City of Kelowna

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STORMWATER MANAGEMENT REPORTS

TERMS OF REFERENCE FOR REPORT PREPARATION

1. GENERAL

Depending on the site conditions and proposed activities stormwater and/or flood impact assessment reports may be required. A comprehensive stormwater management report (3 copies) is required when any of the following conditions apply:

- To support Hazardous Condition Development Permit, Rezoning and Subdivision applications.
- The project proposes to direct water onsite into the ground or off-site.

1.1. Reports are to be prepared as per the Subdivision, Development & Servicing Manual (SD&S). In addition to the requirements of the SD&S Manual, reports are to include information outlined in this 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 Geoscientist licensed in BC.
1.3. The appropriately qualified professional must sign and seal each report submitted to the City.
1.4. Depending on the site conditions and proposed activities geotechnical (Appendix C1) or hydrogeological (Appendix C2) assessment reports may also be required.

2. STORMWATER MANAGEMENT AND DRAINAGE PLANS

A stormwater management plan which establishes the hydrology, drainage, and stormwater quality of the subject site under existing conditions, identifies impacts from the proposed development on these items, and recommended solutions to mitigate and manage these impacts are required. Such a plan does not replace Engineering Drawing Submissions that may be required as per the SD&S Manual.

Several documents are required as part of a stormwater management plan, and may include some or all of the following:

2.1. A topographical survey of pre-development conditions;
2.2. Drawing(s) showing the location of pre-development on-site and off-site stormwater conveyance systems including natural drainage courses, streams, ponds, springs, etc.
2.3. Drawing(s) showing the identification of tributary (upstream) drainage areas and major off-site drainage routes.
2.4. Drawing(s) showing the proposed development layout and stormwater management system(s), including overland emergency drainage routes from all low points on the proposed roads.
2.5. A report summarizing the stormwater management concepts, design criteria, and pertinent analyses (see next items).
2.6. Analyses showing the pre and post-development runoff peak flows and volumes generated from the critical rainfall events and the proposed release rates (see SD&S Manual for details);
2.7. Analyses of the potential downstream problems (i.e., system capacities, erosion, flooding, fish habitat) considering both peak and low flow conditions compared to the latest Drainage Basin Plan findings.
2.8. A discussion of stormwater quality and drawings showing the location and details of proposed water quality Best Management Practices.
2.9. Liaison with a qualified professional to determine fish flow requirements (i.e., low flow and pond requirements).
2.10. Copies of consultation with the Ministry of Environment regarding any concerns or background information;
2.11. Recommendations for mitigating impacts related to development activities;
2.12. For small lots, a small parcel drainage plan may apply. See: City of Kelowna Small Parcel Drainage Plan Requirements document.

2.13. Refer to Guidelines for Geotechnical Report Preparation (Appendix C1) for additional requirements.

It is expected that both potential erosion and flooding will be controlled by way of the stormwater management system, and therefore the stormwater management plan should also identify areas potentially susceptible to these issues and include recommendations to address possible concerns.

3. STORMWATER DISPOSAL TO GROUND

Where appropriate site conditions are present, it may be desirable to discharge runoff to ground to reduce downstream impacts and to enhance groundwater recharge. These issues will require an appropriate assessment and report prepared by a qualified professional which addresses the following:

3.1. The presence of hydrogeologically sensitive areas (HSAs) which commonly have the following characteristics (see Appendix C2 for guidance):

- Ground conditions with limited soil infiltration capacity
- Poorly draining and/or low permeability soils
- Shallow bedrock
- Shallow groundwater
- Known or suspected groundwater discharge areas (springs, seepage zones, wet areas)

Additional information regarding HSAs and site groundwater characteristics is provided in Appendix C2.

3.2. Hydrogeological data acquisition and analysis to support minor and major event designs.
3.3. Impact(s) assessment on local, adjacent and down slope properties resulting from minor and major event stormwater disposal to ground.
3.4. The potential effects from combined stormwater and residential irrigation on local, adjacent and down slope properties.
3.5. Potential impacts of site grading and fill emplacement on stormwater management.
3.6. An investigation of infiltration capacities and recommended design parameters.
3.7. An investigation of on-site and down slope soil/fill material stability under proposed infiltration conditions.
3.8. Recommendations to limit stormwater infiltration, where HSAs are present.
3.9. Recommended works and construction methods to prevent or mitigate potential in-ground stormwater disposal issues.

4. BONDING

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

5. ASSURANCES & LETTER OF NOTICE

The professional geotechnical engineer or geoscientist shall provide in writing the following specific assurances to the City:

5.1. The professional has carried out all necessary surface and subsurface investigations that the professional considers necessary to provide the review and design recommendations.
5.2. 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 does not compromise nor is likely to reduce the stability of the soil on-site or soil on lands which are adjacent or nearby, 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.

5.3. In the professional geotechnical engineer's opinion, in the event of any land slip, land slide, rock fall, mud flow, debris flow, debris torrent, erosion, slumping, settling 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.
5.4. 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.

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

5.5. Each practicing professional acting behalf of an owner, developer or contractor shall notify the City upon being commissioned by their client.
5.6. Each stormwater report provided to the City shall be accompanied by a letter from the owner/developer advising the City 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 geotechnical, hydrogeological and/or stormwater investigations conducted on the property or nearby lands.
5.7. The professional shall notify the City if he/she becomes aware of changes or new information which could affect the outcome of their geotechnical review.
5.8. 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.

6. 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.

7. 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 land owners. The covenant will incorporate provisions included in the geotechnical 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 approved professional.

8. PERFORMANCE ASSURANCE (BONDING OR LETTER OF CREDIT)

It is anticipated the works recommended by the professional will be adhered to. If the City has concerns – with respect to site grading 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 professional report(s) pertaining to that construction.

9. 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.