D.S.Cunliffe, P.Eng.
Consulting Services **Consulting Engineering**

8 – 5260 SQUILAX ANGLEMONT ROAD, CELISTA, B.C. V0E 1M6 *CELL (250) 851-6852 FAX (866) 399-7395*
EMAIL: DaveCunliffe@AirspeedWireless.ca

December 15, 2010

Dan Passmore
Columbia Shuswap Regional District
781 Marine Park Drive NE
PO Box 978
Salmon Arm, B.C. V1E 4P1

Dear Sir:

Subject: Recommended Flood Proofing Measures
Lot 1, Plan 8557, Frac NE ¼ Sec 13, TP 23, RGE 10 – DVP800-07
Lot A, Plan 6799, Sec 13, TP 23, RGE 10 – DVP800-08

I was retained by the property owner, Triple A Contracting of Rosedale, B.C. to make prescriptions for flood proofing mitigation measures on the above two lots in support of a DVP application to vary the flood proofing setbacks.

Please accept this assurance that I am a Professional Engineer with experience, knowledge, and training in the geotechnical, structural, and implementation of flood proofing measures. Furthermore, due consideration has been given to CSRD Bylaws and CSRD Policy P-19.

This report replaces the two previous versions of June 18, 2007 and February 18, 2008. Please destroy previous versions to avoid any confusion in the future.

Subsequently to issuing the February 18, 2008 report, Bylaw 830 - The North Shuswap Official Community Plan was adopted on July 29, 2010. Hazardous Lands Development Permit Area 1 was introduced to cover any development Planned within 100 m of designated creeks and rivers. The Bylaw requires that land should be flood proofed to the standards specified by the Ministry of Environment's Flood Hazard Area Land Use Guidelines.

Although not covered by the Hazardous Lands Development Permit Area 1, the CSRD has specifically requested that Ministry of Environment's Flood Hazard Area Land Use Guidelines requirements be addressed in this report.

Section 1.3 of this document, Requests for Modification of Bylaws specifies that "Setback requirements should not be reduced unless a serious hardship exists and no other reasonable option is available." If setbacks were not reduced in this case, a building on Lot 1 would be limited to a depth of 3 metres. A building on Lot A would be limited to 4 metres. In my opinion, this represents a serious hardship that would prevent reasonable use of the lands in question.

A continuous 1.5 metre high stacked rock wall was constructed in front of both properties in 2008 under a Section 9 Water Act Approval.

1. The average elevation of the top of the wall is 349.2 which approximately conforms to the 1:20 year return flood event.
2. The wall was also constructed with geotextile between the wall and the native soils to prevent migration of soils and potential destabilization of the wall.
3. The toe of the wall was sub excavated and keyed 500 mm below the natural beach elevation to prevent undercutting of the wall.

The CSRD also specifically asked that the following issues from the Flood Hazard Area Land Use Guidelines be addressed.

1. Risk Factors

   The primary risk factor considered is the ability of the proposed residences to be safely occupied for the intended use during and after a 200 year flood event.

2. Risk of Damage to Neighbouring Properties

   None of the prescriptions contained in this report will affect neighbouring properties or increase the risk to them. As the wall was constructed in 2008, it does not constitute any new works and I have considered it as preexisting.

3. Ongoing Maintenance Requirements

   The prescriptions contained in this report are limited to the future structures themselves and no maintenance is required. The preexisting stacked rock wall however needs to be inspected and repaired as required after every freshet. The Section 9 Water Act approval originally granted in 2008 does not authorize any maintenance so a separate permit application or notification is required before commencing any maintenance work.

The following mitigative works will provide safe occupancy to homes constructed within the building envelope as well as serve to protect loss of property due to erosion. There will be no increased risk from flooding if the above noted DVP's are issued; in relation to the potential for wave action, erosion, or slope instability, or to other properties. The mitigative works that are outlined in the following 2 points are essential in making the land safe for the intended use and will not increase the risk to other properties.

1. Lot 1, Plan 8557, Frac NE ¼ Sec 13, TP 23, RGE 10

   A minimum building elevation of 351.0 should be provided. This measurement is to bottom of floor joists or top of slab. No mechanical equipment shall also be located below 351.0.

   The maximum bottom of footing elevation is 349.0 for conventional footings.

   A replanting plan is required as a result of RAR bending and should be prepared by a Registered Professional Biologist. For the area between the stacked rock wall and a new building foundation, the plan should consider bio-engineered solutions to control surface erosion.

2. Lot A, Plan 6799, Sec 13, TP 23, RGE 10

   A minimum building elevation of 351.0 should be provided. This measurement is to bottom of floor joists or top of slab. No mechanical equipment shall also be located below 351.0.

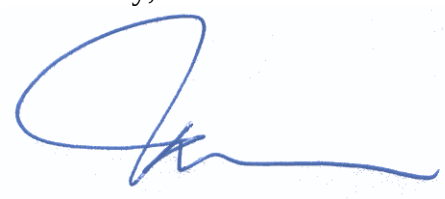
   The maximum bottom of footing elevation is 349.0.

   A replanting plan is required as a result of RAR bending and should be prepared by a Registered Professional Biologist. For the area between the stacked rock wall and a new building foundation, the plan should consider bio-engineered solutions to control surface erosion.

The above noted prescriptions have been illustrated on the attached two drawings.

Please contact me if you have any questions.

Yours truly,



D.S.Cunliffe, P.Eng.