planning

Who approved the building of homes in this area?

In rural areas such as this, subdivision approval is a legislative responsibility of the Ministry of Transportation and Infrastructure and was granted in 1981. After subdivision approval was granted, the SLRD issued some building permits in this area.

If it is not safe to live here, why was I given a building permit when I built my house?

Residential development is within a subdivision area that was approved by the Ministry of Transportation and Infrastructure, and the SLRD issued some building permits based on this subdivision approval and the building code of the day.