

May 27, 2016

Project No. 1522372

Stephen Keen  
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3027 Harvester Road  
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Burlington, Ontario  
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**STORM SEWER CONCEPTUAL DESIGN SUMMARY  
PROPOSED PORTAGE PARKWAY WIDENING AND EXTENSION  
VAUGHAN, ONTARIO**

Dear Mr. Keen:

The following summary has been prepared to highlight the proposed conceptual design of the storm sewer system to service the Portage Parkway Widening and Extension Environmental Assessment. The project limits are from Applewood Crescent to Creditstone Road.

The proposed works involve the widening of Portage Parkway from Applewood Crescent to Jane Street to increase the existing road width to 4 lanes and the extension of Portage Parkway from Jane Street to Creditstone Road, including crossing Black Creek.

**Black Creek Crossing**

As part of the stormwater management plan for the project, several options for conveying Black Creek under the proposed crossing were considered. Hydraulic models for each option were created based on existing TRCA hydraulic models, and the resulting water levels were evaluated. The results were used in the decision making process for the preferred alternative.

A total of five (5) conveyance options were proposed for the crossing. These options included:

- **Option 1:** Twin 4.5 m wide by 5.0 m tall opened-bottom concrete box culverts centered on the low flow channel. Two additional 4.5 m wide by 2.0 m tall culverts were also proposed (one to either side of the of the main culverts) for pedestrian access for the proposed trails along Black Creek;
- **Option 2:** A 60 m wide single span bridge structure spanning the entire valley;
- **Option 3:** Two 30 m span bridges joined at the middle with a pier;
- **Option 4:** Two 15 m span bridges linked by a third 30 m span bridge, supported by piers 25% and 75% across the section; and,
- **Option 5:** A single 12 m wide by 5.0 m tall open-bottom concrete arch culvert centered on the low flow channel. Two additional 4.5 m wide by 2.0 m tall culverts were also proposed (one to either side of the main culverts) for pedestrian access for the proposed trails along Black Creek.



The preferred alternative included Option 5. Options 1 and 5 allowed for a lower road elevation of 204.50 m, compared to 205.20 m for Options 2-4; however, Option 5 resulted in less impact to the upstream and downstream water levels for the 1:100 year storm event and the Regional storm event (Hurricane Hazel).

### **Storm Sewer System**

The existing storm sewer system was mostly constructed between 1987 and 1989 and includes the following:

- A stormwater management (SWM) pond located southeast of the Portage Parkway bridge over Highway 400, which collects stormwater runoff from the following:
  - 1095 mm diameter storm sewer flowing south along Applewood Crescent; and,
  - 900 mm diameter storm sewer flowing west along Portage Parkway, collecting stormwater runoff from the majority of Portage Parkway between Edgeley Boulevard and Applewood Crescent.
- A SWM pond south of Portage Parkway, located southeast of the intersection with Jane Street, which collects stormwater runoff from the following:
  - 1,350 mm diameter storm sewer flowing south along Edgeley Boulevard, crossing Portage Parkway;
  - 1,200 mm diameter storm sewer flowing south along Buttermill Avenue. This storm sewer continues along Portage Parkway as a 1,350 mm diameter storm sewer from Buttermill Avenue to Millway Avenue; and,
  - 1,350 mm diameter storm sewer flowing south along Millway Avenue, crossing Portage Parkway and collects stormwater runoff from the 1,350 mm and 600 mm diameter storm sewers along Portage Parkway. This storm sewer continues south of Portage Parkway along Millway Avenue as a 1,800 mm diameter storm sewer.

Portage Parkway is already a 4 lane road from Edgeley Boulevard to Applewood Crescent; therefore, the widening for this section of Portage Parkway will consist of only one center turning lane. It is anticipated that the proposed widening will have a negligible effect on the rate of stormwater runoff for this area and a new storm sewer system or enlargement of the existing storm sewers west of Edgeley Boulevard will not be required as part of this project. Revisions to the location of catchbasin structures will be required during the detailed design to line up with the edge of the road and the revised profile. These structures will be identified in the conceptual design.

A new local storm sewer system is proposed east of Edgeley Boulevard extending up to, and outletting directly into, Black Creek, by-passing the forebay of the stormwater management facility east of Jane Street. The new local storm sewer system is proposed to help alleviate ponding concerns that the City of Vaughan has noticed on the storm sewer system along Millway Avenue, south of Portage Parkway. The preliminary design for this new storm sewer system consists of 600 mm and 750 mm diameter storm sewers installed along the south edge of Portage Parkway. The sewers will be installed at grades of 0.2 to 0.4% in order to maintain the minimum cover of 1.2 m at Edgeley Boulevard. If the new local storm sewer system is terminated immediately west of Buttermill Avenue, the depth of cover would be approximately 1.8 m. The storm sewers will outlet into Black Creek at an invert elevation of 199.20 m. Refer to the attached Figures for details.

A new catchbasin and maintenance hole are proposed on the east side of Black Creek to intercept stormwater runoff from a portion of the proposed extension of Portage Parkway. A 525 mm diameter storm sewer is proposed at 1.0%, outletting into Black Creek at an invert elevation of 199.20 m. Refer to the attached Figures for details.

The eastern portion of the extension of Portage Parkway, approximately 100 m in length, is proposed to drain to the existing storm sewer system on Creditstone Road. Additional catchbasins at the intersection will likely be required. These structures will be identified in the conceptual design.

The City of Vaughan does not require quantity control of stormwater runoff from Portage Parkway prior to discharge to Black Creek, as Black Creek has an existing online SWM facility. This online SWM facility will be upgraded as part of a separate project. Quality control of stormwater runoff will be managed through the use of an oil/grit separator prior to discharge into Black Creek. Two Stormceptor units are proposed, one for each outlet into Black Creek. The 750 mm diameter storm sewer will be serviced by a Stormceptor STC 4000, which will provide 70% removal of Total Suspended Solids (TSS). The 525 mm diameter storm sewer will be serviced by a Stormceptor STC 1000, which will provide 70% removal of TSS. Copies of the preliminary Stormceptor modelling results are attached.

The approximate Class C (+/- 30%) capital costs for the new local storm sewer systems and revisions to the existing storm sewers system is \$975,000. This cost estimate is for a HDPE storm sewer system only and does not include any general construction costs or costs for other items, including surface removals and reinstatement, as these costs should be included as part of the Portage Parkway widening and extension.

We trust that the above is satisfactory for your purposes at this time. Please let us know if you have any questions.

Yours truly,

**GOLDER ASSOCIATES LTD.**



Scott Taylor, P.Eng.  
Civil Engineer

SWT/DVK/md

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Attachments: STC1000 Modelling Results  
STC4000 Modelling Results

## Brief Stormceptor Sizing Report - Portage Extension

Project Information & Location			
<b>Project Name</b>	Portage	<b>Project Number</b>	1522372
<b>City</b>	Vaughan	<b>State/ Province</b>	Ontario
<b>Country</b>	Canada	<b>Date</b>	5/18/2016
Designer Information		EOR Information (optional)	
<b>Name</b>	Scott Taylor	<b>Name</b>	
<b>Company</b>	Golder Associates Ltd.	<b>Company</b>	
<b>Phone #</b>	613-592-9600	<b>Phone #</b>	
<b>Email</b>	staylor@golder.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	Portage Extension
<b>Target TSS Removal (%)</b>	70
<b>TSS Removal (%) Provided</b>	70
<b>Recommended Stormceptor Model</b>	STC 1000

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 300	58
STC 750	69
STC 1000	70
STC 1500	71
STC 2000	75
STC 3000	77
STC 4000	81
STC 5000	81
STC 6000	84
STC 9000	88
STC 10000	88
STC 14000	90
Stormceptor MAX	Custom

Sizing Details			
Drainage Area		Water Quality Objective	
Total Area (ha)	1.28	TSS Removal (%)	70.0
Imperviousness %	80.0	Runoff Volume Capture (%)	
Rainfall		Oil Spill Capture Volume (L)	
Station Name	TORONTO CENTRAL	Peak Conveyed Flow Rate (L/s)	
State/Province	Ontario	Water Quality Flow Rate (L/s)	
Station ID #	0100	Up Stream Storage	
Years of Records	18	Storage (ha-m)	Discharge (cms)
Latitude	45°30'N	0.000	0.000
Longitude	90°30'W	Up Stream Flow Diversion	
		Max. Flow to Stormceptor (cms)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal City of Toronto PSD		
Particle Diameter (microns)	Distribution %	Specific Gravity
10.0	20.0	2.65
30.0	10.0	2.65
50.0	10.0	2.65
95.0	20.0	2.65
265.0	20.0	2.65
1000.0	20.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

**For Stormceptor Specifications and Drawings Please Visit:**  
<http://www.imbriumsystems.com/technical-specifications>

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### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	Portage
<b>Target TSS Removal (%)</b>	70
<b>TSS Removal (%) Provided</b>	70
<b>Recommended Stormceptor Model</b>	STC 4000

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 300	42
STC 750	57
STC 1000	58
STC 1500	58
STC 2000	63
STC 3000	65
STC 4000	70
STC 5000	71
STC 6000	74
STC 9000	79
STC 10000	79
STC 14000	83
Stormceptor MAX	Custom

Sizing Details			
Drainage Area		Water Quality Objective	
Total Area (ha)	3.36	TSS Removal (%)	70.0
Imperviousness %	80.0	Runoff Volume Capture (%)	
Rainfall		Oil Spill Capture Volume (L)	
Station Name	TORONTO CENTRAL	Peak Conveyed Flow Rate (L/s)	
State/Province	Ontario	Water Quality Flow Rate (L/s)	
Station ID #	0100	Up Stream Storage	
Years of Records	18	Storage (ha-m)	Discharge (cms)
Latitude	45°30'N	0.000	0.000
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50.0	10.0	2.65
95.0	20.0	2.65
265.0	20.0	2.65
1000.0	20.0	2.65

Notes
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