

### Section I – Items for Regional Watershed Alliance Action

**TO:** Chair and Members of the Regional Watershed Alliance  
Meeting #1/18, Wednesday, May 23, 2018

**FROM:** Sameer Dhalla, Associate Director, Restoration and Infrastructure

**RE:** **TORONTO AND REGION CONSERVATION AUTHORITY (TRCA) FLOOD RISK MANAGEMENT PROGRAM AND COMMUNITY ENGAGEMENT**

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#### KEY ISSUE

To update the Regional Watershed Alliance (RWA) on TRCA's Flood Risk Management Program and discuss opportunities for community outreach and engagement.

#### RECOMMENDATION

**THAT staff report and presentation on TRCA Flood Risk Management Program be received;**

**THAT RWA consider implementing key community engagement and outreach priorities highlighted in this report;**

**AND FURTHER THAT the proposed working group of RWA on *Flooding and Extreme Weather Events Outreach* consider integrating these priorities in their work plan.**

#### BACKGROUND

Toronto and Region Conservation Authority (TRCA) Engineering Services section plays a keystone role in fulfilling TRCA's mandate to manage our regional water resources for current and future generations. Specifically, Engineering Services leads the strategic plan objectives to reduce or eliminate existing flood risks within the TRCA jurisdiction, and to minimize or eliminate the impact of new development and urban intensification on water quality, erosion and flood risk. Regulatory policy, planning, and site design are key components of achieving flood management and resilience solutions.

To meet these objectives, TRCA's Engineering Services is comprised of four teams, Water Resources Engineering, Capital Projects, Flood Infrastructure and Flood Risk Management. The Water Resources team works together with Planning and Development to reduce risk by ensuring that development and infrastructure projects are built in harmony with the hazard management principles of the Living City Policies. The Capital Projects team works to reduce flood risk through remedial mitigation projects, and also ensures the continued delivery of high-quality floodplain mapping, along with the hydrologic and hydraulic modelling that support it.

Another cornerstone of flood management is the suite of dams, channels and berms that make up TRCA's flood control infrastructure. The Flood Infrastructure and Hydrometrics team manages this infrastructure, and also ensures the operation of the rainfall and stream gauge network that provides critical real-time and historical information to enable data-driven decision making.

Finally, the Flood Risk Management team works to reduce existing flood risk to people and property by undertaking initiatives throughout the cycle of emergency management – from risk assessment to support preventative measures, to preparedness planning and outreach with municipal partners, through Flood Forecasting and Warning during flood events, to flood event documentation and analysis after the storm. The following report highlights the Flood Risk

## Item 7.2

Management key accomplishments of 2017 and current initiatives for 2018.

Objectives of Flood Risk Management:

1. Reduce or eliminate existing flood risks within the TRCA jurisdiction;
2. Strive to minimize the impact to communities and protect people and property from riverine flood risks, to the extent possible;
3. Fulfil TRCA's legislated mandate and delegated responsibilities; and
4. Build awareness of what Flood Risk Management does.

Strategies to achieve those objectives:

- A. Advance knowledge of flood risk;
- B. Disseminate/document flood risk;
- C. Facilitate the implementation of flood mitigation projects;
- D. Operate a state-of-the-art Flood Forecasting and Warning program;
- E. Work with municipalities to enhance flood emergency response capacity; and
- F. Teach people how to prepare/respond to flooding.

The above strategies are grouped into thematic areas, described together with their highlights for 2017 and 2018 below.

### **Flood Risk Assessment**

Understanding what is at stake when a flood occurs is critical. Leveraging matching funds through successful applications to the National Disaster Mitigation Program (NDMP), TRCA is currently updating the database of structures and roads (Flood Vulnerable Areas, or FVAs) with the help of GIS. This database is a key component of the Flood Risk Assessment process, which layers hazard information (TRCA's floodplain mapping) with exposure and vulnerability information, to help quantify and communicate flood risk spatially. National best practices are incorporated in flood damage estimation and will provide valuable data for further analysis to allow remediation and mitigation efforts. The updated Risk Assessments will be used to re-prioritize Flood Vulnerable Area clusters identified in the Remedial Capital Works and Flood Protection Strategy. This study hopes to wrap up in the Fall of 2018.

TRCA is also undertaking a study to characterize the flood and to understand what is at risk on the Toronto Island following the record high water levels experienced in 2017. Inundation maps are to be prepared with the help from GIS department, as well as a response plan for any future flooding. While conservation authority hazard regulation and shoreline protection projects have limited exposure to flood and erosion risk along the shoreline, the levels experienced in 2017 exceed the previous 100-year lake level. The Lake Ontario flooding is described further below; however this study hopes to provide high level recommendations for permanent mitigation and detail next study steps. Engineering Services will provide the technical expertise and provide information compiled on flooding experienced in the spring and summer of last year.

### **Education and Outreach**

Pro-actively educating the public about flood risk now helps ensure that TRCA communications in times of crisis are better understood. In the spirit of providing access to data, and in light of the evolving landscape of flood insurance, the NDMP Flood Risk Outreach Program project will build on the results from TRCA's Intake 1 Flood Risk Assessment project by supporting public awareness of potential flood emergencies. With this program, TRCA will develop and

## Item 7.2

implement public information sessions within neighbourhoods in the Greater Toronto Area known to be at risk of riverine flooding, as identified through previous and ongoing flood risk assessment work. The communities (neighbourhoods) will be those that are already identified as having a high concentration of structures within the regulatory floodplain, which are known to TRCA as Flood Vulnerable Clusters. This outreach program will:

- Increase awareness of flood risks to neighbourhoods that are within the floodplain, which in turn provides residents with the information they need to better prepare against flooding.
- Encourage neighbourhoods to work together to build local resiliency, which in turn supports overall municipal resilience.
- Prime flood-prone residents to be receptive to flood forecasting and warning messages, this increasing the effectiveness of such programs.

As part of this initiative, there may be an opportunity for the Regional Watershed Alliance get involved in this project by forming a working group to help with the engagement of the public, communications and with the promotion of the public information sessions.

In addition to the recently initiated NDMP Flood Risk Outreach Program, TRCA staff have created web tools that make it easier for the general public to understand about flooding and the floodplain, prepare themselves, and stay informed. TRCA continues to raise awareness about flood risks and personal preparedness by partnering in Emergency Preparedness Week outreach events, Water Festivals and through social media campaigns. The @TRCA Flood Twitter account earned 234,500 impressions in 2016, 533,400 in 2017 and 329,500 for the first four months of 2018. In addition, the number of sessions to [www.trcagauging.ca](http://www.trcagauging.ca) increased by 64%.

A priority project for 2018 is to enhance collaboration with TRCA's Education section with the creation of a curriculum around flood safety and emergency preparedness. Recognizing the need from municipal partners to foster a resilient population through education, TRCA is leveraging our education delivery capacity to create a course, with input from partners, in line with the Ontario Specialist High Skills Major program, the delivery of which can be a source of revenue to TRCA.

### **Preparedness through Strong Partnerships**

Ultimately, TRCA serves partner municipalities and the people that live within them. Flood Risk Management continued to build ever stronger relationships with partners and the communities TRCA serves, through workshops, conference presentations and convening working groups to facilitate cross-training. In 2017 and 2018, Flood Risk Management:

- Further cemented relationships with the emergency management and operational staff of partner municipalities:
  - Presented at the City of Brampton Exercise of 2018;
  - Attended City of Toronto Office of Emergency Management's first annual Private Sector Partners in Preparedness Engagement Workshop and worked on the development of a Risk Specific Plan for flooding;
  - Continued our participation in the Toronto Emergency Management Working Group; revised the Risk Specific Plan for Flooding and updated the flood risk ranking for their Hazard Identification and Risk Assessment program;
- Advanced the state of practice among conservation authorities through presentations

## Item 7.2

at the Provincial Flood Forecasting and Warning Committee fall conference and at the Ministry of Natural Resources and Forestry (MNR) Technical Transfer workshop.

- Reconvened the Lower Don Transportation Working Group to present the final report outlining operational roles and responsibilities, and to present the results of the Lower Don 1D-2D Floodplain mapping update, which better illustrates flooding mechanisms in this critical area and provides a baseline to test remediation options against.
- Continued representation at the GTA Flood Forecasting and Warning group to share advancements and lessons learned.
- Continued TRCA engagement with academic, research and industry partners also working in flood risk reduction (FloodNet, Insurance Bureau of Canada, Partners for Action, Canada Hazus User Group).
- Delivered guest lectures at Ryerson University, York University, Bayview Rotary Club, the Ontario Science Centre, among others.
- Garnered excellent media coverage, beyond our crisis communications during flooding events, which highlighted TRCA's work: Breakfast Television; The Weather Network and CTV news.

### **Flood Forecasting, Warning and Contingency Planning**

In order to fulfill TRCA's delegated responsibility from the Province of Ontario and to further achieve the goals of the Natural Hazards Policies of the Provincial Policy Statement, Section 3.1 of the *Planning Act*, TRCA operates a robust Flood Forecasting and Warning program. The program is operated in accordance with the requirements presented in the "Provincial Flood Forecasting and Warning Implementation Guidelines", Ministry of Natural Resources, August 2008. An experienced team of Flood Duty Officers (FDOs) are on-call 24 hours a day, seven days a week, and 365 days a year. FDOs monitor weather and watershed information, use computer models and hydrology expertise to determine whether to issue or escalate flood warning messages. They provide advice to municipal partners, other levels of government, and infrastructure operators regarding expected impacts, and provide public messaging. When warranted, they will direct the operation of TRCA's flood control infrastructure.

Staff continue to update the Flood Duty Officer manual, and have made updates to the RiverWatch operations manual and the Flood Contingency Plan on an annual basis. These improvements help to ensure clarity, consistency and knowledge transfer even in the case of staff turnover. TRCA has undertaken a study and selected Delft-FEWS as the preferred flood forecasting system moving forward for the new Decision Support System, and now moves into the next stages of the project.

TRCA roles, responsibilities and resources with respect to flood preparedness and response are documented in the Flood Contingency Plan, which is updated annually and distributed to TRCA municipal partners. While municipalities undertake the operational response to emergencies, including flooding, conservation authorities support the municipal response by providing technical advice, information and watershed expertise. In order to optimize TRCA's function for partners during flood events, TRCA maintains an Emergency Operations Centre, and employs Incident Management System (IMS) principles to ensure inter-operability with other agencies in times of crisis. A key accomplishment in has been the roll-out of the updated Incident Management System structure for flood emergencies. This system outlines the various roles and responsibilities and support functions that staff across TRCA would fulfill to support response to a flood event.

## Item 7.2

A high priority project for 2017 was the updating of Emergency Preparedness Plans (EPPs) for the major dams that TRCA owns and operates, ensuring that TRCA meets industry best practices outlined in the Canadian Dam Association guidelines. The update for G. Ross Lord Dam began in 2016, in collaboration with the City of Toronto, and awaiting final approval from the Board. This EPP was presented at a public information session in early 2018 and was well received.

### **Data Management, Technology, and Flood Event Documentation**

The current redevelopment of TRCA's Flood Monitoring website is a key priority in improving the delivery of critical flood related information from TRCA's real-time gauging network. The new website for [trcagauging.ca](http://trcagauging.ca) is in the final stages of internal testing and will be released to the public in the very near future. The team is now undertaking to review the database and improve the "back-end" of the website responsible for the real-time data collection.

In addition a newly implemented improvement of how TRCA collects field information during flood events by leveraging mobile technology tools such as Survey123 for ArcGIS has helped increase TRCA's situational awareness and streamline work. TRCA used this tool with huge success during the weeklong event of February 19<sup>th</sup> – 24<sup>th</sup> of this year with delivery of real-time photos and situation awareness of localized flooding due to ice jams.

### **2017 and 2018 Weather Highlights**

In 2017, the Flood Forecasting and Warning program issued a record thirty-five flood messages including nineteen Water Safety Watershed Conditions Statements, ten Flood Outlook Watershed Conditions Statements, five Flood Watch Statements and one Flood Warning with a cancellation.

In addition to having much of the winter precipitation within TRCA's jurisdiction fall as rain in 2017, the months of April and May were exceptionally rainy, particularly for the Lake Ontario – St. Lawrence basin at large. This exacerbated spring freshet conditions resulted in severe flooding along the Ottawa River and St. Lawrence River. Concurrently, water levels on Lake Ontario rose, reaching record levels in early May. Lake Ontario water levels remain slightly above average, however are below the 2017 thresholds, and are not anticipated to achieve the record high levels of last year.

2018 so far has been drier than 2017, however still with a few events to note. The first event occurred January 10<sup>th</sup> through to January 12<sup>th</sup> which included confirmation of flooding on the DVP south of Dundas from a very large ice jam resulting in a Flood Warning message. The second large event of 2018 was the February 19<sup>th</sup> to 24<sup>th</sup> spring melt event resulting in localized ice jam flooding. This event received a lot of media coverage for the TRCA, however the GTA fared much better than the Grand River area which experienced severe flooding. TRCA did not exceed a Flood Outlook message. April 12<sup>th</sup> – 16<sup>th</sup> was also another long event which also garnered a lot of media attention as it was also referred to as "Ice Storm 2018". There was a lot of lead time for this event, which including a large ice storm, followed by melt and rain with possibility of thunderstorms as well. TRCA river systems managed this system well, and although a Flood Watch message was issued with many reports of urban flooding, there was no riverine flooding from this event.

### **Summary**

The Flood Risk Management group, together with Engineering Services, fulfil one of TRCA's foundational roles. This is accomplished by working to reduce or eliminate existing flood risks

## Item 7.2

within the TRCA jurisdiction, and to minimize or eliminate the impact of new development and urban intensification on water quality, erosion and flood risk. TRCA will continue to bolster the resilience of the region in the face of flood risks, a hazard whose potential is expected to increase with the changing climate, by leveraging advancements in technology and opportunities for partnership.

### **DETAILS OF WORK TO BE DONE**

TRCA staff to work RWA to develop and implementing key community engagement and outreach priorities highlighted in this report

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**Attachments: n/a**