

Geo-Hazard Assurance Statement

for Development Approvals

A. Project Information

Date December 13, 2017 FVRD File No. _____

Property Information

Project Name & Description 45900 Sleepy Hollow Road

Legal Description Lot 30 Block NWP 37174 Section 30 Township 25 LD36

Site Address 45900 Sleepy Hollow Road PID _____

Client Information

Name Brad Geary

Role ☐ Property Owner ☒ Developer ☐ Other

Client Address 1649 Columbia Valley Road

Qualified Professional Information

Name Christopher Clarke

APEGBC Designation ☒ P.Eng. ☐ P. Geo. ☐ Eng.L ☐ Geo.L

Company Name Thurber Engineering Ltd.

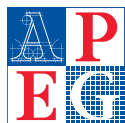
Mailing Address 900 - 1281 West Georgia Street

Email Address cclarke@thurber.ca Phone # 604-684-4384

Geo-Hazard Report Reference

Title 45900 Sleepy Hollow Road, Cultus Lake Geotechnical Recommendations Date December 13, 2017

Personal information on this form is being collected in accordance with Section 27 of the Freedom of Information and Protection of Privacy Act, RSBC 1996 Ch. 165; Part 9, Division 1 [Building Regulation] and Part 14 [Planning and Land Use Management] of the Local Government Act, RSBC 2015 Ch. 1; and Section 56 of the Community Charter, SBC 2003 Ch. 26 and will only be collected, used and disclosed for the purpose of administering geo-technical hazard reviews and assurance statements related to development approvals. Questions? Contact FVRD Privacy Officer at 45950 Cheam Avenue, Chilliwack, BC V2P 1N6; 604-702-5000 or 1-800-528-0061; or FOI@fvr.ca.



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for Development Approvals

B. Assurance

Based on the contents of this Assurance Statement and the Report, I hereby give assurance that:

(check as applicable)

<input type="checkbox"/>	Development Permit	The Report will “assist the local government in determining what conditions or requirements under it will impose in the permit”, as required by the <i>Local Government Act</i> (Division 7)
<input type="checkbox"/>	Building Permit	
<input type="checkbox"/>	<input type="checkbox"/> Community Charter	“The land may be used safely for the use intended”, as required by the <i>Community Charter</i> (Section 56)
<input type="checkbox"/>	<input type="checkbox"/> Seismic Slope	The Report addresses the requirements of the BC Building Code 2006, 4.1.8.1.6 (8) and 9.4.4.4 (2), as detailed in the BC Building & Safety Policy Branch Information Bulletin B10-01, Jan 18, 2010
<input type="checkbox"/>	Floodplain Management Bylaw Exemption	“The land may be used safely for the use intended”, as required by the <i>Local Government Act</i> . (Section 524)
<input checked="" type="checkbox"/>	Subdivision	“The land may be used safely for the use intended”, as required by the <i>Land Title Act</i> (Section 86).
<input type="checkbox"/>	Other (e.g. Zoning Bylaw Amendment, Official Community Plan Amendment, Temporary Use Permit, etc.)	<Insert statement as appropriate>

C. APEGBC Professional Practice Guidelines

The Report and this Assurance Statement should be completed in accordance with the current version of one or both of the following Professional Engineers and Geoscientists of BC (APEGBC).

- *Legislated Flood Assessments in a Changing Climate in BC*
- *Legislated Landslide Assessments for Proposed Residential Development in British Columbia, (“APEGBC Landslide Guidelines”).*

These two documents are collectively referred to as the “APEGBC Guidelines”. The italicized words in this Assurance Statement are defined in the APEGBC Guidelines.

The Report has been prepared pursuant to the following APEGBC Guidelines (check one or both as applicable).

- ☐ APEGBC Flood Guidelines
- ☒ APEGBC Landslide Guidelines

If the Report is **not** prepared pursuant to either of the APEGBC Guidelines, please explain.

D. Background Information

Qualified Professionals **must** confirm and check that each item is included in the Report.

- ☒ 1. Property location map — 8.5 x 11 size
- ☐ 2. Development proposal site plan — 8.5 x 11 size. *If a subdivision, show the parent parcel and all lots to be created, including any remainder.*
- ☒ 3. Description of the proposed development project (including building use) to the extent this is known at the time of Report preparation.
 - ☒ residential
 - ☐ industrial
 - ☐ commercial
 - ☐ institutional
 - ☐ other _____

E. Technical Requirements

Qualified Professionals **must** review, confirm and check completed items (as applicable).

Report Content

- ☒ 4. Relevant information pertaining to the Property and pertinent potential hazards from appropriate background sources, including the FVRD online library.
- ☐ 5. Time limitation or condition statement to describe extent the FVRD may rely on the Assurance Statement and Report for development approvals, and when resubmittal is recommended.
- ☒ 6. Maps, illustrations and diagrams to illustrate areas referred to in the Report.
- ☒ 7. Description of field work conducted on and, if required, beyond the Property.
- ☐ 8. Contact and consultation with the Fraser Valley Regional District. Provide name and title of contact.

- ☒ 9. Review of relevant FVRD bylaws and other statutory requirements.
- ☒ 10. Restrictive covenants registered against the Property title that pertain to geo-hazards (if registered, the Report provides relevant information about the covenants).
- ☒ 11. Notation of any visibly apparent natural hazards or other hazards identified in background reports, which are not identified and addressed in this Report. If yes, provide details in Section H: Geo-Hazard Summary Table.
 - ☐ Yes
 - ☒ No
- ☒ 12. Does the report rely on one or more supporting reports, each of which is independently reviewed, signed and sealed. If yes, provide details in Section H: Geo-Hazard Summary Table.
 - ☒ Yes
 - ☐ No
- ☒ 13. For subdivision approval, the Report addresses natural hazards for:
 - ☒ the parent parcel prior to subdivision
 - ☐ any lots to be created (including any remainder)

Geo-Hazard Assurance Statement

for Development Approvals

Geo-hazard Assessment, Risk Acceptability and Risk Transfer

- ☒ 14. In considering the above-noted potential hazards that may affect the property, I have:
- ☒ reviewed and characterized the potential hazard(s)
 - ☒ estimated the potential frequency and magnitude of the potential hazard(s)
 - ☒ relied on supporting reports as noted above
 - ☒ relied on a pre-existing assessment of hazard frequency and magnitude
 - ☐ considered the potential effects of climate change in the context identified in the Report
 - ☒ considered the potential effects of changed future conditions (upstream watershed changes, forestry activity, land use changes, sea level rise, etc.) in the context identified in the Report
- ☒ 15. This Assurance Statement pertains to all geo-hazards that are assessed in the Report and any supporting reports, and accurately reflects the contents of those documents.
- ☒ 16. The FVRD has adopted “Hazard Acceptability Thresholds for Development Approvals by Local Government”, which provides a specific level of hazard or risk tolerance. I have included a Hazard Summary Table which:
- ☒ lists all the potential hazards addressed by the Report and any supporting reports
 - ☒ provides an annual return frequency and acceptability threshold classification for the unmitigated condition
 - ☒ proposes mitigative measures to appropriately reduce the geo-hazard risk
 - ☒ provides an annual return frequency and acceptability threshold classification for the mitigated condition
- ☒ 17. The Report describes the potential transfer of natural hazard risk to other properties or infrastructure as a result of the proposed project (including any proposed *mitigation works*) and
- ☒ considered the potential for transfer of natural hazard risk
 - ☐ concludes that there is no significant transfer of natural hazard risk
 - ☒ identifies the potential transfer of natural hazard risk and proposes measures to offset such transfer of risk

Geo-Hazard Assurance Statement

for Development Approvals

Mitigation and Design Recommendations (if recommended)

The Report contains the following items:

- ☐ 18. Implementation steps for the identified structural mitigation works (in terms of design, construction and approval).
- ☒ 19. Clearly identified safe locations for building(s), ancillary structures, and onsite utility services (as applicable, such as a septic field) out of the natural hazard area as a preferred development alternative.
- ☒ 20. Commentary on the effectiveness of proposed structural mitigation works in terms of ability to reduce the potential hazard impact, and identification of any residual risk that would remain.
- ☐ 21. Proposed Flood Construction Level (FCL) for future development and including specification of an appropriate method of achieving the FCL.
- ☐ 22. Proposed watercourse setback, which is clearly referenced from the natural boundary, top of bank or another suitable basis.
- ☒ 23. Proposed operation and maintenance actions that will be necessary in order for the level of safety to be maintained in the future, with indications of who should be responsible for those actions and when.

Riparian Area Regulation (if applicable)

- ☐ 24. QP must review RAR assessment report to avoid conflict with Geo-Hazard Report recommendations.

F FVRD Supplemental Requirements

The following points are understood by the Qualified Professional when submitting a Report:

- ☒ 25. Permission is granted to the FVRD to use the Report in considering approval of the proposed development on the property, provided that such permission is limited only to the proposed development project for which the Report was prepared.
- ☒ 26. Methodology used in the Report is described in sufficient detail to facilitate a professional review of the study by the FVRD when necessary.
- ☒ 27. Professional liability insurance coverage of at least \$1 million per claim is carried by the QP.
- ☒ 28. Third party review or supplemental information may be required by the FVRD where complex development proposals warrant.
- ☒ 29. Permission is granted to the FVRD to include the Report in the online FVRD geo-hazard report library (as background information, not for other parties to rely).

Geo-Hazard Assurance Statement

for Development Approvals

G. Qualified Professional (QP)

Prepared by: (QP of Record)

Name Christopher Clarke

Designation ☒ P.Eng. ☐ P. Geo. ☐ Eng.L ☐ Geo.L

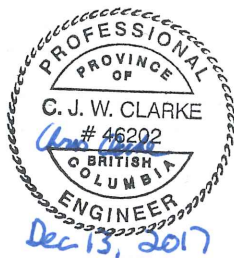
Reviewed by:

Name David Regehr

Designation ☒ P.Eng. ☐ P. Geo.

The Report has received appropriate technical review which is consistent with both the APEGBC Professional Practice Guidelines, and APGBC Quality Management Guidelines. The name of the reviewer is noted in the Report and below.

Professional Seal, Signature and Date:



- ☒ I am a Qualified Professional as defined in the APEGBC Guidelines, and I fulfill the education, training and experience requirements as outlined in the APEGBC Guidelines
- ☒ I have signed, sealed, dated and thereby certify, this Assurance Statement and the attached report.

H. Geo-Hazard Summary Table

The geo-hazard report and/or any supporting reports addresses the following hazard types.

Geo-Hazard Type #1		Geo-Hazard Type #2	
Small Scale Localized Landslip		Rockfall -Small Scale Detachment	
Annual Return Frequency (Unmitigated)		Annual Return Frequency (Unmitigated)	
1:50-1:200		1:100	
Acceptability Threshold Classification	5	Acceptability Threshold Classification	5
MITIGATION (if necessary)			
Proposed Mitigation Measures	Yes <input checked="" type="radio"/>	Proposed Mitigation Measures	Yes <input checked="" type="radio"/>
	No <input type="radio"/>		No <input type="radio"/>
Annual Return Frequency (Mitigated)		Annual Return Frequency (Mitigated)	
1:500 - 1:10000		1:1000 - 1:10000	
Acceptability Threshold Classification	4	Acceptability Threshold Classification	4
Comments		Comments	
SUPPORTING REPORT			
Was this report prepared by others?	Yes <input type="radio"/>	Was this report prepared by others?	Yes <input type="radio"/>
	No <input checked="" type="radio"/>		No <input checked="" type="radio"/>
If yes, list report name, date and author.		If yes, list report name, date and author.	

Geo-Hazard Type #3		Geo-Hazard Type #4	
Annual Return Frequency (Unmitigated)		Annual Return Frequency (Unmitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
MITIGATION (if necessary)			
Proposed Mitigation Measures	Yes <input type="radio"/>	Proposed Mitigation Measures	Yes <input type="radio"/>
	No <input type="radio"/>		No <input type="radio"/>
Annual Return Frequency (Mitigated)		Annual Return Frequency (Mitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
Comments		Comments	
SUPPORTING REPORT			
Was this report prepared by others?	Yes <input type="radio"/>	Was this report prepared by others?	Yes <input type="radio"/>
	No <input type="radio"/>		No <input type="radio"/>
If yes, list report name, date and author.		If yes, list report name, date and author.	

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Indicate which hazards were **NOT** reviewed:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Chilliwack River Valley Erosion or Avulsion | <input type="checkbox"/> Seismic Effects/Liquefaction |
| <input type="checkbox"/> Debris Flow and Debris Torrent | <input type="checkbox"/> Rockfall - Small Scale Detachment |
| <input type="checkbox"/> Debris Flood | <input type="checkbox"/> Slope Stability |
| <input checked="" type="checkbox"/> Fraser River & tributaries flooding | <input type="checkbox"/> Small Scale Localized Landslide |
| <input checked="" type="checkbox"/> Mountain Stream Erosion or Avulsion | <input checked="" type="checkbox"/> Snow Avalanche |
| <input type="checkbox"/> Major Catastrophic Landslide | <input checked="" type="checkbox"/> Tsunami |

Hazard Acceptability Thresholds Classification, as per Hazard Acceptability Thresholds for Development Approvals by Local Government dated November 1993 by Dr. Peter Cave.

- 1 Approval with conditions relating to hazards.
- 2 Approval, without siting conditions or protective works conditions, but with a covenant including “save harmless” conditions.
- 3 Approval, but with siting requirements to avoid the hazard, or with requirements for protective works to mitigate the hazard.
- 4 Approval as (3) above, but with a covenant including “save harmless” conditions as well as siting conditions, protective works or both.
- 5 Not approvable.

Additional Comments