

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Thursday, November 10, 2022 Meeting

FROM: Anil Wijesooriya, Director, Restoration and Infrastructure

RE: **EROSION RISK MANAGEMENT PROGRAM – 2022 UPDATE**

KEY ISSUE

An information report regarding the Erosion Risk Management Program and related services and strategic updates from the Erosion Risk Management business unit.

RECOMMENDATION:

IT IS RECOMMENDED THAT the staff report on Toronto Region and Conservation Authority's (TRCA) Erosion Risk Management Program, be received.

BACKGROUND

Managing the risk associated with the natural hazards of flooding and erosion is one of the primary roles of conservation authorities under the *Conservation Authorities Act*. TRCA fulfills this role through the delivery of multiple natural resource management programs and services, including the Erosion Risk Management Program (ERMP). The ERMP focuses on the identification and remediation of shoreline and valley land erosion hazards throughout TRCA's jurisdiction and encourages proactive prevention, protection, and management of erosion issues on private and public property.

The primary TRCA business unit managing erosion hazards is Erosion Risk Management (ERM) under the Restoration and Infrastructure Division (R&I). Under the ERMP, erosion hazards across TRCA's watersheds are identified and ranked on a priority basis. ERM staff regularly conduct site visits throughout the year to assess and reprioritize erosion hazards in response to major weather events. As such, the list of priority sites is not static, and the ranking of sites may change within any given year as site conditions evolve or as new erosion hazard sites are identified. Stabilization works are conducted annually to address erosion hazards based on the available funding. In general, the ERMP is capital funded through TRCA's partners at the City of Toronto, Region of Peel, and Region of York and in some specific cases local municipalities. Enhanced funding and fee-for-service work with municipal partners has also contributed greatly to the growth and expansion of the ERMP.

Federal grant funding, which TRCA started receiving in 2021 through the Disaster Mitigation & Adaptation Fund (DMAF) continues to have a positive impact on the projects being actively planned and delivered by the ERM group under several project portfolios. Of the approximately 64 projects being actively planned this year by ERM, 61% of them are being partially funded through DMAF.

RATIONALE

The following sections provide a brief overview of the various portfolios and major programs operated under the ERMP. A list of all 64 projects occurring under the ERMP in 2022, summarized by portfolio, is found in Attachment 1 – Table of projects being planned under the ERMP in 2022. These 64 project locations are shown on Attachment 2 – Map of projects being planned under the ERMP in 2022. Detailed descriptions of 11 of these 64 projects are found in

Attachment 3 – ERM Portfolio and Program Factsheets.

Toronto Ravine Major Maintenance

The Toronto Ravine Major Maintenance portfolio focuses on the maintenance and repair of TRCA's permanent erosion control assets within the City of Toronto. These structures are found along valley corridors, ravines, and natural slopes. The following factors are considered when prioritizing work: current condition of the asset; remaining service life; proximity to permanent buildings or essential infrastructure; consequence of asset failure; and asset age.

In 2022, TRCA has seven projects in study, planning or design under the Toronto Ravine Major Maintenance portfolio. TRCA's main implementation priority for this year is the West Don River in E.T Seton Park (Area 3) Major Maintenance Project.

Toronto Waterfront Major Maintenance

The Toronto Waterfront Major Maintenance portfolio handles the repair and maintenance of TRCA's network of permanent shoreline erosion control assets along the City of Toronto waterfront. These structures along the north shore of Lake Ontario are designed to provide erosion protection of the shoreline, adjacent tableland, public amenities, and infrastructure. Many of these assets are nearing the end of their lifespan and over the past five years catalogued damages to the structures have increased significantly due to multiple severe weather events.

In 2022, TRCA has seven active projects under the Toronto Waterfront Major Maintenance portfolio. The major projects being implemented this year include the Port Union Phase 1 Beach Curb Major Maintenance Project and Prince of Wales Park Major Maintenance Project.

Valley Erosion Hazards (City of Toronto)

The Valley Erosion Hazards portfolio addresses erosion hazards and slope instability issues impacting private and public property throughout the ravine systems in the City of Toronto. The July 8, 2013, severe weather event was the catalyst for a funding increase to this portfolio that prompted TRCA to extend assistance to private properties where homes have been deemed at risk by erosion or slope instability. The goal of each project is to provide a cost-effective solution to protect essential infrastructure, such as residential dwellings and municipal assets. Projects are implemented on a priority basis to the limit of available funding each year. Each year, a portion of the annual portfolio budget is allocated towards the completion of slope stability and erosion risk assessments for newly identified sites. The results of these assessments determine whether there exists any long-term erosion risk to essential structures on a property. This information is then used to quantitatively rank sites for work through the ERMP based on erosion risk.

Managing relationships with private landowners is a major component of work advanced under this portfolio and most interactions are constructive and positive. A few of the most common concerns raised by landowners have been listed below for context:

- The approach recommended by TRCA to stabilize the erosion hazards and how it impacts their property including existing vegetation/trees;
- How properties are prioritized, the associated timelines to complete the project given municipal funding considerations, and TRCA's procedural and procurement obligations; and
- Requirements under TRCA's *Private Landowner Contribution for Erosion Control Works* Policy for the property owner(s) to either financially contribute to the cost of the project or convey hazard lands where the stabilization work will take place.

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In 2022, TRCA has 17 active projects under the Valley Erosion Hazard portfolio and has 29 sites planned for work in the 10 Year Forecast based on projected available funding. There is currently a backlog of 39 high-risk sites known to TRCA that will not be addressed in the next 10 years due to funding constraints. The number of high-risk sites is projected to increase as climate change impacts cause more frequent and more intense severe weather events.

Implementation priorities this year include the following projects: Peacham Crescent Slope Stabilization Project; 193 – 195 Hudson Drive Slope Stabilization Project; 31 – 39 Lakeland Drive Slope Stabilization Project; East Don River behind Clarinda Drive Erosion Control and Slope Stabilization Project; 22 – 24 Bucksburn Drive Erosion Control and Slope Stabilization Project; various works as part of the Yellow Creek behind Heath Street East Erosion Control and Slope Stabilization Project; and a few minor works sites whose timing is to be confirmed.

York Region Streambank Infrastructure Erosion Control Management Program

The York Region Streambank Infrastructure Erosion Control Management Program (SIECMP) provides long-term erosion hazard management for Environmental Services' infrastructure assets along ravines and watercourses. The portfolio includes the monitoring, study, design, maintenance, and implementation of erosion control works for infrastructure protection in TRCA's jurisdiction of York Region. Studies and remedial works are prioritized based on a risk framework that considers a number of factors such as: depth of cover; infrastructure type; remaining service life; consequence of failure; and current condition of the asset.

In 2022, TRCA has five active projects under the SIECMP. The main priority for 2022 is to implement German Mills Settlers Park Sanitary Infrastructure Protection Project Sites 2 & 3.

TRCA Maintenance & Other Hazards (York Region)

The TRCA Maintenance & Other Hazards (York Region) portfolio is established for maintaining TRCA's existing permanent erosion control assets and developing new erosion control protection measures on TRCA lands within York Region. These assets are often found along ravine and valley corridors or along natural slopes. Repairs are prioritized based on a number of factors such as: asset age; remaining service life; proximity of permanent buildings or essential infrastructure; consequence of failure; and current condition of the asset.

In 2022, TRCA has three active projects under the TRCA Maintenance & Other Hazards (York Region) portfolio. The main priority for 2022 was to implement the East Humber River (EMS789) Bank Stabilization Project.

Private Property Erosion Hazard Mitigation Business Case (York Region)

The Private Property Erosion Hazard Business Case (York Region) was proposed in 2018 to address a growing number of slope instability and erosion hazards that were placing private properties at risk in TRCA's jurisdiction in the Regional Municipality of York. The goal of the business case is to provide a cost-effective solution to protect essential infrastructure, such as residential dwellings. Slope stability and erosion risk assessments, detailed design development and construction are conducted on a priority basis to the limit of available funding each year. In 2020 it was determined that no new funding would be provided, and the existing budget would be utilized to address existing commitments at key locations.

In 2022, TRCA implemented the 70 Main Street South Slope Stabilization Project under the Private Property Erosion Hazard Mitigation Business Case (York Region).

Region of Peel Erosion Control & Infrastructure Protection

The Region of Peel Erosion Control & Infrastructure Protection portfolio monitors the risk to TRCA owned erosion control structures, Region of Peel infrastructure hazard monitoring sites, and other erosion hazards impacting public and private land. This portfolio includes the monitoring, study, design, maintenance, and implementation of erosion control works to remedy these hazards. Mitigation measures and repairs are prioritized based on several factors such as: depth of cover or closest distance of the erosion hazard to the infrastructure; remaining service life; infrastructure type; consequence of failure; and current condition or exposure of the asset. Prioritization is based on the highest risk locations, which in recent years tends to be infrastructure hazard sites.

Currently, TRCA monitors 1,410 infrastructure hazard sites within the Region of Peel in TRCA's jurisdiction to establish long-term monitoring sites. In addition to these infrastructure hazard sites, TRCA currently monitors a total of 143 erosion control structures and 59 erosion hazard sites in the Region of Peel.

In 2022, TRCA has five projects under the Region of Peel Erosion Control and Infrastructure Protection portfolio. The main implementation priorities for 2022 include the Malton Greenway Sanitary Infrastructure Protection Project (I-700) and the Ken Whillans Greenway Sanitary Infrastructure Protection Project (I-566).

Toronto Water Monitoring

In 2010, the City of Toronto and TRCA developed a long-term monitoring partnership to assess the risks to Toronto Water infrastructure in ravine and valley systems. This program aims to inspect Toronto Water infrastructure within the City of Toronto's stream valleys and along the shoreline of Lake Ontario for the purpose of identifying Toronto Water infrastructure that is at risk or has been damaged due to erosion before a complete failure occurs. The program reduces environmental and public health and safety risks and allows Toronto Water staff to plan, prioritize and budget for asset maintenance, improvement, replacement, and protection effectively and efficiently.

In 2021, TRCA staff assessed a total of 2,885 assets, and it is anticipated that approximately 2,500 assets will be inspected in 2022.

Brampton City-wide Watercourse Erosion Reassessment Study

In 2016, the City of Brampton retained TRCA to undertake the City-wide Watercourse Erosion Assessment Study for the purpose of completing a detailed inventory and report to identify erosion risks to the City's infrastructure and public safety.

Between 2016 and 2017, TRCA ERM staff walked through all accessible stream corridors and completed a comprehensive inventory of erosion/flood control structures, municipal/regional infrastructure, and erosion hazard sites, resulting in 5,135 sites inventoried and inspected.

In 2018 ERM retained Greck and Associates Ltd. (Palmer & Greck) to provide professional water resources engineering services that advised on the fluvial geomorphological processes affecting flagged sites and structures. Palmer & Greck also provided recommended repair solutions for the sites, which TRCA used to develop a detailed 10-year capital repair plan and 20-year repair forecast, assuming an annual budget of \$1,000,000.00.

In 2022, ERM staff will reinspect 425 priority erosion hazard sites and structures that were previously assessed in the city. ERM will utilize information gathered from the re-inspections to

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prepare a technical memorandum that will summarize the results, comment on any change in priorities from the 2018 report and provide recommendations for consideration in 2022 and beyond.

Fee-for-Service Projects

ERM also undertakes projects for TRCA's regional and municipal partners on a fee-for-service basis to help address their erosion hazard priorities. These projects vary in scale and complexity. Typical fee-for-service projects focus on providing erosion protection for critical public infrastructure and are often located in natural or environmentally sensitive areas.

In the City of Toronto, TRCA partners with the Parks, Forestry & Recreation (PF&R) and Transportation Services divisions through a Master Service Agreement. TRCA expects to establish similar service level agreements with the Toronto Water division, as well as other municipalities and regions to help deliver additional fee-for-service projects while strengthening TRCA's partnerships and financial resilience.

In 2022, ERM has 19 fee-for-service projects with various municipal and regional partners, as well as private and not-for-profit organizations. Some of the major fee-for-service projects that are being implemented this year include the University of Toronto Scarborough Campus Bank Stabilization (Area B) Project and the Humber Bay Park East Shoreline Maintenance Project.

ERMP – Strategic updates

In addition to the capital and recoverable projects & programs described above, ERM staff have been working on some key updates to the ERMP to improve operational efficiency. A brief overview on these initiatives and some high-profile and emergency works projects ERM staff are working on has been provided below:

- Staff submitted an updated version of TRCA's *Private Landowner Contribution for Erosion Control Works Policy* to the Policy Committee in March 2022; the updated Policy went into effect on May 24, 2022 (included as Attachment 4 – Private Landowner Contribution for Erosion Control Works Policy). The Policy updates provide clarity on landowner eligibility requirements and include other refinements based on extensive staff experience, knowledge, and lessons learned. The updated Policy also outlines the planning process for these types of projects in a simple and concise manner;
- ERM staff continued to monitor storm events, coordinating post-storm inspections of TRCA owned erosion control assets. During the 2021 summer storm season 6 events occurred over 7 weeks (early August thru late September). ERM staff scheduled 81 inspections of TRCA owned and maintained erosion control assets, and 96 inspections of municipal partner infrastructure hazard sites utilizing their **Flood Risk Analysis Network (FRANK)** tool. ERM staff initiated an academic research partnership with Professor Eric Vaz (*Toronto Metropolitan University – formerly Ryerson*) that will provide an automated source of georeferenced rainfall data for use in FRANK;
- Over the course of 2021, ERM increased its use of Remotely Piloted Aircraft Systems (RPAS) for the purpose of monitoring and assessing erosion hazards. Utilizing a high-resolution camera or a Light Detection and Ranging (LiDAR) payload, ERM collects data within the regulated area of TRCA's jurisdiction to be processed into three-dimensional digital terrain models (DTMs) using photos (photogrammetry), or the LiDAR data. ERM staff have also been experimenting with ground-collected photogrammetry modelling, to allow creation of a 3D model of an erosion hazard using their cellphone cameras; and

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- With the help of internal partners (Infrastructure Planning and Permits) ERM has reviewed the planned and/or permitted erosion control work within TRCA's jurisdiction. Six Emergency Works in the City of Toronto and one Emergency Work within Durham Region were noted as erosion control works not built, maintained, nor inspected by ERM. The proposed Planning Application Review and Enforcement System (PARES) will provide opportunity for simplified queries of planning and permit data for future reporting on non-TRCA led erosion control projects.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan

This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 2 – Manage our regional water resources for current and future generations

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Attachments: 5

Attachment 1: Table of projects being planned under the ERMP in 2022

Attachment 2: Map of projects being planned under the ERMP in 2022

Attachment 3: ERM Portfolio and Program Factsheets

Attachment 4: Private Landowner Contribution for Erosion Control Works Policy

Attachment 5: Map of City of Toronto and Durham Region Planned Emergency Erosion Control Works 2022