

**Section III – Items for the Information of the Board**

**TO:** Chair and Members of the Board of Directors  
Friday, September 27, 2024 Meeting

**FROM:** Sameer Dhalla, Director, Development and Engineering Services

**RE: JULY 16, AUGUST 17, AND AUGUST 18, 2024, SEVERE WEATHER EVENTS**

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**KEY ISSUE**

Significant rain events on July 16, August 17, and August 18 occurred within TRCA’s jurisdiction resulting in significant impacts in the cities of Mississauga and Toronto. These storm events exceeded the 1 in 100-year return period storm events. The report provides information on the storms, TRCA’s responses before, during, and after the events, and identifies potential improvements for subsequent consideration.

**RECOMMENDATION:**

**IT IS RECOMMENDED THAT the Flood Risk Management Summary of the July 16, August 17, and August 18, 2024, Severe Weather Events report be received for information.**

**AND THAT TRCA Engineering Services staff meet with City of Mississauga, City of Toronto, and Region of Peel Emergency Management Offices to review the July 16, August 17, and 18, 2024, storm event responses and to adjust emergency management plans as appropriate.**

**AND THAT TRCA Engineering Services staff review the TRCA Hydrometrics program to identify potential improvements.**

**AND THAT TRCA Engineering Services staff review Flood Messaging opportunities, in collaboration with Credit Valley Conservation, including the consideration of cell phone technologies to increase accessibility.**

**AND THAT TRCA Engineering Services pursue Federal and Provincial funding opportunities to support municipal partners and advance infrastructure improvements to reduce flood impacts, or to further advance the integration of weather forecasting with flood modelling to**

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**increase flood predictability across TRCA's jurisdiction.**

**AND THAT TRCA retain the services of a consultant to undertake a post-storm event analysis report.**

**AND THAT TRCA Engineering Services staff report back in 2025 on the efforts undertaken following the 2024 storm events.**

### **BACKGROUND**

Under the Conservation Authorities Act (CA Act) and Ontario Regulation 686/21: Mandatory Programs and Services, TRCA is required to provide programs and services related to the risk of natural hazards, most notably from flood and erosion. Specific activities include:

- Creating and maintaining flood plain mapping through the study of surface water hydrology and hydraulics,
- Providing flood awareness and public outreach,
- Providing Flood Forecasting and Warning (FFW) programs and services, and
- Operating and maintaining flood and erosion control infrastructure to reduce the risk of natural hazards.

TRCA's role in flood risk management is to provide services to partner municipalities to reduce flood risk from rivers, which includes creating and maintaining floodplain mapping, flood forecasting, issuing flood warning messages, operating flood infrastructure, flood mitigation through a variety of project specific service level agreements such as site-specific flood studies, and advising municipal and emergency response agencies.

In the plan review process, TRCA must, acting on behalf of the Ministry of Natural Resources (MNR) or in its capacity as a public body under the Planning Act, help to ensure that decisions under the Act are consistent with the natural hazard policies in the policy statements issued under section 3 of the Planning Act and conform to any natural hazard policies in a provincial plan. TRCA also regulates development within floodplains in TRCA's Regulated Areas in accordance with the CA Act and associated regulations.

Municipalities are responsible for emergency response, storm drainage infrastructure and urban flooding. They have the primary role for

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maintaining and upgrading urban drainage systems and for setting level of service standards within their jurisdiction.

### Rain Event Details

#### **July 16<sup>th</sup>, 2024 Event**

Toronto and Region Conservation Authority experienced wetter than normal weather leading up to the events of July 2024. The month of June exceeded 100 mm of rain, and the month of July received 215.4 mm of rain, at the Toronto Pearson Airport climate station. These values were significantly greater than the average monthly rainfall expectation of approximately 75 mm for the months of June and July. The July rainfall of 215.4 mm, at the Toronto Pearson Airport station, also exceeded the monthly rainfall record which was set in October 1954 when Hurricane Hazel passed through the Greater Toronto Area (GTA).

In the week prior to the July 16, 2024, event, southern Ontario and the GTA experienced rainfall from the remnants of Hurricane Beryl on July 10 and 11 and experienced multiple thunderstorm systems between July 12-15, in varying locations and distributions. These events resulted in saturated ground conditions prior to July 16, reducing the ability of the soil to absorb additional precipitation, which resulted in increased volumes of runoff experienced across TRCA's jurisdiction.

On July 16, sustained heavy rainfall lasted for 3-4 hours between approximately 8:00 AM and 12:00 PM, with the most intense rainfall being experienced within the municipalities of Mississauga and Toronto. Total rainfall amounts received, within TRCA's watersheds, varied between 8 mm and 102 mm, with the highest amounts concentrated in the west and southern areas. Rainfall intensities also varied between 5 mm/hr and 58 mm/hr, as recorded at TRCA's precipitation stations. Storm event return period calculations, which compare storm intensity and storm duration against historical data, varied across the TRCA jurisdiction with the largest return period measured in the Little Etobicoke Creek sub-watershed at TRCA's Rathwood precipitation station. In this location, the return period exceeded what the definition is for a 100-year return period storm by a small amount. The rainfall amounts, intensities, and locations are summarized in Attachments 1 and 2 which are appended to this report.

### August 17 and 18, 2024 Events

On Saturday, August 17, TRCA watersheds experienced multiple slow-moving severe thunderstorms with torrential downpours over a short period of time. On August 17, most of the rain fell within 4 hours between 1:00 PM and 5:00 PM, and rainfall totals ranged from 3 mm to 136 mm with an overall average of 36 mm across TRCA's precipitation stations. The heaviest rain was recorded in the south-west portion of TRCA's jurisdiction, similar to the July 16 storm event. However, instead of a broader jurisdiction wide storm event, the distribution from this event was a narrow south-west to north-east band along Highway 401, within Mississauga and Etobicoke. The highest amount of rainfall was recorded at TRCA's Rathwood precipitation station in Mississauga within the Little Etobicoke Creek sub-watershed near Tomken Road and Eglinton Avenue. Rainfall intensities recorded from these slow-moving thunderstorms ranged from 2 mm to 84 mm per hour, with an average intensity of 20 mm per hour.

Toronto Pearson International Airport recorded and set a new daily total rainfall record of 128.3 mm on August 17, which surpassed the previous record set on July 8, 2013, for the most rain in one day at this location.

On Sunday, August 18, rainfall was scattered throughout the jurisdiction and thunderstorm cell sizes were smaller than the previous day. Rainfall measured at TRCA's precipitation gauge stations, ranged from 1 mm to 39 mm, with the highest amounts being recorded in the upper portions of watersheds including the upper Humber, Don, and Rouge Rivers. The Etobicoke Creek watershed also received over 30 mm of additional rainfall at two locations within Mississauga. Rainfall daily totals and maximum hourly rain intensities for both the August 17 and August 18 events are provided in Attachments 3, 4, and 5, which are appended to this report.

### **RATIONALE**

The roles and responsibilities for ensuring public safety during flood events are shared between various levels of government, conservation authorities, and individuals. Municipalities are legislated, through the provincial Emergency Management and Civil Protection Act, to develop emergency plans and undertake response actions, including road closures and evacuations.

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TRCA operates a Flood Forecasting and Warning program (FFW) in accordance with the Ministry of Natural Resources (MNR) Provincial Flood Forecasting and Warning Guidelines and Ontario Regulation 686/21: Mandatory Programs and Services. TRCA's FFW program supports municipalities with their obligations under the Emergency Management and Civil Protection Act.

The TRCA FFW program is designed to:

- Support municipal emergency planning,
- Monitor weather and watershed conditions daily and maintain a local data collection network,
- Issue flood messages to municipalities, applicable agencies, media and the public, to advise of potential flooding when appropriate,
- Operate TRCA dams and flood control structures to reduce the effects of flooding, and
- Maintain communications with municipalities and the MNR Surface Water Monitoring Centre during a flood event.

To fulfil its role, TRCA works closely with partner municipalities and agencies, as well as with meteorological agencies such as the Ontario Storm Prediction Centre (OSPC) operated by Environment and Climate Change Canada (ECCC).

### **TRCA's Emergency Response - July 16, and August 17 & 18, 2024**

#### **July 16, 2024 Event**

During the July 16, 2024, event, TRCA acted in accordance with provincial incident management protocols and with the MNR guidelines for flood event messaging. The following provides a chronology of the steps taken during and following the event of July 16.

On July 15, TRCA issued an active *Watershed Conditions Statement – Water Safety* (yellow) message, in response to forecasted thunderstorm activity for that same day. The *Water Safety* message continued to be valid on July 16 and was set to expire at the end of day on July 16.

At 9:35 AM on July 16, TRCA's Flood Duty Officer (FDO) upgraded the Water Safety flood message to a *Flood Watch* (orange) category, in

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response to the FFW program's daily assessment for flood risk, which included consideration of ECCC weather forecasts and alerts for severe weather and verbal information from the OSPC. A *Flood Watch* message is issued when flooding is possible and is intended to advise municipalities, emergency services, and individuals in flood vulnerable areas to prepare for possible impacts.

At 10:50 AM, TRCA's FFW on-call staff activated the Emergency Operations Centre (EOC) and assigned Engineering Services staff specific roles in accordance with the Incident Management System (IMS) to assist with the fast-developing weather situation.

At 11:35 AM, the TRCA FDO issued a *Flood Warning* (red) category, which is the highest level of messaging, to municipal partners, agencies, school boards, media, and the public. The *Flood Warning* was issued due to the rainfall amounts received and the observations of fast rising water levels, particularly within Etobicoke Creek, Humber River, Black Creek, and the Don River. A *Flood Warning* is issued when flooding is imminent or already occurring. TRCA's *Flood Warning* message cited that significant rainfall amounts of up to 70mm in 3 hours had already been received, and that low lying areas and areas with poor drainage had already flooded or were going to flood. The message specifically identified the Lower Don River, Little Etobicoke Creek, and the Lower Humber River as areas that had flooded or were at imminent risk of flooding.

In addition to the publication of *Water Safety*, *Flood Watch*, and *Flood Warning* messaging, affected municipalities and agencies were contacted by phone at each instance of the TRCA flood message being upgraded. Direct communications were made to the City of Mississauga Emergency Management Office, Toronto Emergency Management Office, Toronto Transportation Central Dispatch, GO Transit Control Centre and the Evergreen Brick Works facility. These direct communications followed previously established emergency plans and agreements.

Throughout, and following the event, TRCA was actively involved in responding to media requests, including to CityNews, CBC The National, Toronto Star, CBC Radio, and CP24.

### August 17 & 18, 2024 Event

TRCA flood duty staff issued a *Watershed Conditions Statement – Water Safety* (yellow category) flood message on Friday, August 16 at 3:00 PM, following a Special Weather Statement issued by Environment Canada that cited an unstable weather pattern moving into the Golden Horseshoe area over the weekend. The *Water Safety Statement* warned the public about the dangers of being close to rivers and streams during severe weather and to avoid recreational activities in, on and around watercourses due to expected higher than normal water levels and flows.

TRCA's FDO upgraded the *Water Safety* flood message to a *Flood Watch* (orange category) at 2:00 PM on August 17, due to the amount of rainfall being received on the west side of the TRCA jurisdiction, specifically in Mississauga, with one rain gauge having recorded over 80 mm of rain in one hour. TRCA remained in a *Flood Watch* category for the duration of the weekend, including on August 18 before it was cancelled on Monday, August 19 at 10:30 AM.

TRCA communicated with municipal agencies about the weather events and their associated flood risks on August 17 and 18, including the City of Mississauga Emergency Management Office, Toronto Emergency Management Office, Toronto Transportation Central Dispatch, GO Transit Control Centre, the City of Markham, and Evergreen Brick Works.

### Comparison of the July 16<sup>th</sup> and August 17<sup>th</sup>, 2024 Storm Events

Both events consisted of a series of individual thunderstorms moving slowly and recurring, which are known as 'training thunderstorms' that resulted in high rainfall amounts with most rain falling within a 4-hour period. Rainfall intensities differed between the events, with the August 17 rainfall reaching as high as approximately 40-80 mm per hour, and the July 16 rainfall reaching as high as approximately 30 mm per hour. Conversely, the July 16 event had a larger geographical extent than the August 17 event, which was more localized.

In both events, received rainfall amounts were much higher than the forecasted amounts, which is an ongoing challenge for flood forecasting thunderstorm activity, and the issuance of flood messages prior to events taking place.

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On July 16, flood impacts were widespread, impacting both the cities of Toronto and Mississauga, while on August 17 and August 18, significant flooding was mostly experienced within the City of Mississauga. Flooding impacts consisted of both riverine and urban sources of flooding.

Comparison of the storm events provides an example of the effect of saturated ground conditions on the magnitude of flooding impacts. The drier conditions in the days preceding the August 17 and 18 storm events meant that even though the rainfall intensities were greater than July 16, the flooding impacts were not substantively different. If the soil conditions had been saturated like the preceding July 16 event, both urban and riverine flooding could have been worse.

### **Flooding Impacts**

During the storm events, the riverine flooding impacts occurred, to varying extents, within 4 of TRCA's 40 flood vulnerable clusters (i.e. areas with a high concentration of buildings and roads in a floodplain). These areas included the Little Etobicoke, Dixie-Dundas, Brickworks and Lower Don flood vulnerable clusters and these areas are illustrated in Attachment 6 which is appended to this report. The following sections summarize the flooding impacts by watershed for the three events of July 16, August 17, and August 18.

### **Etobicoke Creek Watershed**

On July 16, the Little Etobicoke and Dixie-Dundas flood vulnerable clusters were impacted with the Little Etobicoke Creek tributary of Etobicoke Creek reaching critical levels and overtopping its banks in multiple locations. The dominant spill from Little Etobicoke Creek occurred in the vicinity of Queen Frederica Drive, in Mississauga, adjacent to the Dixie Road and Dundas Street intersection. This spill flowed beyond the TRCA boundaries and impacted downstream communities within the Credit Valley Conservation jurisdiction in the City of Mississauga. The experienced flooding was consistent with impacts from the flood event of July 8, 2013, and aligned with TRCA's past modelling efforts for Little Etobicoke Creek. A comparison of recorded water levels within Little Etobicoke for the three events is included as Attachment 7, which is appended to this report.



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Following the storm event of July 8, 2013, which highlighted the need to provide a higher level of stormwater management service, the City of Mississauga initiated an Environmental Assessment study to reduce flood risk in the Dixie-Dundas area. This study was completed in the spring of 2024 and sets the stage for the design and construction of infrastructure solutions that when implemented can significantly lower the flood risks for the communities heavily impacted by the 2024 storms. More information regarding this study can be found on the City of Mississauga's website at: <https://www.mississauga.ca/projects-and-strategies/environmental-assessments/dixie-dundas-flood-mitigation-study/>, and on TRCA's website at: [Living in a Flood Vulnerable Area: Dixie-Dundas - Toronto and Region Conservation Authority \(TRCA\)](#).

Significant urban flooding was evidenced during the three storm events due to a combination of the storm events overwhelming municipal drainage systems and the overtopping of watercourses. Of note, the Tyndall Seniors Residence, which is located upstream of the Dixie-Dundas area in the City of Mississauga, was significantly flooded during the July 16 and August 17 storm events. A private flood wall was constructed in 1991 to reduce the risk of flooding at the Tyndal Seniors Residence but it was overtopped during both the July 16<sup>th</sup> and August 17<sup>th</sup> events. The wall was not designed to protect against the magnitude of events that occurred on July 16 and August 17, and post-event inspections showed that flow on the nearby road outflanked the flood wall and flooded the residence. During the events, evacuations were required and the building incurred significant flooding damage. As the senior's home is scheduled to be demolished and replaced with a new building, which is located at a higher elevation outside the flood plain, improvements to the Tyndall Flood Wall are likely not required. Decommissioning of the flood wall will be needed in the future, complete with riverbank re-establishment to restore natural river flow, subsequent to the completion of the new senior's residence. TRCA permitting for the new building which is currently under construction was issued in February 2024.

### **Don River Watershed**

During the storm of July 16, the lower reaches of the Don River experienced flooding with the most significant impacts being the closure

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and flooding of the Don Valley Parkway, Bayview Avenue extension, the Richmond Hill GO line, and the Evergreen Brick Works. During the July 16, 2024 event, TRCA's flood messages and communications led to Metrolinx closing the affected train lines thereby avoiding a repeat of the July 8, 2013, storm event whereby a train was overcome by floodwaters. Road closures by the City of Toronto further minimized impacts, however several vehicles, primarily on the Don Valley Parkway, were still trapped by floodwaters. Discussions with the City of Toronto Emergency Management Office and City of Toronto Transportation Services regarding this event are still underway.

Also, during the July 16 storm event, Mud Creek, which is located adjacent to the Evergreen Brick Works facility in the City of Toronto, experienced a bank failure leading to creek flows and debris being diverted into the nearby wetlands. Emergency repairs were instituted by the City of Toronto and TRCA in the days following the event thereby limiting damage to the Evergreen Brick Works wetlands. Permanent repairs will need to be designed and implemented, with the City of Toronto leading the repair efforts as Mud Creek is a Toronto owned watercourse. TRCA will provide support services, such as ecological, environmental monitoring, and permitting services, as the repair solution is designed and implemented.

On August 17, the Don River experienced significant rainfall and elevated flows but to a smaller degree than on July 16. During this event, the Don River breached its banks in the Todmorden Mills area and Bayview Avenue extension at Pottery Road was closed. In the lower reaches of the Don Valley Parkway near Dundas Street, the Don River did not overtop, however, the City of Toronto closed the on-ramp to the DVP as a precaution for a few hours. Also, as a precaution, the Evergreen Brick Works was evacuated on August 17.

The storm event of August 18 did not have significant effects on the Don River watershed and no flooding was reported to TRCA.

TRCA's G. Ross Lord dam was in storage mode for all three events to reduce flows further downstream. In all instances, the dam was able to accommodate the rainfall that was received, and it was not necessary to increase dam release rates until after the events had passed and water levels had receded downstream.

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Large storms often result in significant movement of sediments within a river system. Erosion can be a problem when infrastructure and buildings are at risk of failure, and erosion can be a problem as the eroded sediments are deposited elsewhere potentially creating flooding in other areas. Within the Don River watershed, high flows resulted in significant movement of sediments within the Keating Channel, near Lake Ontario. Fortunately, dredging operations are already underway to manage sediments within the Keating Channel and the storm did not negatively impact the dredging plans and backlog dredging operations in this location that are now underway.

### **Mimico Creek Watershed**

During the July and August storm events, Mimico Creek did not directly flood communities within the Mimico Creek watershed, however, significant urban flooding was noted within the Malton community in Mississauga. TRCA has been working with the City of Mississauga to assist with their flooding investigations.

The urban flooding experienced in Malton was consistent with observed impacts from the flood event of July 8, 2013, and aligned with TRCA's past modelling efforts within the Malton community.

### **Rouge River Watershed**

During the event of July 16, the Rouge River watershed is not known to have experienced riverine flooding.

However, during the event of August 17, Bruce Creek, a tributary of the Rouge River watershed, near Unionville, reached high water levels. The City of Markham was notified, however no significant flooding impacts were reported.

### **Humber River Watershed**

During all three storm events, the Humber River responded with high and fast flows, however, no critical levels were exceeded, and no significant riverine based flooding was reported, including along Black Creek and further downstream through to, and including the Lower Humber River. In

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the upper reaches of the Humber River, specifically in the City of Vaughan, some park trails and river crossings were closed to the public due to ponding in low-lying areas.

Within the Humber River watershed, TRCA's flood control structures were not damaged by the July 16, August 17, or August 18 flood events, except for two instances, namely that of sedimentation upstream of the Black Creek Dam and damages to channel linings within the Scarlett Flood Control Channel near Scarlett Road.

Black Creek Dam is located at Jane St. and Sheppard Ave. on Black Creek, which is tributary of the Humber River, and was constructed in 1959 to reduce flows downstream. A preliminary inspection following the rain events revealed a significant accumulation of sediments within the upstream reservoir. Sediment accumulation is expected during rain events, but this summer's storm events have accelerated the need for sediment management activity.

The Scarlett Road flood control channel was constructed in 1959, is located at Black Creek and Scarlett Road, and is a trapezoidal concrete channel design. During the July 16 event, several concrete panels lining the channel downstream of Scarlett Road failed due to the erosion of sub-grade material. This damage occurred within the vicinity of the Rockcliffe flood vulnerable area where channel improvements are currently being pursued by the City of Toronto.

### **TRCA's Response Post-Event**

Large storm events provide an opportunity to learn and prepare for future storm events. This learning is accomplished through the collection of field data to validate flood event projections, the analysis of rain and streamflow measurement systems, the review of communications, and the review of emergency response actions to improve response times.

While TRCA's role in flood risk management resides primarily within the Mitigation and Preparedness phases of Ontario's Flooding Strategy (<https://files.ontario.ca/mnrf-2020-flood-strategy-en-2020-03-10.pdf>), TRCA has also undertaken actions under the Response phase. These actions include the collection of information to support future mitigation and preparedness activities as well as the provision of support to municipal

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partners as they recover and rebuild after the storm events. Some of TRCA's response activities are described below.

Immediately following the storm events, TRCA staff began data collection activities to record high water marks at approximately 60 locations and the verification and archiving of watercourse flow, watercourse level, and precipitation information. Once compiled and checked, the intention is to share this information with our partners and the public using TRCA's Open Data portal.

TRCA staff also followed up with municipal partners at the cities of Mississauga, Brampton, Vaughan, Markham, and Toronto, to discuss and advise on municipal flood event response activities, locations of flood impacts and to identify potential improvements and collaboration opportunities on emergency planning and preparedness. As part of this work, numerous site visits and meetings have occurred involving TRCA staff and public officials to discuss the impacts of localized flooding and long-term and short-term strategies for mitigating future impacts. Public meetings have taken place, and more public meetings are planned with the TRCA participating in such meetings as appropriate.

### **Relationship to TRCA's 2023-2034 Strategic Plan**

This report supports the following Pillars and Outcomes set forth in TRCA's 2023-2034 Strategic Plan:

#### **Pillar 1 Environmental Protection and Hazard Management:**

- 1.1 Deliver provincially mandated services pertaining to flood and erosion hazards

#### **Pillar 4 Service Excellence:**

- 4.3 Responsive relationships and a trusted brand with a reputation for excellence

### **FINANCIAL DETAILS**

Funds for Flood Forecasting and Warning operations during flood events are available in operating account 115-60 (Flood Warning Program). Post event data collection, analysis, and reporting will be tracked and managed

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through account 157-03 (July 16th, 2024, Flood Event Data Collection and Documentation) with supporting funds from accounts 107-02 (Flood Protection and Remedial Capital Works) and 129-19 (Flood Remedial Works).

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

#### **Emergency Services Reviews**

Preparedness is an essential element for effective emergency response, and preparedness is enhanced through iterative review and improvement of emergency response plans and training programs. Effective emergency response also relies on effective communication and coordination amongst partners.

TRCA staff have already begun meeting with the City of Mississauga, Region of Peel, and City of Toronto Emergency Management Offices, and CVC to discuss lessons learned from the flooding events. These discussions are expected to result in changes to site specific flood risk packages as discussions continue into and through the Fall of 2024. These discussions are also expected to influence training procedures and exercises. Specifically, the Don Valley Parkway and the Dixie Dundas community will be areas of focus. Lessons from these exercises may also result in adjustments to TRCA's FFW program, and in enhancements to public education and awareness surrounding flood risk.

Procedure and program improvements will be introduced directly within emergency preparedness procedures and programs as they are identified. Should these changes result in a TRCA financial impact, a subsequent report will be prepared for TRCA Board consideration.

#### **Hydrometric Program**

With the support of TRCA's municipal partners, TRCA has developed an extensive and sophisticated hydrometric program, consisting of a collection of rain gauges, stream flow and level gauges, dam flow and level gauges and cameras with collected information being made available through a publicly accessible website. The information collected by the program prior to and during storm events is used to inform the flood messaging provided

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to the public and emergency services personnel. As thunderstorms are difficult to predict by weather forecasting, the real time measurement of field conditions is critical when deciding to issue Flood Watch and Flood Warning messaging.

Information from TRCA's hydrometric monitoring network is openly shared with external parties and is regularly used by municipal emergency management services and infrastructure planning groups. Since 2006, the program has expanded from 4 gauges to over 100 today, with the hydrometric program being operated in accordance with Water Survey Canada standards and procedures to ensure quality control and assurance. The monitoring program is a Category 1 (Mandatory) service provided by TRCA in accordance with Ontario Regulation 686/21.

During the storms of July 16, August 17, and August 18, the hydrometric program performed well and allowed TRCA to provide advance warning thereby limiting storm impacts. The storms also revealed opportunities for improvement with our and our partner's systems. For example, large website traffic on July 16<sup>th</sup> meant that the TRCA gauging website was not accessible at times. In addition, high water levels meant that some gauge locations were at risk of being damaged. We also noted that differing municipal, regional, and conservation authority approaches to data sharing and data quality control complicated some analyses and communications. These opportunities for improvement are now being addressed.

Furthermore, TRCA's neighbouring conservation authorities and municipal and agency partners have expressed an interest in working with the TRCA on a review of these opportunities. While it will take some time to consult with partners on these areas of identified improvements, TRCA's Engineering Services staff is aiming to provide a report on TRCA's hydrometric program in 2025 following this consultation and a more detailed program review. This review will also include examining current funding arrangements with partners and comparing these with identified needs to sustain and improve the program to address areas for continuous improvement.

Data from TRCA's rain gauges, streamflow gauges, stream water level gauges, dam water level gauges, and cameras is publicly available via TRCA's website and at <https://trcagauging.ca/>.

### **Flood Forecasting & Warning Messaging**

TRCA issues different types of flood messages in accordance with MNR requirements, including Watershed Conditions Statement (Water Safety and Flood Outlook), Flood Watch, Flood Warning, as well as messages specifically for the Lake Ontario Shoreline within TRCA's jurisdiction. Since the July 8, 2013, storm event, TRCA has made considerable investment to improve ease of access to flood information for the public, including an online flood plain map viewer, digital content on specific flood risk areas and a sign-up process where members of the public can sign up to receive TRCA flood messages via email.

While improvements have been made and online resources are available, in discussions following the 2024 storm events, we have in consultation with partners and officials identified opportunities to increase public awareness and usage of TRCA's flood warning messaging system. As advance warning gives the public an opportunity to move to safety and avoid flood vulnerable areas, expanding flood risk awareness is critical for achieving improved outcomes. TRCA will review the opportunity to employ cell phone technologies, such as apps and government warning systems such as the federal Alert Ready system to make warning messaging more accessible to the public. TRCA will also work directly with local councillors and municipal staff to spread knowledge of the TRCA's warning systems to affected and interested communities. This effort will include collaboration with neighbouring conservation authorities, municipalities, and the MNR to develop systems and approaches that can be standardized. An update for the TRCA Board will be provided in 2025 regarding these efforts.

### **Infrastructure Management**

The 2024 storm events have created a need for accelerated investment for TRCA's assets. Specifically, Black Creek Dam and the Scarlett Road Channel were impacted by the storms as described below.

The Black Creek Dam's reservoir requires periodic dredging and was last dredged in 2018 at a cost of \$1.05 million. The 2024 storm events have increased the amount of deposition upstream of the dam beyond the average rate of deposition thereby accelerating the need for dredging. The July 16<sup>th</sup> event required the TRCA to undertake emergency dredging



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operations at the dam inlet to restore flow through the control structure, and the August 17<sup>th</sup> event partially filled in the reservoir inlet again. Site access challenges and the cost of removing and disposing of sediment complicates maintenance activities and increases costs. Reduced reservoir capacity, resulting from sedimentation, decreases the dam's effectiveness at reducing downstream flooding risk. One option is to plan for the dredging of the reservoir within the next 1-2 years. Another option is to introduce design changes to the dam to more easily allow the natural movement of sediment downstream and reduce overall dredging costs. An analysis of options is planned and a recommendation for the next steps will be presented for consideration as part of TRCA's annual budgeting process. Emergency removal of sediments is not required, but planned action is likely required within the next 2 years and should be viewed as an unfunded priority budget need.

The Scarlett Road flood control channel requires short term stabilization and a long-term repair due to the July 16, 2024, storm event. TRCA is in the process of evaluating the damage and will be looking to temporarily stabilize the channel until a permanent solution can be implemented. At this point in the investigation, the channel lining failure is not believed to increase flood risk but a near term solution will be needed to prevent further damage due to watercourse erosion. An analysis of temporary stabilization options is planned, and a recommendation will be presented for consideration as part of TRCA's annual budgeting process. The permanent solution is anticipated to be part of the Scarlett Road bridge replacement works that are already in the planning stages by the City of Toronto.

### **External Program Funding**

A strength of TRCA is its ability to leverage federal and provincial sources of funding for flood risk mitigation. TRCA has both obtained funding to further its own projects and has assisted in obtaining funding for municipally led initiatives.

TRCA's floodplain mapping efforts have relied upon the federal governments' Flood Hazard Identification Program (FHIMP). This funding has fostered technological advancement and has allowed the TRCA to undertake, or as required, to hire consultants to update hydrological and hydraulic modelling which has led to the TRCA having the majority of its floodplain mapping being within the 10-year service level target. TRCA

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applies to this program for funding during most intake years. Application success depends on the competition for funding across the country and TRCA's internal ability to manage new or additional projects.

Infrastructure improvements have also benefitted from provincial and federal funding grants. For example, the improvements to Black Creek in Toronto are benefitting from the federal Disaster Mitigation Adaptation Fund (DMAF), and the Riverwalk project in Downtown Brampton is benefitting from DMAF and the provincial Housing Enabling Water Systems Fund. TRCA's efforts in collaboration with our partners have contributed to the high success rates in obtaining funding.

Competition for funding grants is high and success can be increased by aligning project specifics with provincial or federal program goals. For example, the Black Creek project aligned with the federal government's interest in reducing disaster recovery costs. Conversely, Brampton's Riverwalk project creates conditions for housing development which is a provincial priority. TRCA will continue to identify and apply for provincial and federal funding for risk reduction projects across its jurisdiction. TRCA understands the urgency and need to advance improvements within the Dixie-Dundas area of Mississauga and will continue its efforts to pursue provincial and federal funding support in collaboration with the City of Mississauga and the Region of Peel, as grant program opportunities become available. TRCA's collaboration with the City of Mississauga will include modelling services to identify the optimal phasing and extent of works in the Dixie-Dundas area to maximize the speed at which risk reduction can be achieved. TRCA will also continue its efforts to advocate for the creation of new grant programs given the large need for such programs across Ontario and Canada.

### **Storm Event Analysis Report**

Storm impacts vary from storm to storm and developing a thorough understanding of the relationship between extreme rainfall and flooding impacts is an important step in preparing emergency services for future events and in developing accurate floodplain mapping. The best way to develop and document the lessons from an extreme storm event is to prepare and publish a storm event analysis report. Such a report was last prepared by the TRCA for the July 8, 2013, storm event and this report is available through TRCA's website (<https://trca.ca/conservation/flood-risk->

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management/modeling-references-section/).

During and following the significant storm events of 2024 numerous statements have been observed in the media regarding the expected frequency of significant storm events or of significant flooding events and of the influence of climate change. A storm event analysis report can serve as a statistical foundation to identify whether the current 100-year storm event definition remains valid and can inform municipal infrastructure storm event design standards. TRCA will lead the preparation of storm event analysis report, using the services of an external consultant, through a competitive procurement process, to prepare a single report discussing the events of July 16, August 17, and August 18. This report will be prepared in collaboration with the Cities of Mississauga and Toronto, Region of Peel, and Credit Valley Conservation, and will contain analysis and discussion on the following:

- Storm event return periods characterization (i.e. How do these storms compare to the 100-year design storm events and Hurricane Hazel?),
- Flood event return period characterization (i.e. Undertake a flood frequency and hydrologic analysis to understand the effect of compounding risks),
- Intensity Duration Curves (IDF) (i.e. Is a 100-year storm still a 100-year storm?). This analysis would include comments on the influence of these storm events on existing municipal and regional IDF definitions, and the development of a process for more frequent IDF updates),
- A meteorological assessment to understand what conditions led to such significant rainfall occurring. This assessment would include a characterization of the local climate within this pocket of TRCA's jurisdiction which has experienced 3 events which exceeded the 100-year storm within the last 11 years, and
- Inclusion of detailed storm event data to allow easy access for use in floodplain modelling and infrastructure design by TRCA and stakeholders, with the report being available for public use.

## Item 9.2

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Date: September 18, 2024**

Attachment 1 - Rainfall Totals - July 16 Storm Event  
Attachment 2 - Rainfall distribution map for July 16, 2024  
Attachment 3 - Rainfall Totals – August 17-18, 2024  
Attachment 4 - Rainfall distribution map for August 17, 2024  
Attachment 5 - Rainfall distribution map for August 18, 2024  
Attachment 6 - TRCA Flood Vulnerable Clusters Map  
Attachment 7 - Water level comparison chart for Little Etobicoke Creek