



DEVELOPMENT PERMIT

NO. DP- 2018-02

TO: [REDACTED]

ADDRESS: [REDACTED]
(Permittee)

- 1) This Development Permit is issued subject to compliance with all of the Bylaws of the Town of Gibsons applicable thereto, except those specifically varied or supplemented by this Permit.
- 2) The Development Permit applies to those "lands" within the Town of Gibsons described below:

Parcel Identifier: 009-409-564

Legal Description: Lot 14, Block F, District Lot 685, Plan 10362

Civic Address: Lot 14 Skyline Drive

- 3) These lands are within Development Permit Area('s) of the Town of Gibsons Official Community Plan (Bylaw 985, 2005). This permit applies to the following Development Permit Area:
 - Development Permit Area No. 1 (Geotechnical Hazard Area) for the purpose of protection of development from hazardous conditions.
- 4) The "land" described herein shall be developed strictly in accordance with the terms and conditions and provisions of this Permit, and any plans and specifications attached to this Permit which shall form a part thereof; specifically:
 - *Geotechnical Report, dated March 1, 2018, signed by John Hessel, AScT and Water Rathbun, P.Eng.*
- 5) All requirements of the plan(s) are to be followed. On site monitoring by the Geotechnical Engineer during construction as outlined in the plan(s) is required.
- 6) Minor changes to the aforesaid drawings that do not affect the intent of this Development Permit are permitted only with the approval of the Town of Gibsons and Geotechnical Engineer.
- 7) If the Permittee does not commence the development permitted by this Permit within twenty four months of the date of this Permit, this Permit shall lapse.

8) This Permit is NOT a Building Permit.

ISSUED THIS 15TH DAY OF MARCH, 2018.



Lesley-Ann Staats, MCIP, RPP
Director of Planning

Copy of permit to the Geotechnical Engineer



Lewkowich Engineering Associates Ltd.
geotechnical • health, safety & environmental • materials testing

Summerhill Fine Homes Inc.
Unit B – 675 Industrial Way
Gibsons, BC

File Number: F5478.01

Date: March 1, 2018

Attention: Mr. Brad Jennens

PROJECT: PROPOSED SINGLE FAMILY RESIDENCE
388 SKYLINE DRIVE, GIBSONS, BC

SUBJECT: GEOTECHNICAL ASSESSMENT

REFERENCES:

1. Town of Gibsons. Planning and Development Department. (March 2015). *Smart Plan: Gibsons Official Community Plan*. Retrieved from <http://gibsons.ca/ocp>.
2. Waterline Resources Inc. report titled “*Aquifer Mapping Study – Town of Gibsons, British Columbia*” File No. WL09-1578, dated May 13, 2013.

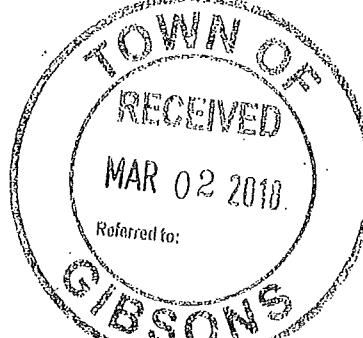
Dear Mr. Jennens,

1. INTRODUCTION

As requested, Lewkowich Engineering Associates Ltd. (LEA) has carried out a geotechnical assessment of the above referenced property. This report provides a summary of our findings and recommendations.

2. BACKGROUND

- a. We understand that the proposed development is in a detached residential zone and will include the construction of a residential building of conventional construction methods, including a cast-in-place continuous concrete footings foundation system supporting a wood-framed superstructure.
- b. Based on available information, including the Town of Gibsons Official Community Plan (Gibsons. Planning and Development Department, 2015), we understand that the site is in the DPA 1, Geotechnical Hazards Development Permit Area, Low Geotech Hazard Area.
- c. Additionally, the site also falls within the DPA 2, Environmentally Sensitive Development Permit Area, Marine Shore designation with eel grass beds off shore.



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3. ASSESSMENT OBJECTIVES

Our assessment, as summarized within this report, is intended to meet the following objectives:

- i. Determine whether the land is considered safe for the use intended (defined for the purposes of this report as construction of a residential building of conventional construction methods), with the probability of a geotechnical failure resulting in property damage of less than 10 percent (10%) in 50 years, with the exception of geohazards due to a seismic event which are to be based on a less than 2 percent (2%) probability of exceedance in 50 years, provided the recommendations in this report are followed.
- ii. Identify any geotechnical deficiency that might impact the design and construction of the development, and prescribe the geotechnical works and any changes in the standards of the design and construction of the development that are required to ensure the land, buildings, and works and services are developed and maintained safely for the use intended.
- iii. Acknowledge that Approving and/or Building Inspection Officer may rely on this report when making a decision on applications for the development of the land.

4. ASSESSMENT METHODOLOGY

- a. LEA personnel conducted a visual assessment of the property on January 31st, 2018 with the owners general contractor (Summerhill Fine Homes Inc.). We have reviewed a 1.4m deep test pit in the middle of the lot and completed a general reconnaissance of the entire lot. We have reviewed the pertinent DPA 1 and DPA 2 requirements and a desktop study of the local geology as well as previous investigations conducted in the Town of Gibsons.

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5. SITE CONDITIONS

5.1 General

- a. The subject property is located within the jurisdictional limits of the Town of Gibsons and is bordered to the north and south by existing residential properties and by a steep slope and Bayview Road to the west and east, respectively. The lot is currently undeveloped, but contains some fills and debris on the upper reaches. See location picture below.

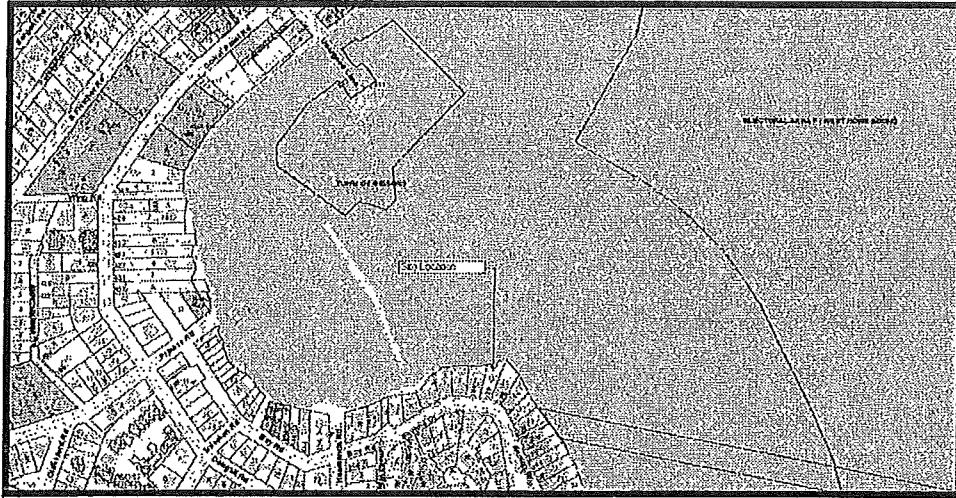


Figure 1: Site location plan for proposed development property.

- b. The natural terrain of the proposed development is characterized by a steep, north facing slope with an overall 20 degree inclination. The steepest portion has a slope of 30 degrees and is located below the 12m contour. The total relief of the site is 20m with an estimated 9m relief over the proposed development area.
- c. Most of the vegetation has been removed from the property over the proposed building area. The remaining vegetation consists of berry vines (Himalayan black berry) low lying bushes and sporadic smaller evergreens and deciduous trees on the lower slope.

5.2 Soil Conditions

The soil investigation consisted of a single test pit near the center of the lot where some fill

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had been placed. This material consisted of silty, sandy rock rubble with inclusion of wood debris to a depth of 1.4m underlain by granitic bedrock. Additional wood / concrete debris was noted along the right property line. Our desktop study indicates the entire site is underlain by near surface igneous granitic bedrock with exposures noted along the lower reaches of the site (outside of the fill area).

5.3 Groundwater

- a. There were no indications of significant seepage at the time of our site visit. No accumulations of water (ponding) or watercourses were noted on the subject property.
- b. Groundwater levels can be expected to fluctuate seasonally with cycles of precipitation. Groundwater conditions at other times and locations can differ from those observed within at the time of our assessment.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 General

From a geotechnical point of view, the land is considered safe for the use intended (defined for the purposes of this report as construction of a residential building of conventional construction methods), with the probability of a geotechnical failure resulting in property damage of less than 10 percent (10%) in 50 years, with the exception of geohazards due to a seismic event which are to be based on a less than 2 percent (2%) probability of exceedance in 50 years, provided the recommendations in this report are followed.

6.2 Geotechnical Discussions – Development Permit Area No. 1

- a. Guidelines for the DPA No. 1 area, include a minimum 15.0m and 30.0m setback review from the marine foreshore and / or the crest of the shoreline slope. This site is within a Low Geotech Hazard Area (Thurber Report , 1991) and characterized by a steep slope comprised of igneous bedrock with maximum gradients to 20 degrees within the proposed building area (upper half of the site) and maximum gradients to 30 degrees on areas below the proposed

building site (lower half of the site).

- b. There is no defined slope crest at the site and no significant near vertical (bluff) areas within the topography. The exposed bedrock shows no signs of significant landslip or faulting. Therefore considering the geology and gradients we conclude that the site is globally stable as defined by the Association of Professional Engineers and Geologists of British Columbia (APEGBC) "Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC", see the attached Appendix D "Landslide Assurance Statement". Site topography is shown in Figure 2.

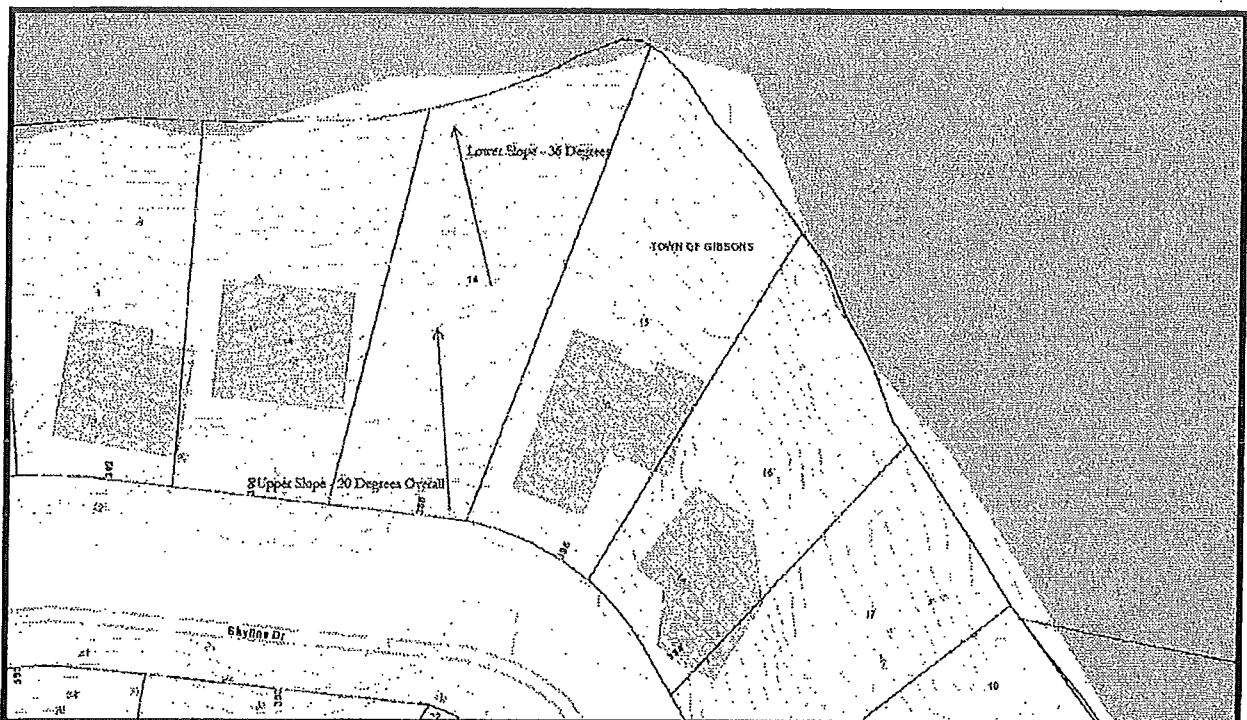


Figure 2: Site topographic plan showing analyzed sections and slope angles for upper and lower slopes.

6.3 Geotechnical Discussions – Development Permit Area No. 2

- a. This site is within a DPA 2, environmentally sensitive area; Marine shore with eel grass beds fronting the site. This marine environment is sensitive to any significant disturbance therefore; the 15m buffer zone from high-water to the site will remain undisturbed for the

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duration of the project. In addition, the building area lower extent will include a soil barrier along the downslope extent of the excavation to help ensure no sediments reach the foreshore area. The proposed plan includes the careful removal of any unsuitable fill materials to be replaced with clean sands and gravels under the guidance of the Geotechnical Engineer.

If any significant work is contemplated within the buffer zone we understand that a DPA 2 application with an environmental assessment will be required.

6.4 General Excavation Recommendations

- a. Prior to construction, all unsuitable materials within the proposed building envelope should be removed to provide a suitable base of support. Unsuitable materials include any non-mineral material such as vegetation, topsoil, peat, undocumented/re-worked fill or other materials containing organic matter, as well as any soft, loose, or disturbed soils.
- b. If construction commences during the rainy season, any groundwater ingressing into any excavations should be controlled with a perimeter berm outside of the building areas, connected to positive drainage.
- c. The Geotechnical Engineer is to confirm the removal of unsuitable materials and approve the exposed competent inorganic subgrade prior to footing installation or the placement of engineered fills (if required). We anticipate that the on-site fills will not be suitable for re-use as structural fill. We anticipate the building will be founded on prepared bedrock benches that may include rock pinning on steeper sections or areas lacking adjacent support (see section 6.4d). Details of rock pinning can be provided once general site excavation and rock manipulation is completed.

6.5 Structural Fill

- a. Where fill is required to raise areas that will support buildings, slabs, or pavements, structural fill should be used. The Geotechnical Engineer should first approve the exposed subgrade.

in fill areas, to confirm the removal of all unsuitable materials.

- b. Structural fill should be inorganic sand and gravel. If structural fill placement is to be carried out in the wet season, material with a fines content limited to 5% passing the 75 μm sieve should be used, as such a material will not be overly sensitive to moisture, allowing compaction during rainy periods of weather.
- c. Structural fill should be compacted to a minimum of 95% of Modified Proctor maximum dry density (ASTM D1557) in foundation and floor slab areas, as well as in paved roadway and parking areas.
- d. Structural fills under foundations, roadways, and pavements should include the zone defined by a plane extending down and outward a minimum 0.5m from the outer edge of the foundation at an angle of 45 degrees from horizontal to ensure adequate subjacent support. This support zone is shown in Figure 3.

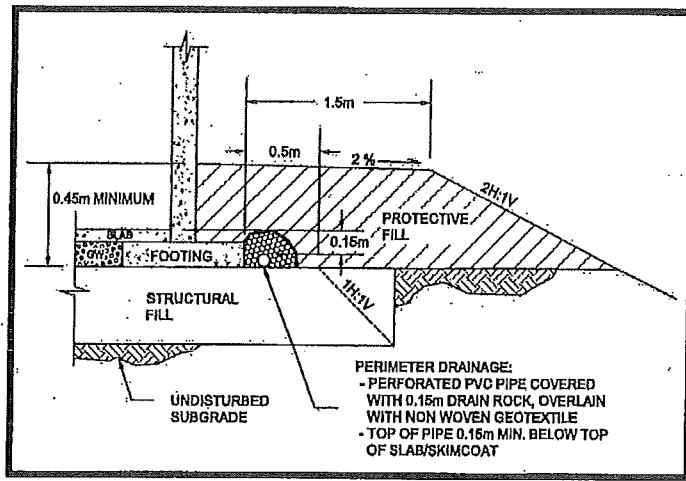


Figure 3: Typical structural fill schematic.

- e. Compaction of fill should include moisture conditioning as needed to bring the soils to the optimum moisture content and compacted using vibratory compaction equipment in lift thicknesses appropriate for the size and type of compaction equipment used.
- f. A general guideline for maximum lift thickness is no more than 100mm for light hand equipment such as a "jumping-jack," 150mm for a small roller and 300mm for a large roller or heavy (>500 kg) vibratory plate compactor or a backhoe mounted hoe-pac or a large excavator mounted hoe-pac, as measured loose.
- g. It should be emphasized that the long-term performance of buildings, slabs, and pavements

is highly dependent on the correct placement and compaction of underlying structural fills.

Consequently, we recommend that any structural fills be observed and approved by the Geotechnical Engineer. This would include approval of the proposed fill materials and performing a suitable program of compaction testing during construction.

6.4 Foundation Design & Construction

- a. Prior to construction, the building area should be stripped to remove all unsuitable materials to provide an undisturbed natural subgrade for the footing support.
- b. Foundation loads should be supported on natural undisturbed material approved for use as a bearing stratum by our office, or structural fill, and may be designed using the following values.
 - i. For foundations constructed on an approved natural subgrade, or structural fill as outlined in Section 6.3 of this report, a Service Limit State (SLS) bearing pressure of 150 kPa, and an Ultimate Limit State (ULS) of 200 kPa may be used for design purposes. These values assume a minimum 0.45m depth of confinement or cover.
 - ii. For foundations constructed on an approved bedrock , a Service Limit State (SLS) bearing pressure of 450 kPa, and a Ultimate Limit State (ULS) of 600 kPa may be used for design purposes.
- c. Exterior footings should be provided with a minimum 0.45m depth of ground cover for frost protection purposes unless directed otherwise by the Geotechnical Engineer.
- d. Prior to placement of concrete footings, any bearing soils that have been softened, loosened, or otherwise disturbed during the course of construction should be removed, or else compacted following our recommendations for structural fill. Compaction will only be feasible if the soil has suitable moisture content and if there is access to heavy compaction equipment. If no structural fill is placed, a smooth-bladed clean up bucket should be used to finish the excavation or alternatively clean off the bedrock. Foundation elements bearing on

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bedrock surfaces with inclination greater than 10 degrees should be evaluated for a rock pinning design by the Geotechnical Engineer.

- e. The Geotechnical Engineer should evaluate the bearing surfaces at the time of construction to confirm that all footings are based on appropriate and properly prepared founding material.

6.5 Seismic Issues

- a. No compressible or liquefiable soils were encountered within the proposed development area during the test pitting investigation.
- b. Based on the 2012 British Columbia Building Code, Division B, Part 4, Table 4.1.8.4.A, "Site Classification for Seismic Site Response," the soils and strata encountered during the test pitting investigation would be "Site Class C" (very dense soil and soft bedrock). If foundations are founded entirely on bedrock "Site Class B" (Rock) can be used.

6.6 Flooding (DPA 1)

We have reviewed the proposed plans, and the lowest foundation elements are approximately at the 107.60m elevation (elevations are relative in the proposed plans, not above sea level) to the present natural boundary of 100.77m which give a difference of 6.83m above the present natural boundary. We compared this elevation to the typical elevations derived utilizing the APEGBC Flood Hazard assessments in the area (1:200 year event) and found that the proposed building footings will be founded on bedrock and are situated at least 4.5m above the typical recommended FCL's. Therefore, we conclude the proposed building is considered safe and suitable for the intended use (single family dwelling) from coastal flooding.

6.7 Permanent Dewatering

Conventional requirements of the 2012 British Columbia Building Code pertaining to building drainage are considered suitable at this site. Once final plans and tentative elevations are determined, the Geotechnical Engineer should be consulted to provide further

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dewatering data.

6.8 On site infiltration and Stormwater Disposal

The subsurface investigation indicates that the site is very near or at bedrock level throughout the site. Therefore the site is not conducive to the infiltration of collected waters therefore we recommend the water be disposed onto the bedrock surface at least 3m below the building extents at a minimum two separate locations.

7. GEOTECHNICAL ASSURANCE AND QUALITY ASSURANCE

The 2012 British Columbia Building Code requires that a geotechnical engineer be retained to provide Geotechnical Assurance services for the proposed development works. Geotechnical Assurance services include review of the geotechnical components of the plans and supporting documents, and responsibility for field reviews of these components during construction.

8. ACKNOWLEDGEMENTS

Lewkowich Engineering Associates Ltd. acknowledges that this report may be requested by the Building Inspector (or equivalent) of the Town of Gibsons as a precondition to the issuance of a building permit. It is acknowledged that the Approving Officers and Building Officials may rely on this report when making a decision on application for development of the land. We acknowledge that this report has been prepared solely for, and at the expense of Summerhill Fine Homes Inc. as requested by Mr. Brad Jennens. We have not acted for or as an agent of the Town of Gibsons in the preparation of this report.

9. LIMITATIONS

The conclusions and recommendations submitted in this report are based upon the data obtained from a limited number of widely spaced subsurface explorations. The nature and

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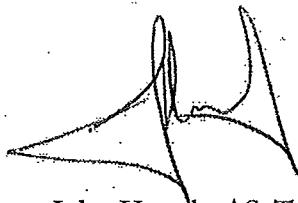


extent of variations between these explorations may not become evident until construction or further investigation. The recommendations given are based on the subsurface soil conditions encountered during test pitting investigation, current construction techniques, and generally accepted engineering practices. No other warrantee, expressed or implied, is made. Due to the geological randomness of many soil formations, no interpolation of soil conditions between or away from the test pits has been made or implied. Soil conditions are known only at the test pit locations. If other soils are encountered, unanticipated conditions become known during construction or other information pertinent to the development become available, the recommendations may be altered or modified in writing by the undersigned.

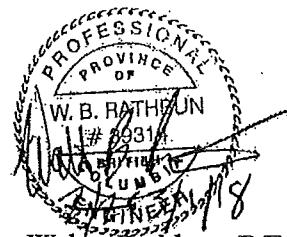
10. CLOSURE

Lewkowich Engineering Associates Ltd. appreciates the opportunity to be of service on this project. If you have any comments, or additional requirements at this time, please contact us at your convenience.

Respectfully Submitted,
Lewkowich Engineering Associates Ltd.



John Hessel, AScT
Senior Technologist



Walter Rathbun, P.Eng.
Geotechnical Engineer

Attachment:

APEG BC, Appendix D "Landslide Assurance Statement"

APPENDIX D: LANDSLIDE ASSESSMENT ASSURANCE STATEMENT

Note: This Statement is to be read and completed in conjunction with the "APEGBC Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia", March 2006/Revised September 2008 ("APEGBC Guidelines") and the "2006 BC Building Code (BCBC 2006)" and is to be provided for *landslide assessments* (not floods or flood controls) for the purposes of the Land Title Act, Community Charter or the Local Government Act. Italicized words are defined in the APEGBC Guidelines.

To: The Approving Authority

Date: March 1, 2018

Town of Gibsons

474 South Fletcher Road, Box 340, Gibsons, BC V0N 1V0

Jurisdiction and address

With reference to (check one):

- Land Title Act (Section 86) – Subdivision Approval
- Local Government Act (Sections 919.1 and 920) – Development Permit
- Community Charter (Section 56) – Building Permit
- Local Government Act (Section 910) – Flood Plain Bylaw Variance
- Local Government Act (Section 910) – Flood Plain Bylaw Exemption
- British Columbia Building Code 2006 sentences 4.1.8.16 (8) and 9.4.4.4.(2) (Refer to BC Building and Safety Policy Branch Information Bulletin B10-01 issued January 18, 2010)

For the Property:

Lot 14, Block F, District Lot 685, Plan VAP10362

Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a *Qualified Professional* and is a *Professional Engineer or Professional Geoscientist*.

I have signed, sealed and dated, and thereby certified, the attached *landslide assessment* report on the Property in accordance with the *APEGBC Guidelines*. That report must be read in conjunction with this Statement. In preparing that report I have:

Check to the left of applicable items

- 1. Collected and reviewed appropriate background information
- 2. Reviewed the proposed *residential development* on the Property
- 3. Conducted field work on and, if required, beyond the Property
- 4. Reported on the results of the field work on and, if required, beyond the Property
- 5. Considered any changed conditions on and, if required, beyond the Property
- 6. For a *landslide hazard analysis* or *landslide risk analysis* I have:
 - 6.1 reviewed and characterized, if appropriate, any *landslide* that may affect the Property
 - 6.2 estimated the *landslide hazard*
 - 6.3 Identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
 - 6.4 estimated the potential consequences to those *elements at risk*
- 7. Where the *Approving Authority* has adopted a *level of landslide safety* I have:
 - 7.1 compared the *level of landslide safety* adopted by the *Approving Authority* with the findings of my investigation
 - 7.2 made a finding on the *level of landslide safety* on the Property based on the comparison
 - 7.3 made recommendations to reduce *landslide hazards* and/or *landslide risks*
- 8. Where the *Approving Authority* has **not** adopted a *level of landslide safety* I have:

- 8.1 described the method of *landslide hazard analysis* or *landslide risk analysis* used
- 8.2 referred to an appropriate and identified provincial, national or international guideline for *level of landslide safety*
- 8.3 compared this guideline with the findings of my investigation
- 8.4 made a finding on the *level of landslide safety* on the Property based on the comparison
- 8.5 made recommendations to reduce *landslide hazards* and/or *landslide risks*
- 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections.

Based on my comparison between

Check one

- the findings from the investigation and the adopted *level of landslide safety* (item 7.2 above)
- the appropriate and identified provincial, national or international guideline for *level of landslide safety* (item 8.4 above)

I hereby give my assurance that, based on the conditions⁽¹⁾ contained in the attached *landslide assessment report*,

Check one

- for subdivision approval, as required by the Land Title Act (Section 86), "that the land may be used safely for the use intended"

Check one

- with one or more recommended registered covenants.
- without any registered covenant.



for a development permit, as required by the Local Government Act (Sections 919.1 and 920), my report will "assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit".



for a building permit, as required by the Community Charter (Section 56), "the land may be used safely for the use intended"

Check one

- with one or more recommended registered covenants.
- without any registered covenant.



for flood plain bylaw variance, as required by the "Flood Hazard Area Land Use Management Guidelines" associated with the Local Government Act (Section 910), "the development may occur safely".



for flood plain bylaw exemption, as required by the Local Government Act (Section 910), "the land may be used safely for the use intended".

Walter B. Rathbun, P.Eng.

Name (print)

Signature

March 1, 2018

Date

⁽¹⁾ When seismic slope stability assessments are involved, *level of landslide safety* is considered to be a "life safety" criteria as described in the National Building Code of Canada (NBCC 2005), Commentary on Design for Seismic Effects in the User's Guide, Structural Commentaries, Part 4 of Division B. This states:

"The primary objective of seismic design is to provide an acceptable level of safety for building occupants and the general public as the building responds to strong ground motion; in other words, to minimize loss of life. This implies that, although there will likely be extensive structural and non-structural damage, during the DGM (design ground motion), there is a reasonable degree of confidence that the building will not collapse nor will its attachments break off and fall on people near the building. This performance level is termed 'extensive damage' because, although the structure may be heavily damaged and may have lost a substantial amount of its initial strength and stiffness, it retains some margin of resistance against collapse".

2569 Kenworth Road

Address

Nanaimo, BC V9T 3M4

250-756-0355

Telephone



If the *Qualified Professional* is a member of a firm, complete the following.

I am a member of the firm Lewkowich Engineering Associates Ltd.

and I sign this letter on behalf of the firm.

(Print name of firm)