Little Campbell River
Integrated Stormwater Scoping Study
VOLUME 1

Final Report
March 2011
EXECUTIVE SUMMARY
The City of Surrey (COS) and the Township of Langley (TOL) initiated this study to guide the development of Integrated Stormwater Management Plans (ISMPs) for subwatersheds in the Little Campbell River (LCR) watershed. ISMPs are component of Metro Vancouver's Liquid Waste Management Plan (LWMP) that describe stormwater management strategies to balance future growth and environmental protection. They are typically undertaken in urbanized or developing watersheds that are ideally between 500 and 750 ha in size. Because of the large size of the Little Campbell River watershed (7,580 ha), this study developed an approach to proceed with ISMPs in priority subwatersheds. Several areas including Grandview Heights, Fernridge, Campbell Heights, and Douglas are expected to be developed over the next several years which will increase the effects on urbanization on watershed health.

WATERSHED CHARACTERISTICS OF LITTLE CAMPBELL RIVER WATERSHED
The Little Campbell River watershed is largely situated within the Township of Langley and the City of Surrey with portions within the City of White Rock, the State of Washington, and the Semiahmoo First Nation Reserve No. 1. Existing land use in the watershed is predominantly agricultural with several urban areas. Additional future urban development is expected largely in the Ferndale, Campbell Heights, Douglas, and Grandview Heights areas.

The LCR has significant environmental values including:

- **Diverse and abundant fish populations:** It is one of the most important salmon rivers in the Lower Mainland relative to its size, and contains productive, low-gradient fish habitat.

- **Poor to fair riparian corridor integrity:** The mainstem riparian corridor remains approximately 40% forested; much of the riparian corridor in the LCR has been fragmented by road construction and land clearing for agricultural or rural development.

- **Habitat for species at risk:** The mid-basin wetland and associated riparian areas in Campbell Valley Regional Park and the marine foreshore on Semiahmoo Bay provide habitat for Oregon Forestsnail, Pacific Water Shrew, Red-legged Frog, Vancouver Island beggarticks, and other species.

- **Moderate stream health:** Indicators of stream health in the LCR mainstem range from fair to poor and show improving health with distance upstream. The Fergus Creek sites fall within the very poor category.

- **Water quality problems:** MOE has previously conducted an extensive water quality study due to closures of Boundary Bay foreshore problems. The priority water quality issues are fecal coliforms, low dissolved oxygen and high summer water temperature, and turbidity from construction and bank erosion.
SCOPE OF THIS STUDY

Due to the large size of LCR, a typical ISMP process would be prohibitively extensive in data collection, analysis and development of mitigative alternatives and plans. Therefore this scoping collected basic overview information and framed the watershed and subwatershed issues to develop an approach to ISMP planning. Overview inventories and assessments were undertaken for the following:

- existing and future land use;
- lumped hydrology modelling using XP-SWMM;
- mainstem drainage structures, erosion and hydraulic modelling using MIKE 11;
- water quality and benthic invertebrates;
- fish and fish habitats; and
- biodiversity.

The findings are summarized in this report. In general, bank erosion was found throughout the inventoried portion of the LCR mainstem. Some erosion appeared to be natural but at many locations the causes of erosion included riparian deforestation, livestock access, and high flows from development. Of the 23 LCR mainstem crossings assessed, 12 appear to be undersized for and may be overtopped during the existing land use 200-year flow.

APPROACH TO INTEGRATED STORMWATER MANAGEMENT PLANNING IN THE LCR

The LCR watershed was discretized into more manageable ISMP areas and prioritized for further study based on the extent and timing of future development as follows:

1. Ferrridge / Campbell Heights ISMP - 872 ha;
2. Sam Hill / Twin Creeks ISMP – 1,028 ha;
3. Kuhn Creek ISMP – 931 ha;
4. Jacobsen / Highland Creeks ISMP – 1,090 ha – ISMP;
5. Upper Little Campbell River Agricultural Study – 2,415 ha; and

Issues specific to each ISMP area were identified and information to guide the future studies were outlined.

Because development will continue in the watershed while the ISMPs are being undertaken, interim criteria are proposed to strive to maintain watershed health. The municipalities should ensure all future development and redevelopment have designs to meet the applicable municipal criteria and bylaws for flood protection, water quality treatment during and post-construction activities, rate control for environmental, erosion and flood protection, and riparian setbacks. It would also be beneficial to implement an interim stormwater volume reduction criterion that requires source controls to capture on-site the runoff from a 25 mm (50% of 2-year rainfall event). This criterion would provide guidance to development proceeding before the completion of the ISMPs.
Development of typical examples and standards of source controls to achieve the above mentioned criterion is also recommended to expedite implementation and construction of source controls. Once each ISMP is completed, the generic criterion and standards may be replaced by ISMP-specific criteria and standards.

Proposed studies within the LCR system are estimated to cost approximately $1 million, detailed as follows:

<table>
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<tr>
<th>Study</th>
<th>Budget $</th>
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<tbody>
<tr>
<td>1. Interim Criteria Bylaw and Source Control Typical Examples and Standards</td>
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</tr>
<tr>
<td>2. Fernridge / Campbell Heights ISMP</td>
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<tr>
<td>3. Sam Hill / Twin Creeks ISMP</td>
<td>150,000</td>
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<tr>
<td>4. Kuhn Creek ISMP</td>
<td>150,000</td>
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<tr>
<td>5. Jacobsen / Highland Creek ISMP</td>
<td>200,000</td>
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<tr>
<td>6. Upper Little Campbell River Agricultural Study</td>
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<td>7. McNally Creek ISMP Lite</td>
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<tr>
<td>8. Recalibrate Main Stem Model and Update Flood Levels</td>
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<td><strong>Total</strong></td>
<td><strong>1,000,000</strong></td>
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Report recommendations also include the development and implementation of a long-term performance monitoring program for each ISMP area and the Little Campbell River watershed as a whole. Because integrated stormwater management planning is an evolving approach to a complex natural system, an adaptive management program is suggested to provide opportunities to revisit ISMP outcomes and recommendations to assess what is working and what is not. The future management of LCR watershed will require a process to modify and optimize mitigative approaches and measures as needed and adjust source control and/or BMP sizing and/or designs if monitoring results show trend of decreasing watershed health.