

TERMS OF REFERENCE FOR REPORT PREPARATION

1. GENERAL

Hydrogeologically sensitive areas (HSAs) may be present in proposed development locations. HSAs commonly have the following characteristics:

- Soil conditions with limited infiltration capacity
- Poorly draining and/or low permeability soils
- Shallow bedrock
- Shallow groundwater
- Known or suspected groundwater discharge areas, such as, springs, seepage zones, wet areas.

The occurrence of HSAs may significantly affect the design and effects of the proposed development; therefore, a comprehensive hydrogeological assessment report (3 copies) is required when any of the following conditions apply:

- To support Hazardous Condition Development Permit, Hillside Development Permit, Rezoning and Subdivision applications.
- Available documentation indicates that HSA conditions may be present.
- The project proposes to infiltrate stormwater into site soils, either on individual properties or via community stormwater system (e.g., drywells, perforated pipes, or infiltration/detention ponds).

- 1.1. Reports are to be prepared as per the attached Terms of Reference for Professional Reports to the City of Kelowna.
- 1.2. The assessment must be prepared by a Registered Professional Geotechnical Engineer or Professional Geoscientist licensed in BC.
- 1.3. The appropriately qualified professional must sign and seal each report submitted to the City.
- 1.4. Consider and integrate relevant findings and recommendations from other studies completed or underway that relate to the site, as part of the assessment.
- 1.5. Depending on the site conditions and proposed activities, geotechnical, stormwater management and/or flood impact assessment reports may also be required. Detailed information regarding these assessments is provided in Appendices C1 and C3.

2. HYDROGEOLOGICAL ASSESSMENTS

A hydrogeological assessment and mitigation plan to provide assurances that down slope properties will not be negatively impacted resulting from the proposed development activities will include:

- 2.1. Review of all available soils, geotechnical and hydrogeologic information from previous site investigations.
- 2.2. Assessment of pre-development groundwater conditions including a description of the hydrogeology, seasonal high groundwater, and aquifer vulnerability.
- 2.3. An assessment of how HSA characteristics will potentially influence onsite and down slope groundwater conditions.
- 2.4. Identification and mapping of existing and potential groundwater recharge/discharge areas, springs, seeps and seepage zones.
- 2.5. Assessment, mapping and discussion of anticipated post-development groundwater conditions including the effects of stormwater disposal, residential irrigation, site grading and the potential for utility trenches to convey groundwater.
- 2.6. Assessment of potential slope stability issues caused by site grading and increased groundwater recharge from irrigation and/or stormwater disposal.
- 2.7. Recommendations for managing naturally occurring groundwater and infiltrated water (e.g., stormwater, irrigation water) considering impacts to adjacent and down slope properties.

- 2.8. Recommendations for on-site disposal of drainage water, where appropriate; complete with a design for the disposal method (see Subdivision, Development & Servicing Manual for detailed design and construction requirements).
- 2.9. Assessments and recommendations for off-site management of drainage, if site conditions preclude on-site disposal.
- 2.10. Recommendations for limiting residential irrigation and/or stormwater infiltration in HSAs.

3. BONDING

Refer to City of Kelowna Bylaws, including but not limited to Bylaw No. 7900 and No. 8140 for specific bonding requirements.

4. ASSURANCES & LETTER OF NOTICE

- 4.1. The professional has completed all necessary surface and subsurface investigations that the professional considers necessary to provide the review and design recommendations
- 4.2. The professional will provide the review, design and supervision such that, in the professional's opinion, the site is suitable for the proposed development and the proposed development will not negatively impact down slope or down gradient groundwater flow conditions including increased groundwater seepage, surficial groundwater discharge, slope stability, or other geotechnical impact.
- 4.3. The professional shall provide a written statement from the geotechnical engineer of note that any changes to the development plan or new information pertaining to site conditions arising from development activities have been adequately assessed and hydrogeological conditions remain suitable for the proposed development and the proposed development may continue and does not compromise nor is likely to reduce the stability of the soil on-site or soil on lands which are adjacent, nearby or down slope, and will not cause or contribute to such soils becoming susceptible to land slip, land slide, rock fall, mud/land flow, debris flow, torrent, erosion, slumping, creeping, settling, avalanches, or other such occurrence.
- 4.4. In the professional's opinion, in the event of any groundwater discharge, slope stability or other such occurrence, which occurs after the proposed development is completed, the extent of the property damage and damage to life and limb which occurs is not likely to be in any way greater than the damage or harm which would occur prior to the development taking place.

Notice The professional shall provide notice, in writing to the City of Kelowna, of the following:

- 4.5. Each practicing professional acting behalf of an owner, developer or contractor shall notify the City upon being commissioned by their client.
- 4.6. Each hydrogeological report provided to the City shall be accompanied by a letter from the owner/developer advising the City that the professional had free, uninterrupted and complete access to the property and he/she has been provided the necessary information by the owner/developer, including previous investigations conducted on the property or nearby lands.
- 4.7. The professional shall notify the City if he/she becomes aware of changes or new information which could affect the outcome of their hydrogeologic review.
- 4.8. In the event the retainer is terminated for any reason by the owner/developer, the Professional shall be obligated to immediately notify the City in writing of that fact.

5. INSURANCE

The professional shall provide the City with evidence of professional liability insurance coverage which does not lapse in the amount of at least \$1,000,000 as provided to their client

6. COVENANTS

The owner/developer may be required by the City to register a covenant against the property title at the Land Titles Office as a notification to future landowners. The covenant will incorporate provisions included in the hydrogeological report(s) and indemnify the City against all claims. It must be in a form as required by the City, granted to the City in priority of all liens, charges and encumbrances and executed in registrable form by the person who owns the land. During the construction phase enforcement of the covenant provisions are the responsibility of the owner/developer and the professional.

7. PERFORMANCE ASSURANCE (BONDING OR LETTER OF CREDIT)

It is anticipated that works recommended by the professional will be adhered to. If the City has concerns – with respect to site suitability for stormwater disposal by infiltration for example – the owner/developer may also be required by the City to provide bonding as security for performance of the on-site and off-site construction works and the provisions outlined in the hydrogeological report(s) pertaining to that construction.

8. PEER REVIEW

The City may require a professional peer review for conformance to good engineering practice and adherence to these guidelines on a case by case basis. The peer review shall be completed by a qualified professional with the City selecting from a list of consultants proposed by the applicant. Any costs incurred by the City to conduct a peer review shall be borne by the owner/developer. The professional engaged by the City shall notify the responsible professional in writing of the peer review.

The peer review may identify deficiencies in field investigations, analysis and/or reporting. All deficiencies will need to be resolved prior to issuance of permits.