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# A Real-World Test Case For Subwatershed Systems-Based Stormwater Management Planning

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# Agenda

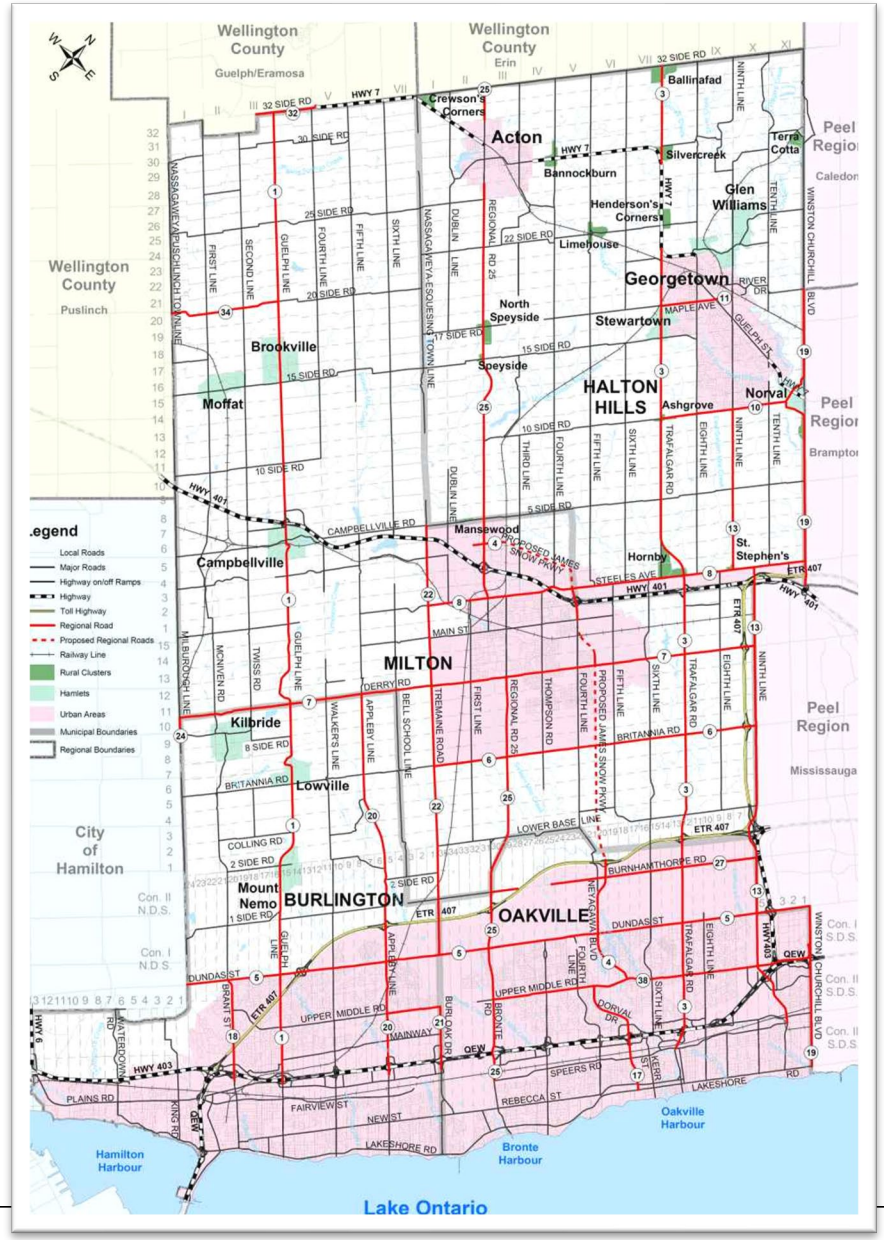
| | |
|---|---|
| 1 | Introduction |
| 2 | Milton’s Planning and Subwatershed Study Process |
| 3 | Hydrologic Verification Process and Model Refinements |
| 4 | Milton’s Construction/Assumption/Monitoring Process |
| 5 | 2024 Storm Events |
| 6 | Lessons Learned/Future Process |

# 1. Introduction

The Town of Milton is located in Halton Region

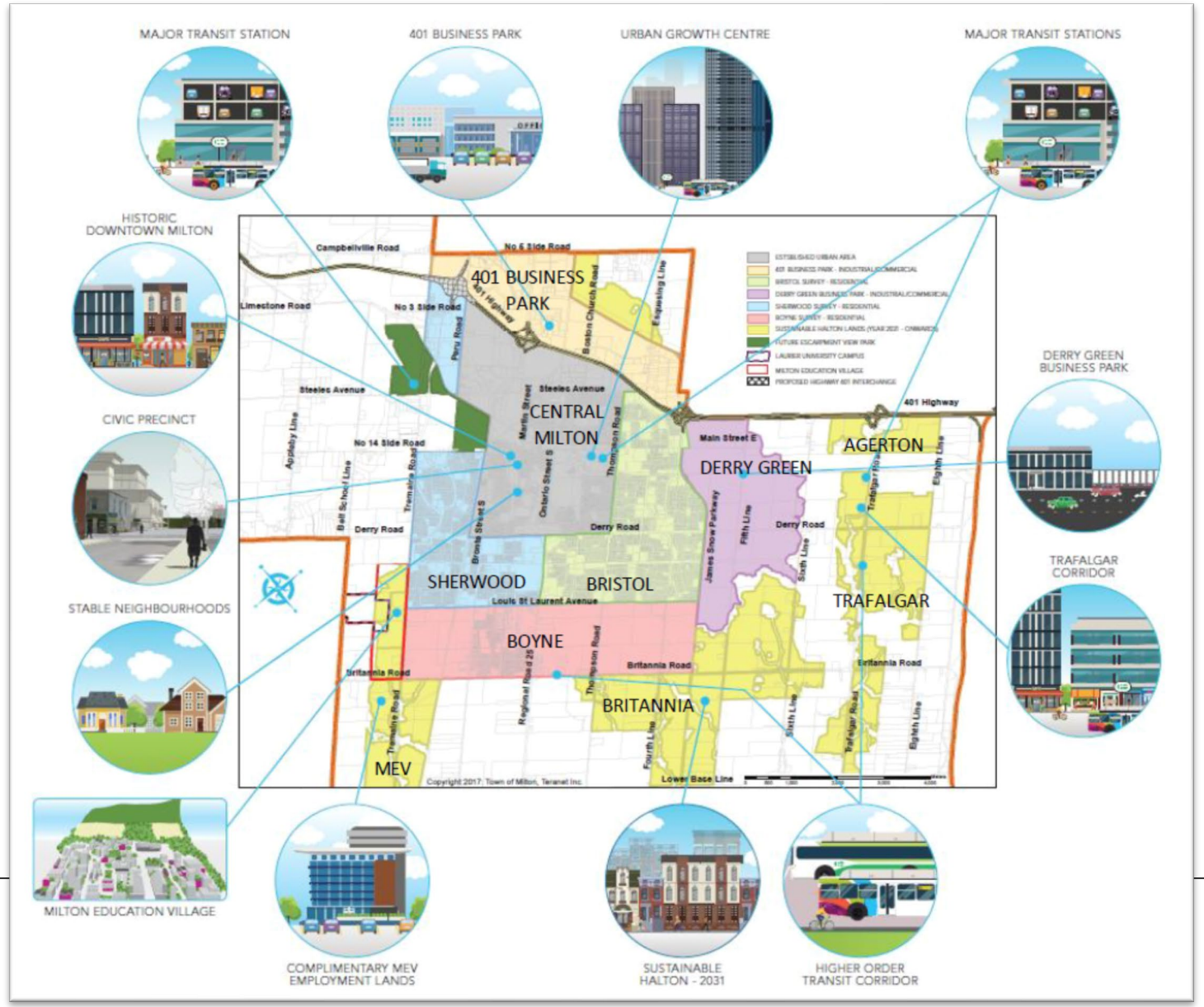
Mostly within the Sixteen Mile Creek Watershed (Conservation Halton jurisdiction)

One of the fastest growing communities in North America over the past 25 years



# 1. Introduction

- Bristol Survey (2000) 800ha
- Highway 401 Industrial/Business Park (2001) 940ha
- Sherwood Survey (2004) 910ha
- Boyne Survey (2013) 930ha
- Derry Green Secondary Plan Area (2014) 800ha



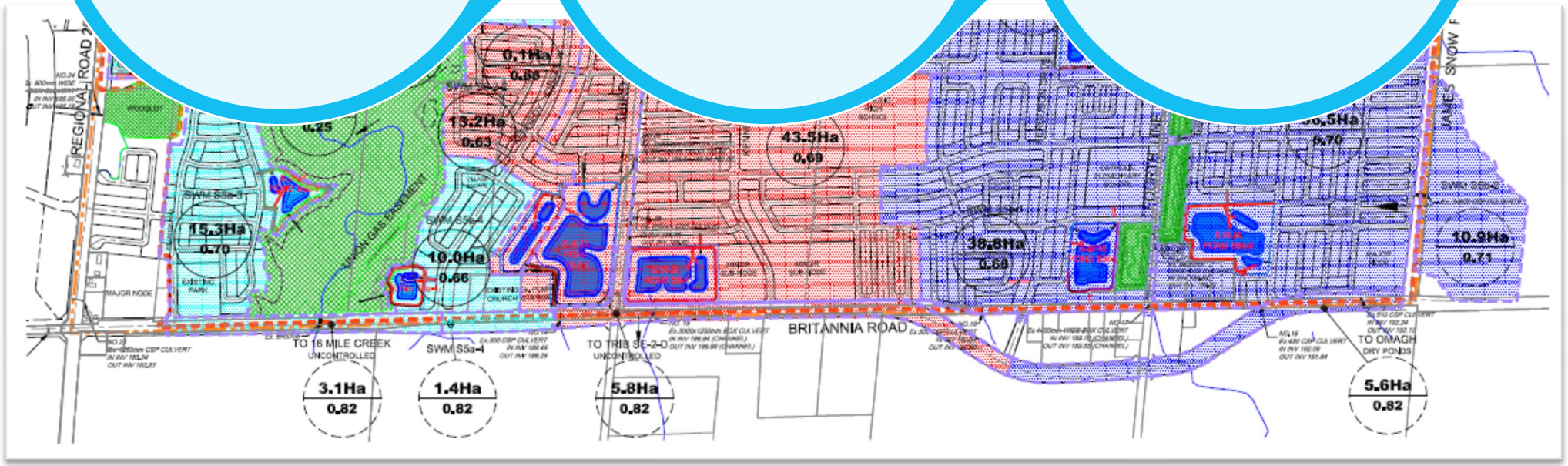

- Milton Education Village (2023) 160ha
- Trafalgar Secondary Plan (2024) 466ha
- Agerton Secondary Plan (expected 2025) 300ha
- Britannia Secondary Plan (2025) 875ha

# 1. Introduction - Subwatershed Planning

All growth phases completed through a Secondary Planning process and Subwatershed Studies

Subwatershed Studies are multi-disciplinary, characterize the natural heritage and water resources systems, and establish management plans for these systems

Key outcomes are the integrated stormwater management plan and sizing criteria



# 2. Milton's Planning and Subwatershed Study Process

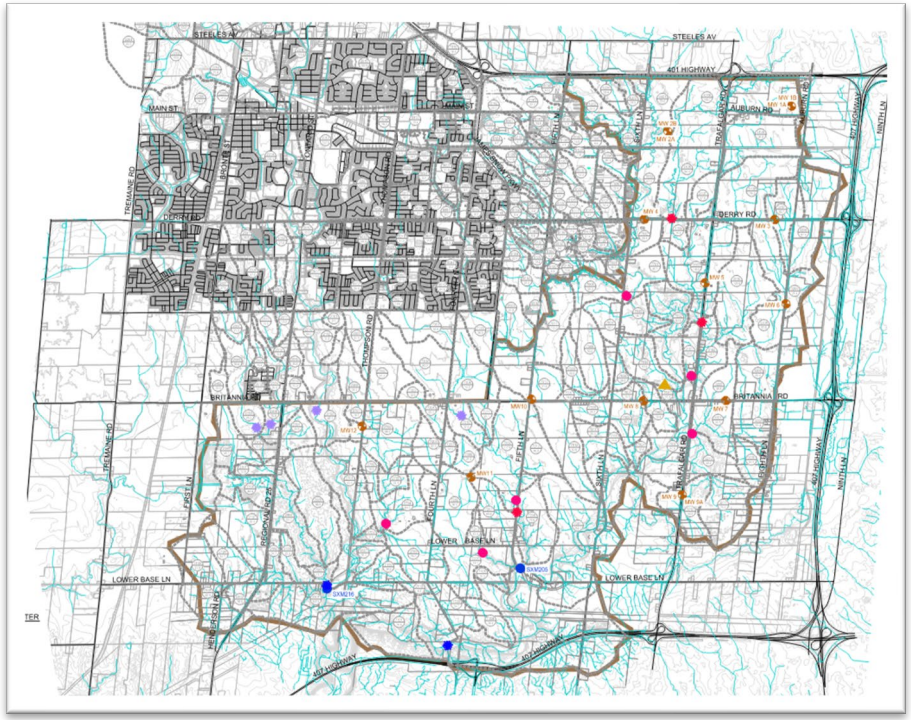
All Secondary Plans have applied the HSP-F hydrologic model

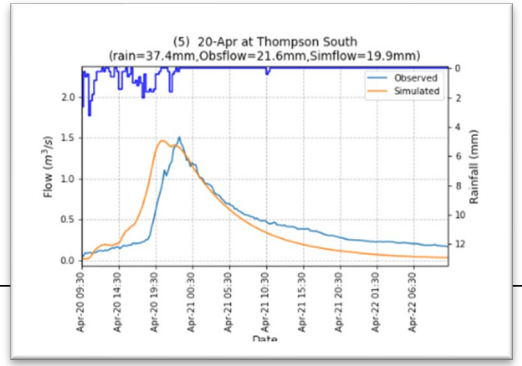
- The model was originally calibrated in 1999 as part of the first Subwatershed Study for Bristol Survey.

Updated parameterization completed in 2008 and 2016 as part of Updated Subwatershed Studies

- Additional updates include subcatchment refinements and rating curves for SWM facilities and constructed channels

The model is endorsed by Conservation Halton for SWM sizing for flooding and erosion control



# 2. Milton's Planning and Subwatershed Study Process

## Methodology:

- Long-term continuous simulation including snow accumulation and melt (i.e. "real world" meteorology)

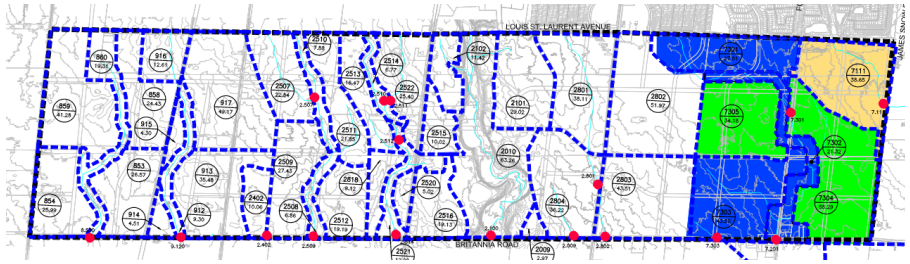
  Meteorological timeseries extended from original 34 years to 56 years

- SWM sizing criteria applies holistic and systems-based approach, setting targets based on receiver

  SWM planning encourages strategic siting of multi-party SWM facilities rather than individual facilities for each development

- Landowner participation in recent studies affords opportunity to include more detailed information

| Table 4.2.5: Stormwater Management Facility Sizing Criteria | | |
|---|---|---|
| **Quantity Component** | **Cumulative Unitary Volume ($m^3$/impervious ha)** | **Unitary Discharge ($m^3$/s/ha)** |
| ***Node 8.530*** | | |
| Erosion | 375 | 0.0004 |
| 25 Year | 600 | 0.012 |
| 100 Year | 825 | 0.024 |
| ***Node 9.120*** | | |
| Erosion | 375 | 0.0004 |
| 25 Year | 600 | 0.01 |
| 100 Year | 850 | 0.023 |
| ***Node 2.402/2.509*** | | |
| Erosion | 400 | 0.0003 |
| 25 Year | 750 | 0.01 |
| 100 Year | 975 | 0.024 |
| ***Node 2.514*** | | |
| Erosion | 400 | 0.0003 |
| 25 Year | 750 | 0.01 |
| 100 Year | 975 | 0.035 |
| ***Node 2.100*** | | |
| Erosion | 400 | 0.002 |
| 25 Year | 650 | 0.015 |
| 100 Year | 800 | 0.035 |
| ***Node 7.302*** | | |
| Erosion | 550/0 | 0.0005/0 |
| 25 Year | 745/400 | 0.0015/0.0013 |
| 100 Year | 795/800 | 0.08/0.035 |
| ***Node 7.111*** | | |
| Erosion | 430 | 0.0011 |
| 25 Year | 704 | 0.010 |
| 100 Year | 795 | 0.034 |
| ***Node 2.802*** | | |
| Erosion | 400 | 0.0003 |
| 25 Year | 625 | 0.01 |
| 100 Year | 975 | 0.035 |



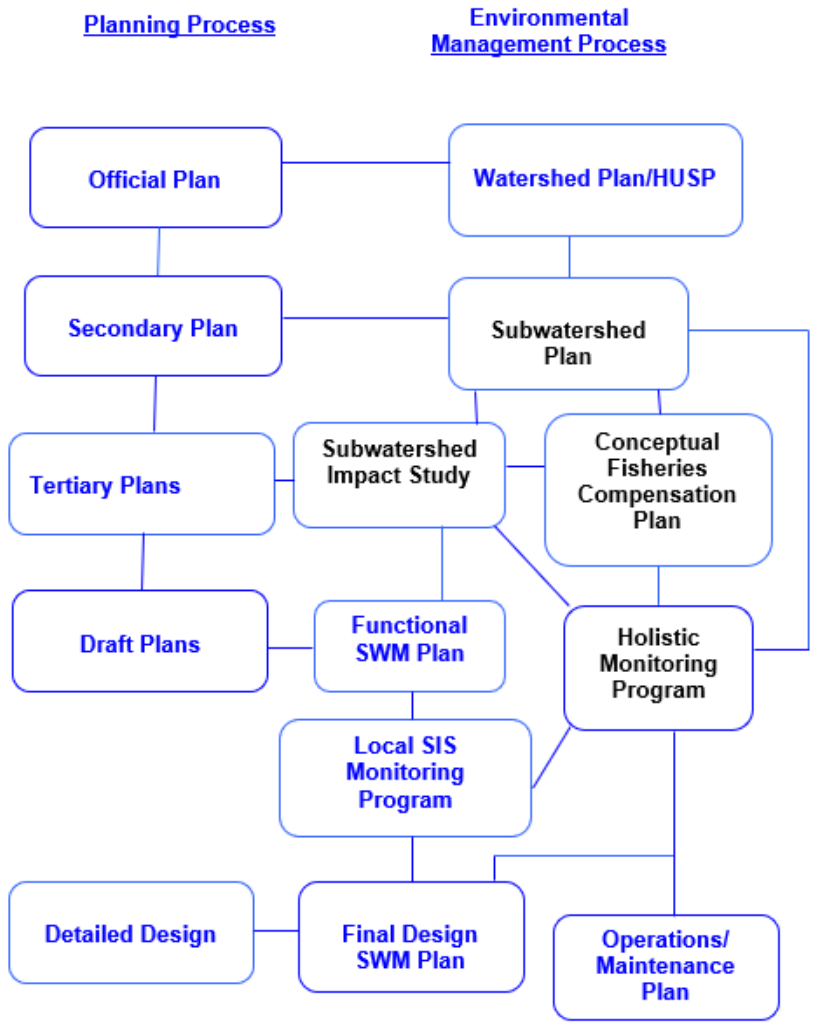
# 3. Hydrologic Verification Process and Model Refinements

Planning process extends beyond Secondary Plan

Differences at next stages of planning:

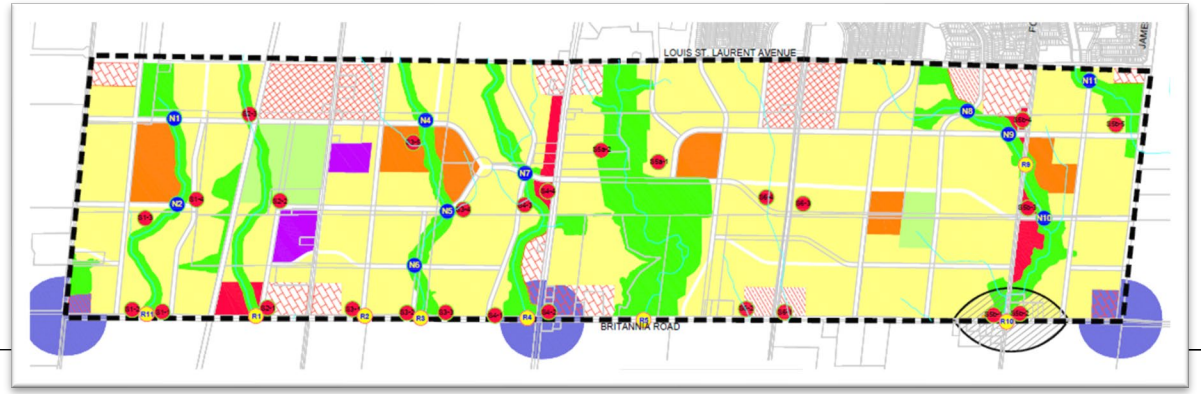
- Timing of development
- Siting of stormwater management facilities
- Size and impervious coverage of drainage areas to SWM facilities
- More details for SWM facility designs (detailed storage-discharge relationships)

Milton has implemented a hydrologic verification process, to test, refine, and update the stormwater management criteria based upon the more detailed information

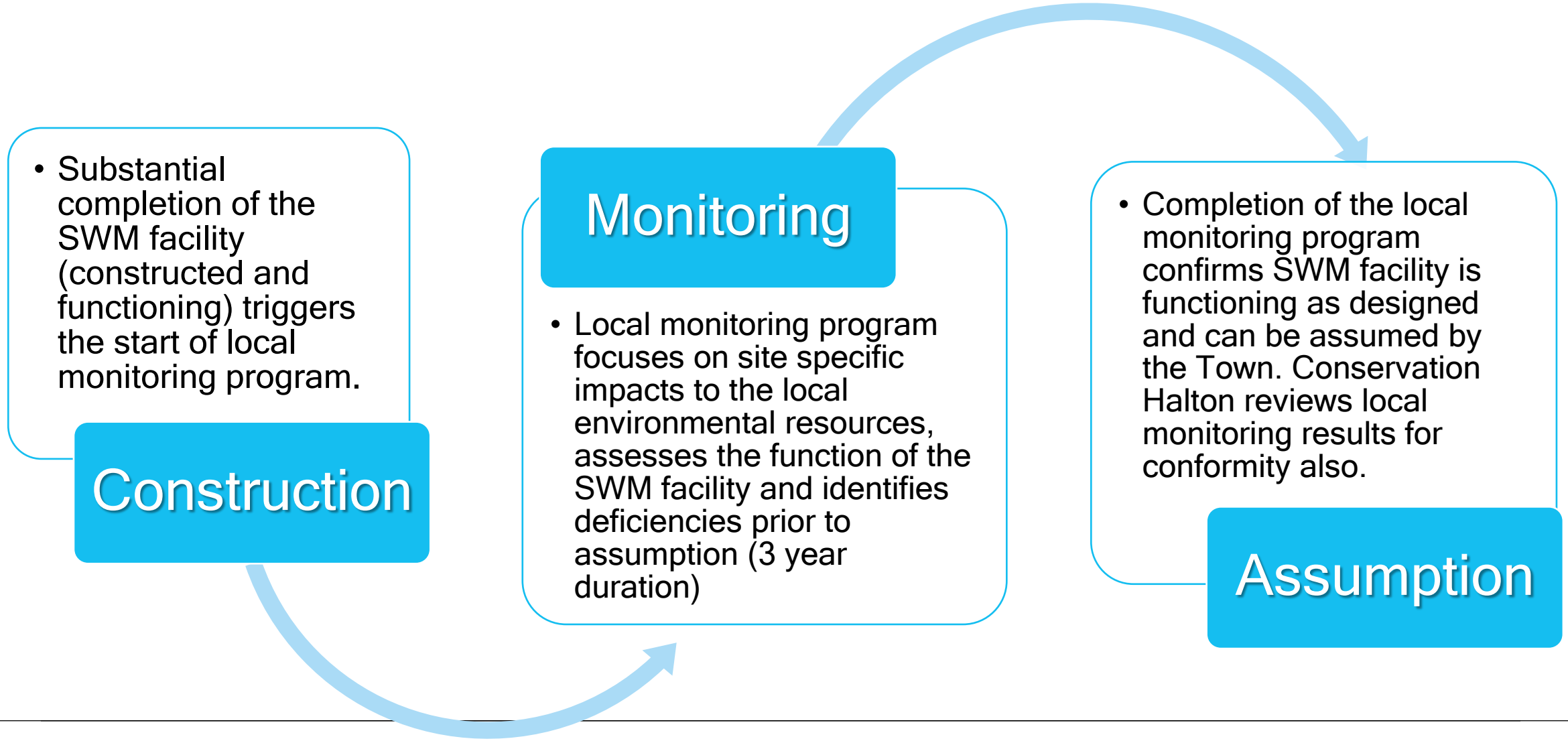


# 3. Hydrologic Verification Process and Model Refinements

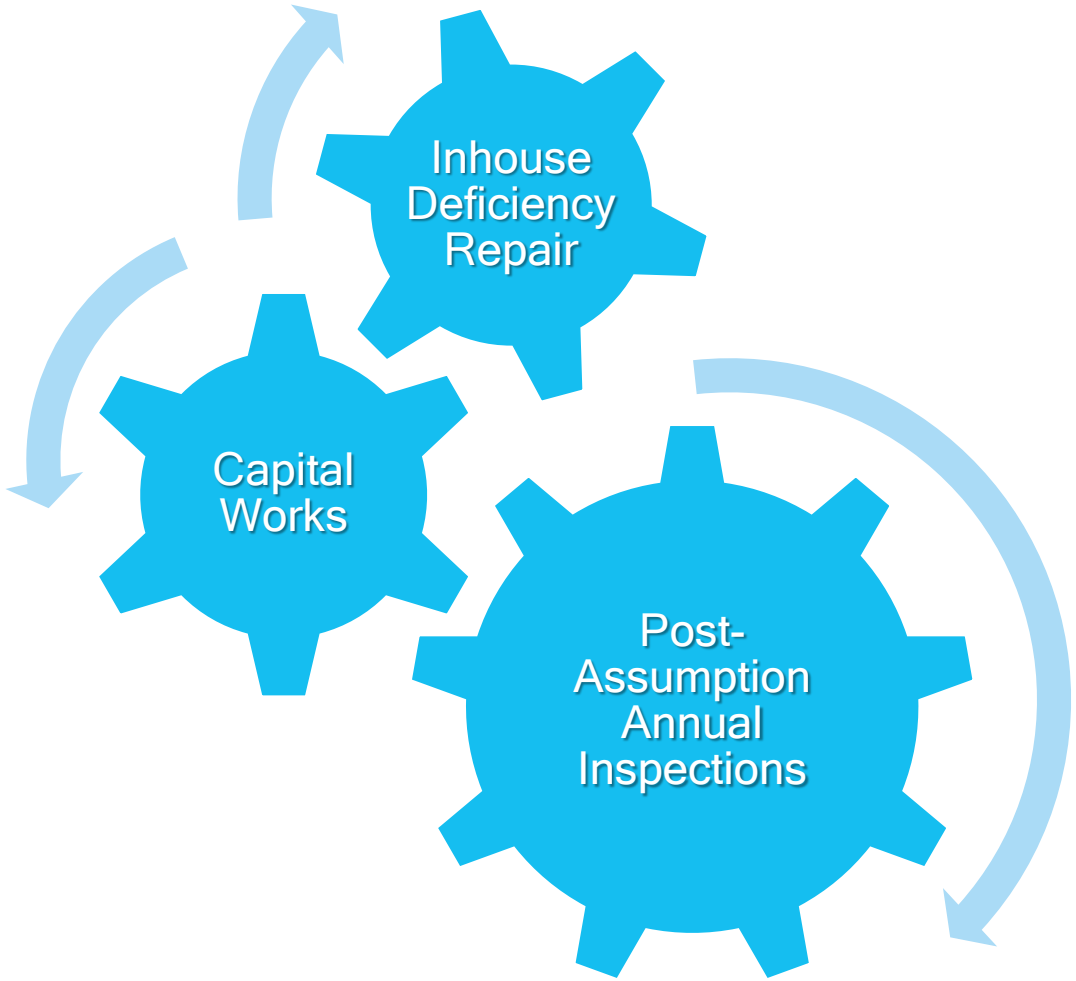
- Assumptions at SWS stage are not necessarily representative of the final proposed conditions
- SWM Criteria from SWS tested and refined as appropriate during subsequent stages of planning and design
- Where necessary, SWM sizing is revised, and further verification conducted at detailed design stage.
- Verification process supports assumption by the Town
- Refinement at next stages supports compiling an inventory of SWM facilities
- Holistic monitoring program initiated to verify SWM performance




# 4. Construction and Assumption

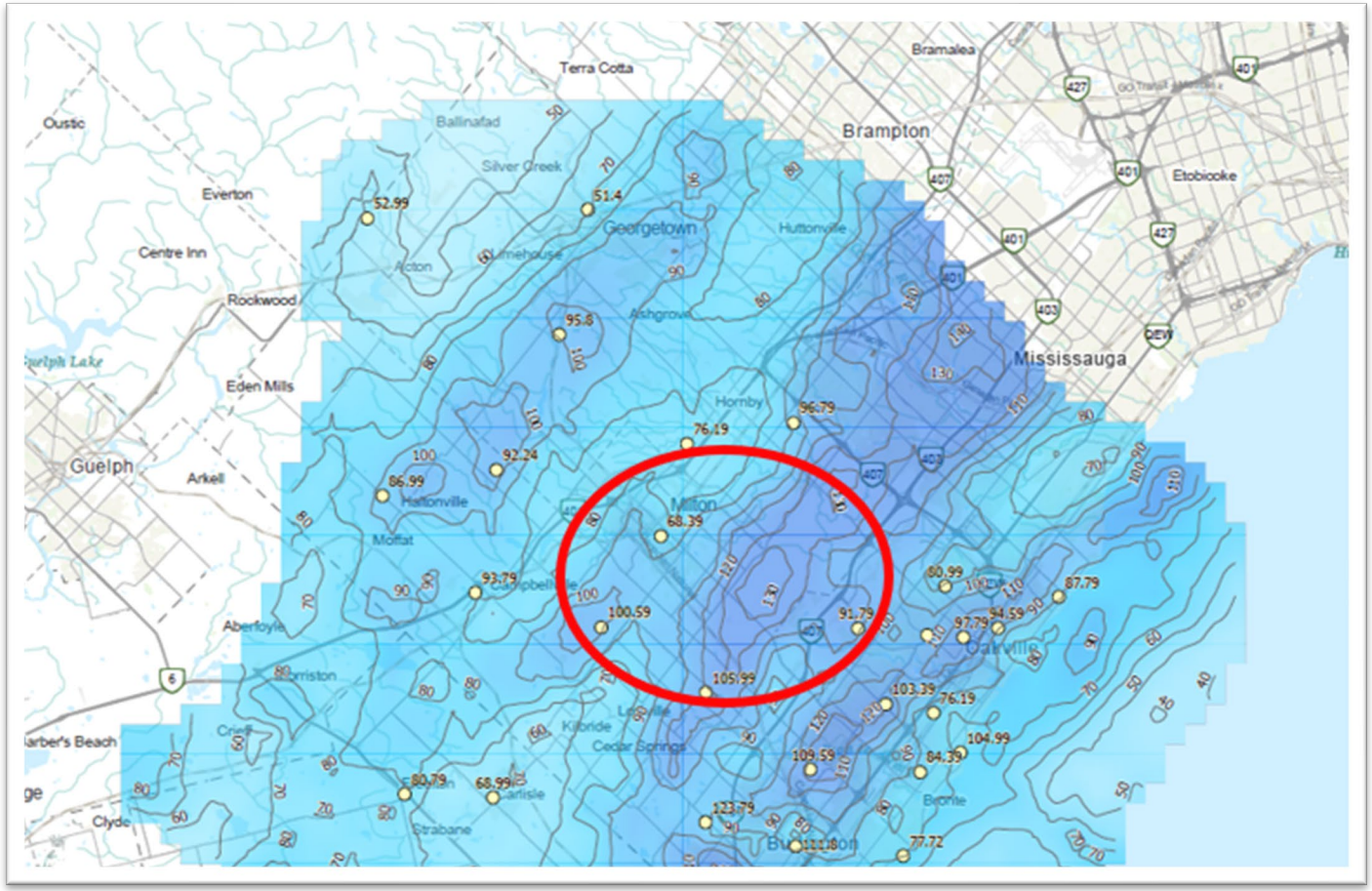


# 4. Operation and Maintenance




- O&M activities undertaken by the Town must conform with CLI-ECA
- Annual visual inspections are undertaken to determine deficiencies
- Routine deficiencies are corrected by operations staff
- Major repairs or sediment removal are undertaken through capital contracts
- Annual inspections results are included in CLI ECA annual report and provided on Town's website

# 5. July 2024 Precipitation Event



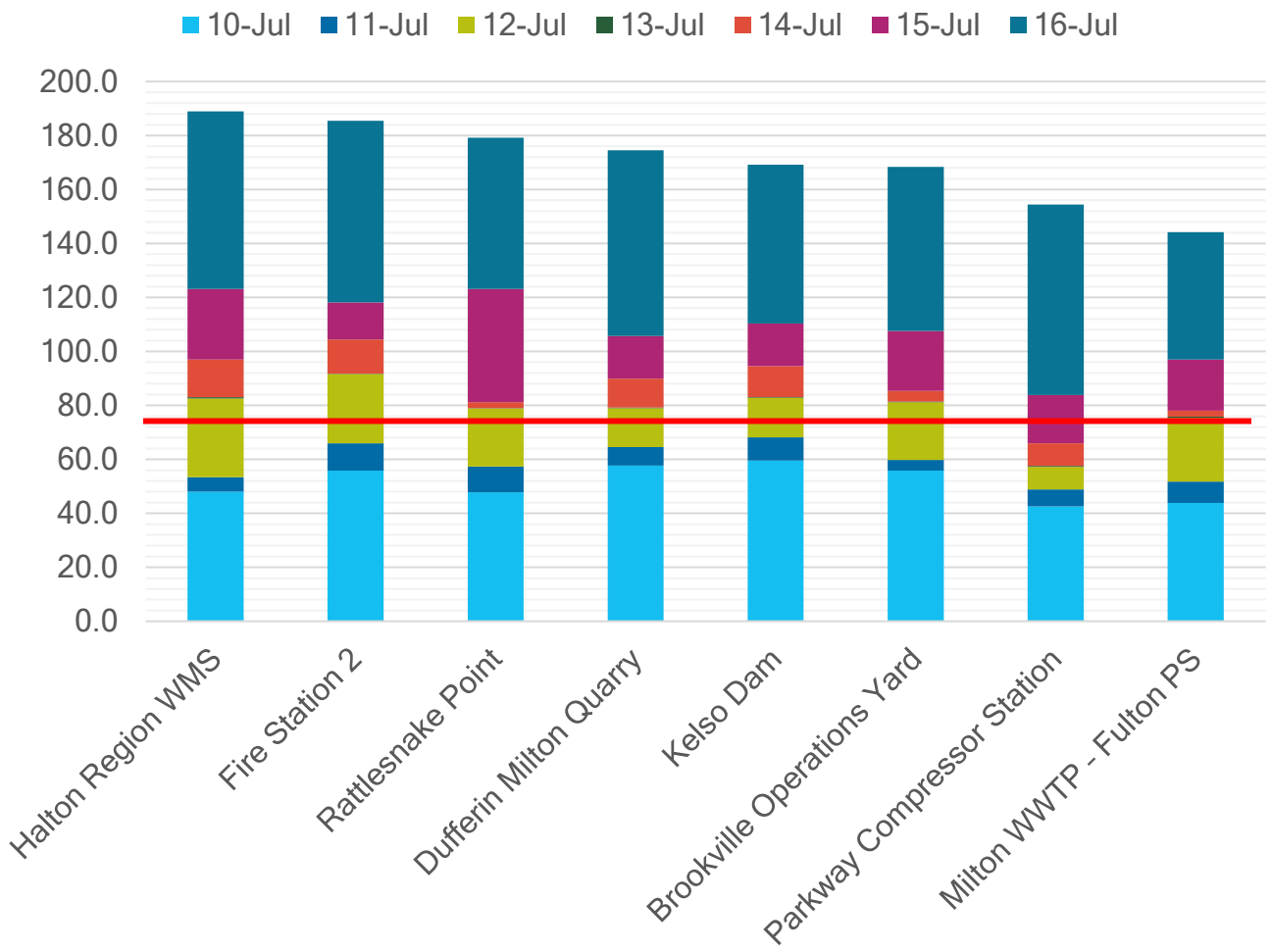

Precipitation Data provided by Conservation Halton & Environment Canada

July 10 – July 16 the Town of Milton received nearly 190mm of rain, nearly 2.5x average monthly rainfall

8 rain gauges across Milton were able to capture the rain event

Data from the rain gauges indicates that the entirety of Milton was inundated

# 5. July 2024 Precipitation Event




Monthly average rainfall for Milton = 74mm

8 rain gauges across the Town showed rainfall was not isolated

Total precipitation amount on July 16 alone corresponds to 100 year storm event

Precipitation Data provided by Conservation Halton & Environment Canada

# 5. Response to Precipitation Event

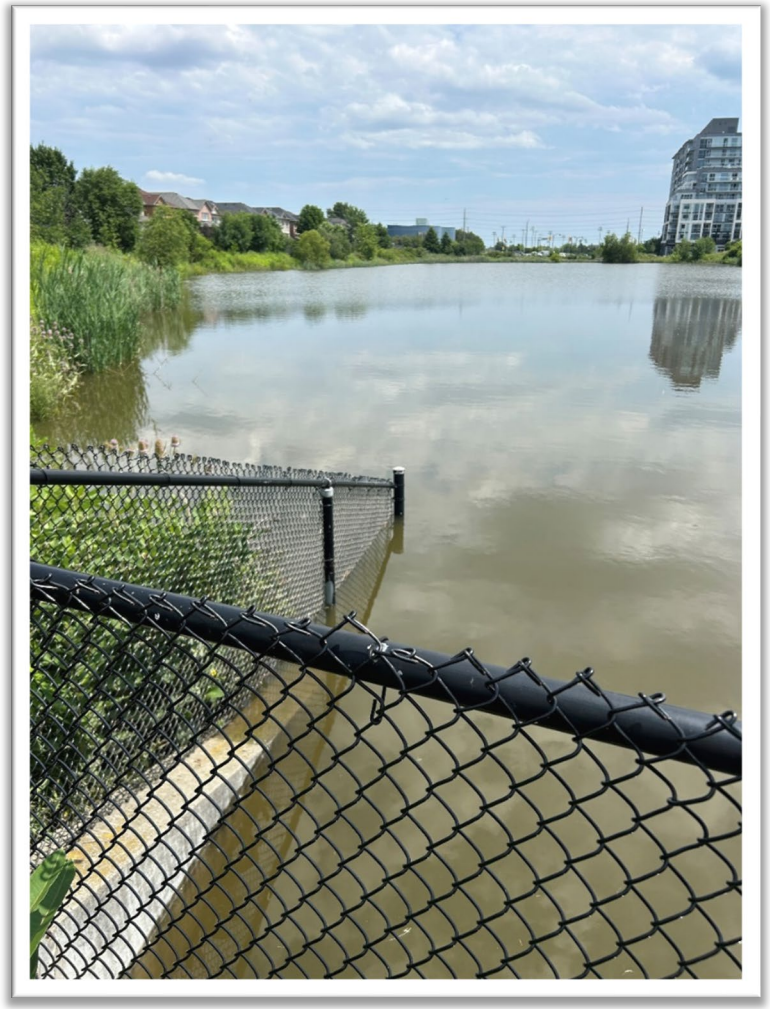
**24hrs post storm**

- Town staff inspected all SWM ponds after July precipitation event
- Town received 21 calls – majority for standing water in backyards

**48hrs post storm**

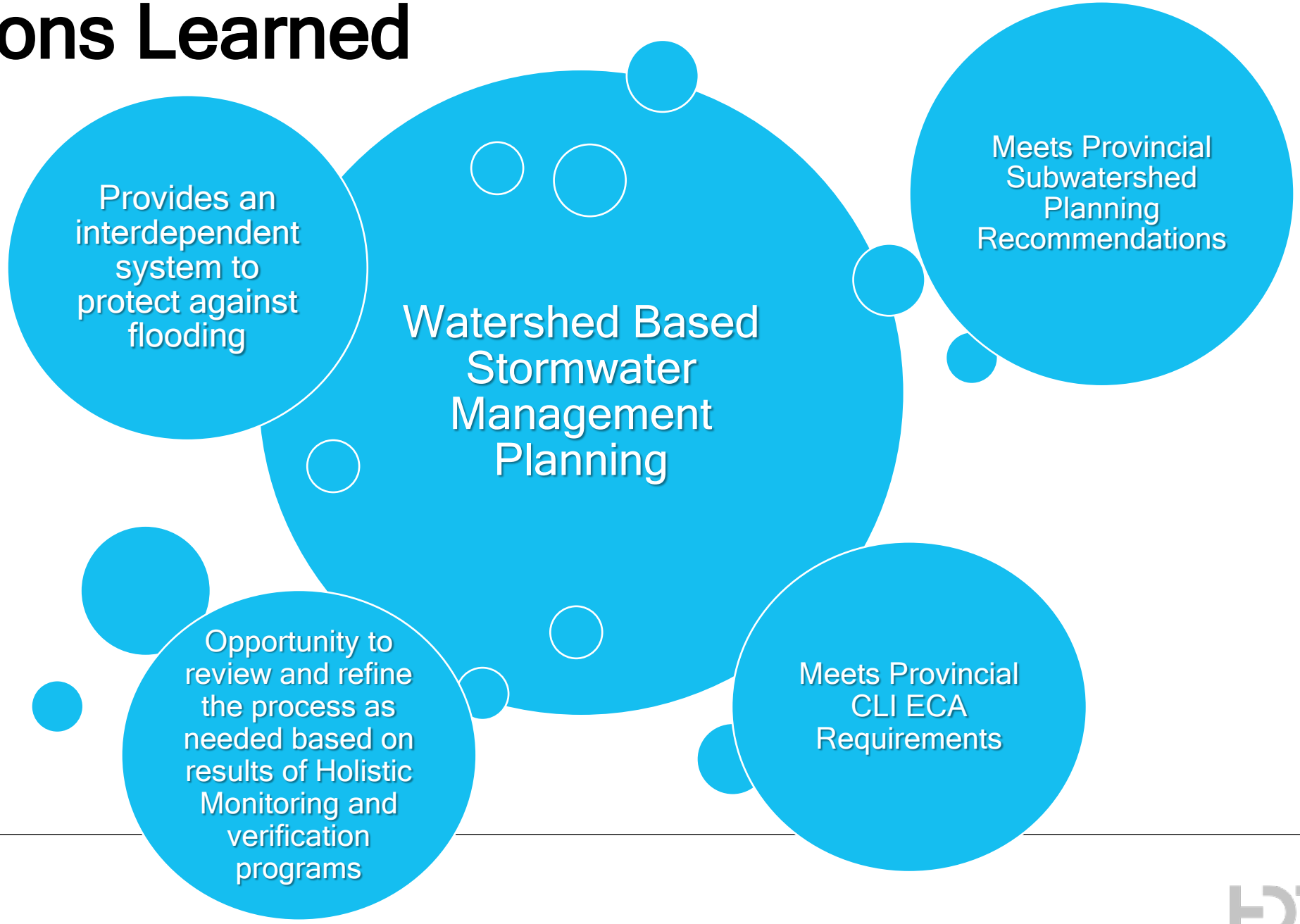
- Ponds were close to capacity but still operational; no major concerns identified from inspections
- Resident calls were investigated
- No major flooding events resulting in property damage in Urban Area
- Road wash outs occurred in Rural Areas with no centralized SWM controls

# 5. Response to Precipitation Event



# 5. Response to Precipitation Event

# 6. Lessons Learned



# 6. Next Steps

**2025**

Continue to utilize systems based Stormwater Management Planning for Milton's new Secondary Plan Areas

Apply minor changes to meet the needs of each individual Secondary Plan Area

**2031-2051**

Re-visit in the future to ensure the system is continuing to meet Milton's needs and Provincial Legislation

# Questions?

## Thank you!

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