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Newtonbrook Creek Geomorphic Systems Master Plan Report

Submitted by:

Aquafor Beech Limited

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EXECUTIVE SUMMARY

Overview

The City of Toronto (City) has commissioned Aquafor Beech Limited to undertake the Geomorphic Systems Master Plan Study for Newtonbrook Creek and Blue Ridge Creek (NCGSMP), in North York. The emphasis of the NCGSMP is on systematically locating and prioritizing erosion related risks to Toronto Water (TW) infrastructure within the Don Valley corridor, including: sanitary sewers, storm sewers, outfalls, watermains and any associated erosion protection works. The study area was found to contain **seventy-two (x72) distinct erosion risks** to Toronto Water infrastructure, including nineteen (x19) vertical erosion risks to watermain and sanitary infrastructure, twenty-two (x22) horizontal erosion risks to watermain and sanitary infrastructure, and thirty-one (x31) erosion risks to storm sewer and outfall infrastructure. The extent of the NCGSMP study area is illustrated in the figure below.

Newtonbrook Creek Geomorphic Systems Master Plan Study Area

Study Objectives

The objective of the NCGSMP is to investigate the geomorphic processes which have contributed to the physical degradation of Newtonbrook and Blue Ridge Creeks, and develop a long-term plan to strategically rehabilitate the watercourses to protect Toronto Water infrastructure that is at risk of damage due to erosion. The NCGSMP study is intended to follow the Municipal Class Environmental Assessment process, in conjunction with applying the Adaptive Management of Stream Corridors principles.

Establishment of Twenty-Four (x24) High Priority Sites

In order to achieve these stated objectives, a series of technical studies and assessments were completed to characterize the study area, and identify the highest priority erosion sites to be rehabilitated. These technical

studies included fluvial geomorphology, terrestrial ecology, aquatic ecology, utility conflict, hydrologic, hydraulic, and climate change assessments. Following the completion of these studies, the level of risk at each identified erosion site was evaluated based on a series of factors taking into account the depth of cover, level of protection, and condition of the asset. Using this evaluation system, the twenty-four (x24) highest priority sites were established. Within these twenty-four priority sites, there are **fourteen (x14) sites** where there is an **immediate risk of infrastructure failure** (i.e., exposed sewer crossing or a failed outfall), as listed in the following table.

Top Fourteen Priority Sites, with Immediate Risk of Infrastructure Failure

Priority Site Rank	Erosion Site Description	Risk ID
1	Exposed Sanitary Sewer Maintenance Hole and Lateral Risk to Sanitary Sewer Near Pedestrian Trail	Lateral Risk #1 and Crossing #2
2	Exposed Sanitary Sewer Crossing at Restwell Crescent	Crossing #3
3	Failed Storm Water Outfall at Forest Grove Drive	Outfall #3
4	Failed Storm Water Outfall at Canary Crescent	Outfall #7
5	Exposed Sanitary Sewer Crossing at Farmingdale Road	Crossing #5
6	Exposed Sanitary Sewer Crossing upstream of Farmingdale Road	Crossing #6
7	Exposed Sanitary Sewer Crossing Downstream of Finch Avenue and Bayview Avenue	Crossing #7
8	Exposed Sanitary Sewer Maintenance Hole and Lateral Risk to Sanitary Sewer Downstream of Finch and Bayview Avenue	Lateral Risk #10
9	Exposed Sanitary Sewer Crossing at Finch and Bayview Avenue	Crossing #8
10	Exposed Watermain Chamber at Manorcrest Drive	Crossing #10
11	Exposed Sanitary Sewer Crossing upstream of Blessed Trinity Parish	Crossing #13
12	Failed Storm Sewer Outfall at Hi Mount Drive	Outfall #25
13	Failed Storm Sewer Outfall at Citation Drive	Outfall#26
14	Exposed Sanitary Sewer Crossing at Sifton Court	Crossing #19

The remaining **ten (x10) high priority sites** are locations where unmitigated erosion processes are expected to create an immediate risk to municipal infrastructure within the next **five to fifty (5 - 50) years**, as shown in the table below.

Ten Additional High Priority Sites

Priority Site Rank	Erosion Site Description	Risk ID
15	Lateral Risk to Sanitary Sewer downstream of Sifton Court	Lateral Risk #22
16	Lateral Risk to Sanitary Sewer at Heathview and Page Avenue	Lateral Risk #6
17	Lateral Risk to Sanitary Sewer upstream of Maxome Avenue	Lateral Risk #12
18	Lateral Risk to Sanitary Sewer upstream of Forest Grove Drive	Lateral Risk #5
19	Lateral Risk to Sanitary Sewer at Finchgate Court	Lateral Risk #7
20	Lateral Risk to Sanitary Sewer at Brucedale Crescent	Lateral Risk #9
21	Lateral Risk to Sanitary Sewer at Ambrose Road	Lateral Risk #20
22	Lateral Risk to Sanitary Sewer Downstream of Finch Avenue and Bayview Avenue	Lateral Risk #11
23	Lateral Risk to Sanitary Sewer at Hi Mount Drive	Lateral Risk #17
24	Lateral Risk to Sanitary Sewer downstream of Forest Grove Drive	Lateral Risk #4

Development and Evaluation of Alternatives

After the twenty-four (x24) highest priority sites were established, watercourse restoration alternatives were developed for each of the sites. In general, three (x3) alternatives were considered, including "Do Nothing", "Local Works", and "Sub-Reach Based Works". A description of each alternative is provided below:

- **Alternative 1: Do Nothing** – This alternative involves leaving the site as it is and allowing erosional processes to continue within the watercourse corridor. Under this alternative, it should be expected that maintenance, or possibly emergency works, may have to be undertaken to address damage to infrastructure caused by continued erosion. Damage from erosion may occur gradually over time or suddenly due to a high magnitude flood event.

- **Alternative 2: Local Works** – This alternative consists of localized channel bank and/or bed work to address erosion issues within the immediate vicinity of the site. While it is understood that local erosion protection works may require ongoing maintenance, occasional repairs, or eventual replacement, this alternative is often still preferred to limit the economic cost and the environmental damage associated with construction of large-scale channel engineering and stream restoration works.

- **Alternative 3: Sub-Reach Based Works** – This alternative consists of a reach-based approach to address erosion issues, potentially incorporating multiple locations of risk to infrastructure. Reach-scale engineering focuses on minimizing the risks of erosion in highly constrained urban watercourses and can also include opportunities to ameliorate flood conditions and geomorphic processes. This alternative primarily applies "hard" channel engineering approaches for erosion control, but may incorporate some environmentally sensitive materials and features in the channel.

After establishing three (x3) candidate alternatives for each of the twenty-four (x24) risk sites, these alternatives were evaluated using a series of criteria accounting for a combination of environmental, social, economic and technical criteria, consistent with EA standard practice and City of Toronto Standards for their geomorphic system master plan projects. Particular importance was given towards an alternative's ability to provide long-term protection to at-risk Toronto Water infrastructure. The evaluation process yielded **twenty (x20) sites** with the **sub-reach-based solution preferred**, and **four (x4) sites** with the **local works solution preferred**.

Grouping of Sites into Projects

Given the spatial density of the twenty-four (x24) priority sites, and the expansive nature of some of the proposed sub reach based solutions, several priority sites can be addressed through a single capital works project. Through this bundling process, the **twenty-four (x24) priority sites** were grouped into **eleven (x11) capital works** projects which will address not only the top twenty-four (24) priority sites, but will also address several other lower priority sites with medium to long-term erosion related risks to Toronto Water infrastructure.

Priority Ranking and Estimated Costs

After the establishment of the eleven (x11) projects, a prioritization methodology was developed to rank projects based on each project's associated failure risk. The basis of the failure risk framework is the principal that failure risk is the product of failure likelihood and failure impact. Failure risk was calculated for each of the risk sites that constitute each project. The maximum failure risk of all the risk sites that constitute a project was considered to be the overall project failure risk. Based on these results, the **eleven (x11) projects** were grouped into **four (x4) priority groups**. Furthermore, cost estimates were established for each of the proposed projects to assisted with budgetary planning. The priority groups, and project cost estimates, are provided in the following summary table.

Project Priority and Cost Summary Table

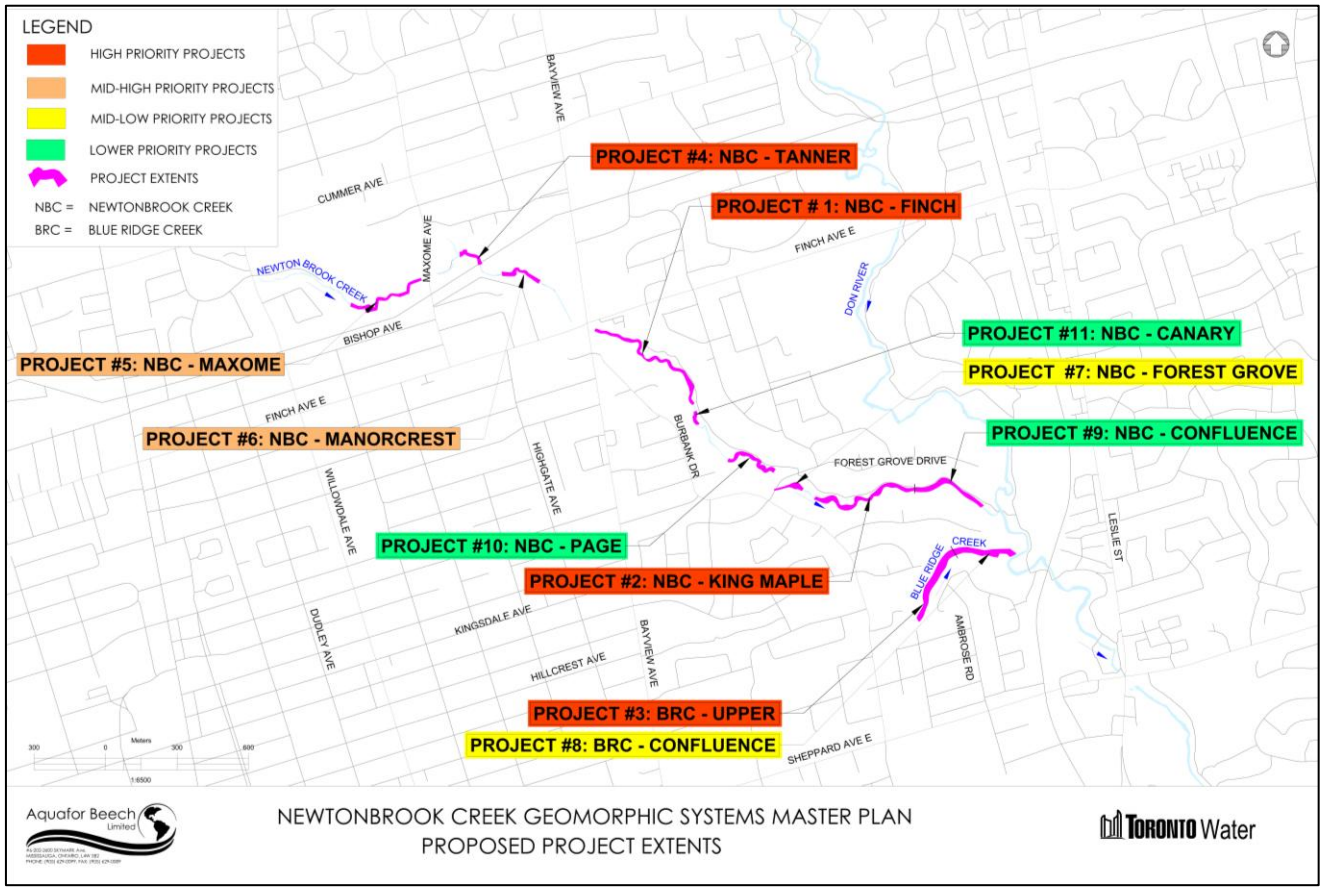
Project Name	Priority Grouping	Project Description	Project Cost Estimates
Project #1: NBC - Finch	**High**	Multiple Sanitary Assets Downstream of Bayview and Finch	$8,207,000
Project #2: NBC - King Maple	**High**	Exposed Sanitary Sewer Downstream of Forest Grove Near King Maple Place	$5,959,000
Project #3: BRC - Upper	**High**	Upper Blue Ridge Creek near Sifton Court	$4,834,000
Project #4: NBC - Tanner	**High**	Exposed Sanitary Crossing Downstream of Maxome Avenue Near Tanner Court	$2,434,000
Project #5: NBC - Maxome	**Mid-High**	Multiple Sanitary Risks Directly Upstream of Maxome Avenue	$5,757,000
Project #6: NBC - Manorcrest	**Mid-High**	Watermain Infrastructure Upstream of Bayview and Finch Near Manorcrest Drive	$3,271,000
Project #7: NBC - Forest Grove	**Mid-Low**	Failed Stormwater Outfall Downstream of Forest Grove Drive	$1,733,000
Project #8: BRC - Confluence	**Mid-Low**	Lower Blue Ridge Creek near Confluence with the Don River	$4,971,000
Project #9: NBC - Confluence	**Lower**	Previously Exposed Sanitary Maintenance Hole near Confluence with the Don River	$4,449,000
Project #10: NBC - Page	**Lower**	Multiple Sanitary Assets Upstream of Forest Grove Drive Near Page Avenue	$4,848,000
Project #11: NBC - Canary	**Lower**	Failed Stormwater Outfall at Burbank Drive Near Canary Crescent	$875,000
		Total Cost	**$47,338,000**

It is acknowledged that the ultimate prioritization of capital works projects will be at the discretion of the City of Toronto and will need to take into consideration a multitude of factors in addition to project failure risk. The recommended implementation timeline for each priority group is show in the following table.

Recommended Implementation Timeline for Each Priority Group

Priority Group	Implementation Timeline
High	2025-2030
Mid-High	2030-2035
Mid-Low	2035-2040
Lower	2040-2045

The spatial distribution of the eleven (x11) projects is illustrated in the following figure.



Spatial Distribution of the Eleven NCGSMP Projects

Public and First Nations Consultation

The City of Toronto has undergone comprehensive public consultation in support of the NCGSMP, consistent with the Schedule B Municipal Class Environmental Assessment process. A Notice of Study Commencement was issued in September 2022. A Notice of Public Consultation was issued on October 2nd, 2023, in advance of the Public Information Centre (PIC) on October 18th, 2023. The PIC was conducted in both an outdoor open house and site walk format, where participants were taken on a guided walk through the study area. Comments, concerns and questions were accepted in person, and by mail, email and phone until November 1st, 2023.

The City of Toronto has undertaken First Nations consultation activities, consistent with the Schedule B Municipal Class Environmental Assessment process. The following First Nations were included in the consultation process:

- Alderville First Nation
- Beausoleil First Nation, with copy to the Williams Treaties First Nations coordinator
- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation (Chippewas of Mnjikaning)
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation
- Mississaugas of the Credit First Nation

The following information was provided to these First Nations:

- Notice of Commencement (October 2022)
- Notice of Public Consultation / recommended solutions (October 2023)
- Stage 1 Archaeology Report (December 2023)
- Overview of Key Study Findings (July 2025)

Conclusions and Recommendations

The City of Toronto has completed the Newtonbrook Creek Geomorphic Systems Master Plan to guide the future rehabilitation of Newtonbrook Creek and Blue Ridge Creek, with the aim of protecting Toronto Water infrastructure that is at risk of damage due to erosion. Ultimately, eleven (x11) future capital works projects are proposed which will address erosion related risks to:

- 8x Exposed Sanitary Sewer Crossings;
- 1x Exposed Sanitary Sewer Maintenance Hole;
- 1x Previously Exposed Sanitary Sewer Maintenance Hole (Protected through Emergency Works);
- 7x Sanitary Sewer Crossings with Minimal Cover;
- 17x Lateral Risks to Sanitary Sewer Infrastructure;
- 1x Watermain Crossing with Minimal Cover;
- 1x Exposed Watermain Chamber;
- 4x Failed Storm Sewer Outfalls;
- 4x Storm Sewer Outfalls that are Functional but in a Degraded Condition;
- Multiple risks to Private Property;
- Multiple risks to the Local Multi-Use Trail System; and
- 3x Private Oil Pipeline Crossings (Trans-Northern, Imperial Oil and Sun-Canadian).

Moving forward, the City will schedule each of the aforementioned projects for detailed design and construction. Scheduling of projects will give consideration to City-wide priorities, taking into account the findings from the other four geomorphic systems master plans the City is currently undertaking for the West Humber River, Mimico Creek, German Mills Creek and Yellow Creek. Budgetary constraints, as well as the timing of construction projects being undertaken by other City departments may also dictate construction timing on a project-by-project basis. Prior to construction, all required regulatory approvals will be procured and further targeted consultation efforts undertaken.

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