

Prospect Place Pemberton Ltd.
c/o Christine Alexandra Properties Ltd.
1688 Ayleslynn Drive
North Vancouver, BC V7J 2T3

March 23, 2023
File: 1067

Attention: Mr. Bruce Van Mook

**RE: Preliminary Flood Hazard Review Report, Proposed Townhome Development,
Prospect Place, Pemberton, BC**

1.0 INTRODUCTION

It is proposed to construct a new townhome development in Pemberton, BC located on the northwest side of Prospect Street on the property having the legal lot description LOT A DISTRICT LOT 202 LILLOOET DISTRICT PLAN KAP73119.

We have reviewed the preliminary design drawings prepared by Dennis Maguire Architects dated February 20, 2023, and the civil drawings prepared by Webster Engineering dated, March 8, 2023, in preparing this report. We understand that eight buildings with a total of 59 townhome units are being proposed. The townhomes are proposed to have at-grade garages and entrance foyers with two levels of habitable space above.

The site is located within the Lillooet River floodplain and therefore a flood hazard exists. This report presents our review of the flood hazard defined by others, provides a recommendation for a 200-year flood construction level (FCL), and provides geotechnical recommendations related to flooding.

There are other geohazards which could affect the site which have not been considered herein and should be addressed by others.

This report has been prepared exclusively for Prospect Place Pemberton Ltd., for their use, and the use of others on their design team and for permitting with the Village of Pemberton however, it remains the property of Frontera Geotechnical Inc.

2.0 SITE DESCRIPTION

The property is currently undeveloped and much of the area is covered in trees, small bushes and grasses. The site becomes less treed moving west where it becomes marshy and covered in relatively low lying vegetation.

According to the Geological Survey of Canada map 5324 the general geology of the region is described as a combination of fan and floodplain sediments. The floodplain sediments are described as flat lying, consisting of sand and silt and commonly including organic material. The surficial flood plain deposits are expected to be underlain by loose sand to sand and gravel interbedded with finer silty flood deposits.

The site is relatively flat with grades of approximately 207.3 m to 208.4 m geodetic from north to south.



3.0 FLOOD HAZARD REVIEW

3.1 Recommended FCL

We have based our FCL determination on the Floodplain Mapping prepared by Northwest Hydraulic Consultants, dated August 31, 2018 as part of a Lillooet River Floodplain Study.

EGBC, 2018, defines the FCL as the design flood level plus an allowance for freeboard. Normally we recommend that a minimum freeboard of 0.3 m be applied to the maximum instantaneous flood surface elevations presented on the flood plain map. However, we understand that the Lillooet River Floodplain Study has accounted for freeboard in the flood levels shown. An allowance for projected climate change impacts has also been incorporated within the study to the year 2100. Therefore, the recommended FCL for this project is 212.1 m.

Provincial guidelines, best practices, and Frontera recommend that all habitable space be located above the FCL. In the context of flood assessments habitable space typically includes any area used for living, commercial use, or storage of goods damageable by floodwaters. In habitable areas, the top of any concrete slabs-on-grade or the underside of wooden floor systems should be located above the FCL. Typically, building areas located below the FCL are limited to entry foyers, crawl spaces and garages. Any major fixed equipment including, but not limited to, major electrical switchgear, furnaces, ventilation systems, hot water tanks and hot water heaters that are integral to and necessary for the functioning of a building according to the BC Building Code must meet the FCL.

Following our review of the design drawings, we understand that the lower level slab elevation for the buildings is proposed to be 209.4 m geodetic elevation and the underside of the second level floor joists will be constructed at 212.1 m geodetic. As only garages and entrance foyers are proposed to be located on the lower level and all habitable space including mechanical and electrical equipment is proposed on the upper two levels, we are of the opinion that the above requirements have been considered in the design and the FCL is being met.

3.2 Further Considerations

Frontera Geotechnical Inc. will not accept any liability resulting from damage to improvements, goods, equipment, or structures constructed below the FCL. This letter should be registered as a covenant on the title and should be made available to future building tenants.

The portions of the structure located below the FCL will be subject to flooding and therefore the owner and any future tenants of the property must be made aware of this risk and should fully appreciate that the portion of the building below the FCL would be subject to flood damage, any contents or stored goods within these areas would be subject to flood damage, and that following major flooding a significant restorative effort would likely be required.

Much of the surrounding area would likely be cut off from access and safe egress during extreme flood events. We recommend that evacuation of the property be prepared for and implemented at the onset of predicted moderate to large flooding in accordance with Village of Pemberton evacuation procedures.

Interpretation of the flood flow velocities from the hazard ratings provided in the Lillooet River Floodplain Report indicates that the subject site is in an area where flood flows in the range of 0.5 – 1.0 m/s could occur and therefore scour protection is recommended. For these moderate flow velocities, per the Village of Pemberton Flood Management Bylaw, armouring of fill slopes which support foundations is considered necessary. Frontera can design the erosion and scour protection upon request which should be included with the building permit drawings.



The structural designer must consider the hydrodynamic loading which could be imparted by the flood flow velocities and flood depths described above and factored accordingly for their design. The structure must be able to safely withstand these flood flows from a structural design standpoint. A statement should be provided by the structural engineer confirming that they have included the effects of flooding in their design.

4.0 CLOSURE

Sections 919.1 and 920 of the Local Government Act contains provisions for a local government to request a report from a professional engineer with experienced relevant to the applicable matter to assist them in determining the conditions or requirements which may be required of a project prior to granting of a development permit. In the context of this report “used safely” is defined to mean that the direct effects of the flood itself are unlikely to cause structural damage so as to prevent egress from the building.

In consideration of the flood hazards described herein, and assuming that the hazard mitigation strategies described above are implemented, we consider that the land may be used safely for the use intended.

Prior to issuance of a building permit a Qualified Professional should be asked to review and confirm that the final design drawings have considered and taken into account the recommendations described in this report.

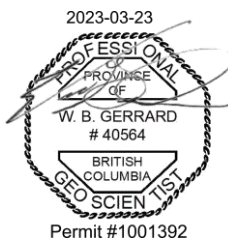
It must be appreciated that this report has been written with respect to a 1 in 200-year flood event with flood flow behaviour as shown in the Lillooet River floodplain study and Village of Pemberton floodplain bylaw. Less frequent but more extreme flood events are beyond the scope of this report and have the potential to damage or destroy property and cause harm or death.

Frontera is pleased to be of assistance to you on this project. We trust the foregoing is sufficient at this time.

Yours truly,

Frontera Geotechnical Inc.

Reviewed by:



Will Gerrard, P.Geo.
Geoscientist

Steven Fofonoff, M.Eng., P.Eng.
Principal