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Commentary on "Single-Family Residential Lot Rainwater Management Guidelines"

This commentary was developed to address common questions and misconceptions from designers when interpreting and applying the guidelines to their stormwater management plan design. The commentary does not take the place of the guidelines or bylaws, where any inconsistencies exist between the documents, the bylaw and guideline take precedence.

The commentary generally follows the numbering format of the guideline, where possible.

Terms

Controlled: includes areas of the lot where rainfall that lands within it is collected and released from the site at a determined rate (typically through the detention facility and orifice). Examples include roof areas that are connected to a detention facility, driveways that are graded into trench drains and are connected to a detention facility, or pervious paving that directs non-infiltrated flow into a detention facility typically using a lawn basin with sump.

Uncontrolled: includes areas of the lot where rainfall that lands within it are unregulated and disperse from the lot at uncontrolled flow rates (not through the detention facility). Examples include landscape areas such as lawns or gardens with no connectivity to the detention facility, driveways that drain runoff to landscape areas with no connectivity to the detention facility, or any areas connected to the municipal storm system downstream of the detention facility.

Detention Storage: surface runoff volume that is captured and released at a controlled rate to the municipal storm system.

Volumetric Capture: rainfall volume that is collected and retained onsite through infiltration or re-use. Under special circumstances (refer to Section 5.1: Slow Release Capture Alternative) this volume may be released at a very slow controlled rate to the municipal system.

3.1 Detention Storage Criteria

Existing condition runoff rate for the site is calculated using the 10-year 6-hour peak flow rate. The methodology in the guidelines does not use a time of concentration for the site to determine rainfall intensity, instead a time of concentration for the downstream municipal infrastructure is used, and estimated at 6-hours, hence the use of the 10-year 6-hour peak flow for calculations.

The volume of the detention storage tank does not represent the “total storage volume” for the site. The volumetric capture volume cannot be subtracted from the detention storage volume.

3.2 Volume Capture Criteria

The pool area is considered an impermeable surface so should be included in the increase in impervious area for the purpose of calculating capture volume. However, since the pool runoff coefficient should be zero since the overflow is directed to the sanitary system, any rain failing on the pool would have no contribution the stormwater system for detention purposes.

4.1 Rational Method

Equation 1 should be used to calculate the runoff in each 5-minute time step for five storm events:

- Pre-development 6-hour to determine max allowable runoff rate (subject to the 31.8 L/s/Ha criterion included in Section 4.3)
- Post-development 1, 2, 4 and 6-hour to determine excess flow due to development in each storm event and to aid in designing the detention storage volume

This is explained further in Section 4.3.

4.3 Determination of Detention Storage Volume Required

The clause “calculated orifice flow should be within 10% of the target release rate for the site” is not intended to allow 10% to be added to the allowable release rate, but rather to allow a slight variance in the release rate where circumstances may necessitate it.

4.6 Pumping for Downslope Lots

In cases were a gravity system from the detention tank to the municipal storm service is not possible, the perimeter drain inlet may tie into the pump sump above the maximum water level to minimize the risk of backflow.

4.7 Perimeter Drains

It is reiterated in this commentary that the sizing for the detention storage facility (and infiltration facility) does not incorporate flow from the foundation perimeter drains (or other groundwater collection systems such as for retaining walls). Perimeter drains shall not be connected to either facility. The surface collection system shall not be connected to the building footing drain system upstream of the storage facility as this could cause backflow into the perimeter drain system from the surface collection system. Flows from perimeter drains should be connected to the lot's storm service line downstream of the storage facility and flow control manhole.

5.1 Sizing Methods to Meet Volumetric Capture Criteria

A combination of measures for achieving the required capture volume can be used on a site, some examples are provided in Section 5.1. The calculations should clearly identify the capture volume for each measured used for the site, as well as the runoff volume used for sizing the detention storage. Capture volumes shall be added to demonstrate that the minimum required volume has been achieved.

Please direct any questions to about stormwater management plans to the District's Land Development Engineer.