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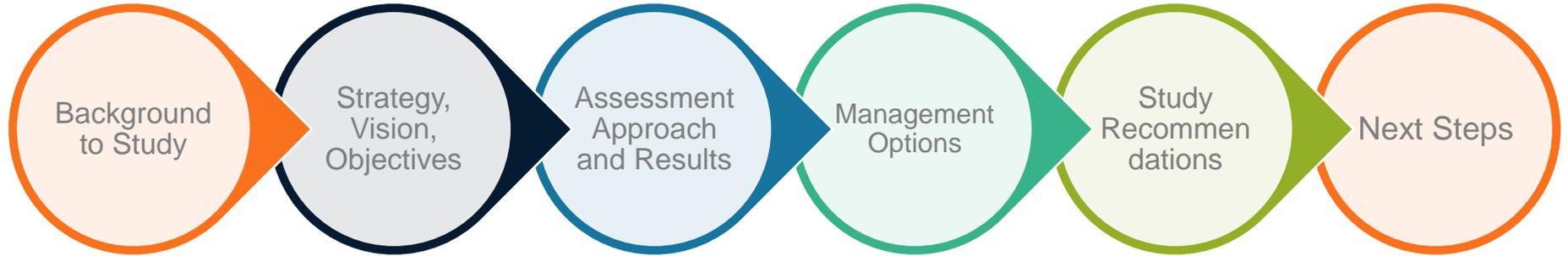
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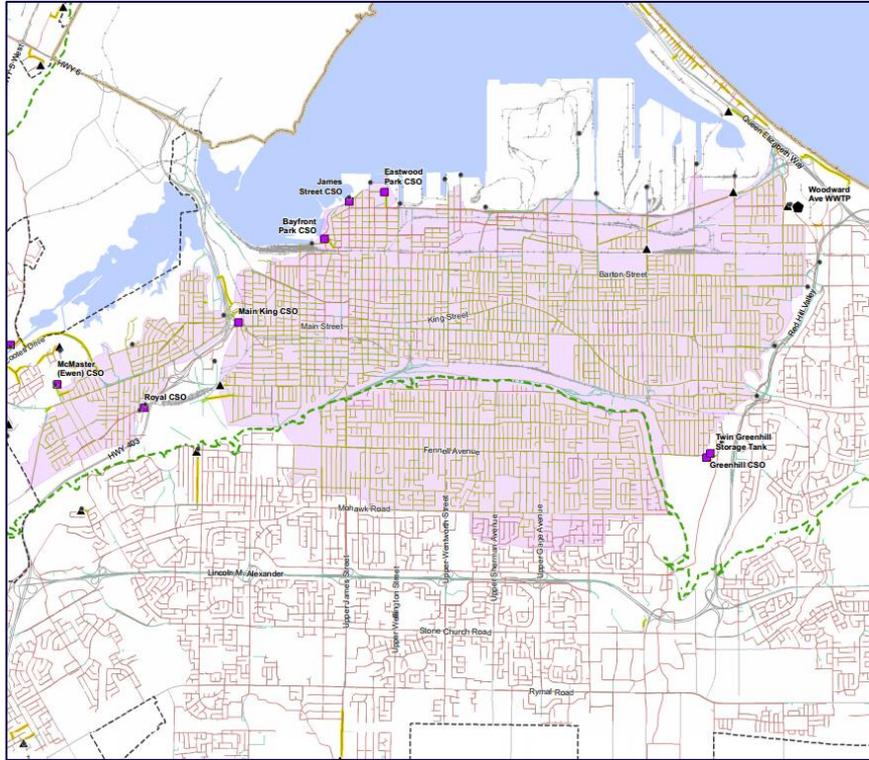
## **Flooding and Drainage Improvement Framework (FDIF)**

**City of Hamilton  
Public Works Committee  
August 10<sup>th</sup>, 2022**





# 1. Background to Study



- Legacy issues and new challenges are straining the capacity of the City's combined sewer system
- City of Hamilton has, since the 1960's +/-, been addressing problems in the CSS
- Recent City Initiatives
  - Increased the primary capacity at the Woodward WWTP
  - Established a program of Real Time Control (RTC)
  - Applied LID practices in new and retrofit developments
  - Extraneous flow management (Separated WW system)
- Despite this, the risk of flooding (basement and surface) and environmental impacts (CSOs) persist
- City has completed local and City-wide studies to investigate solutions

# 1. Background to Study

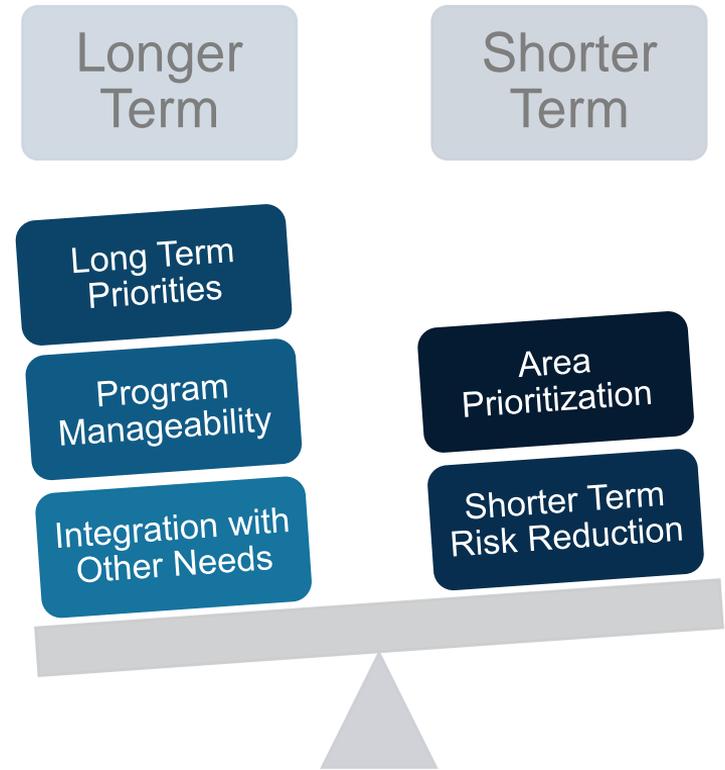
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- “Framework Study” to
  - Validated and updated past recommendations
  - Established Performance Objectives and developed a Management Strategy
  - Developed a prioritization and implementation schedule
  - Established high-level costing of recommendations
  - Advanced a set of short, medium, and long-term projects
- Strategy will need to be validated and supported through more detailed technical work and Public/Stakeholder Consultation



## 2. Strategy, Vision, Objectives

- **Short-term management strategy:**  
Mitigate the higher-risk basement and surface flooding areas
- **Long-term management strategy:**  
Improve resiliency to flooding, and addressing environmental stewardship and climate change adaptation



# 3. Assessment Approach and Results

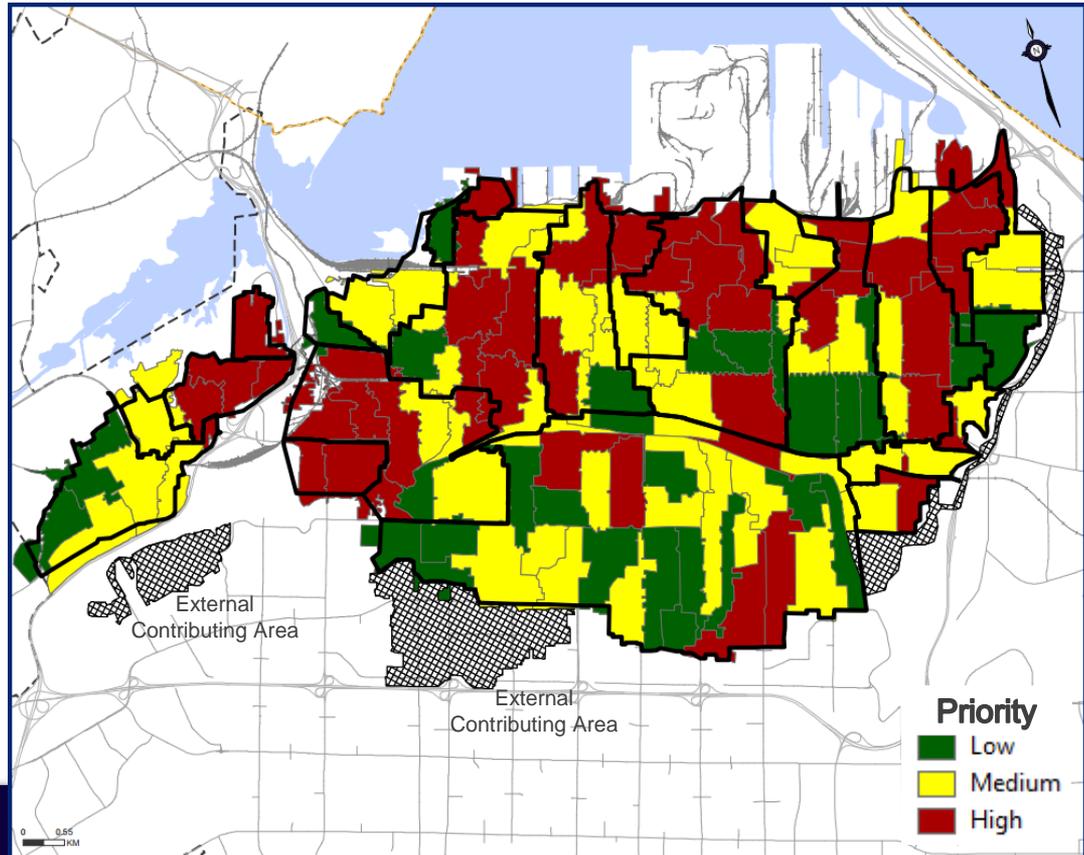
- Leveraged available information
- Use preliminary level of service targets
- Assessed major & minor system to understand potential flood risks
- Prioritized areas based on potential risk
- High-level assessment to:
  - guide strategic direction
  - inform long-term budget needs

*Validation needed prior to implementation*

Assessment Factor	Proposed Weighting	Rationale
Historic Flooding	3.0	Highly important/critical parameter – based on actual observed instances of flooding
Sewer Depth	0.5	Overall is more of a physical constraint than a prioritization factor
Sewer Age and Condition	1.5	Considered a slightly higher priority factor to drive infrastructure renewal
Minor System (Model)	2.0	After historic flooding, likely the most important parameter despite concerns regarding uncertainties in modelling results; provides a means to consistently assess sewer system deficiencies
Major System (Model)	1.0	Lower confidence in modelling results however provides some indication of potentially deficient areas on a relative basis
Overland Flow (Topo)	1.5	Considered a better overall indicator of spatial extent of overland flow deficiencies, also integrates surface depressions
Inlet Capacity	0.5	Lower utility as a prioritization factor given complexity of interpreting results at this scale (i.e. implications of land use, capacity of receiving sewer system)
Surface Depressions (Topo)	0.5	Somewhat duplicative of the overland flow results, and thereby may over-estimate potential for areas near valleys etcetera

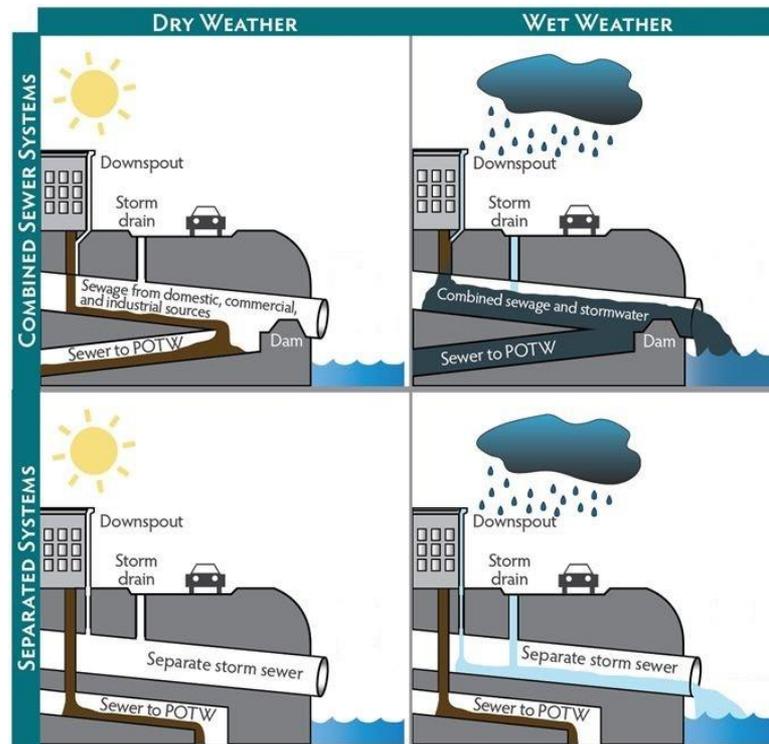
# 3. Assessment Approach and Results

- 24 major CSO catchments subdivided into 108 subcatchments
- Individual assessment and ranking for all 108 subcatchments
- High Priority area clusters
  - West Hamilton
  - Wellington CSO
  - North End



## 4. Management Options

- Long-Term Strategy - “Managed Sewer Separation”
  - Default options for future upgrades
  - Aligns Asset Renewal and other capital projects
  - Priority based on risk management
  - Optimize based on local needs
  - +20 years

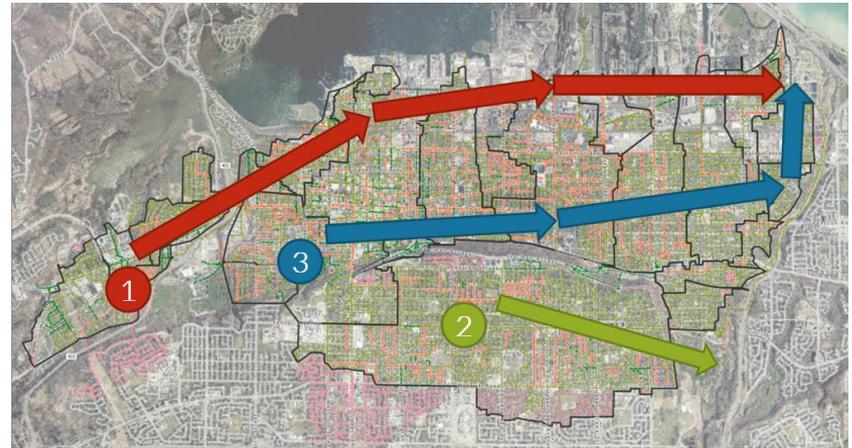


High Level Concept of Sewer Separation  
(Passaic Valley Sewerage Commission, North Bergen/Guttenberg  
CSO Long Term Control Plan)

# 4. Management Options

- Short Term Strategy – Addressing High Risk Areas
  - Local strategies focused on local flooding issues
  - Review if sewer separation can proceed immediately
  - Considering works that can be readily implemented

-Sewer Upgrades	Sewer Diversions/Local interceptors	Sewer Rehabilitation
Storage	Major System improvements	New outlets
Inlet controls/improvements	LID practices/GI	Private Property measures



- Broader System Wide Management Options
  - Not focused on local Subcatchments or CSO Catchments
  - Long-Term system wide solutions
  - Provide additional benefits
  - To be further evaluated in City’s Master Plan with additional lenses of Growth*

## 5. Recommendations: *Supporting Policies and Studies*

Studies and Tools Supporting Shorter-Term Priorities	Major Studies to Support Managed Sewer Separation Strategy	Policies To Support Overall Strategy
<ul style="list-style-type: none"><li>• Update City <i>All Pipes</i> Model</li><li>• Flow Monitoring / Benchmarking and Beneficial Impact Program</li><li>• Field Investigation Program and Issues Validation</li><li>• Ainslie Wood Neighborhood Creek Separation EA</li></ul>	<ul style="list-style-type: none"><li>• West End Sewer Separation Study and New Outfall EA</li><li>• Harbour Sewer Separation Study and New Outfall EA</li><li>• Red Hill Creek Sewer Separation Study and New Outfall EA</li><li>• Interceptor Feasibility Study and EA</li></ul>	<ul style="list-style-type: none"><li>• Enhance stormwater management policies for development</li><li>• Develop Low Impact Development (LID) practices policy for road reconstruction projects</li><li>• General LID practices policy / stormwater user rate</li><li>• Wet weather flow policy for separated sewer areas</li></ul>

**Further Stakeholder and Public Consultation is needed to confirm/finalize Policy Recommendations and Development of “Managed Sewer Separation” Strategy**

# 5. Study Recommendations: *Shorter-Term Priorities*

## 0-3 Years

- Adoption of study recommendations and vision
- Policy review and update
- Stormwater user rate
- Major sewer model update
- 1<sup>st</sup> “Managed Sewer Separation” EA West End Sewer Separation Study and New Outfall EA
- Ainslie Wood Neighborhood Creek Separation EA
- \$20M in ground works to address Short-Term priority areas

## 3-5 Years

- 2<sup>nd</sup> and 3<sup>rd</sup> “Managed Sewer Separation” feasibility study and EA
- \$87M in ground works to address Short-Term priority areas

## 5-10 Years

- Begin implementation of “Managed Sewer Separation”
- Studies to review major long-term solutions (Interceptor Feasibility Study & North Mountain Storm Trunk)
- \$106M in ground works to address Short-Term priority areas

# 5. Study Recommendations: *Program Cost*

- Long-term cost to be further evaluated based on future study findings
- Full program cost is dependent on attainable performance objectives/targets

Timeline	Studies	Priority Area Projects	Potential Projects	Managed Sewer Separation	Total (\$)
0-10 yrs	\$5M	\$214M	\$96M	\$52M	\$367M
10-20- yrs		\$93M	\$146M	\$19M	\$258M
20+ yrs		-		\$404M	\$404M
<b>Total</b>	<b>\$5M</b>	<b>\$307M</b>	<b>\$242M</b>	<b>\$475M</b>	<b>\$1,029M</b>



- Address Priority Flooding
- Reduce Overflows
- Flooding and Overflows Remain



- Target Elimination of Overflows
- Flooding only in Extreme Events
- Climate Change Resiliency

# 6. Next Steps



- Initiation of FDIF
- FDIF Final Report
- Ainslie Wood Neighborhood Creek Separation EA RFP Closes
- Information Report to PWC
- West End Sewer Separation Study and New Outfall EA
- Financing and Intergovernmental Relations Strategy
- Confirm/initiate priority, short-term capital works

Ongoing – Updates to All-Pipes Model, Stormwater and LID Policies, Stormwater User Rate Study

# Thank You

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**Thank you for your time**, we will now be answering any questions you may have.

