



REPORT

Council

August 13, 2024

FROM: Transportation and Engineering Department

DATE: July 30, 2024

SUBJECT: Joshua Creek Flood Mitigation Opportunities Study

LOCATION: Joshua Creek Between Upper Middle Road and Lake Ontario

WARD: Ward 3 and 6 Page 1

RECOMMENDATION:

That the Notice of Completion for the Joshua Creek Flood Mitigation Opportunities Municipal Class Environmental Assessment Study be published, commencing a 30-day public review period from September 1, 2024 to September 30, 2024.

KEY FACTS:

The following are key points for consideration with respect to this report:

- In 2008, the *Town-Wide Flood Prioritization Study Review* identified at a high-level flood-prone areas throughout the Town, including Joshua's Creek watershed.
- The Joshua's Creek Flood Mitigation Opportunities Study (herein referred to as the Study) is a follow up to the 2008 study and includes a detailed assessment of riverine flood risk and recommended works to reduce these risks, in accordance with the Municipal Class Environmental Assessment (MCEA), Schedule B, process.
- The results indicate a low probability of adverse flooding in the Joshua's Creek watershed as compared to other creek systems within Oakville with the majority of flood risk occurring under the Regional storm (1954 Hurricane Hazel storm) event, with a less than 1% probability of occurrence in any given year.
- The recommendations to mitigate flood risk include flood emergency preparedness in the short-term, green infrastructure with future

consideration of increasing the Regional storm capacity of the Metrolinx crossing, and construction of a flood wall.

- The EA recommendations will be assessed through the lens of the Rainwater Management Financial Plan to prioritize recommendations from the study against all other stormwater related infrastructure projects.
- An Environmental Study Report has been compiled, documenting the selection of a preferred solution and preliminary design plans. This report, subject to Council's endorsement, will be made available public review, commencing September 1 to September 30, 2024.

BACKGROUND:

Town-wide Flood Prioritization Study identified flood-sensitive sites and subsequent riverine studies has been completed and currently underway.

In 2008, the town compiled the findings from a long list of historical studies into one comprehensive document which was used to quantify the magnitude of riverine flood risk exposure in Oakville. Over 40 flood-sensitive sites were identified and documented in the 2008 *Town-Wide Flood Prioritization Study Review* report (Philips Engineering Ltd., 2008). The report contains details on each flood sensitive area, mapping, and high-level options for mitigation.

Subsequent detailed study of those creek channel reaches with flood sensitive sites were initiated to determine the most viable and responsible mitigation options. Follow-up flood mitigation studies to date include:

- Munn's Creek Flood Mitigation Opportunities Study (Completed in 2017)
- Sheldon Creek Flood Mitigation Opportunities Study (Completed in 2019)
- Lower Morrison and Lower Wedgewood Creeks Flood Mitigation Opportunities Study (Pending Council Endorsement)
- 14 Mile Creek/McCraney Creeks Flood Mitigation Opportunities Study (Anticipated Completion December 2024)

As part of the 2008 Flood Study, a small number of flood prone sites were identified within the Joshua's Creek watershed. None of these sites were identified as a high priority based the evaluation carried out with available information at that time.

COMMENT/OPTIONS:

In 2020, the town retained GHD Limited to complete the Joshua's Creek Flood Mitigation Opportunities Study as a Schedule B Municipal Class Environmental Assessment (herein referred to as the "Study"). The Study area is shown in Appendix A.

The Joshua Creek Flood Mitigation Opportunities Study assessed flood risk to establish recommended municipality-led capital work to reduce these flood risks. This study is not an exercise in floodplain mapping for the purposes of establishing floodplain Regulatory boundaries, pursuant to the Conservation Authorities Act and under the authority of Conservation Halton (CH).

Flood risks refer to the condition that occurs when any depth of riverine waters is present on a property, and/or a building is exposed to any depth of flood water on one or more of its sides, posing a potential danger to public safety and/or potentially causing damage to property and the environment. Flood risk is quantified into two categories for properties along the creeks:

1. "Property at risk" -
 - a. Flooding risk on property, no flooding in the building
 - b. Flooding risk on property, no buildings (vacant property)
2. "Building at risk" - Flooding risk on property, flooding risk in the building

Low risk of flooding identified for Joshua Creek under Regional storm event, with no residential buildings impacts up to 100-year storm event.

Overall, flooding within Joshua’s Creek is considered relatively low risk. Under 2-year to 100-year storm events, no residential property or buildings has been identified with flood risk. Some commercial/industrial properties have been identified with flood risk at more frequent return period storm events; however, flooding is generally over parking areas and is considered low risk based on flood depths and velocities. Only under the Regional storm event, 191 properties and 163 buildings has been identified with flood risk.

Flood Mitigation Alternatives and Recommendations

Flood mitigation alternatives were developed and screened based on functionality (technical merits) initially. Shortlisted alternatives were then comparatively assessed based on natural, social environment, and economic considerations. The alternatives, and the preferred alternatives (recommendations), and are summarized in the table below:

ALTERNATIVE SOLUTIONS	DESCRIPTION / RESULT OF EVALUATION
Do Nothing	"Status quo." Do Nothing option is required to be included within the Municipal Class EA to provide a benchmark for the other alternatives. Not recommended

ALTERNATIVE SOLUTIONS	DESCRIPTION / RESULT OF EVALUATION
Implement LID measures	<p>Low impact development (LID) measures to promote infiltration, evaporation, harvesting, filtration, and detention of stormwater.</p> <p>Recommended with other alternatives as part of the Town's green infrastructure preferred approach to rainwater management - LIDs as a stand alone alternative are not designed to provide flood control for severe flood events, such as a 100-year storm and therefore cannot be considered a standalone solution. However, LIDs will be incorporated during the detailed design phase of the Metrolinx Crossing detail design. The cost of green infrastructure / LID costs are incorporated into the recommended works below.</p>
Increase the flow Capacity of the Metrolinx Crossing	<p>Results from the 2D modelling shows an area of flood risk located downstream of the Metrolinx Lakeshore West rail line on the southwest side of Joshua's Creek during the Regional storm event. The progression of flooding shows the Regional storm flood wave originates from the overtopping of the Metrolinx tracks and creek bank between Constance Drive and Brookmill Road. Mapping is provided in Appendix B.</p> <p>The installation of a second bridge opening, next to the existing structure or replacement of the existing bridge with a larger opening along the Metrolinx tracks. This work will require the construction of a floodwall along the right creek bank between Constance Drive and Brookmill Road, adjacent to an existing municipal trail.</p> <p>Recommended alternative - estimated \$7.4 million, including green infrastructure / LID costs.</p>
Construct Flood Control Infrastructure	<p>Construction of a flood control berm on private property to direct floodwater away from the commercial and residential areas. It also includes the construction of a floodwall along the right creek bank between Constance Drive and Brookmill Road, adjacent to an existing municipal trail.</p> <p>Not recommended</p> <p>Constructing a berm on private property would require the property owner's consent. Potential property acquisition and/or temporary work, permanent maintenance, and access easements, implementing work on private property, make this option difficult to implement. Additionally, this alternative may impact Hydro One infrastructure and potentially increase flood risk for properties near the berm.</p>

ALTERNATIVE SOLUTIONS	DESCRIPTION / RESULT OF EVALUATION
Install a Relief Culvert under Royal Windsor Drive	<p>Includes the installation of a relief culvert under Royal Windsor Drive to prevent overtopping of the road during a flood event.</p> <p>Not recommended This alternative does not reduce flooding of any employment, commercial, or residential lands. Road overtopping depths and velocities are not significant during the Regional storm event.</p>
Construct an Offline Storage Facility	<p>Includes the diversion of creek flows to an offline flood storage facility to attenuate peak flow rates and discharge any remaining water back into Joshua's Creek.</p> <p>Not recommended Limited space availability due to environmental constraints and high land acquisition costs.</p>
Construct a Flow Diversion Channel	<p>Includes the diversion of creek flows into an adjacent drainage system, or downstream location within the same system, to by-pass the identified flood risk sites.</p> <p>Not recommended Flow diversion is not feasible due to existing development, challenging topography, and flood concerns in adjacent watercourse (i.e. Wedgewood Creek).</p>
Implement Non-Structural Flood Mitigation Measures	<p>Includes the implementation of an emergency preparedness measures to help reduce the extent and severity of flooding impacts. The onus for this alternative is placed on the property owner to participate.</p> <p>Recommended Alternative The Study area does not require any capital mitigation measures as the properties within it have low flooding risks as residential homes are not flooded under the 100-year storm conditions, including the consideration of climate changes.</p>

The preferred alternative is a combination of flood emergency preparedness (in the short term) and the future consideration of increasing the flow capacity of the Metrolinx crossing (with LIDs and flood wall) at the time of infrastructural renewal.

Implementation of flood emergency preparedness, whereby the property owners within the flooding area are informed of the flood risk due to extreme storm events so they may undertake the necessary actions to mitigate the flood risk to their homes and properties. There are several resources available to Oakville residents to

help ensure their safety and minimize property damage due to flooding. This includes the Town of Oakville's Emergency Preparedness webpage and the Region of Halton's Community Hazards webpage. Additional flooding resources are available through Conservation Halton's webpages and the University of Waterloo Intact Centre on Climate Adaptation at www.intactcentreclimateadaptation.ca/.

Increasing the flow capacity of the Metrolinx crossing and constructing a flood wall downstream to accommodate this increased flow downstream, provides the most effective reduction in flood risk by removing 124 building out of the 134 residential buildings from flooding during the Regional Storm event, however there are several challenges with the implementation of this alternative that reduced its overall score in the evaluation. This includes ownership of lands, high capital costs and constructability. The crossing is owned by Metrolinx; therefore, any upgrades, improvements, or replacements to the structure would be outside of the town's jurisdiction to implement. In discussions with Metrolinx, there is no foreseeable plans for work at this crossing, therefore this is a long-term recommendation to work with Metrolinx to incorporate into their replacement design to increase flow capacity.

Future detail design phase of the Metrolinx Crossing recommended alternative will incorporate green infrastructure design.

Town Council passed motion that green infrastructure be preferred, and grey infrastructure only where necessary and will be adopted under the town's Climate Action Plan.

The Study assessed Low Impact Developments (LIDs) as an option to reduce flood risk, however LIDs is not intended for flood control during severe storms. LIDs employ various strategies, such as infiltration, evaporation, harvesting, filtration, and stormwater detention at a smaller scale. During the detail design phase, LIDs such as tree conservation, soil improvements, and infiltration measures will be incorporated.

Rainwater Management Financial Plan

The Rainwater Management Financial Plan (RWMP) is a long-term plan to improve resiliency against climate change and protect our stormwater infrastructure and natural assets.

The RMFP takes comprehensive approach to integrate the state of good repair and increase resiliency of the town's stormwater network based on various studies and assessments completed to date. The multi-phase RWMP will deliver a financing plan that provides an all-inclusive approach to planning and implementing stormwater-related infrastructure renewal and improvement projects into the future.

The RWMP has developed a framework to prioritize the projects from the various study recommendations that considers, asset management principles, cost/benefit, risk and likelihood of service impact and alignment/coordination with other projects so that projects in areas with the greatest risk and provide the most benefit are prioritized first. Prioritization of the crossing upgrade and flood wall construction will be dependent on Metrolinx timing for infrastructure renewal.

Each watershed has its own unique characteristics that influence the nature of flooding within an area, this includes features such as drainage area, topography, proximity of urban land use to watercourse, etc. As a result of these differences, a consistent level of flood mitigation protection cannot always be achieved from one creek system to another or in one area to another within the same creek system. The RWMP will evaluate these protection measures in conjunction with their cost-effectiveness and level of flood protection as it prioritizes projects for future capital budgets.

Conclusion

The Joshua' Creek Flood Mitigation Opportunities Study Report has been compiled documenting the selection of a recommended preferred alternatives. Appendix B is the consultant's Executive Summary Report.

In accordance with a Schedule B undertaking, the project file must be made available for a 30-day public review period and staff are proposing to do so after this report is received, commencing September 1, 2024. The Report will be made available on the town's website and special accommodations to view hard copies will be determined on an as needed basis. A Notice of Study Completion will be sent out to the public, stakeholders and posted on the town's website and will have details on the public review period and how those interested can provide comments. Should no requests be made to Minister of Environment, Conservation and Parks requiring further study on the grounds of prevention, mitigation, or remedy of adverse impacts on constitutionally protected Aboriginal and treaty rights during the review period, the study will be deemed approved.

Moving forward, the Study recommendations will be integrated in the town's RWMP which will prioritize works against all other works related to stormwater assets.

CONSIDERATIONS:

(A) PUBLIC

Property owners located within the Study area have been notified of the study work and invited to the Public Information Centres. Metrolinx as

property owner within the study area has also been informed on the study and its results.

An overview of the issues, alternatives, evaluation, and preliminary preferred alternative solutions were presented at two Public Information Centres (PIC) on January 28, 2021, and October 14, 2021. Feedback was received from residents, resident associations, agencies including Conservation Halton, Region of Halton and the Ministry of Environment, Conservation and Parks.

Additionally, Indigenous groups, including the Mississauga of the New Credit First Nation, Haudenosaunee Confederacy Council, Metis Nations of Ontario, and Six Nations of Grand River, were provided opportunity to engage with the project team, ask questions, and provide feedback.

(B) FINANCIAL

There is currently no financial impact from the Study recommendations. The long-term recommendation to upgrade the Metrolinx crossing will be evaluated alongside other stormwater initiatives, using the RWMP framework to prioritize projects for the capital forecast which is pending the development of a sustainable financing plan which is currently underway.

(C) IMPACT ON OTHER DEPARTMENTS & USERS

Recommendation from the Study have taken into consideration feedback from Parks and Open Space, Asset Management, Planning and Development and Legal, and external parties such as Conservation Halton, Region of Halton, Metrolinx, area stakeholders and residents.

(D) COUNCIL STRATEGIC PRIORITIES

This report addresses Council's strategic priority:

- Environmental Sustainability

(E) CLIMATE CHANGE/ACTION

The recommendations of the report support the incorporation of climate change resiliency into flood protection measures. This initiative offers community benefits by safeguarding private and public lands, thereby mitigating the risks posed by more frequent and severe rainstorms resulting from climate change.

APPENDICES:

- Appendix A - Map of Study Area
- Appendix B - Joshua's Creek Flood Mitigation Opportunities Study Executive Summary.

Prepared by:
Diana Michalakos, Project Leader, Capital Projects

Recommended by:
Philip Kelly, Manager Design and Construction

Submitted by:
Jill Stephen, Director Transportation and Engineering