COMMITTEE OF THE WHOLE – JANUARY 17, 2012

BLACK CREEK STORMWATER OPTIMIZATION PLAN
CLASS ENVIRONMENTAL ASSESSMENT STUDY
NOTICE OF STUDY COMPLETION
WARDS 1, 3 & 4

Recommendation

The Commissioner of Engineering and Public Works recommends that Council approve the Draft Black Creek Stormwater Optimization Plan in principle, and direct staff to issue a notice of study completion following finalization of the study report.

Contribution to Sustainability

In considering the objectives of the City's Community Sustainability and Environmental Master Plan (Green Directions Vaughan), the preferred optimization strategy for the Black Creek subwatershed will assist in:

- Supporting enhanced standards of stormwater management within the City and working with others to care for Vaughan's watersheds
- Achieving sustainable growth and development
- Creating a City with sustainable built form
- Sharing sustainable best practices and ideas between and among municipal staff and the community

Implementing the recommended infrastructure improvements will reduce flooding risk to adjacent structures, roads and municipal infrastructure, and enhance water quality and erosion protection.

Economic Impact

The Black Creek Optimization Plan recommends a series of drainage improvements to reduce the flooding risk, and to progress water quality and erosion control in the watershed. The cost of these improvements is valued at approximately $50 million as detailed in this report. The majority of these works are considered growth related and the implementation of these is proposed to be funded through the enactment of Special Area Development Charge By-laws or City-wide Development Charges.

Certain components of the water quality and erosion control improvements are within existing developed areas of the watershed and may not be considered growth related. Accordingly, an appropriate source of capital funding for the non-growth component of the works will need to be identified. On February 3, 2009, Council directed staff to develop a funding and implementation strategy for the City's Storm Water Management Retrofit Program. A number of potential funding sources will be explored in developing this strategy including a stormwater management levy or utility rate, sewer rates, Provincial or Federal infrastructure funding or in-lieu payments. Similar funding sources can be considered for the non-growth components of the Black Creek Optimization Plan.

Prior to implementing the recommended Black Creek channel improvements along the east side of Jane Street, further environmental assessment is required to establish the preferred design alternative. The necessary funding to complete this additional study has been included in the approved 2011 Capital Budget Project No. DT-7058-11, with funding from City-Wide Development Charges. The terms of reference for this study have been drafted and the process to procure a multi-disciplined consulting team to complete the study will be initiated in early 2012.

Once implemented, the Black Creek improvements will incur the normal expense associated with annual operating, maintenance and life cycle costs. These costs will be further detailed in conjunction with capital funding requests for each component of the Plan.

Communications Plan

A comprehensive public consultation program to obtain input from all affected stakeholders was completed as part of the study. The main components undertaken include:

- Notice of study commencement
- Two public information forums
- Various individual stakeholder meetings with local landowners
- Notice of study completion (to be released early 2012)

All notification related to the study was directly mailed to affected stakeholders on the project mailing list, advertised in the newspapers and posted on the City website.

A final Notice of Study Completion will be issued in early 2012. Upon issuance of this notice, the final study report will be placed on public record for a 30-day review period in accordance with the requirements of the Municipal Class Environmental Assessment process.

Purpose

The purpose of this report is to highlight the conclusions and recommendations of the Black Creek Optimization study for Council's approval in principle so the Notice of Study Completion can be issued in accordance with the Municipal Class Environmental Assessment process.

Background - Analysis and Options

The Black Creek subwatershed is a tributary of the Humber River. The boundaries of the Black Creek subwatershed within the City of Vaughan encompass approximately 1,500 hectares as shown on Attachment No. 2.

The subwatershed includes the Vaughan Metropolitan Centre and Steeles West Secondary Plan areas. A comprehensive strategy to manage the flows in the Black Creek is vital to facilitate the planned development in the Vaughan Metropolitan Centre (VMC) and Steeles West Secondary Plan areas.

Development within the Black Creek subwatershed began in the 1960's and now the vast majority of the lands are urbanized. Some of the urbanization within the watershed occurred prior to the requirement for storm water management controls. Stream flows in the Black Creek subwatershed during intense storm event, in particular the August 19th, 2005 storm, have resulted in significant flooding, which identified the need for measures to improve the quality and manage the quantity of flows in the Black Creek.

In 2008 staff prepared the terms of reference for the Black Creek Optimization study in close consultation with the Toronto and Region Conservation Authority (TRCA).

The City retained the consulting engineering firm AECOM to undertake the study in accordance with Municipal Class Environmental Assessment process. The Black Creek Optimization Plan was completed in May 2011, and recommended a strategy to address the flooding, water quality, and erosion issues within the subwatershed. A detailed overview of the Black Creek Optimization Plan is provided in Attachment No. 1 to this report, however, the key findings and recommendations are outlined below.

FLOOD CONTROL NEEDS

The recommended flood control needs within the watershed are estimated to cost approximately $30 million as itemized in the table below.

ITEM	FLOODING CONTROL PROJECTS	COST (Millions)
1	Natural Channel Expansion - Highway 7 to Highway 407 *(Including berm work, restoration and landscaping)*	$10
2	Highway 7 Culvert Improvements	$12
3	Doughton Road Culvert Improvements	$4
4	Interchange Way Culvert Improvements	$4
	TOTAL	**$30 M**

WATER QUALITY NEEDS

The recommended water quality improvement needs include the retrofitting of five existing stormwater management ponds and the construction of five new ponds as development occurs within the watershed. The location of these stormwater management ponds are shown on Attachment No. 3 and 4 to this report. These water quality works are estimated to cost approximately $18 million as itemized in the table below.

ITEM	WATER QUALITY PROJECTS	COST (Millions)
1	Storm Water Management Pond Retrofits *(5 Ponds in total; including 3 ponds in VMC and 1 pond in OPA 620)*	$8
2	New Storm Water Management Ponds *(5 Ponds in total; including 1 pond in VMC and 2 ponds in OPA 620)*	$10
	TOTAL	**$18 M**

OTHER PROPOSED WORKS

Erosion along the existing creek bed and banks is widespread between Doughton Road and Steeles Avenue. This has resulted in slope instability in some areas. Accordingly, in-stream restoration work is being recommended at 18 existing erosion sites generally located between Peelar Road and Steeles Avenue as shown on Attachment No. 6. Restoration of these 18 erosion sites is estimated to cost approximately $2.0 million.

The Black Creek Optimization Plan also identifies minimum stormwater management criteria for new development to satisfy current environmental regulations, and best management and sustainability practices.

PROPOSED IMPLEMENTATION

Based on projected development trends and funding challenges, it is anticipated implementing the recommendations of the Black Creek Optimization Plan will take 10 to 20 years to complete.

The majority of the elements in the Plan are considered growth related so they will be funded through Development Charges as discussed above in the Economic Impact section of this report.

The key next steps in implementing the recommendations of the Black Creek Optimization Plan will include the following actions:

- Incorporate the Highway 7 Black Creek culvert replacement with the construction of the Bus Rapid Transitway H2-VMC project
- Undertake a Schedule "C" Class Environmental Assessment for the Black Creek channel improvements from the existing stormwater management pond located north of Highway 7 to Highway 407 including the culvert replacements
- Develop a funding strategy and establish the necessary Special Area Development Charge By-laws

Relationship to Vaughan Vision 2020 / Strategic Plan

In consideration of the strategic priorities related to Vaughan Vision 2020, the recommendations of this report will assist in:

- The pursuit of excellence in service delivery
- Enhancing and ensuring community safety, health and wellness
- Leading and promoting environmental and financial sustainability
- Demonstrating leadership and promoting effective governance
- Planning and managing growth, and economic vitality

Further, the recommendations of this report will assist in advancing the following specific Strategic Plan initiatives to:

- Implement the Vaughan Metropolitan Centre Secondary Plan
- Work with other levels of government to continue to support the expansion of Regional rapid transit initiatives
- Coordinate land use planning to support high capacity transit at strategic locations throughout the City
- Review the Engineering Department design criteria and strategy for storm drainage and stormwater management facilities to reflect climate changes and emerging legislation, and protection from significant flooding

This report is therefore consistent with the priorities previously set by Council.

Regional Implications

The Region of York and York Region Rapid Transit have participated throughout the duration of the study, providing input and comment as required to ensure its successful completion.

Staff will continue to work with both York Region and York Region Rapid Transit Corporation to facilitate the replacement of the Highway 7 Black Creek culvert in conjunction with the Highway 7 Bus Rapid Transit H2-VMC project.

Conclusion

The draft Black Creek Stormwater Optimization Plan has been completed and recommends a stormwater management strategy to address flooding, water quality, and erosion issues in the watershed. Preliminary estimates value the recommended improvements at approximately $50 million. Capital funding for the majority of these improvements will come from Development Charges. Capital funding for the non-growth components of the Plan will be addressed through the development of the funding and implementation strategy associated with the City's Storm Water Management Retrofit Program.

The approval in principle of the recommendations of the draft Black Creek Stormwater Optimization Plan will facilitate city building in both the Vaughan Metropolitan Centre and Steeles West development areas and will enable staff to take the next steps towards implementing the Plan.

Attachments

1. Executive Summary - Black Creek Stormwater Optimization Plan
2. Study Area - Black Creek Subwatershed Limits
3. Flood Control Improvements
4. Vaughan Metropolitan Centre Context Plan
5. Water Quality Improvements
6. Erosion Control/Restoration Sites

Report prepared by:

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Respectfully submitted,

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Commissioner of Engineering
And Public Works

Andrew Pearce, C.E.T.
Director of Development /
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Attachment No. 1

Executive Summary
Black Creek Stormwater Optimization Plan

The Black Creek subwatershed is a tributary of the Humber River. The creek's watershed limits within the City of Vaughan are generally located between Steeles Avenue and Major Mackenzie Drive, and between Keele Street to the east and Pine Valley Drive to the west as shown on Attachment No. 2. The northern most reach of the creek begins at Rutherford Road with secondary tributaries from the east and west converging just north of Steeles Avenue prior to traversing the Black Creek Pioneer Village lands within the City of Toronto. The portion of the Black Creek subwatershed within Vaughan encompasses approximately 1,500 hectares.

Varying degrees of stormwater management controls exist in the watershed

The vast majority of the lands within the Black Creek watershed are now urbanized. Some of the urbanization within the watershed occurred prior to the implementation of current storm water management controls and techniques. For example, the industrial lands south of Highway 7 and east of Jane Street developed during the 1970's when storm water management was focused on preventing flooding on a site specific basis. In the early 1980s, a portion of the creek was re-aligned and channelized in conjunction with development of the industrial area east of Highway 400 between Langstaff Road and Highway 7. Most recently development of the Vellore Village and Vellore Woods (Blocks 39 and 32 West respectively) residential neighbourhoods has occurred in addition to various commercial sites in the vicinity of Weston Road and Rutherford Road.

The flows in the Black Creek watershed during the intense storm event on August 19th, 2005 demonstrated the need to implement cost-effective retrofit and stream rehabilitation projects to improve the quality and quantity of flows in the Black Creek. In addition, the City of Toronto and the Toronto and Region Conservation Authority have expressed concerns about downstream flooding and channel erosion within the Black Creek watershed over the past decade.

The key stormwater management issues, constraints and opportunities within the study area are:

- A significant number of structures and municipal infrastructure is located within the regulatory floodplain, including portions of Highway 7 and Jane Street
- Considerable portions of the Black Creek channel and associated culverts provide insufficient capacity, particularly along Jane Street south of Highway 7, which is contributing to flooding
- Localized erosion exists at multiple locations within the Black Creek
- Water quality protection varies widely within the watershed

A Comprehensive Stormwater Management Strategy for the Black Creek is required

With additional development and re-development proposed in the Vaughan Metropolitan Centre (VMC) and Steeles West Secondary Plan areas, the need for a comprehensive assessment of the Black Creek stormwater management requirements and optimization opportunities was identified. In 2008, staff prepared the terms of reference for the Black Creek Optimization Plan study in close consultation with the Toronto and Region Conservation Authority (TRCA). The main purpose of the study was to identify a stormwater optimization strategy for the Black Creek that would address localized flooding, ongoing channel erosion and impaired water quality.

The study includes the following objectives:

- Characterize the existing environmental conditions by establishing the location, extent, significance and sensitivities of the existing natural features within the watershed
- Identify stormwater management retrofit measures that can be incorporated into existing developments
- Review and confirm suitable stormwater management strategies established for proposed development initiatives within the study area including the Vaughan Metropolitan Centre and the Steeles West Secondary Plan
- Evaluate a range of alternative solutions
- Incorporate emerging sustainable technologies
- Ensure all solutions achieve adequate protection for municipal infrastructure
- Satisfy regulatory requirements
- Satisfy the requirements of the Municipal Class Environmental Assessment master plan process

In 2008, the City retained the consulting engineering firm AECOM to undertake the study.

The Black Creek Optimization Plan

The Black Creek Optimization Plan was completed in May 2011. The recommended stormwater optimization plan consists of a combination of improvement measures to address flooding, water quality, and erosion issues. The preferred alternative for each element of the Plan was selected based on a review of the social, cultural and natural environmental impacts in accordance with Municipal Class Environmental Assessment process. Other factors considered were overall cost, implementation and compatibility with proposed development plans within the watershed. The preferred optimization strategy consists of improvements in the following three areas:

- Flood control
- Water quality
- Erosion control

The recommended preferred alternatives for each component of the Plan are detailed below.

Flood Control Improvements

The recommended flood control element of the Plan includes the reconstruction of approximately 900 metres of the existing Black Creek channel from the existing stormwater management facility just north of Highway 7 to Highway 407 as shown on Attachment No.3. This work will include the construction of a larger naturalized channel capable of conveying regional storm flows. The proposed top width of the channel will be approximately 30 metres at Highway 7 and gradually widens to 60 metres near Highway 407. The preferred design of the channel section will need to be finalized through a more detailed Class Environmental Assessment, which will be carried out in 2012.

The new channel will be designed to contain and safely convey regional flows which will result in a significant reduction in the existing floodplain. A reduced floodplain will free up land within the Vaughan Metropolitan Centre (VMC) for redevelopment as illustrated on Attachment No. 3. This concept has been incorporated into the VMC Secondary Plan, and envisioned to be a key environmental corridor and community focal point within the VMC as shown on Attachment 4.

Together with the channel improvements, the existing roadway creek crossings at Highway 7 and Doughton Road will need to be replaced and enlarged to convey the expected flows. In addition, the VMC Plan calls for the future extension of Interchange Way east of Jane Street, which will

include a crossing of the Black Creek. This future roadway crossing will need to be sized to convey regional storm flows.

The overall recommended flood control improvements will:

- Allow for redevelopment to proceed as planned within the Vaughan Metropolitan Centre by significantly reducing the current floodplain limits within the area
- Increase public safety and provide flood protection up to and including the regional storm event

The preferred flood improvement works are estimated to cost approximately $30 million as itemized in the table below.

FLOOD CONTROL NEEDS
(Preliminary Cost Estimate)

ITEM	FLOODING CONTROL PROJECTS	COST (Millions)
1	Natural Channel Expansion - Highway 7 to Highway 407 *(Including berm work, restoration and landscaping)*	$10
2	Highway 7 Culvert Improvements	$12
3	Doughton Road Culvert Improvements	$4
4	Interchange Way Culvert Improvements	$4
	TOTAL	**$30 M**

Notes:
1. All costs include 25% engineering and contingency.
2. Land acquisition costs not included.

It is expected that the majority of the land required for the wider channel will be secured through development approvals.

The Highway 7 Black Creek culvert is under the jurisdiction of the Region of York and is situated within the limits of the Bus Rapid Transitway H2-VMC project. This phase of the BRT project is currently under design and is scheduled for completion by December 2015 concurrently with the planned opening of the Toronto-York Spadina Subway Extension. Accordingly, Vaughan staff is working with both York Region and York Region Rapid Transit Corporation to include the replacement of the Highway 7 Black Creek culvert in conjunction with the Highway 7 Bus Rapid Transit H2-VMC project. The cost of the Highway 7 culvert replacement has been recently estimated by York Region Rapid Transit Corporation at $12 million.

Water Quality Improvements

The preferred water quality improvement alternative includes the retrofit of five existing stormwater management ponds and the construction of five new ponds as development occurs within the watershed. The pond retrofit work will ensure current water quality standards are achieved in older ponds. This may include modifications to the inlet and outlet structures and the construction of additional storage cells within the existing ponds to allow for settlement of silt and other deleterious materials before water is released to the Black Creek. The location of the recommended water quality improvement works are identified in Attachment No. 5. The water quality improvements are estimated to cost approximately $18 million as itemized in the table below.

WATER QUALITY NEEDS
(Preliminary Cost Estimate)

ITEM	WATER QUALITY PROJECTS	COST (Millions)
1	Storm Water Management Pond Retrofits *(5 Ponds in total; including 3 ponds in VMC and 1 pond in OPA 620)*	$8
2	New Storm Water Management Ponds *(5 Ponds in total; including 1 pond in VMC and 2 ponds in OPA 620)*	$10
	TOTAL	**$18 M**

Notes:
1. *All costs include 25% engineering and contingency.*
2. *Land acquisition costs not included.*

Erosion Control Improvements

Erosion along the existing creek bed and banks is widespread between Doughton Road and Steeles Avenue as shown on Attachment No.6. This has resulted in slope instability in some areas. In addition, the creek's response to more frequent, intense, and flashier floods has caused down-cutting and widening of the banks in certain areas. In most cases, bed scour has led to undercutting of the lower banks and localized slumping. Accordingly, in-stream restoration work is the most effective and appropriate approach to address the ongoing erosion issues.

The preferred alternative includes the prioritized restoration of 18 existing erosion sites. These sites are generally located between Peelar Road and Steeles Avenue as shown on Attachment No. 6.

The recommended implementation schedule for high priority erosion sites is between 1 and 3 years, medium priority sites between 3 to 5 years, and beyond 5 years for low priority sites. Restoration of the 18 erosion sites identified is estimated to cost approximately $2.0 million.

Stormwater Management Policies for Future Developments

The Black Creek Optimization Plan identifies minimum stormwater management criteria for new development to satisfy current environmental regulations, and best management and sustainability practices. The recommended stormwater management criteria for new and infill developments are consistent with the TRCA's requirements for the Humber River Watershed and include the following targets:

Quality control: Enhanced level of protection as per the Ministry of the Environment Stormwater Planning and Design Manual (2003)

Quantity control: Control post-development flows to pre-development levels for all storms up to and including 100 year event, as per the Unit Flow Equations prescribed for the Humber River Watershed

Erosion control: At a minimum, runoff from a 25mm storm must be detained for at least 24 hours for sites less than 5 hectares, and 48 hours for sites greater than 5 hectares

Water balance: A minimum of 5mm of rainfall must be retained on-site through best management practices and low impact development measures

These requirements will be implemented through the development review and approvals process.

Implementation

Given the wide range of capital projects which make up the overall preferred optimization strategy, implementation will require significant financial resources, regulatory approvals and coordination with development projects. For the most part, implementation shall be development driven. Based on projected development trends and funding challenges, it is anticipated implementing the recommendations of the Black Creek Optimization Plan will take 10 to 20 years to complete.

Capital Funding

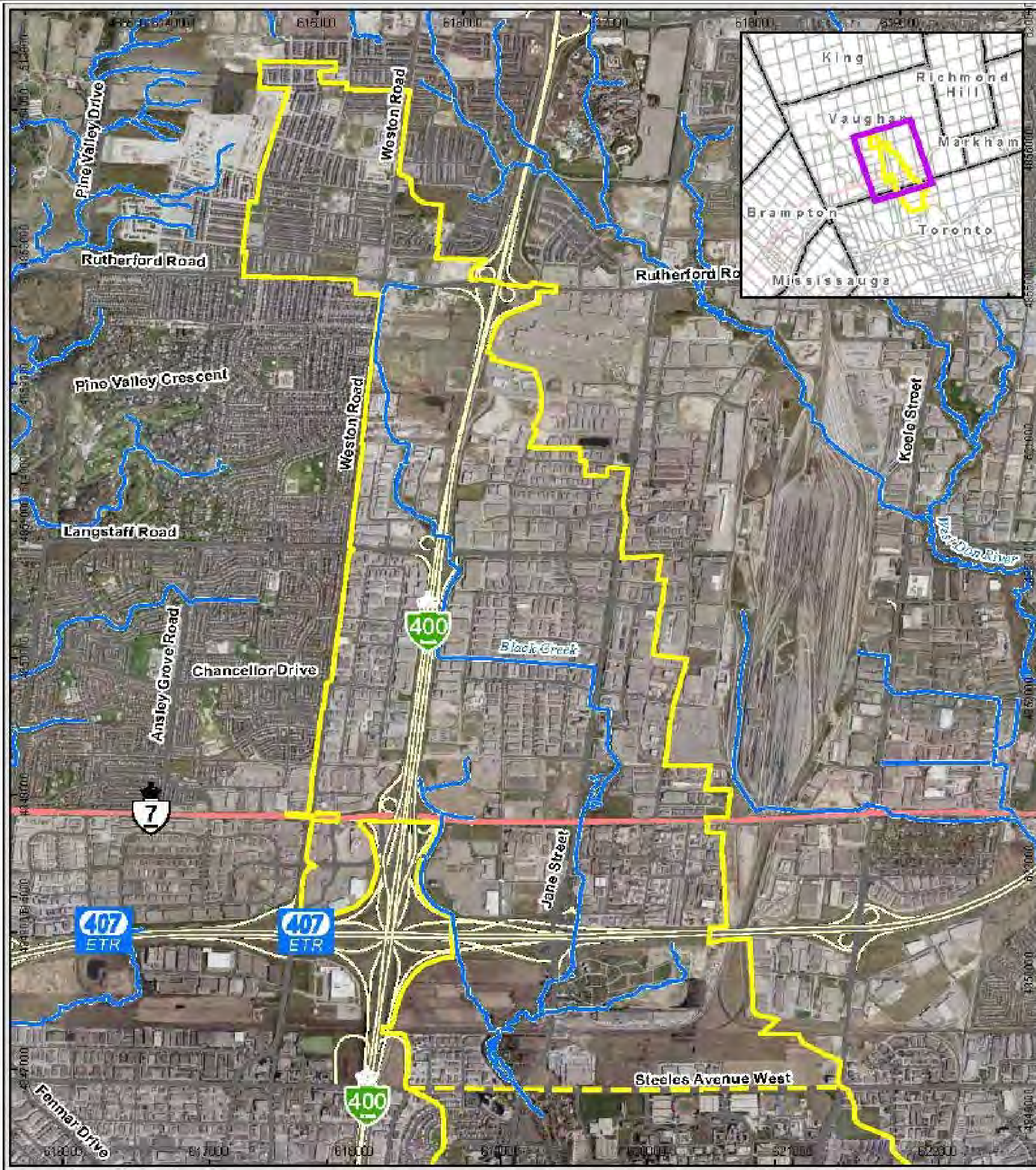
The Black Creek Optimization Plan recommends a series of drainage improvements to reduce the flooding risk, and to progress water quality and erosion control in the watershed. The cost of these improvements is valued at approximately $50 million as detailed in this report. The majority of these works are considered growth related and the implementation of these is proposed to be funded through the enactment of Special Area Development Charge By-laws or City-wide Development Charges.

Certain components of the water quality and erosion control improvements are within existing developed areas of the watershed and may not be considered growth related. Accordingly, an appropriate source of capital funding for the non-growth component of the works will need to be identified. On February 3, 2009, Council directed staff to develop a funding and implementation strategy for the City's Storm Water Management Retrofit Program. A number of potential funding sources will be explored in developing this strategy including a stormwater management levy or utility rate, sewer rates, Provincial or Federal infrastructure funding or in-lieu payments. Similar funding sources can be considered for the non-growth components of the Black Creek Optimization Plan.

Next Steps

The key next steps in implementing the recommendations of the Black Creek Optimization Plan will include the following actions:

- Complete the Black Creek Optimization Plan study report and issue the Notice of Completion
- Incorporate the Highway 7 Black Creek culvert replacement with the construction of the Bus Rapid Transitway H2-VMC project
- Undertake a Schedule "C" Class Environmental Assessment for the Black Creek channel improvements from the existing stormwater management pond located north of Highway 7 to Highway 407 including the culvert replacements
- Develop a funding strategy and establish the necessary Special Area Development Charge
- Implement the recommended stormwater management criteria through development approvals
- Undertake the priority localized channel improvements to address the existing erosion issues



Basemapping from Ontario Ministry of Natural Resources
Orthophotography: 2007

Legend

Subwatershed Boundary

Watercourse

m

0 250 500 1,000

1:40,000

UTM Zone 17N, NAD 83

ATTACHMENT No. 2

Black Creek Stormwater Optimization Study Master Plan
Class Environmental Assessment

Study Area

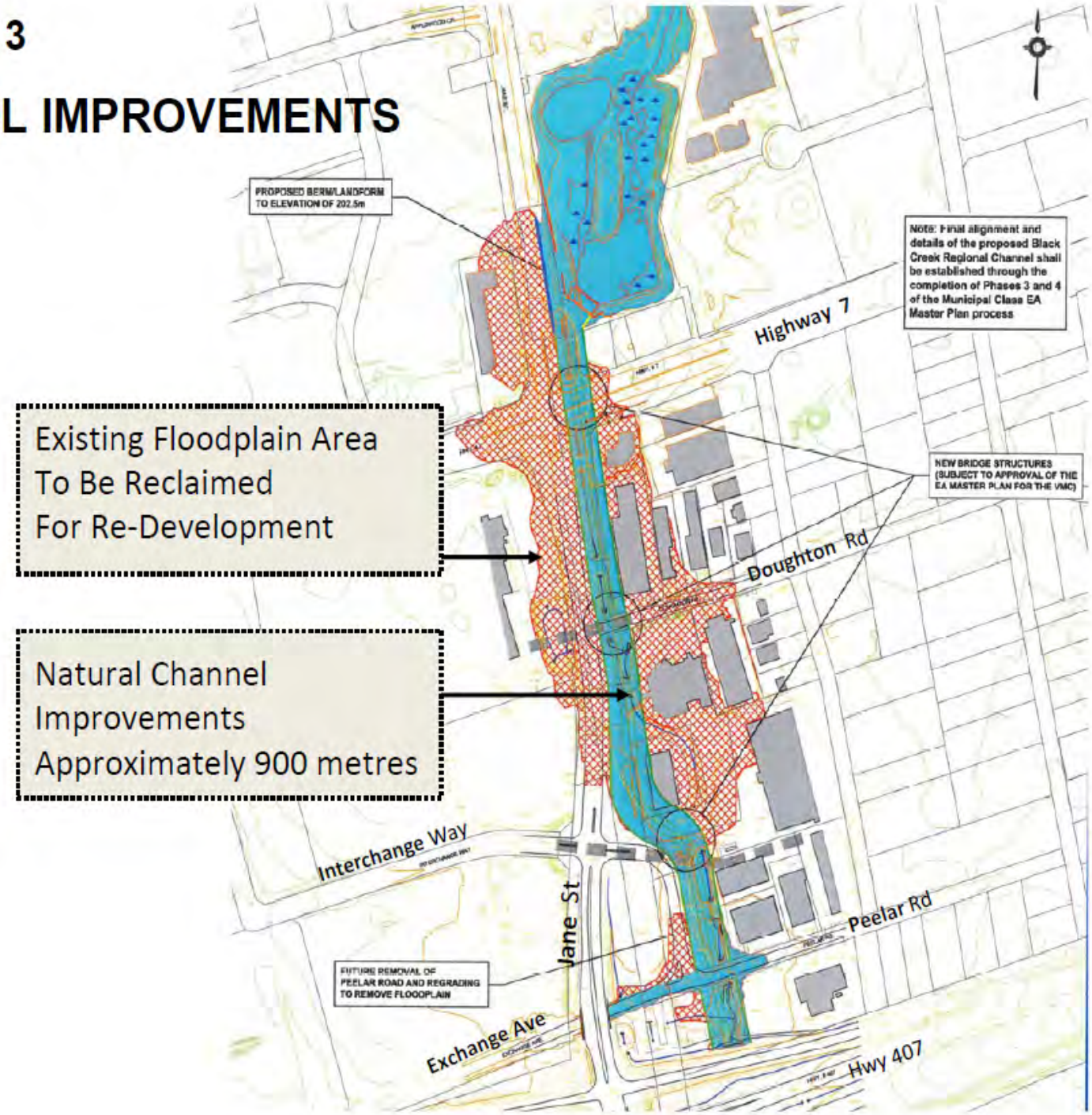
January 2011
Project 60143980

Figure 2

AECOM VAUGHAN

ATTACHMENT No. 3

FLOOD CONTROL IMPROVEMENTS



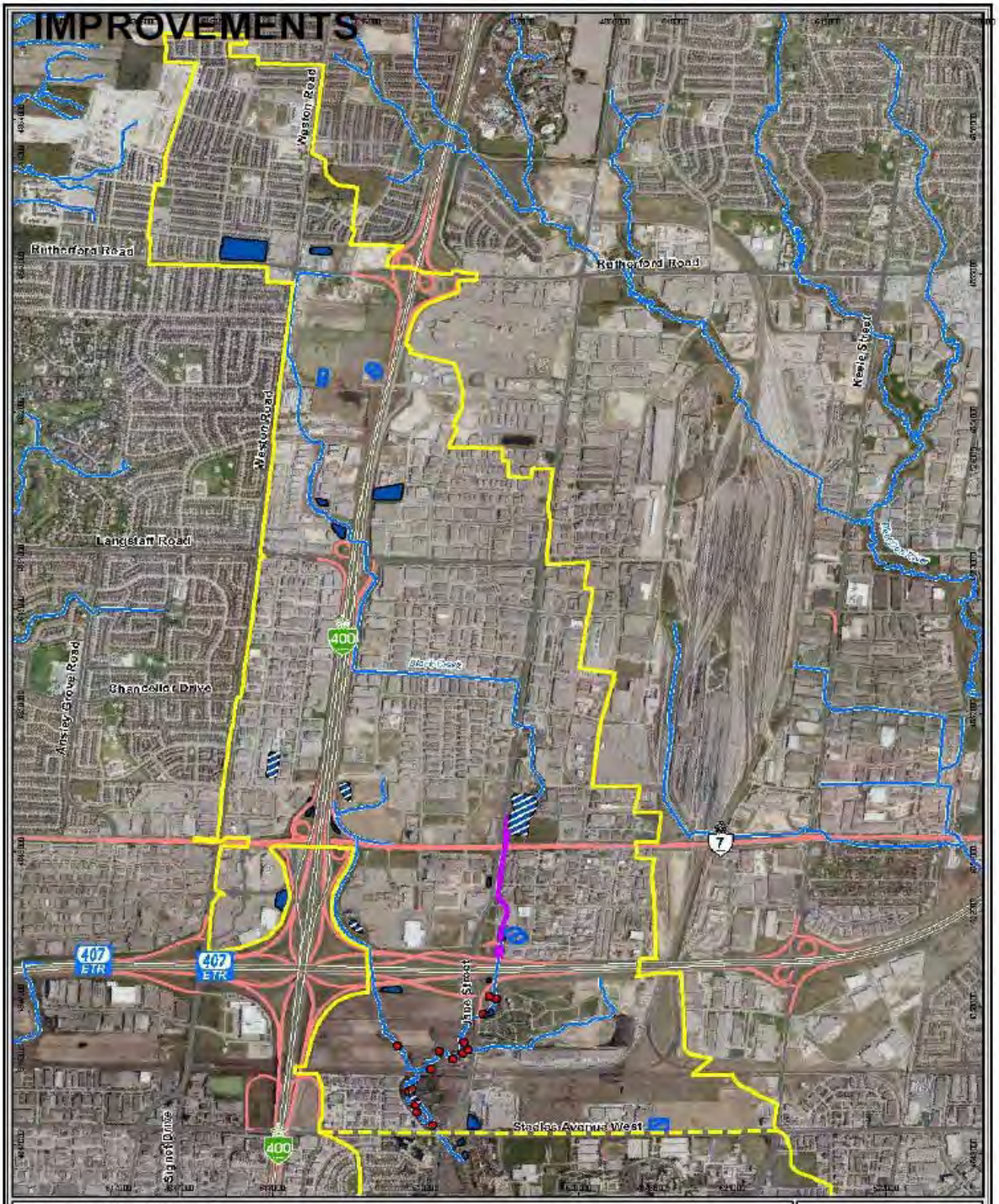
VAUGHAN
Development/Transportation Engineering

ATTACHMENT No. 4

VAUGHAN METROPOLITAN CENTRE CONTEXT PLAN

VAUGHAN
Development/Transportation Engineering

ATTACHMENT No. 5 - WATER QUALITY IMPROVEMENTS



ATTACHMENT No. 6
EROSION CONTROL / RESTORATION SITES