Cooksville Creek Stormwater Management Facilities: Urban Retrofit Flood Control in Action

Samantha Archibald, P.Eng.
Marjorie MacDonald, P.Eng.

November 12, 2025

Presentation Agenda

1. Project Background
2. Overview of Completed SWMFs
3. Recent Storm Events
4. Site Investigation Results
5. Impacts of SWMFs on Cooksville Creek

Cooksville Creek Background

The Cooksville Creek watershed has experienced numerous flooding issues over the past decade as a result of intensive urban development and inadequate SWM.

In July 2012, the City of Mississauga undertook a Municipal Class Environmental Assessment (EA) Study to compare alternatives which would reduce the risk of flooding in the Cooksville Creek watershed

Results of the EA recommended construction of 13 SWMFs within the watershed, primarily in the upstream portion of the watershed to free up capacity in the downstream drainage system.

Eastgate Park SWMF

The underground SWMF was constructed using a Plastic Arch Chamber System.

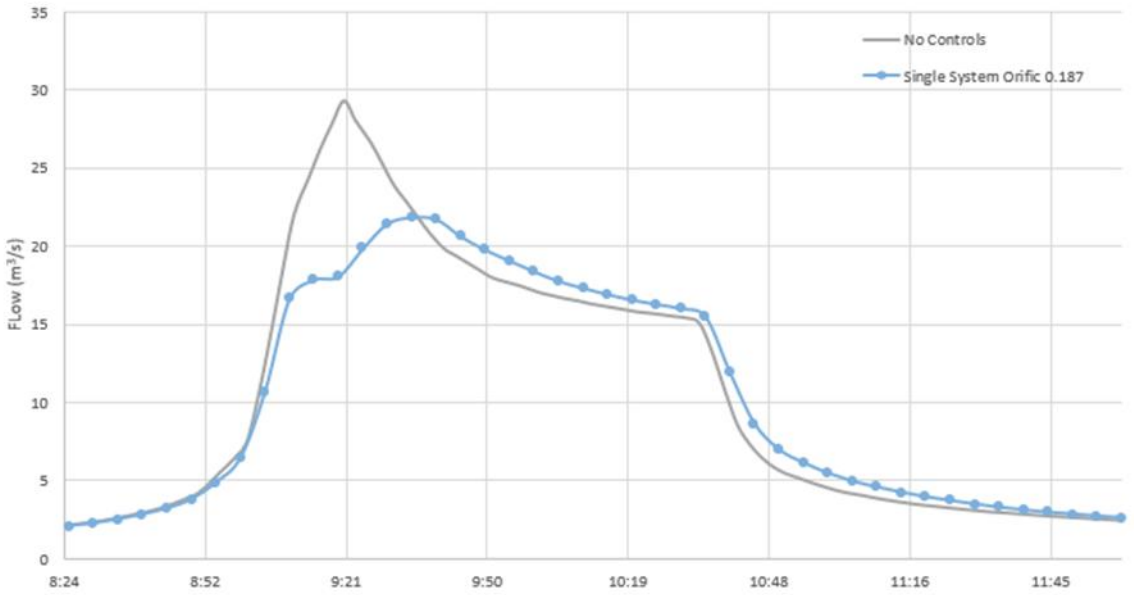
SWMF receives runoff from a trunk storm sewer which conveys the east branch of Cooksville Creek.

The chambers do not provide water balance or water quality controls but do include an 'Isolator Row' for improved maintenance.

Events smaller than the 25-year are not intended to enter the facility in order to retain storage for large events.

Designed to reduce 100-Year Peak Flow by 27% at the location of the facility

Parameter	Value
Provided Storage (m^3)	13,888
Total Construction Cost ($)	$6.43 M
Completion Date	August 2018



Eastgate Park SWMF

Pre-Construction – August 2017
Construction – July 2018
Completion – 2018

Sandalwood Park SWMF

Located upstream of Eastgate SWMF and is configured using a Plastic Arch Chamber System.

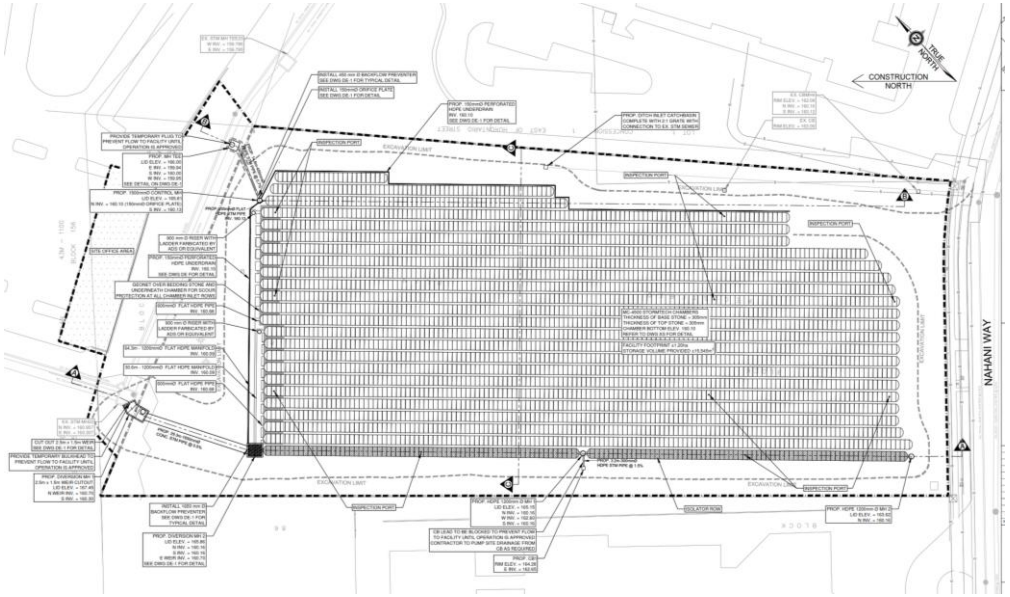
SWMF receives runoff from a trunk storm sewer which conveys the east branch of Cooksville Creek.

The chambers do not provide water balance or water quality controls but does include a ‘Separator Row’ for improved maintenance.

Smaller storm events (<10 year) are not intended to enter the facility in order to retain storage for large events.

Designed to reduce 100-Year Peak Flow by 25% at this location

Parameter	Value
Provided Storage (m^3)	14,073
Total Construction Cost ($)	$6.06 M
Completion Date	August 2021



Sandalwood Park SWMF

Reconstruction Completed August 2020

Mississauga Valley Park SWMF

The underground SWMF was constructed of cast in place concrete with sacrificial forms.

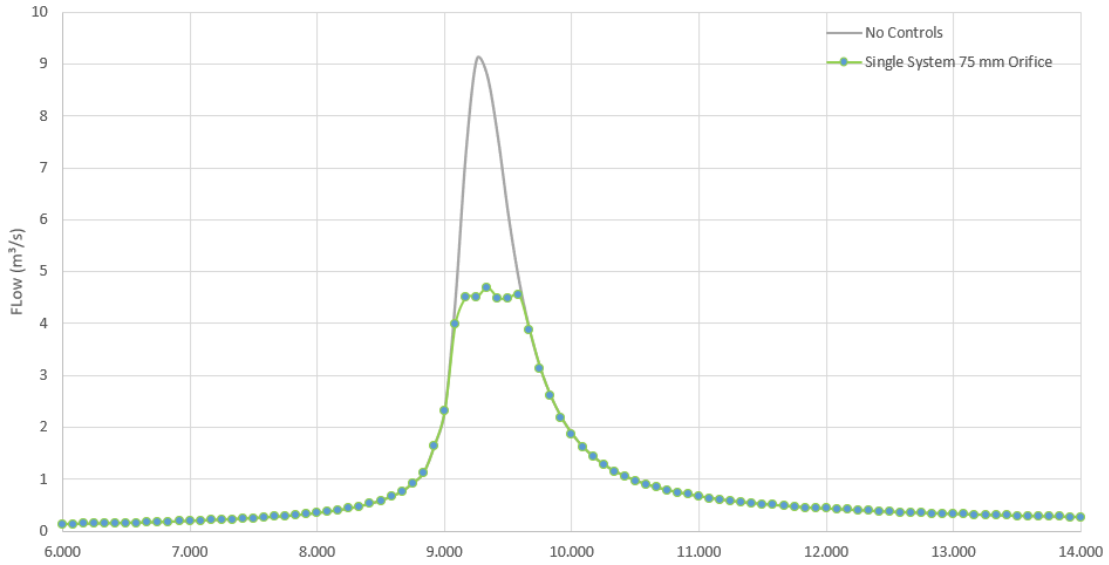
SWMF receives runoff via major storm intakes from a catchment area of 50.3 ha.

The tank does not provide water balance or water quality controls but does include a concrete baffle at the inlet for improved maintenance operations.

In general, both major and minor storm events from this catchment are discharged to the SWMF.

Designed to reduce 100-Year Peak Flow by 50% at this location

Parameter	Value
Provided Storage (m^3)	5,260
Total Construction Cost ($)	$6.52 M
Completion Date	February 2023



Mississauga Valley Park SWMF

Pre-Construction - August 2022

McKenzie Park SWMF

The underground SWMF was constructed using a Plastic Arch Chamber System.

SWMF receives runoff via major storm intakes from a catchment area of 117.6 ha.

Intakes are sized to capture and convey the major storm event to the SWMF, with the minor event to continue to by-pass the facility.

The chambers do not provide water balance or water quality controls but do include an 'Isolator Row' for improved maintenance.

Designed to reduce 100-Year Peak Flow by 25% at this location

Parameter	Value
Provided Storage (m^3)	6,507
Total Construction Cost ($)	$5.78 M
Completion Date	September 2024

McKenzie Park SWMF

Pre-Construction – February 2023 Construction – February 2023 to December 2024

Saigon Park SWMF

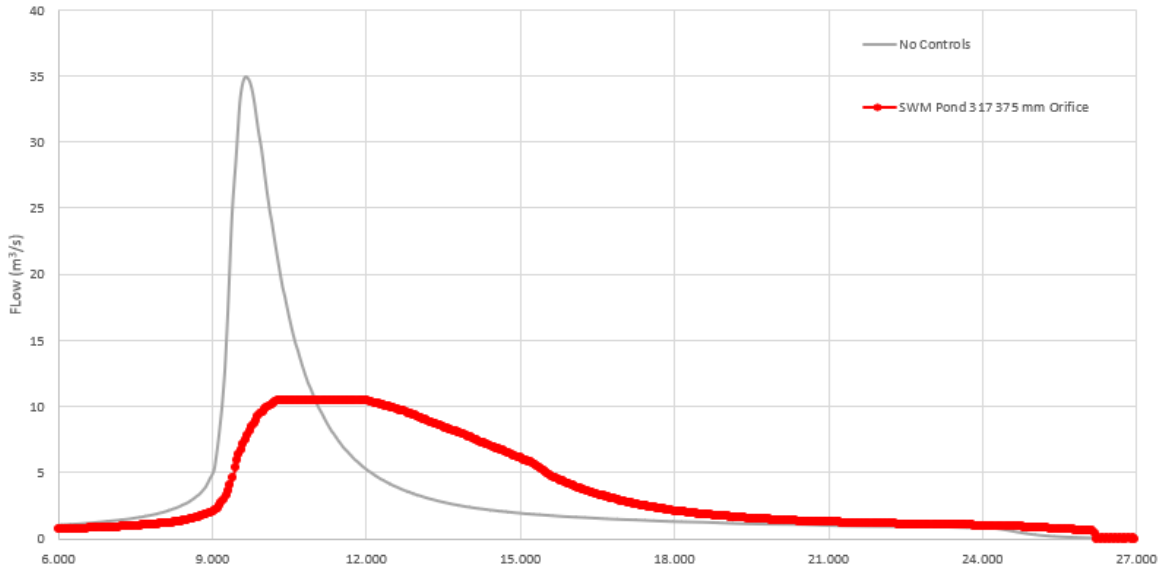
Above ground wet stormwater management pond servicing a catchment area of 605 ha.

Provides quality control via two OGS units, two forebays in the pond, and a polishing wetland at the outlet

Receives flow from three trunk storm sewers on neighbouring streets

Designed to reduce incoming 100-Year Peak Flow by 66%, based on a target release rate set out in the EA

Parameter	Value
Provided Storage (m³)	254,500
Completion Date	2020



Saigon Park SWM

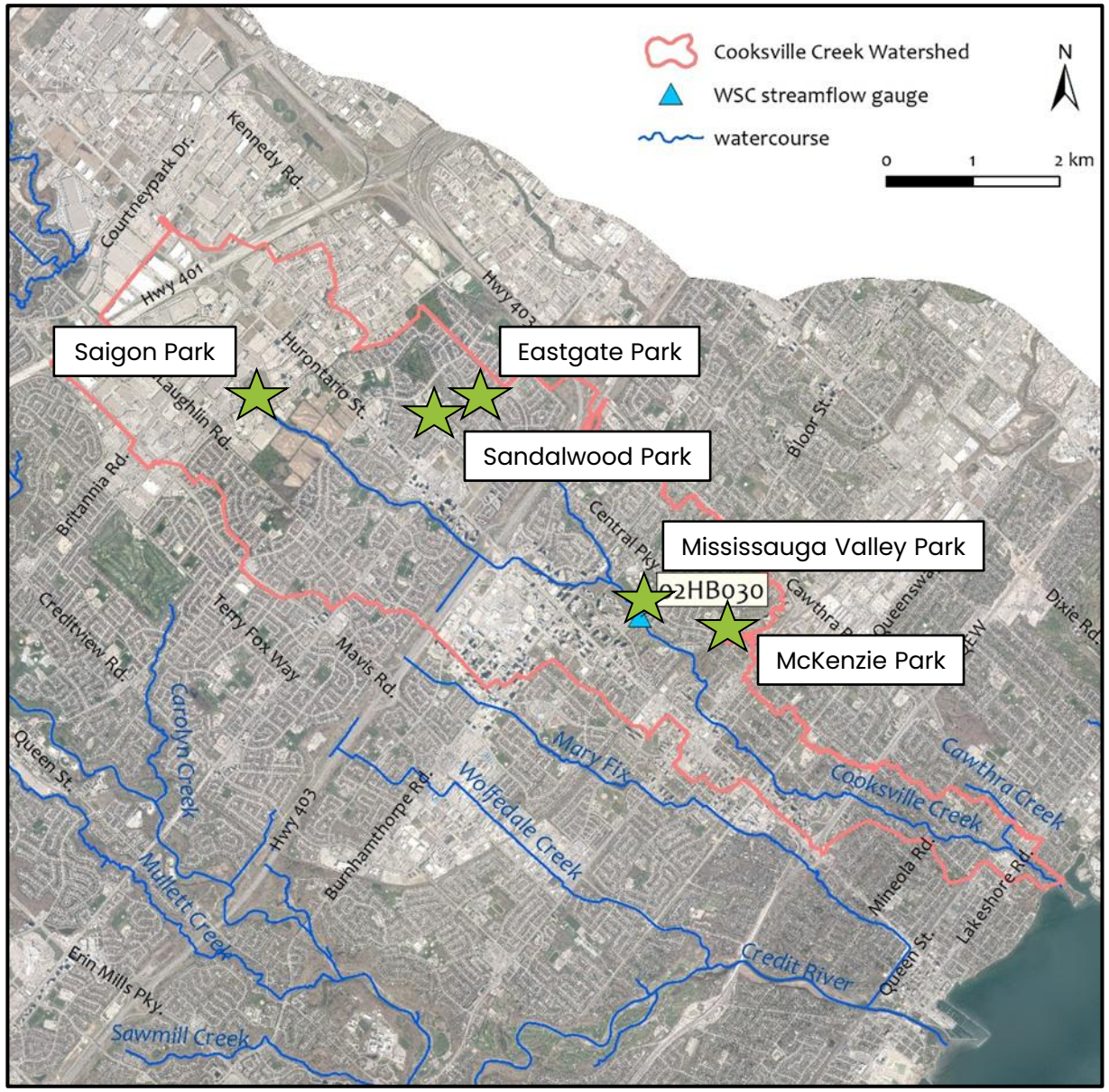
Pre-construction 2024 (Source: Google Maps)

Recent Storm Events

Photo: City of Mississauga Fire, July 16, 2024

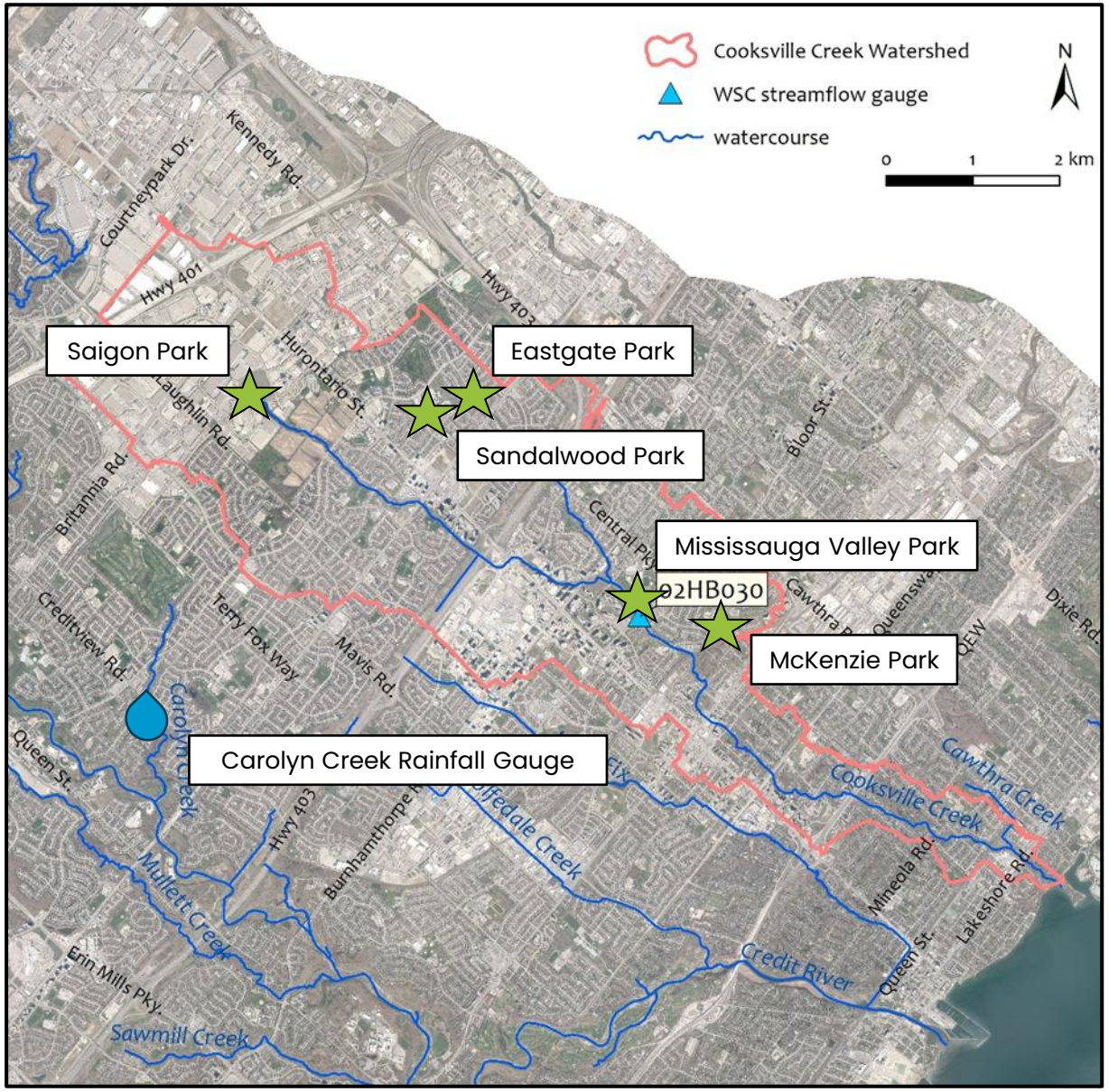
Water Survey of Canada (WSC) Stream Gauge

- The WSC Streamflow Gauge is located on Cooksville Creek at Central Parkway East.
- This gauge was used to confirm how Cooksville Creek was responding during each storm event.
- Historic data was used to evaluate the success of the implemented SWMFs.
- Flow data has not consistently been available for this stream gauge and therefore water level readings are used.

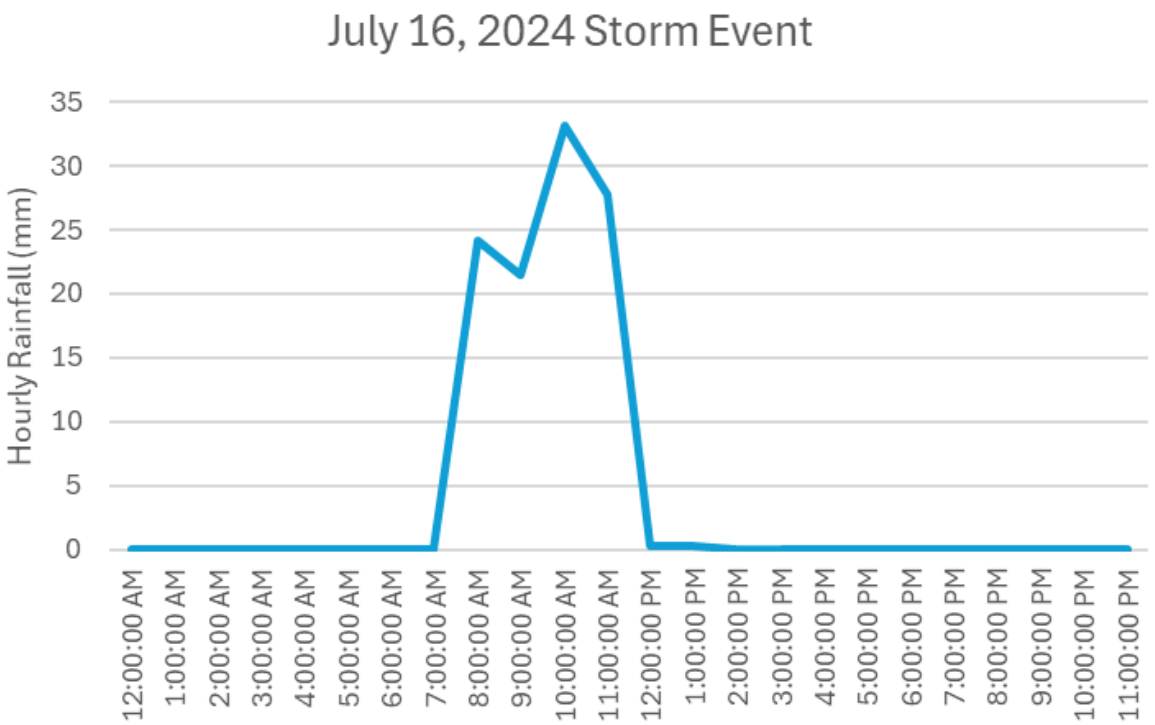


Rainfall Gauge

- Carolyn Creek Rainfall Gauge at Creditview Road
- Approximately 5.8 km west of the WSC Stream Gauge on Cooksville Creek
- Ranging from 3.6 km to 5.7 km west of the SWMFs
- An increased margin of error is present given the distance between rainfall and streamflow gauges
- This variability was noted during the August 2024 event



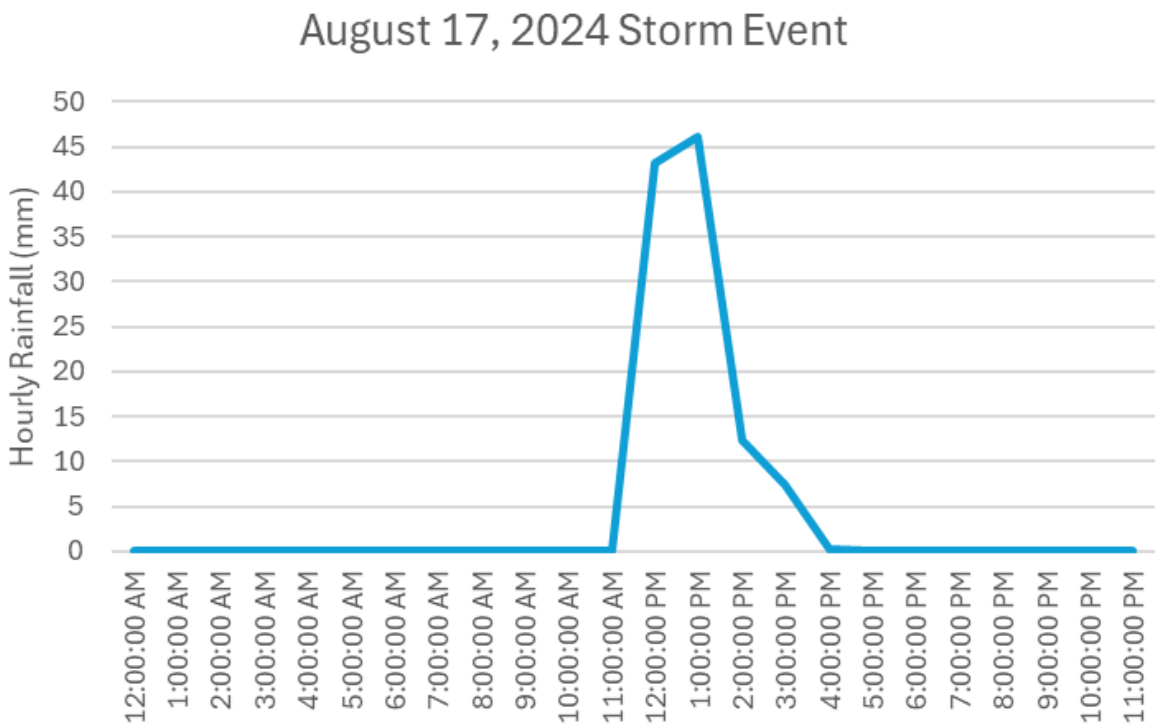
July 16, 2024 Storm Event



- CVC Carolyn Creek Rain Gauge
- Two peaks resulting in an increase in volume and saturated conditions
- Higher water level readings in Cooksville Creek
- Preceded by multiple days of rain

Parameter	Precipitation (mm)
Precipitation (mm)	101.0
Duration (hr)	3.5
Avg. Intensity (mm/hr)	28.9
Max. Intensity (mm/hr)	33.2
Cooksville Creek High Water Level (m)	4.1

August 17, 2024 Storm Event



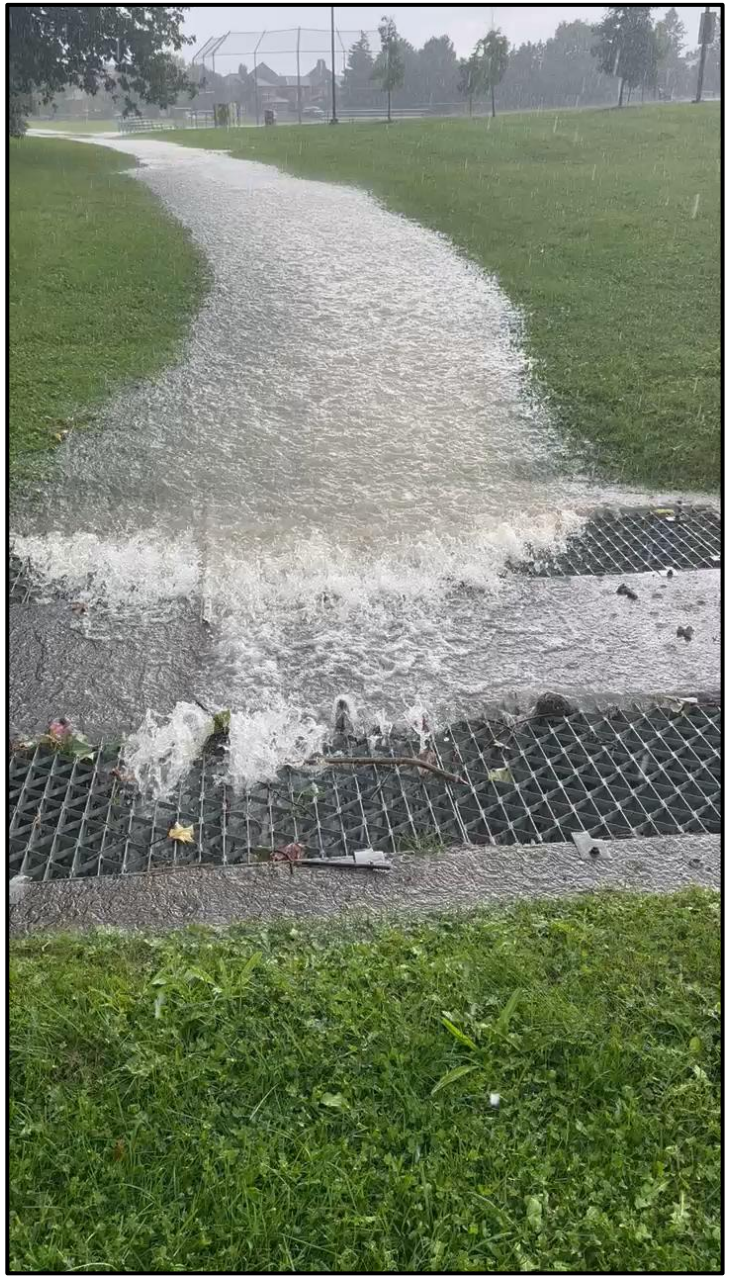
- CVC Carolyn Creek Rain Gauge
- More precipitation and higher intensity than the July event
- Lower water level than July event
- Variability in distance between gauges

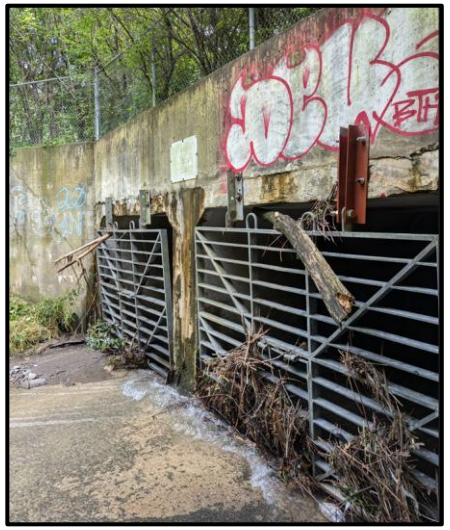
Parameter	Precipitation (mm)
Precipitation (mm)	128.2
Duration (hr)	3.5
Avg. Intensity (mm/hr)	36.6
Max. Intensity (mm/hr)	46.2
Cooksville Creek High Water Level (m)	3.9

Site Investigation

A site investigation was completed after the 2024 major storm events to investigate:

- High-water markings on inlet/outlet manholes
- Evidence of excess ponding, spills, and overland flow routes
- Estimate storage utilized in the SWMF
- Evidence of damage and debris build-up





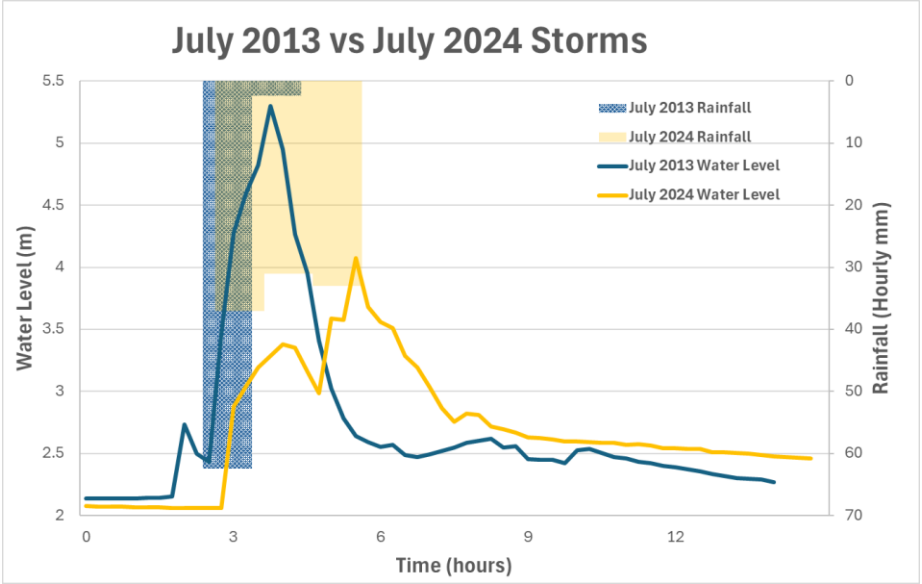
Results – Site Investigation

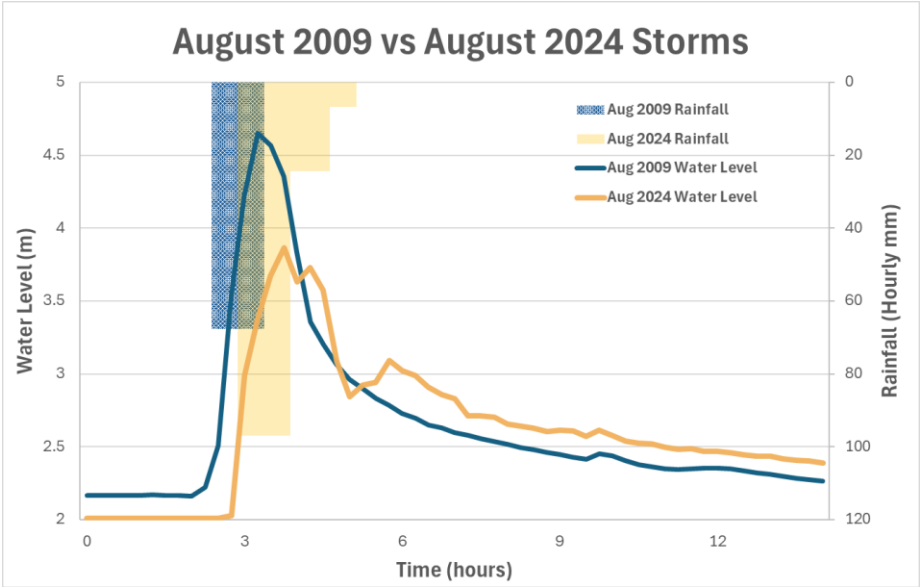
Site	July 16	August 17
Eastgate Park SWMF	22%	11%
Sandalwood Park SWMF	100%	64%
Mississauga Valley Park SWMF	75%	38%
Total Volume (m^3)	22,528	13,475
Olympic Pools	9.0	5.4

- Based on measured water surface elevations in control structures
- August event not as extreme in Cooksville Creek watershed

Results – Streamflow Gauge

- The CVC has rainfall depths, storm durations, and high-water levels from the major events experienced 2009, 2013 and 2024.
- SWMFs were implemented after 2013 and therefore a provides insight on their success.
- Key Findings:
  - Higher intensity storms in 2024
  - Water levels were reduced
  - Delay in time to peak and drop back down





Graphs provided by Credit Valley Conservation

Summary

These major storm events are anticipated to become more frequent and more severe – Municipalities need to prepare themselves.

The implemented SWMFs in the Cooksville Creek watershed were successful at detaining stormwater during the major events in the Summer of 2024.

Rainfall data and stream gauge data is a key tool for assessing SWMF function and success.

Next Steps include further assessments on the functionality and financial impacts of these SWMFs, and the continued design and construction of the remaining facilities.

Thank You

LinkedIn
https://www.linkedin.com/company/resilient-consulting-corporation

Instagram
@Resilientccorp

Email
info@resilientconsulting.ca

Resilient

Credit Valley Conservation
inspired by nature

MISSISSAUGA