

MONITORING AND REPORTING GUIDELINES FOR STORMWATER SOURCE CONTROLS

Document History

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Introduction

The City of North Vancouver requires developments with floor space ratio (FSR) 1.0 or greater to provide performance monitoring of stormwater source controls provided in new developments as part of Stormwater Management Plans (SWMPs). This requirement is to ensure that source controls are functioning as designed and provide the benefits intended. Monitoring also provides important information regarding design that will ideally improve design and design efficiencies in the future.

Flow Monitoring Approach and Apparatus

Stormwater source controls generally relate to volume reduction or attenuation and water quality treatment of stormwater. For developments that require performance monitoring, the general criteria for SWMP includes:

- source controls shall consume (not release to the storm sewer) 56 mm of rain over a 24 hour period from all impervious building surfaces, unless agreed upon by the City.
- all other impervious surfaces (e.g. concrete) shall be directed to pervious areas or a source control for treatment and attenuation
- all roadways reporting to catchbasins at the property edge shall be treated and attenuated or consumed with source controls potentially located in the City right-of-way.

The City will review all SWMPs and provide monitoring criteria for each development or part thereof. Typically the monitoring will be proposed to capture the volume reduction from impervious building surfaces and water quality treatment from roadways.

Volumetric monitoring is dependent on the nature of the source control design, but would typically be captured in a flow monitoring chamber (e.g. manhole), using a controlled section (e.g. vee notch weir) and water elevation sensor. In some cases level monitoring in soil cells may best indicate the volume of water stored, the volume of water infiltrated and the volume of water overflowing to the stormsewer.

Water quality sampling would typically be captured during a storm event and would include a pre-treatment sample (e.g. from the gutter or catchbasin) and a post treatment sample (e.g. from an inspection chamber at the downstream end (or overflow) of the treatment facility).

The City will identify locations for inspection chambers if the designs do not already include them. Generally there should be an ability to monitoring water level at the upstream and downstream end of any below grade source control (e.g. soil cells), but for smaller facilities such as rain gardens, one inspection chamber may only be necessary. Inspection chambers shall be provided even if monitoring is not required at that location during the monitoring period.

Monitoring of water level shall be conducted using a pressure transducer and data logging sensor. These are simple and robust instruments that can be placed in submerged locations and downloaded manually at regular intervals. The City recommends the use of the Hobo U20 Level Logger as a reliable and cost competitive instrument. Most level loggers can be quickly downloaded with a simple optical data shuttle in less than one minute which is a very effective approach for field data collection. Following the

monitoring period, the level loggers will become the property of the City for ongoing monitoring as needed.

Reporting and Submission Requirements

Source control monitoring shall be for the duration of the off-site works maintenance period (typically two years), and deposits shall not be returned prior to completion of the monitoring for the period required.

The performance monitoring reporting shall include the following:

- Interim reporting at the end of the first calendar year (or following the first 3 months, whichever is longer).
- Final reporting at the end of the period.

Reporting shall include:

- A short letter report outlining the reporting program, results, and conclusions regarding the effectiveness of the source controls as compared to the design criteria.
- The report shall include any tables or graphs of data to support the conclusions.
- The report should include a calibration check of any flow monitoring weir or outlet (e.g. confirm the stage discharge relationship). This could be done with controlled volume measurements (e.g. bucket gauging).
- The report shall be accompanied by a copy of the monitoring data (e.g. spreadsheet).
- The report may and should be submitted digitally (e.g. emailed or FTP as required).

The report should generally quantify the stormwater generated by a site based on the impervious areas, the runoff occurring from the site, and stormwater consumed by source controls. This should be reported generally on a daily or hourly scale, and investigated in more detail for storms that best represent the design criteria. Should the submission be incomplete, the monitoring may not be accepted.

The monitoring data should typically be:

- Level or flow data at 5 minute increments (based on level logger this would require downloads every 60 to 75 days based on memory)
- Water quality shall include general physical, metals, and nutrients associated with normal water quality measure and as outlined in the Metro Vancouver "Monitoring and Adaptive Management Framework" document. Number of samples will be based on the comments from the City during the review period.
- Rainfall data and barometric compensation data will be available from the City from the City's climate station (5 minute data) for preparation of the report.