

REPORT

Council

Meeting Date: November 15, 2021

FROM: Transportation and Engineering Department

DATE: November 2, 2021

SUBJECT: **Sheldon Creek Flood Mitigation Opportunities Study**

LOCATION: Sheldon Creek East Branch and Sheldon Creek Main Branch

WARD: Ward 1 Page 1

RECOMMENDATION:

1. That the Sheldon Creek Flood Mitigation Opportunities Municipal Class Environmental Assessment Study Report and the preferred alternatives to reduce flood risk for properties located within the Sheldon Creek watershed as outlined in the staff report from the Transportation and Engineering Department dated November 2, 2021 be received.
2. That the Notice of Completion for the Sheldon Creek Flood Mitigation Opportunities Municipal Class Environmental Assessment Study be published, commencing the mandatory 30-day public review period of November 17, 2021 to December 17, 2021.

KEY FACTS:

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

- In 2008, the Town-wide flood study identified a limited number of flood prone sites within the Sheldon Creek watershed. None of these sites were identified as a high priority for further study based on evaluation carried out with available information at the time.
- Since the 2008 *Town-Wide Flood Prioritization Study Review* study, updates to the floodplain modelling has been carried out for several channel systems within the town resulting in an improved understanding of vulnerabilities related to riverine flooding.
- During the Burlington August 4, 2014 storm event, flooding occurred within the Sheldon Creek watershed which resulted in floodwaters spilling over top

of Rebecca Street and some properties reporting minor flooding (as well as sewage backups) downstream of Lakeshore Road.

- The Sheldon Creek Flood Mitigation Opportunities Study (the Study) provided an opportunity to update relevant models and revisit issues associated with previously identified flood prone sites and determine if there are any new flood prone sites and then develop and assess flood mitigation options to reduce the flood risk at these locations.
- The Study is an assessment of 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).
- Conservation Halton (CH) is currently in the process of updating floodplain mapping for Sheldon Creek as part of their Flood Hazard Mapping – East Burlington Creeks (Tuck, Shoreacres, Appleby and Sheldon Creeks) study. Through that study CH will be updating floodplain models to reflect the needs of preparing Regulatory floodplain mapping, pursuant to Ontario Regulation 162/08.
- The Study was carried out as a Municipal Class Environmental Assessment (MCEA), Schedule B.
- Updated hydraulic (i.e. floodplain) models identified the following four (4) flood risk sites that have the potential to flood during less frequent storm events (Regional – [Hurricane Hazel] storm event, 100 year storm event, and August 4, Burlington Storm Event):

Spill/Flooding Location			Storm Event
Site 1	East Sheldon Creek	Rebecca Street, spill onto Suncor lands and overtopping of Rebecca Street	Spill during the 100 year event, Regional Storm Event and simulated August 4 Burlington Storm
Site 2	East Sheldon Creek	Spill to the east side of channel to Great Lakes Boulevard, south of Rebecca Street	Spill during the Regional Storm Event and simulated August 4 Burlington Storm
Site 3	Main Sheldon Creek	Spill along South Side of Channel towards Wilmot Crescent	Spill during the Regional Storm Event
Site 4	Main Sheldon Creek	Potential flooding of properties on north side of channel, downstream of Lakeshore Road	Flooding during the 100 year event, Regional Storm Event and simulated August 4 Burlington Storm

- In comparison to other areas of riverine flood risk within the town, these four (4) flood risk sites are considered relatively low risk as flooding is likely to occur only during the less frequent storm events.
- Several mitigation alternatives were evaluated based on environmental/physical; social, and economic considerations.
- The preferred alternative to mitigate the spills at Sites 2, and 3 would consist of the construction of berms to contain the flows within the creek channel corridor.
- The preferred alternative to mitigate flooding at Site 1 is emergency preparedness in the form of monitoring the depth of flow at the sag in the Rebecca Street ROW and mobilizing town staff to limit pedestrian and vehicular traffic in the ROW during a significant precipitation event
- The preferred alternative to mitigate flooding at Site 4 is the implementation of emergency preparedness plans and flood proofing of buildings. For this alternative, the onus is placed on the property owners as it has been evaluated that all other flood mitigation alternatives are ineffective or impractical.
- An overview of the issues, alternatives, evaluation and preliminary preferred alternative solutions were presented at two Public Information Center (PIC) on December 12, 2019 and March 13, 2020.
- 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 for the mandatory 30-day public review period to commence November 17, 2021, until December 17, 2021.

BACKGROUND:

In 2008, the town undertook a town-wide flood study to identify areas of concern for flooding. The study compiled the findings from a long list of historical studies into one comprehensive document which was used to quantify the magnitude of 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 details, mechanisms for flooding and options for mitigation.

For Sheldon Creek specifically, the following three (3) flood-prone sites warranted consideration for flood mitigation study, specifically:

- East Branch of Sheldon Creek at Rebecca Street, just east of Great Lakes Boulevard
- Main Branch of Sheldon Creek at Burloak Drive Crossing (Border between Oakville and Burlington).
- Main Branch of Sheldon Creek south of Lakeshore Road

Recent updates to the floodplain modelling has been carried out for several channel systems throughout the Town of Oakville resulting in an improved understanding of vulnerabilities related to riverine flooding. Initiating the Sheldon Creek Flood Mitigation Opportunities Study (see study area map in Appendix A) provided an opportunity to update relevant models and revisit issues associated with previously identified flood prone sites and determine if there are any new flood prone sites, and then to develop and assess flood mitigation options to reduce the flood risk at these locations.

Furthermore, the August 4, 2014 Burlington storm that saw nearly 200mm of rainfall over a short time duration occurred resulting in widespread flood damage. While this extreme rainfall intensity storm event was primarily centered over Burlington, flooding was observed within the Sheldon Creek watershed within the boundaries of Oakville. This rain event resulted in floodwaters spilling overtop of Rebecca Street and into the woodlot at Village Wood Park. Homes downstream of Lakeshore Road also reported minor flooding in backyards and sewage backup.

COMMENT/OPTIONS:

The Sheldon Creek Flood Mitigation Opportunities Study was initiated in November 2017 and managed by Design and Construction within the Transportation and Engineering Department. The consulting firm of Wood Environmental & Infrastructure Solutions was retained to carry out the study assignment.

The purpose of the Sheldon Creek Flood Mitigation Opportunities Study is to assess flood risk and 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).

The Study was carried out as a Municipal Class Environmental Assessment (MCEA), Schedule B.

Study Results

Updated floodplain modeling identified four (4) flood risk sites located at Rebecca Street Great Lakes Boulevard, Wilmot Crescent, and downstream of Lakeshore Road.

		Spill/Flooding Location	Storm Event
Site 1	East Sheldon Creek	Rebecca Street, spill onto Suncor lands and overtopping of Rebecca Street	Spill during the 100 year event, Regional Storm Event and simulated August 4 Burlington Storm
Site 2	East Sheldon Creek	Spill to the east side of channel to Great Lakes Boulevard, south of Rebecca Street	Spill during the Regional Storm Event and simulated August 4 Burlington Storm
Site 3	Main Sheldon Creek	Spill along South Side of Channel towards Wilmot Crescent	Spill during the Regional Storm Event
Site 4	Main Sheldon Creek	Potential flooding of properties on north side of channel, downstream of Lakeshore Road	Flooding during the 100 year event, Regional Storm Event and simulated August 4 Burlington Storm

Criteria was developed to define the flood risk for private properties at the above noted sites. Two categories were determined; major and minor flood risk:

Minor Flood Risk

- Flood risk to one side of the property
- No flood risk to the structure
- The flood risk has not been validated during the August 4, 2014, storm event

Major Flood Risk

- Floodlines encroach onto more than one side of the property
- Flood risk to the structure
- The flood risk has been verified during the August 4, 2014, storm event

Thirty-six (36) private properties have been identified with minor flood risk during the Regional Storm event at the four (4) flood risk sites. Flooding during the Regional Storm event would have the potential to encroach onto private properties, however flooding is not anticipated to impact any structures. Properties with minor flood risk would be validated and

addressed as required as part of future studies, however such follow-up work is considered a low priority.

Thirty-one (31) private properties have been identified with major flood risk at the four (4) identified locations within the study area during a Regional Storm event. This study provides flood mitigation measures to address the major flood risk to these properties. Notwithstanding the above, it should be noted that in comparison to other areas of the town, the four (4) flood risk sites identified as “major flood risk” are considered low risk as flooding is likely to only occur during the less frequent, more extreme storm events (i.e. 1 in 100 year storm event, Regional storm “Hurricane Hazel” flood event).

Cumulative Number of Properties Identified with Major Flood Risk during Less Frequent Storm Events					
Storm Event	Rebecca Street	Great Lakes Boulevard	Wilmot Crescent	Downstream of Lakeshore Road	Summation
100 Year Frequency Storm Event	0	0	0	5	5
August 4, 2014 Storm Event	0	9	0	8	17
Regional Storm Event	0	17	6	8	31

While buildings have not been identified as being at risk at Site # 1 (Rebecca Street), modelling shows that buildings and properties near the storm sewer inlet at Chalmers Street, opposite Village Wood Park (pathway for the spill) have the potential to be impacted during significant rainfall events. Modelling carried out for this study is high level and thus does not provide enough information to verify the spill pathway and assess specific impacts. It should be noted that during the August 4, 2014 event flooding was not reported in this area.

Flood Mitigation Options

Several alternative flood mitigation measures were developed and assessed based on the following evaluation factors:

- Environmental/Physical considerations;
- Social considerations; and:
- Economic considerations

Both structural alternatives (floodplain/channel improvements, flood proofing of buildings, flow diversions, and roadway modifications) and non-structural alternatives (creek maintenance plan, emergency preparedness, flood forecasting/warning, land acquisition, and regulation) were assessed.

The preferred alternative for Sites 2 and 3 are floodplain/channel improvements in the form of berms to mitigate flood risk, while the preferred alternative at Sites 1 and 4 is the non-structural alternative of emergency preparedness.

Site 1 (Rebecca Street):

Several structural options were investigated in detail to alleviate the spill to Rebecca Street. This included such works as berms, flood proofing, flow diversions, and roadway re-profiling; however, such works were either deemed impractical and/or onerous due to physical constraints such as existing utilities, grades and property limits and would not eliminate the flood risk. The preferred alternative for this site is to develop an emergency preparedness plan in the form of flood risk monitoring at the sag in the Rebecca Street right-of-way (ROW) and mobilizing town staff to limit pedestrian and vehicular traffic in the ROW during a significant precipitation event.

Additionally, representatives at the Suncor Site should be informed of the flood risk so they may undertake the necessary actions to mitigate the flood risk. Similar information should be provided to the property owners in the vicinity of the storm sewer inlet opposite Village Wood Park.

Site 2 (Great Lakes Boulevard):

The implementation of two (2) berms adjacent to Great Lakes Boulevard has been assessed to mitigate both the August 4, 2014 storm event and the Regional Storm event to mitigate the flood risk to nineteen (19) buildings. An existing berm has been identified at this location and the proposed berm could be constructed on top of the existing berm.

Site 3 (Wilmot Crescent)

The implementation of the berm adjacent to Wilmot Crescent has been assessed to mitigate the Regional Storm event to mitigate the flood risk to seven (7) buildings.

Site 4 (South of Lakeshore Road):

Several structural mitigation options were assessed, but were considered ineffective and impractical due to physical constraints and could potentially increase flood risk for others. The preferred alternative to reduce flood risk downstream of Lakeshore Road is the implementation of the emergency preparedness, a non-structural

alternative, followed by implementation of flood proofing buildings where feasible. The property owners adjacent to the creek should be informed of the flood risk due to less frequent storm events so they may undertake the necessary actions to mitigate the flood risk to their homes and properties. The onus for this alternative has been placed on the property owner.

Other non-structural measures such as the application of Conservation Halton (CH) regulation and regulatory policies, as well as municipal official plans and zoning by-laws to inform development in floodplain areas also help to mitigate risk. For example, a teardown/rebuild of a home within a Regulated floodplain would require the landowner to obtain permission from CH to ensure the development does not worsen existing flooding conditions within the property and adjacent to the property.

An Environmental Study Report has been compiled documenting the selection of a recommended preferred alternative and preliminary design plans. In accordance with a Schedule B undertaking, the project file must be made available for a mandatory 30-day public review period and staff are proposing to do so after this report is received, starting November 17, 2021 until December 17, 2021. In recognition of current COVID-19 restrictions, 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. Should no Part II Board Orders be received by the Minister of Environment, Conservation and Parks during the review period, the project will be deemed approved allowing it to proceed to detailed design and implementation.

Appendix B presents the consultant's executive summary report and preliminary design plans for this project.

CONSIDERATIONS:

(A) PUBLIC

Properties owners that are situated adjacent to the town-owned creek corridor all have been notified of the study work and invited to the Public Information Centres.

An overview of the issues, alternatives, evaluation and preliminary preferred alternative solutions were presented at two Public Information Centres (PIC) on December 12, 2019 and March 13, 2020 which were attended by local residents, Suncor Energy, and Region of Halton staff.

Residents/landowners as well as stakeholders and who expressed an interest in being updated of the progress of this project will be advised, via the formal Notice of Completion for the EA study, regarding the commencement of the 30-day public review period.

(B) FINANCIAL

The recommended flood mitigation works will be delivered through Transportation and Engineering capital flooding protection program. The implementation of these structures are not currently identified in the 10 year Capital Forecast.

Several riverine flood mitigation studies either have been completed or are nearing completion within the next 6 to 12 months, which will have recommendations that will also have budgetary demands on the capital flood mitigation program. These studies include Munn's Creek, Fourteen Mile /McCrane Creek, Lower Morrison and Wedgewood Creek and Joshua's Creek. Once all studies are completed, a prioritization of flood mitigation works will be carried out and implemented with consideration of level of risk, return on investment and funding availability.

Estimated costs for the recommended alternatives for flood mitigation at Sheldon Creek are:

Site	Preferred Alternative	Estimated Supply and Construction Cost (\$)
Rebecca Street	Non-Structural alternative in the form of emergency preparedness	N/A
Great Lakes Boulevard	Floodplain/Channel Improvements in the form of two berms	\$90,000
Wilmot Crescent	Floodplain/Channel Improvements in the form of a berm	\$222,000
Downstream of Lakeshore Road	Non-Structural alternative in the form of emergency preparedness/flood proofing building	Cost of implementation at the property owners expense

(C) IMPACT ON OTHER DEPARTMENTS & USERS

As this project moves into detailed design and forward to implementation, staff will work with both internal partners including staff from Parks and Open Space and Legal, and external parties such as Conservation Halton, Region of Halton, Suncor Energy and area stakeholders, to facilitate the design and construction of the recommended works.

Conservation Halton (CH) is currently in the process of updating floodplain mapping for Sheldon Creek as part of their Flood Hazard Mapping – East Burlington Creeks (Tuck, Shoreacres, Appleby and Sheldon Creeks) study. Through this study CH will be updating floodplain models to reflect the needs of preparing Regulatory floodplain mapping, pursuant to Ontario Regulation 162/08.

(D) CORPORATE STRATEGIC GOALS

This report addresses the corporate strategic goal(s) to:

- enhance our natural environment
- continuously improve our programs and services

(E) CLIMATE CHANGE/ACTION

The recommendations of the report support the incorporation of climate change resiliency into flood protection measures. This provides a benefit to the community through protection or reducing risk to private and public lands. The design work for the flood protection works will consider the impacts of the August 4, 2014 extreme rain event and the Hurricane Hazel Regional Storm event.

APPENDICES:

Appendix A - Map of Study Area
Appendix B - Sheldon Creek Flood Mitigation Opportunities Municipal Class Environmental Assessment Study Executive Summary.

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