ENVIRONMENT COMMITTEE

HIS WORSHIP, THE MAYOR
AND COUNCILLORS

SUBJECT: DRAFT EAGLE CREEK INTEGRATED STORMWATER MANAGEMENT PLAN

RECOMMENDATIONS:

1. THAT Council receive the draft Integrated Stormwater Management Plan (ISMP) for Eagle Creek.

2. THAT Council approve, in principle, the vision, strategies and the recommended plan for Eagle Creek watershed.

3. THAT Council authorize staff to finalize the reports and incorporate the recommended action items, where appropriate, into the City's infrastructure and community plan development process.

4. THAT Council forward a copy of this report to all members of the stakeholder consultation group who provided input to development of the proposed plan.

REPORT

The Environment Committee, at its meeting held on 2014 June 10, received and adopted the *attached* report providing an overview of the principles, elements and recommendations of the draft integrated stormwater management plan for Eagle Creek watershed in North Burnaby.

Respectfully submitted,

Councillor D. Johnston
Chair

Councillor A. Kang
Vice Chair

Councillor N. Volkow
Member

Copied to:	City Manager Director Engineering Director Planning & Building Director Parks, Recr. & Cult. Services Chief Building Inspector

City of Burnaby

Item .....
Meeting ..... 2014 June 11

COMMITTEE REPORT

TO: CHAIR AND MEMBERS ENVIRONMENT COMMITTEE **DATE:** 2014 June 05

FROM: DIRECTOR ENGINEERING **FILE:** 31000 – 40

SUBJECT: **DRAFT EAGLE CREEK INTEGRATED STORMWATER MANAGEMENT PLAN**

PURPOSE: To provide the Committee and Council with an overview of the principles, elements and recommendations of the draft integrated stormwater management plan for Eagle Creek watershed in North Burnaby.

RECOMMENDATIONS:

1. **THAT** the Committee recommend that Council:

   a. Receive the draft Integrated Stormwater Management Plan (ISMP) for Eagle Creek;

   b. Approve, in principle, the vision, strategies and the recommended plan for Eagle Creek watershed;

   c. Authorize staff to finalize the reports and incorporate the recommended action items, where appropriate, into the City's infrastructure and community plan development process; and

   d. Forward a copy of this report to all members of the stakeholder consultation group who provided input to development of the proposed plan.

REPORT

1.0 BACKGROUND

Based on the commitments made under the municipal component of the regional Integrated Liquid Waste and Resource Management Plan (ILWRMP), the City of Burnaby (the City) is developing Integrated Stormwater Management Plans (ISMPs) for all its watersheds. Throughout the last decade, the City has made significant progress towards achieving better storm water management and creating a healthier environment for all. ISMPs have been developed for the Byrne Creek, Kaymar Creek, Still Creek, Stoney Creek, and Brunette watersheds, and many initiatives and action plans have since been advanced and incorporated in the development of land use and engineering infrastructure plans.

The ISMP process strives to preserve watershed health as a whole, while meeting community needs as development and redevelopment occurs. This report provides the Committee and Council with an overview of the principles, elements and recommendations of the draft integrated stormwater management plan for Eagle Creek watershed in North Burnaby.

2.0 DRAFT EAGLE CREEK ISMP OVERVIEW

The Eagle Creek watershed is approximately 585 hectares in size and the creek and tributaries have a cumulative length of 14.5 km (FIGURE 1). The watershed is delineated to the north by Burnaby Mountain (south west region), south by Burnaby Lake, east by Underhill Avenue and west by Phillips Avenue. Elevation above sea level in the watershed ranges from 327 m on Burnaby Mountain to 12.4 m at Burnaby Lake. The watershed length from north to south is approximately 4.7 km, with an average slope of 7%. Eagle Creek and its tributaries follow a north to south drainage pattern with culvert crossings at various roads, including Burnaby Mountain Highway, Greystone Drive, Broadway Avenue, Lougheed Highway, Government Road, Winston Street and Piper Avenue.

The headwaters/upper reaches include parkland, a golf course, the Kinder Morgan Canada – Burnaby Terminal and Simon Fraser University lands. The lower reaches are primarily residential land use. The creek provides valuable fish habitat for coho, trout and other species and retains a fairly natural state.

The major soil groups (63% of watershed area) include Vashon Drift and Capilano Sediments, which are considered to be well drained soils. The slopes of the Burnaby Mountain exhibit Tertiary Bedrock, which are poorly drained and occupy 18% of the area. The Kinder Morgan Canada Terminal area located in the upper watershed is primarily composed of well drained Capilano Sediments (16% watershed area). Other minor soil groups are bog and channel fill with sandy and clay loam soils (4% watershed area).

The City initiated the ISMP for the Eagle Creek watershed (see *attached* figures) in 2012, led by the City, and informed by an interdisciplinary consultant team and input from stakeholders. The draft Eagle Creek ISMP sets out how the resources within the watershed should be managed to balance land development, stormwater management with environmental protection, preservation and enhancement. Green space, stream corridors and economic considerations are also integrated into the study to provide a holistic and integrated outlook to ensure the long term health and success of this watershed.

2.1 Watershed Issues

Typical of many urban watersheds, Eagle Creek has undergone significant changes over the last sixty years as natural vegetation and soils have been cleared and drainage infrastructure has been installed to support the construction of buildings and roads. The resulting changes in stream water quality, watershed hydrology, in-stream and riparian habitat are apparent within the Eagle Creek watershed. Urban watersheds undergo profound changes to natural watershed conditions by altering the terrain, modifying the vegetation and soil characteristics, and introducing pavement, buildings, drainage, and flood control infrastructure. Hydrologic and geomorphic impacts are closely associated with an increase of impervious area resulting from urban development. These changes have a profound impact on the health of the stream.

Through the ISMP process the main issues within the watershed are identified and described in further detail below:

1. **Watershed Hydrology:** The hydrology of the Eagle Creek watershed exhibits characteristics of an urbanized basin with extreme high and low flows. The flashy high flows can create issues in the watershed such as bank erosion and instability, increased sediment load in the stream and infilling. Low flows in the summer contribute to higher water temperatures and lower dissolved oxygen levels which can be significant impediments to fisheries resources. There have not been any recorded incidences of flooding due to drainage capacity constraints within the watershed. However, there are some storm sewers and culverts within the watershed that do not have sufficient capacity to convey design storm events and may pose a risk of flooding in the future.

2. **Stream Water Quality:** A water quality and benthic invertebrate sampling program was conducted in conjunction with this ISMP between August-November 2012. The sampling program results demonstrate that in addition to a large volume of sediment transported through the Eagle Creek system during high flow conditions, flushing of iron oxide and periphyton growth was also noted to have occurred. Iron oxide was noted to be present in large quantities downstream of the Kinder Morgan site. Furthermore, some dissolved and total metals were identified to exceed the CCME, Brunette River Objectives and/or BC Water Quality Guidelines.

3. Sedimentation: Burnaby Lake is prone to sedimentation which has significant impacts on aquatic species and recreational facilities within Burnaby Lake. During the water quality sampling program, incidences of sediment transport were identified through Eagle Creek. There are likely two main sources of the sediment: stormwater run-off from adjacent development; and erosion within the creek channel. A recent separate study by Thurber Engineering identified 29 erosion sites along the various tributaries of Eagle Creek.

4. **In-stream Habitat:** Several sections of the creek do not have the natural in-stream habitat that helps support aquatic species. The stream is confined and impacted by residential and industrial development with portions of the stream being channelized or culverted and many areas lacking adequate riparian vegetation,

6. **Riparian Corridor:** Eagle Creek passes through a variety of public parks and residential neighbourhoods where there is little to no vegetated corridor between the creek and residential yards, playfields and paths. These riparian corridors are critical for fish by providing shade and food and they also help stabilize banks, filter stormwater run-off, discourage people and animals from entering the creek and provide terrestrial habitat.

2.2 Watershed Vision and Goals

A number of workshops were held with stakeholders in developing the vision and goals for the Eagle Creek watershed. Stakeholders who provided input included Fisheries & Oceans Canada, Metro Vancouver, Simon Fraser University, Simon Fraser University Community Trust, Community Streamkeeper groups, Kinder Morgan, residents and City staff from various departments. Based on these discussions, the following vision and goals were identified for the Eagle Creek Watershed:

Vision

The vision statement for the watershed was articulated as:

"*That the Eagle Creek Watershed provides environmental, recreational and aesthetic value to the region; is actively supported by local residents, businesses and institutions; and can be managed in a financially sustainable manner.*"

A short-form version of the vision statement was identified as easier to communicate:

"*A healthy stream from Burnaby Mountain to Burnaby Lake*"

Goals

Goal 1: Achieve a more natural hydrological cycle in the watershed
Goal 2: Provide and enhance a continuous green corridor from Burnaby Mountain to Burnaby Lake that allows for wildlife passage and controlled human access
Goal 3: Protect and enhance the creek and its riparian corridors
Goal 4: Inform and engage the public regarding the importance of watershed health
Goal 5: Manage erosion and sediment transport within the creek to prevent negative impacts to fisheries, property and Burnaby Lake
Goal 6: Manage the watershed in a financially sustainable manner
Goal 7: Improve aquatic and terrestrial habitat
Goal 8: Maintain and enhance the quality of the creek water in order to support a healthy and robust aquatic ecosystem
Goal 9: Promote environmentally sensitive recreational opportunities that foster education and stewardship

2.3 Proposed Strategies for Eagle Creek

The watershed issues identified within Eagle Creek were layered with the stakeholder input with the objective being to develop strategies and an implementation plan (Plan) to achieve the vision and goals identified above. The Plan will support the City's vision while considering aspects from Metro Vancouver's ILWRMP, as well as provincial and federal government regulations for watershed restoration.

The draft Eagle Creek ISMP includes many possible strategies which will be further assessed by staff with respect to other corporate priorities. The elements that are of highest priority and meeting the financial and infrastructure requirements will be included in the future City Financial Plan discussion process. The implementation of the Eagle Creek ISMP includes short-term, medium-term, and long-term initiatives identified for both Metro Vancouver and the City of Burnaby. The draft Eagle Creek ISMP strives to resolve the identified issues through the following strategies to facilitate the achievement of the watershed goals:

1. **Update of Stormwater Management Criteria**

   This action is echoed in regional Integrated Liquid Waste and Resource Management Plan (ILWRMP) action 1.1.20 requiring municipal on-site rainwater management bylaws and policies to meet criteria established in the ISMPs.

   The primary method of attaining the watershed goal of mitigating negative hydrologic impacts of future developments and achieving a "net-gain" of watershed ecological health is to manage rainwater through the use of on-site source controls to reduce the volume of runoff leaving the site as well as improving the water quality that is discharged to the receiving environment.

   The current Total Stormwater Management Policy, adopted in 2003, applies varying criteria to developments based upon classification of watercourses to which stormwater

runoff is conveyed. The existing criterion addresses stormwater management from a quantity and flow perspective, but does not specifically addresses water quality.

A separate detailed report outlining *Stormwater Management Criteria* and *Rainwater Source Controls* will be brought further at a later date detailing the requirements to update bylaws and policies for each land use designation and the resource allocation necessary to implement the stormwater management criteria. Rainwater source control requirements as well as approval and review procedures will be developed in collaboration with the Planning and Building Department.

2. **Creation of a Stormwater Monitoring Program**

This action is required to address the BC Ministry of Environment (MOE) Condition 7 of the ILWRMP. This Condition states that municipalities are required to develop a coordinated program to monitor stormwater, and to assess and report the implementation and effectiveness of ISMPs. In addition to this program other water quality actions identified include:

- Updating bylaws to require individual spill prevention and response plans for all commercial and industrial sites;
- Tracking commercial/industrial chemicals/operations for spill prevention compliance; and
- Having continued monitoring of water quality to address point and non-point sources of contamination and fish kills.

While the City currently conducts water quality monitoring to address specific issues, the Stormwater Monitoring Program is a comprehensive approach to reflect changes to stormwater due to land use changes and will allow application of adaptive management principles. Engineering staff are currently developing a framework for a Stormwater Monitoring Program for watersheds that includes water quantity and quality monitoring.

3. **Capital Works Program and Environmental Enhancement Opportunities**

The existing condition of the drainage system and the ecological health of the watershed were assessed allowing the development of a robust and complete capital works program.

Metro Vancouver plays a significant role in the monitoring, protection and enhancement of Eagle Creek south of Broadway Avenue due to the proximity of the Metro Vancouver Sanitary Trunk Sewer along the creek corridor and the presence of Burnaby Lake Regional Park. The creek, north of Broadway is the responsibility of the City of Burnaby.

For Burnaby's portion of the capital projects, a number of engineering capital works are proposed to address capacity constraints within the drainage system, and reduce the amount of sediment entering Eagle Creek. In particular the proposed projects for include:

- Upsize the storm sewer on Aubrey Street;
- Upsize or redirect the storm sewer between Hunter Street and Government Road;
- Construct a stormwater detention pond upstream of the Greystone Shopping Plaza;
- Upsize the storm sewer on Enterprise Street; and
- Install an engineered sediment trap (or oil grit separator) upstream of the storm outfall in Charles Rummel Park.

Priority riparian and in-stream enhancement projects have also been identified including areas to reduce channelization, daylighting streams where appropriate and constructing instream complexing and off-channel habitats. These projects could be undertaken when compensation works are required, when development opportunities arise or as part of the capital works program. Staff will prioritize and integrate the projects identified in the draft Eagle Creek ISMP with the projects identified in other ISMPs currently in process as part of the overall capital works program as appropriate. These projects will be brought forward to Council as part of the city-wide capital works program for watersheds.

4. Watershed Operations and Maintenance

An introduction of a comprehensive program for erosion and sediment management is recommended to optimize efforts and retain natural stream integrity. In 2013 staff, as part of other requirements, completed an inventory of erosion 'sites of interest' which will be used as a first step in developing this program.
The Engineering Department regularly sweeps roadways and cleans catch basins. It is recommended that this roadway maintenance program continues as it is an effective means to reducing the amount of sediment and associated pollutants from entering Eagle Creek.

The City does not currently inspect culverts under its responsibility within Eagle Creek. The ISMP recommends that the culverts within Eagle Creek, from Broadway north are added into the culvert inspection program.

5. Monitoring and Reporting Requirements

ISMP performance will be monitored with the Stormwater Monitoring Program outlined above and stormwater approaches will be adapted as needed to meet the watershed goal of net gain in ecological health. The City will continue to report to the BC Ministry of the Environment on ISMP implementation progress as required by the ILWMP. The draft Eagle Creek ISMP will be re-assessed in twelve years as required by the ILWRMP.

6. Agency Collaboration

There are many groups who are actively involved in the management of the watershed; including:

- Simon Fraser University;
- UniverCity Trust;
- City of Burnaby Engineering;
- City of Burnaby Parks;
- Metro Vancouver Engineering;
- Metro Vancouver Parks; and
- Eagle Creek Streamkeepers.

To ensure that everyone's efforts within the watershed are coordinated and synergies are realized, an annual meeting with the groups listed above should be organized by the City of Burnaby to connect, coordinate and collaborate on initiatives.

7. Public Education and Engagement

As Eagle Creek flows through several public parks and the "backyards" of many residents and businesses; community stewardship will be an important element of realizing the vision for the watershed. Educating and the engaging the public on stream stewardship will help:

- Reduce the number of incidents of harmful behaviour such as littering, allowing dogs to enter and damage riparian zones, removing riparian vegetation adjacent to one's residence, discharging harmful substances into street drains etc.;
- Encourage more "eyes" on the creek to monitor the health of the watershed and to watch for harmful behaviours;
- Increase participation in watershed restoration projects such as riparian planting, storm drain marking, fish counts etc.

The following initiatives are recommended to further educate and engage the public:

- Distribute education material to all residents adjacent to the creek, particularly with respect to the maintenance of riparian vegetation;
- Develop an Eagle Creek greenway that strengthens the public's connection to the creek and offers recreational opportunities; and
- Install signage that increases public awareness of Eagle Creek as well as signs that encourage dog-owners to keep their dogs out of the creek and riparian zones.

8. Trans Mountain Expansion Project

The proposed Trans Mountain Expansion Project, if approved by the National Energy Board, will result in doubling of the oil storage tanks from the current 13 tanks to 26 tanks. Furthermore there will be a loss of vegetated area within the Terminal including piping or redirection of existing open tributaries traversing the Terminal to accommodate the installation of additional tanks. The implications of these activities on downstream channel(s) will have to be evaluated.

3.0 CONCLUSION

Since 2012, Burnaby and community stakeholders have been working together to develop an ISMP for the Eagle Creek watershed that will provide a long term vision for the watershed and its stream system integrating the drainage, environmental and recreational values.

The draft Eagle Creek ISMP contains many possible action items which will be further assessed with respect to other corporate priorities. Subject to Council approval of the draft Plan, the action items identified in the Plan will be prioritized and included in the City's financial and infrastructure discussion and Council approval process in the future.

Leon A. Gous, P. Eng., MBA
DIRECTOR ENGINEERING

KC/DD/br

Attachment

Copied: Director of Planning and Building
Director Parks, Recreation and Cultural Services
Chief Building Inspector
City Clerk

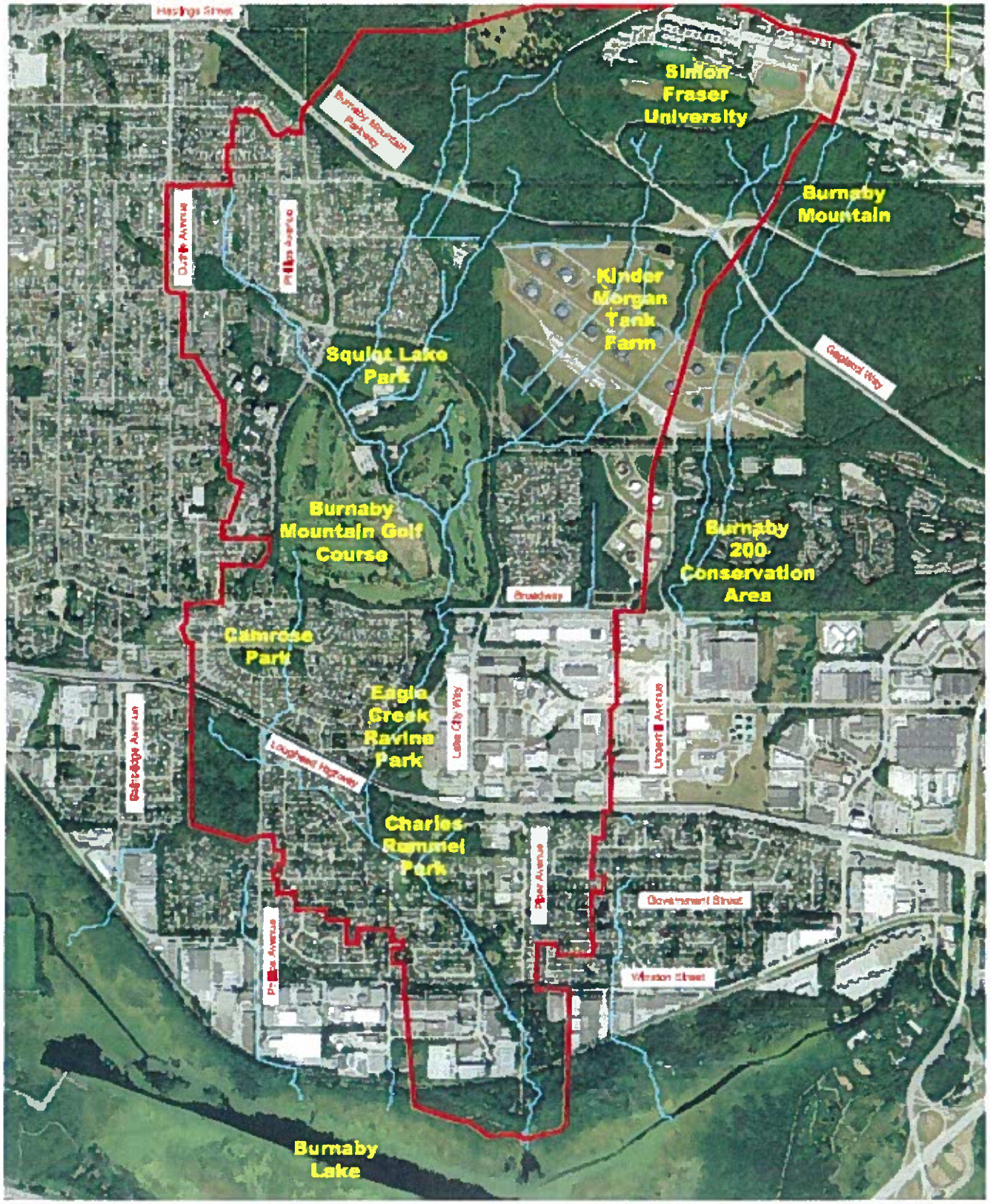

Figure 1 - Eagle Creek Watershed