



The Corporation of the Town of Tecumseh

Public Works & Environmental Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Environmental Services

Date to Council: May 28, 2019

Report Number: PWES-2019-34

Subject: Lake Flooding Emergency Preparedness

Recommendations

It is recommended:

That the Public Works & Environmental Services Report PWES-2019-34 Lake Flooding Emergency Preparedness **be received.**

Background

The purpose of this report is to provide Council with information related to the current Lake St. Clair high water levels, the projected Lake St. Clair water levels over the next few months and the related potential impacts to the Town of Tecumseh. The report will also provide information on Administration's assessment of this issue and potential mitigation measures.

Essex Region Conservation Authority (ERCA)

At the May 14, 2019 Regular Council Meeting (RCM), ERCA gave a presentation on the Great Lakes Water Levels: Current Conditions and Outlook (see Attachment No.1). The following is a summary of the information provided during the ERCA presentation:

- Significant rainfall events have occurred within the entire Great Lakes watershed this spring.
- The Lake Superior watershed received significant amounts of snow this past winter, which is continuing to melt and drain into Lake Superior.

- In February, the outflow from Lake Superior was 135% above the February long-term average outflow.
- Flows from Lake Superior take approximately 3 to 5 months to reach Lake St. Clair.
- The combination of snowmelt and significant rain events in the Great Lakes watershed is raising water elevations throughout the Great Lakes.
- In March 2019, the Lake St. Clair water level was approximately 72 cm above the March monthly mean water elevation (1918-2017).
- The Lake St. Clair maximum recorded monthly mean water elevation is 175.960 metres which occurred in October 1986.
- The Lake St. Clair maximum recorded monthly mean water elevation for the month of May is 175.830 metres which occurred in 1986.
- The current average Lake St. Clair water elevation (from May 1, 2019 to May 22, 2019) is approximately 175.890 metres.
- Water levels on Lake St. Clair typically reach the yearly maximum in July.
- Environment and Climate Change Canada is predicting that the 1986 maximum recorded spring/summer monthly mean water elevations may be slightly exceeded this year.
- The potential for flooding is exacerbated by certain wind events. Northeast wind events can raise water levels along the Lake St. Clair shoreline increasing the risk for flooding. In addition, wind generated waves have the potential to break overtop of existing shore protection and flow inland.
- The Lake St. Clair floodplain generally extends approximately 1.0 to 1.5 kilometers inland from the existing lake shoreline.
- Based on the estimated Lake St. Clair 1:100 year water level (176.400 metres), flooding depths for the portions of Tecumseh located in the Lake St. Clair floodplain could generally range from 0.0 to 0.75 metres, with maximum depths on certain roadways exceeding 0.9 metres.

May 14, 2019 Regular Council Meeting - Resolution of Council (Motion: RCM-124/19)

The following resolution of Council was adopted at the May 14, 2019 RCM:

That a new Sandbag Program **be developed** to make sand and sandbags available at no cost to residents living adjacent to Lake St Clair and Pike Creek, until mid-June 2019, subject to re-evaluation at that time;

And that equipment and materials **be purchased** to assist in filling the sandbags at an estimated cost of \$50,000.

And further that Administration **be authorized** to begin to install protective measures on the Town's critical infrastructure, being the storm and sanitary pump stations;

And furthermore that in the coming weeks, Administration also **be authorized** to give notices and offer assistance in building flood defences to those identified properties along Lake St. Clair and Pike Creek who are low lying and pose a higher risk of further inland flooding;

And furthermore that the costs for the new Sandbag Program, including materials, **be funded** from the Storm Sewer System (4200) Operational Budget, and the cost of equipment **be funded** from the Lifecycle Small Equipment Reserve;

And furthermore over that a report **be prepared** with full details on "Lake Flooding Emergency Preparedness" for the May 28, 2019, regular meeting of Council.

Comments

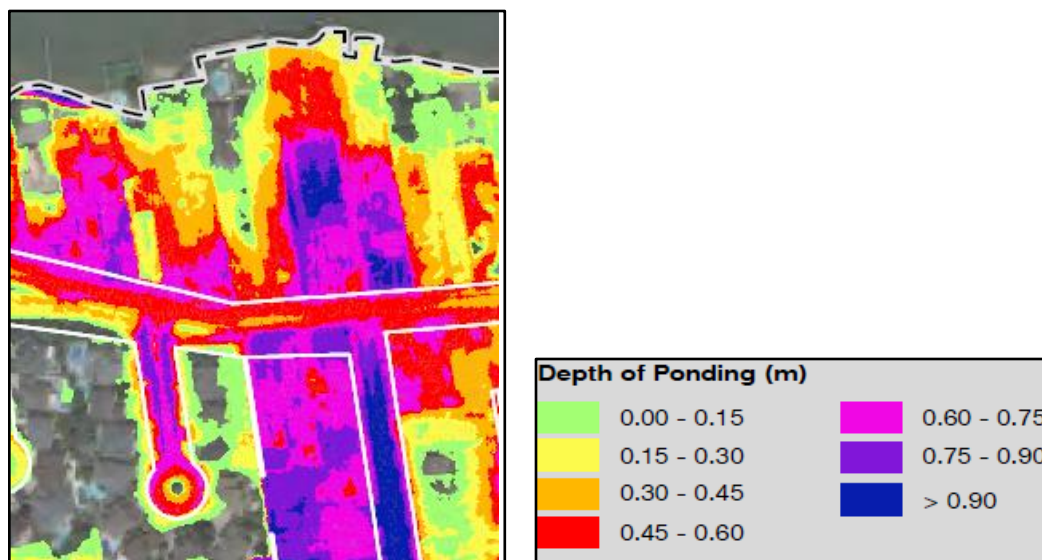
The Town has undertaken a number of recent strategic initiatives to prepare in the event of inland (lake induced) flooding. These include:

- Refinement of the 1:100 Year Lake Flood Line.

In 1976, ERCA completed the 'Essex Shoreline, Flood and Erosion Study' which had identified the 1:100 year lake flood elevation as 176.400 metres. The inland flooding extent up to this elevation for Essex County is available on the ERCA public interactive mapping site. The extent of inland flooding within Essex County, as well as the area along Lake St. Clair shoreline within the Town of Tecumseh have been depicted in Attachment No. 3.

Through the Town's recent works on the Storm Drainage Master Plan, the Town's storm sewer network along with LiDAR (light detection and ranging) information have been incorporated into a PCSWMM 2D Model. With the 2D Model the Town's Consultant, Dillon Consulting Ltd. (Dillon), was able to refine the limits of inland flooding from the 1976 report, which provides a more accurate depiction of the low lying areas. (see Attachment No. 4).

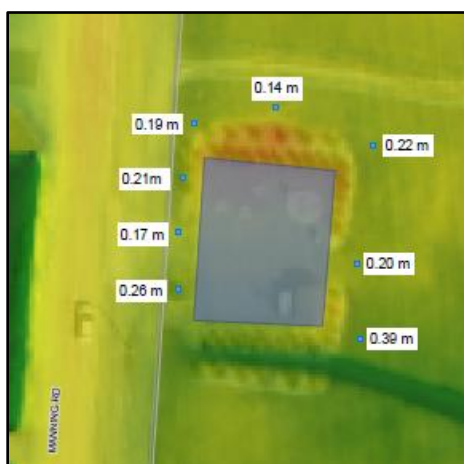
In addition, Dillon was also able to provide further mapping depicting the anticipated flooding depths at the 176.390 metre (static) elevation. This information is extremely useful for determining high priority areas that need protection, as well as areas that may be accessible and inaccessible during an inland flooding event. An example of this mapping is depicted below.



- Review of the Town's Critical Infrastructure (Storm and Sanitary Pump Stations)

With the refinement of the area affected by the 1:100 year lake flood elevation, the Town was able to focus on the possible effects on the critical infrastructure, being the eight (8) storm pump stations and two (2) sanitary pump stations. Through the utilization of the LiDAR information, the topography surrounding each pump station was reviewed and the flooding depths in relation to the 176.400 were determined.

Administration will be installing flood defences around these structures to ensure they continue working should a lake flooding event occur. The flood defences may be of a temporary nature (i.e. sandbags) or a more permanent structure (i.e. earth berming and grading) depending on site constraints. An example of the LiDAR information that was utilized is depicted below.



- Identification of Low Lying Waterfront Properties

A review of the LiDAR information was completed for properties adjacent to Lake St. Clair and Pike Creek. This enabled the Town to identify those low lying properties that may pose a higher risk of further inland flooding. The Town then retained the services of an Ontario Land Surveyor to obtain spot elevations on those properties and break walls to further refine the locations that may pose a higher risk.

A letter to those higher risk properties was hand delivered on May 16, 2019 advising them of the current lake levels, the associated risks, and offered assistance in the form of additional (filled) sandbags (see Attachment No.5). The letter also requested meeting as soon as possible with Town Staff to conduct further site investigations. Correspondence with the property owners and site meetings are still ongoing, and thus far the feedback has been very positive, and the property owners very cooperative.

It should be noted that no work will completely remove potential for flooding, however it is hoped that strategically placed mitigation measures may reduce the potential for inland flooding and adverse impacts to private properties.

- Availability of Sandbags to Waterfront Properties

At the May 14, 2019 Regular Meeting of Council, Council approved (Motion: RCM-124/19) the development of a sandbag program to make sand and sandbags available at no cost to the residents living adjacent to Lake St. Clair and Pike Creek (from Lake St. Clair to VIA Rail), until mid-June 2019, subject to re-evaluation at that time.

Subsequent to the May 14, 2019 RCM, a News Release was issued on May 15, 2019, and a Fact Sheet hand delivered to residents on May 17, 2019. (see Attachment No.6)

Sand bags were made available starting Thursday May 16, 2019 at the Tecumseh Arena and throughout the holiday weekend. The sand stockpile was placed at the Lakewood Park south parking lot and signed accordingly. The location of the sandbag pick-up was moved over to Town Hall (starting on Thursday May 23, 2019) to better utilize Town Staff. The sand bags are made available throughout regular business hours (8:30 a.m. to 4:30 p.m.)

From the time the sand bags were first made available, up to the end of day Tuesday May 21, 2019, there were 46 property owners that picked up approximately 4,400 sand bags.

Further notices and messaging will continue to be provided through the Town's website and social media accounts.

- Sandbag Materials and Equipment

At the beginning of 2019, Public Works had 6,000 sandbags in stock. On May 3, 2019, Administration purchased an additional 10,000 sandbags, which was part of a larger regional order placed by the County of Essex, Amherstburg and LaSalle.

On May 16, 2019, Administration also purchased equipment (the Sand Master 20) that will be able to mass fill sandbags, along with an additional 60,000 sandbags. Delivery of the equipment and sandbags is anticipated by May 24, 2019. The equipment and sandbags will be used to fortify flood defences on the Town's critical infrastructure, as well as provide those low-lying properties that may pose a higher risk of further inland flooding the necessary materials to build private flood defences.

- **Coordination of Volunteers**

There have been a few groups of volunteers that have contacted the Town, and are being coordinated through the Public Works Division to those property owners that are in need of assistance.

- **Continued Monitoring and Communications**

Administration continues to monitor weather conditions and water levels for Lake St. Clair. We are also reviewing the prognostications for water levels as they are updated monthly on various websites (The Canadian Hydrographic Service and the U.S. Army Corps of Engineers).

Public Works and OCWA staff will also continue to monitor the Town's critical infrastructure, being the storm and sanitary pump stations. The recently installed rain shields within the sanitary manholes will be re-inspected to ensure that it reduces the risk of extraneous flows (rain or lake) from entering into the sanitary sewer system.

Information will continue to be communicated through the various outlets, including news releases, the Town's website, social media accounts, and direct mailings of notices to those properties adjacent to the Lake St. Clair and Pike Creek shoreline.

Future Works to be Completed

As Administration continues to monitor the situation, further updates on the lake levels and our emergency preparedness efforts may be brought forward in a future report to Council as needed.

There are a number of Town initiatives that are currently being worked on, are being investigated, or are anticipated to commence in 2020. These include:

- **Flood Response Plan.** The Tecumseh Fire Department is currently updating a Flood Response Plan, which is anticipated to be completed in the coming week(s).
- **Shoreline Management Plan.** At the June 26, 2018 Regular Council Meeting, Council received (Motion RCM-194/18) PWES Report No. 2018-17 'Flood Mitigation Strategy'. The strategy included the completion of a Shoreline Management Plan, which was subsequently incorporated into the PWES 5-Year Capital Works Plan with an anticipated commencement date of 2020.
- **Temporary Emergency Works By-Law/Policy.** Administration will continue discussions with the Town Solicitor on the possibility of creating a Temporary

Emergency Works By-Law/Policy, which would permit works to commence on private property.

Consultations

Chief Administrative Officer
Fire & Emergency Services
Parks & Recreation Services
Financial Services
Manager Strategic Initiatives
Essex Region Conservation Authority
Dillon Consulting Limited

Financial Implications

At the May 14, 2019 Regular Meeting of Council, Council approved (Motion: RCM-124/19) the estimated costs of \$50,000 for the new sandbag program, including materials, be funded from the Storm Sewer System (4200) Operational Budget, and the cost of equipment be funded from the Lifecycle Small Equipment Reserve.

The costs to date are summarized below. It is important to note there are variable costs moving forward in relation to the quantity of sandbags and sand required, contractors completing permanent earth works on a 'time and material basis' (rather than placing temporary sand bags), additional consulting services, and associated staff labour and overtime costs.

Cost Item	Amount
Sand Master 20, including 60,000 sandbags	\$40,000
10,000 regular sandbags	\$4,179
Ontario Land Surveyor	\$1,943
Sand (approximate value to date)	\$2,500
Sub-total	\$48,622
Non-rebateable HST (1.76%)	\$856
Total to date	\$49,478

Link to Strategic Priorities

Applicable	2017-18 Strategic Priorities
<input checked="" type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that the Town of Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input type="checkbox"/>	Integrate the principles of health and wellness into all of the Town of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input checked="" type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☐

Website ☒ Social Media ☒ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Phil Bartnik, P.Eng.
Director Public Works & Environmental Services

Reviewed by:

Doug Pitre
Director Fire Services & Fire Chief, C.E.M.C.

Reviewed by:

Paul Anthony, RRFA
Director Parks & Recreation Services

Reviewed by:

Tom Kitsos, CPA, CMA, BComm
Director Financial Services & Treasurer

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
1	May 14, 2019 RCM, ERCA Presentation - Great Lakes Water Levels: Current Conditions and Outlook

Attachment Number	Attachment Name
2	Draft Resolution – May 14, 2019, Lake Flooding Emergency Preparedness
3	ERCA 1:100 Year Flood Line
4	ERCA 1:100 Year Flood Line Revised
5	2019-05-16 Letter to Low Lying Shoreline Properties
6	Sandbag News Release and Fact Sheet