



Flood Reduction Strategies in the City of Ottawa

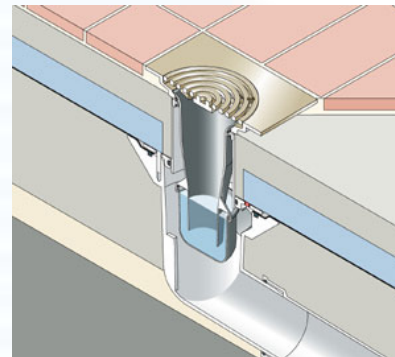
Presented by : Eric Tousignant, P.Eng
Senior Water Resources Engineer, City of Ottawa

Flooding in Ottawa

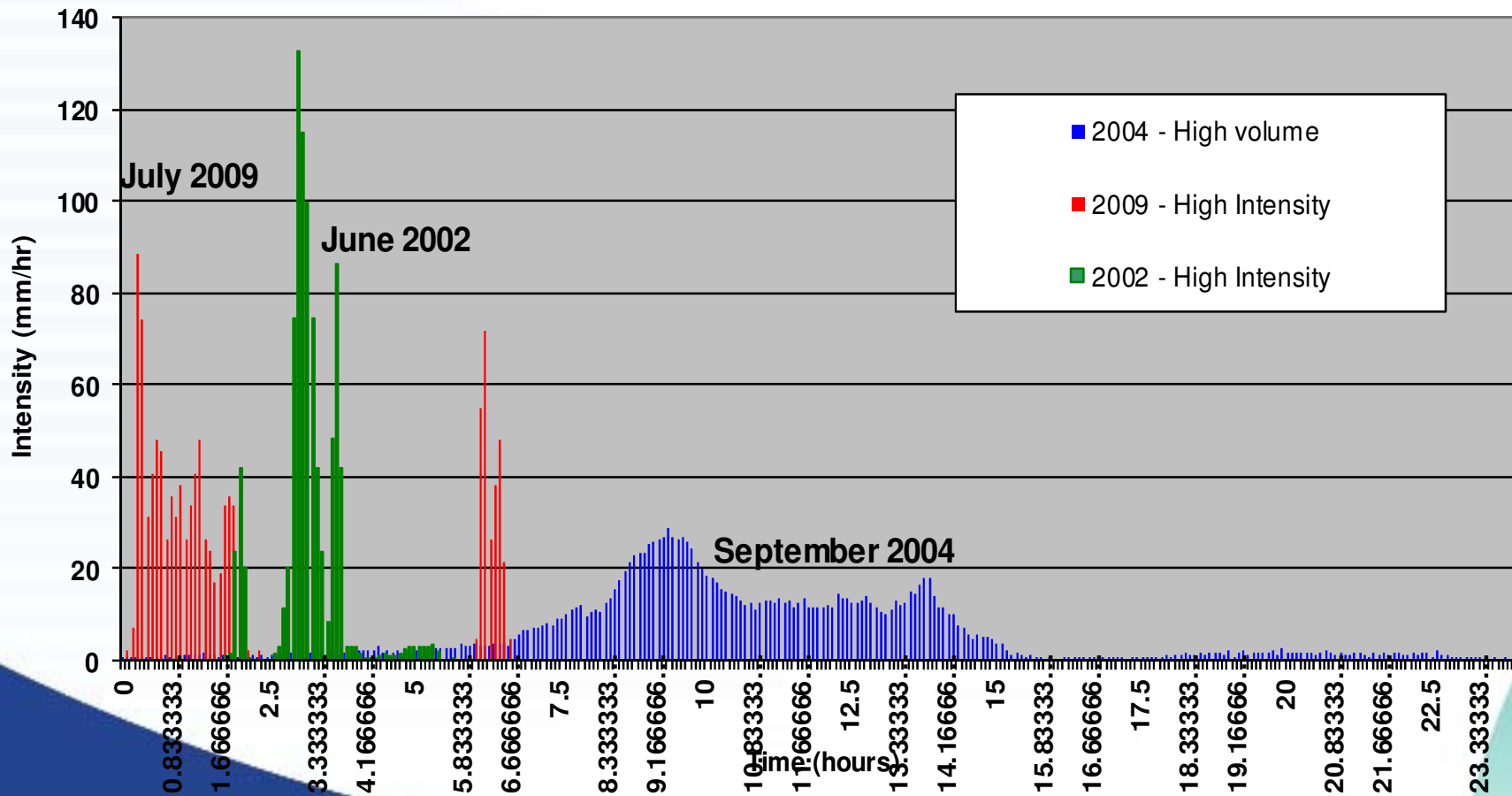
- **Since amalgamation in 2000, there has been 4 significant flooding events in Ottawa.**
- **On Sep 9, 2004 hurricane Frances caused over 1200 incidents of Basement flooding throughout the city, giving us a snapshot of how the sanitary system performs.**
- **Convection storms in 2002, 2006 and 2009 were also responsible for flooding occurrences.**

Types of Flooding in Ottawa

- **Basement flooding due to storm sewer surcharge**
- **Basement flooding due to sanitary sewer surcharge**
- **Overland Flooding.**

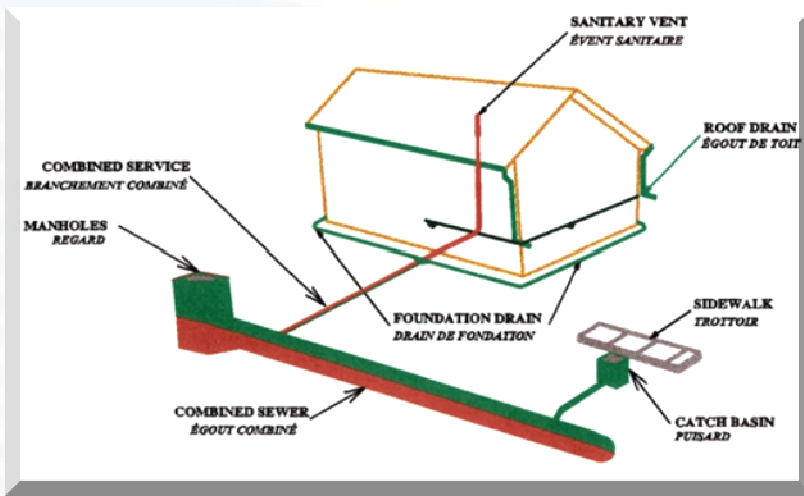


Types of Flooding Events

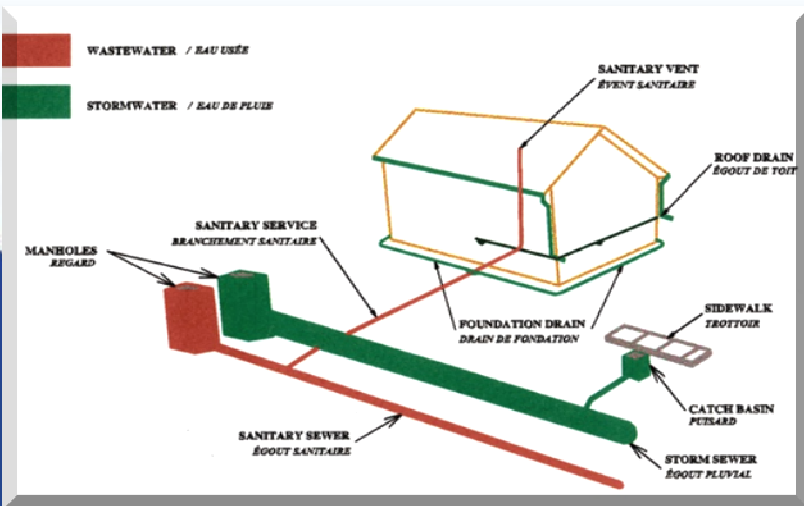
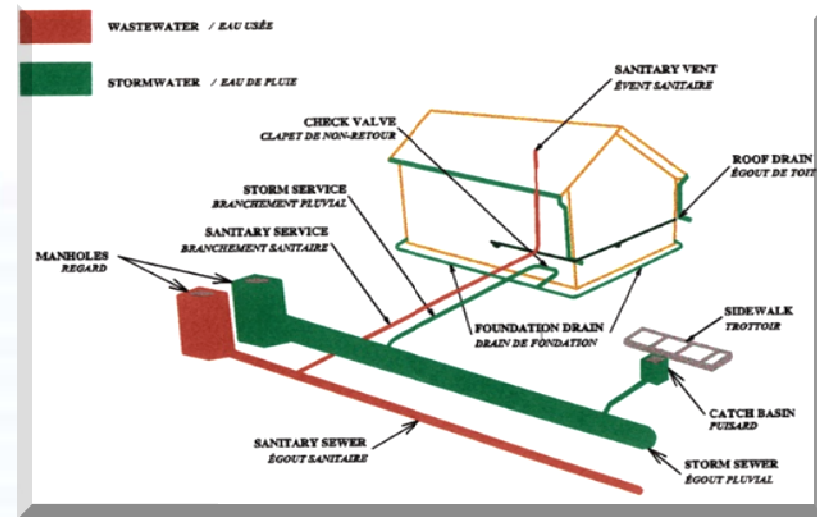


Types of Systems

Combined (pre 1950)



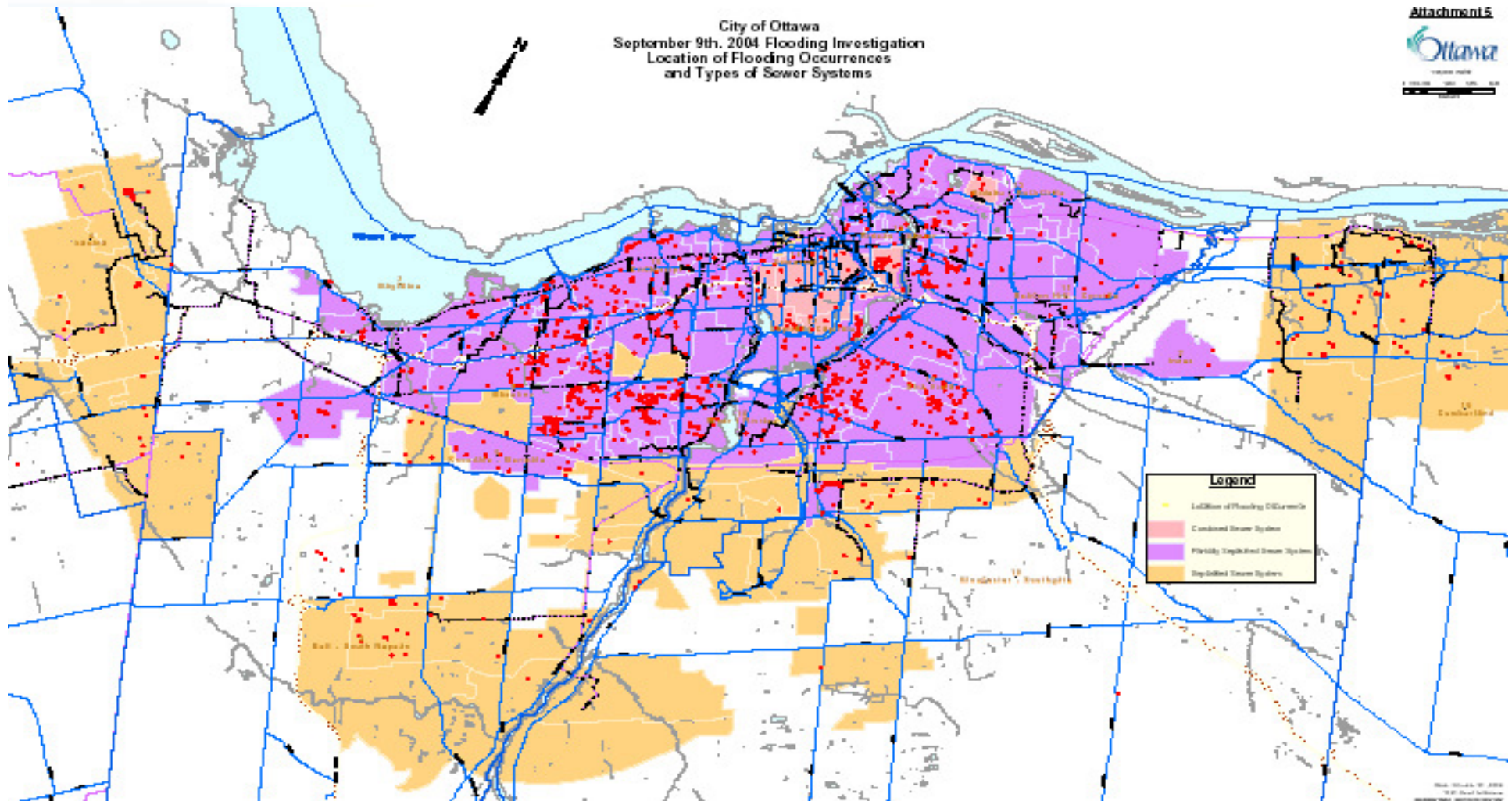
Separated (post 1961)



**Partially Separated
(1950-1961 and converted
combined systems
after 1961)**

Location of Sewer Types

City of Ottawa
September 9th, 2004 Flooding Investigation
Location of Flooding Occurrences
and Types of Sewer Systems



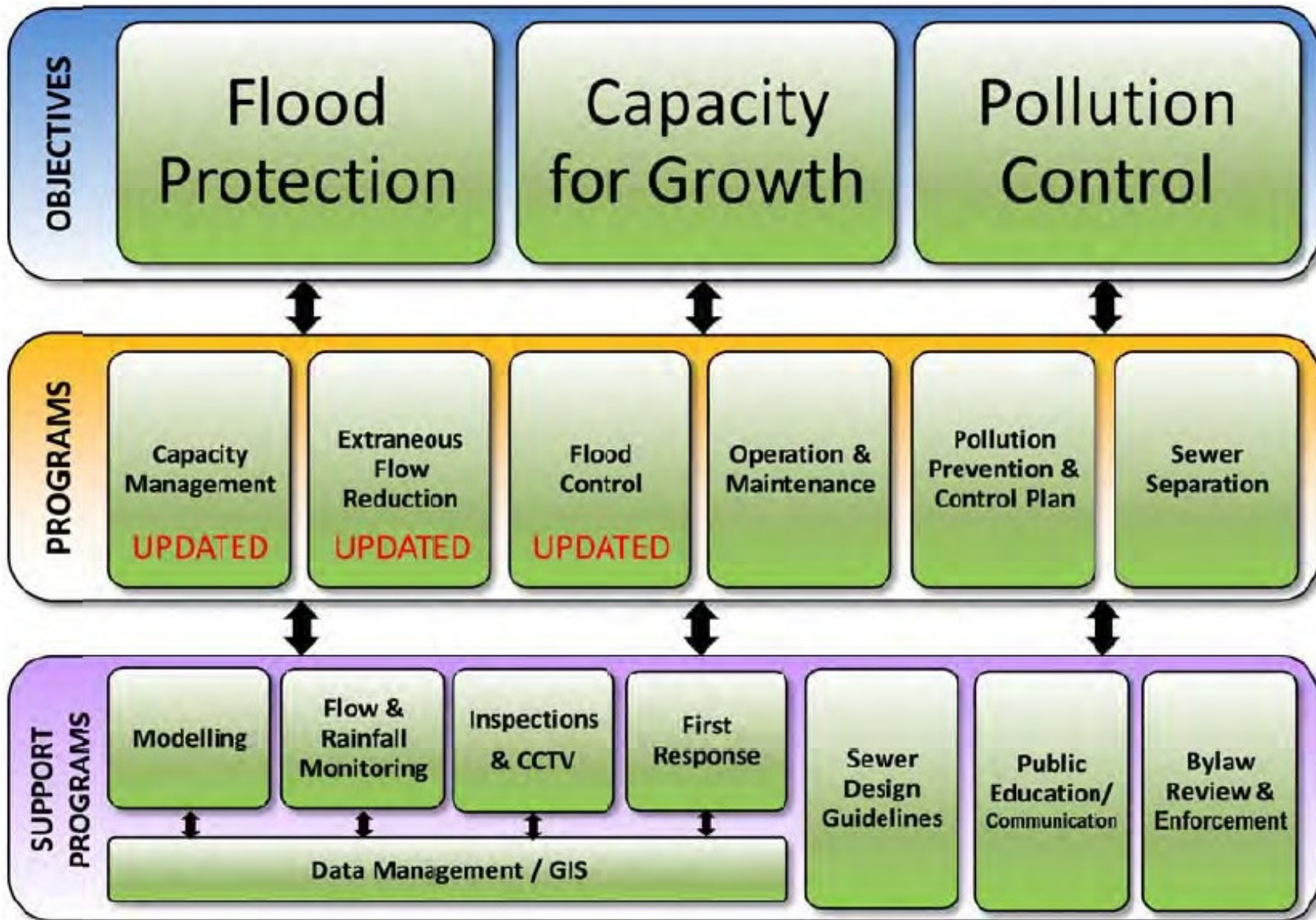
City Initiatives

- **Wet Weather Infrastructure Management Plan**

Objectives: Recommend Initiatives to provide...

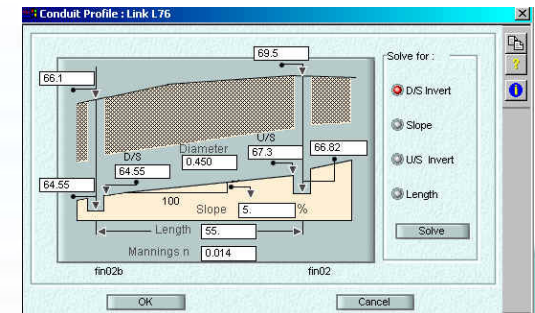
- ***Flood Protection - Reduce threats to human health and property damage from flooding;***
- ***Capacity for Growth - and intensification in areas with infrastructure capacity restrictions; and,***
- ***Pollution Control - Minimize adverse impacts on water quality in watercourses.***

Wet Weather Infrastructure Management Plan



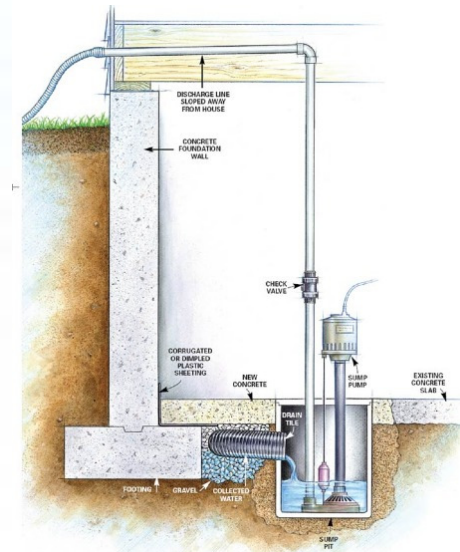
Current Ongoing Initiatives

- Residential Plumbing Protection Program
- Changes to guidelines
- Ongoing flood remediation projects
- RTC / Central Storage Tunnel
- Sewer separation
- Extraneous flow reduction
- Flow monitoring and modelling
- Public education



Residential Plumbing Protection Program

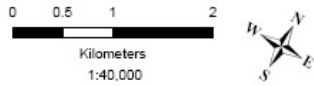
- Homes in high risk areas that have experienced flooding are eligible for a 100% subsidy up to \$5000 (or \$7,500 depending on the area)
- Homes that are in high risk areas but have not experienced flooding are eligible for a 50% subsidy (\$2,500 or \$3,500 max).
- Work includes extraneous flow removal, backwater valve installation, flat roof disconnect, and a sump pump if required.



Sewer separation

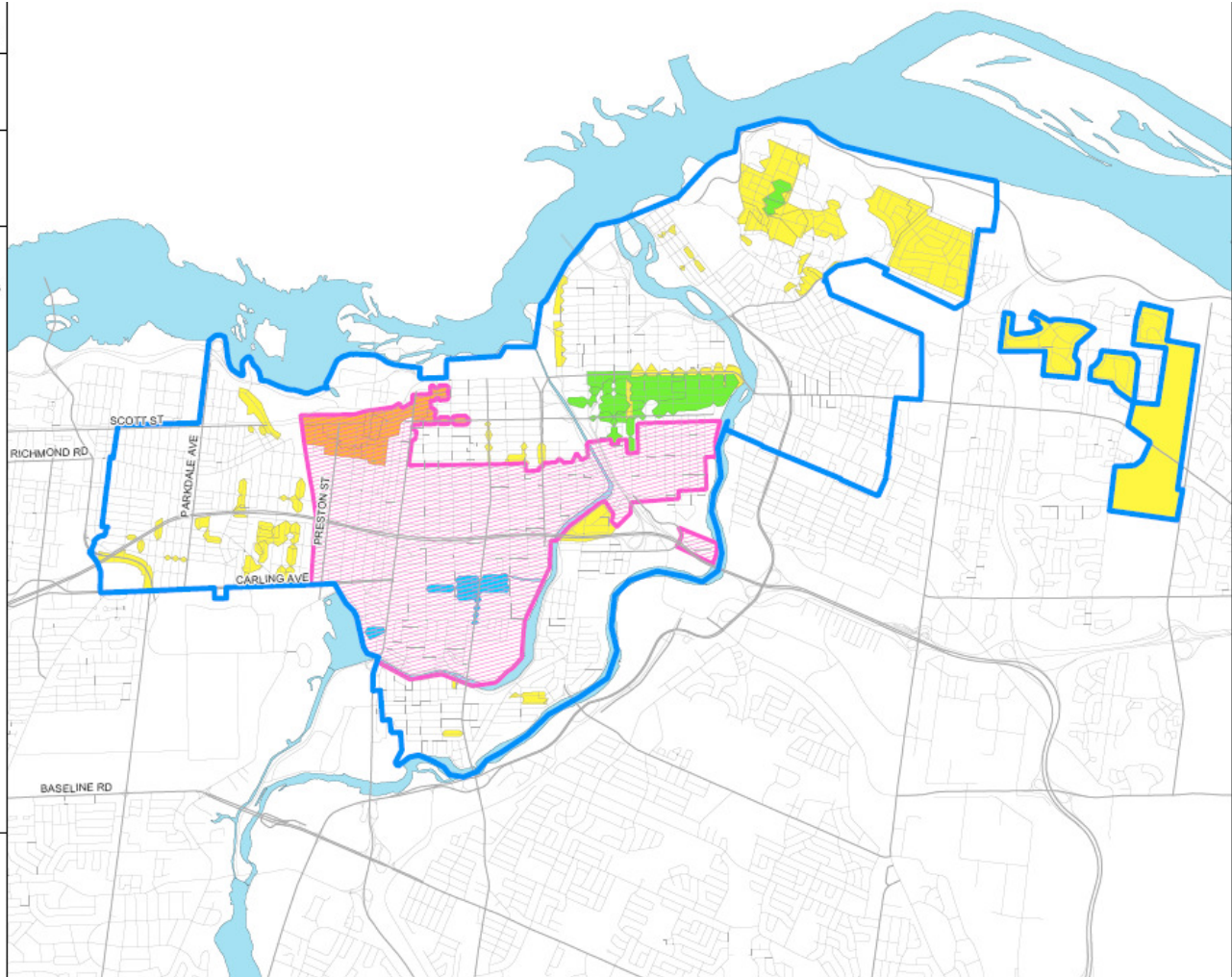
COMBINED SEWER AREA
POLLUTION PREVENTION & CONTROL PLAN

Figure 1.1
Scope of PPCP,
Ultimate Combined Sewer Area and
Current Status of Separation Program



Legend

- Scope of PPCP: Original Combined Sewer Areas
- Ultimate Combined Sewer Area (UCSA)
- Separated Areas within UCSA
- Combined Areas Still Awaiting Separation**
 - Separated but Still Drains to Combined
 - Planned for Future Separation
 - Separation Potential Under Investigation

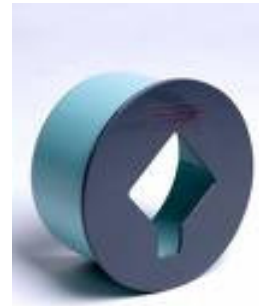


Department of Public Works and Services

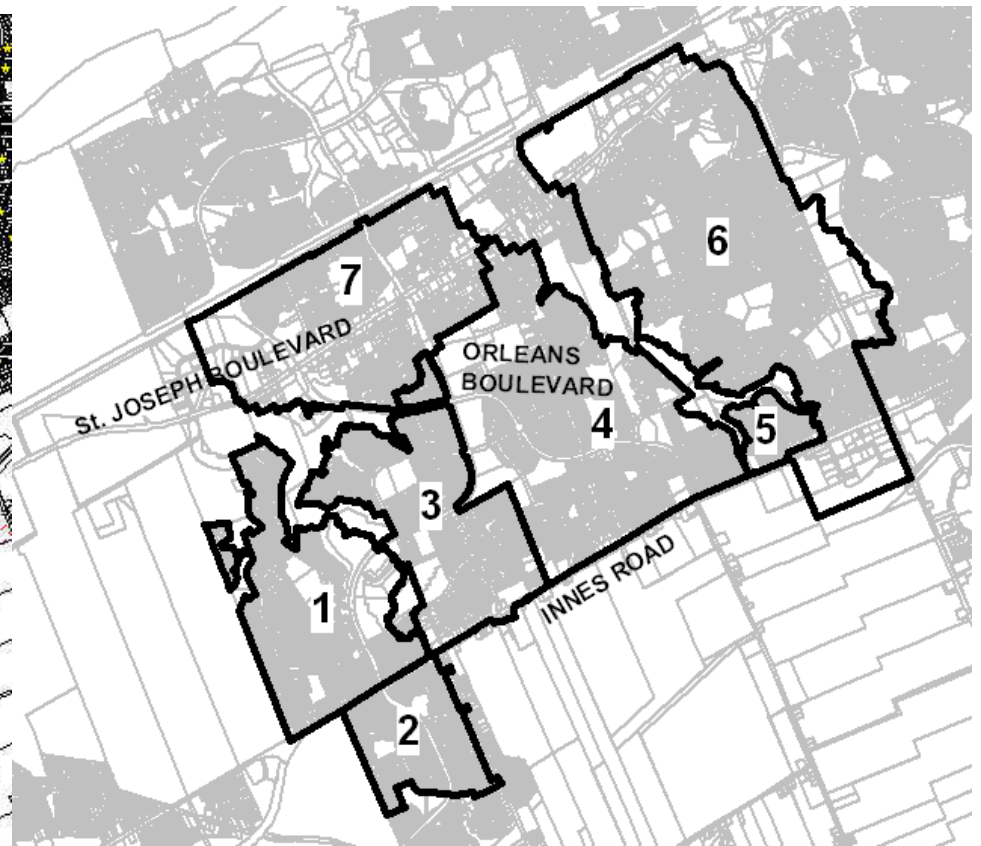
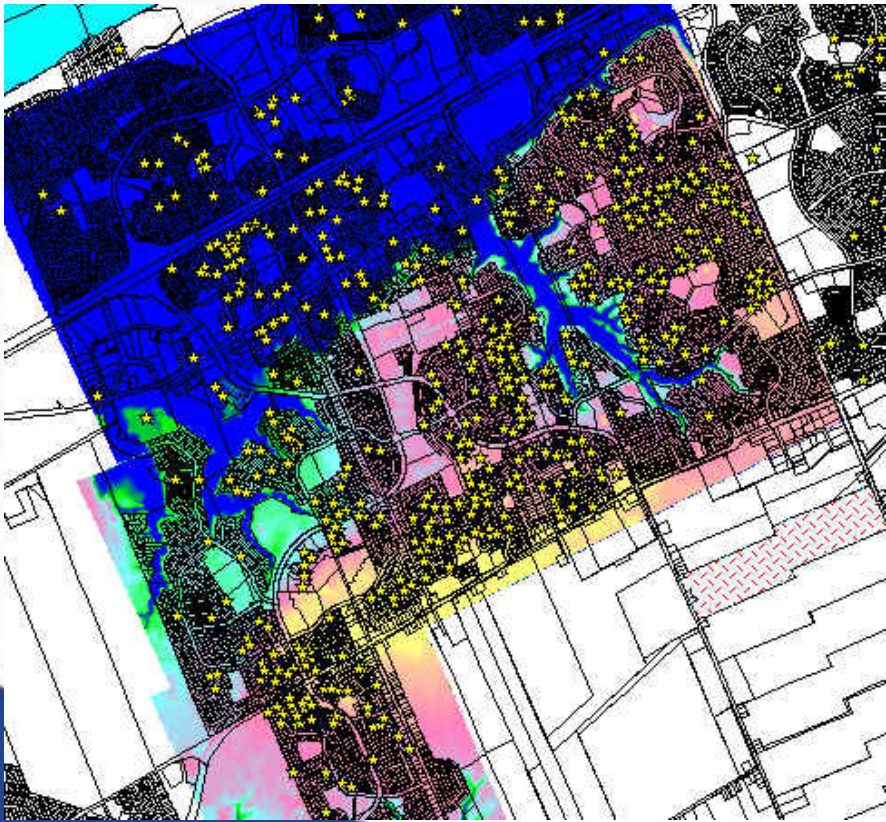
This map was compiled from existing & collected engineering information from the City of Ottawa Geographic Information System and is protected by copyright. The location of infrastructure is approximate.

Dual Drainage Implementation

- **Installation of Inlet Control Devices in separated areas.**
- **Overland Flow Improvements**
- **Replacement of MH covers**



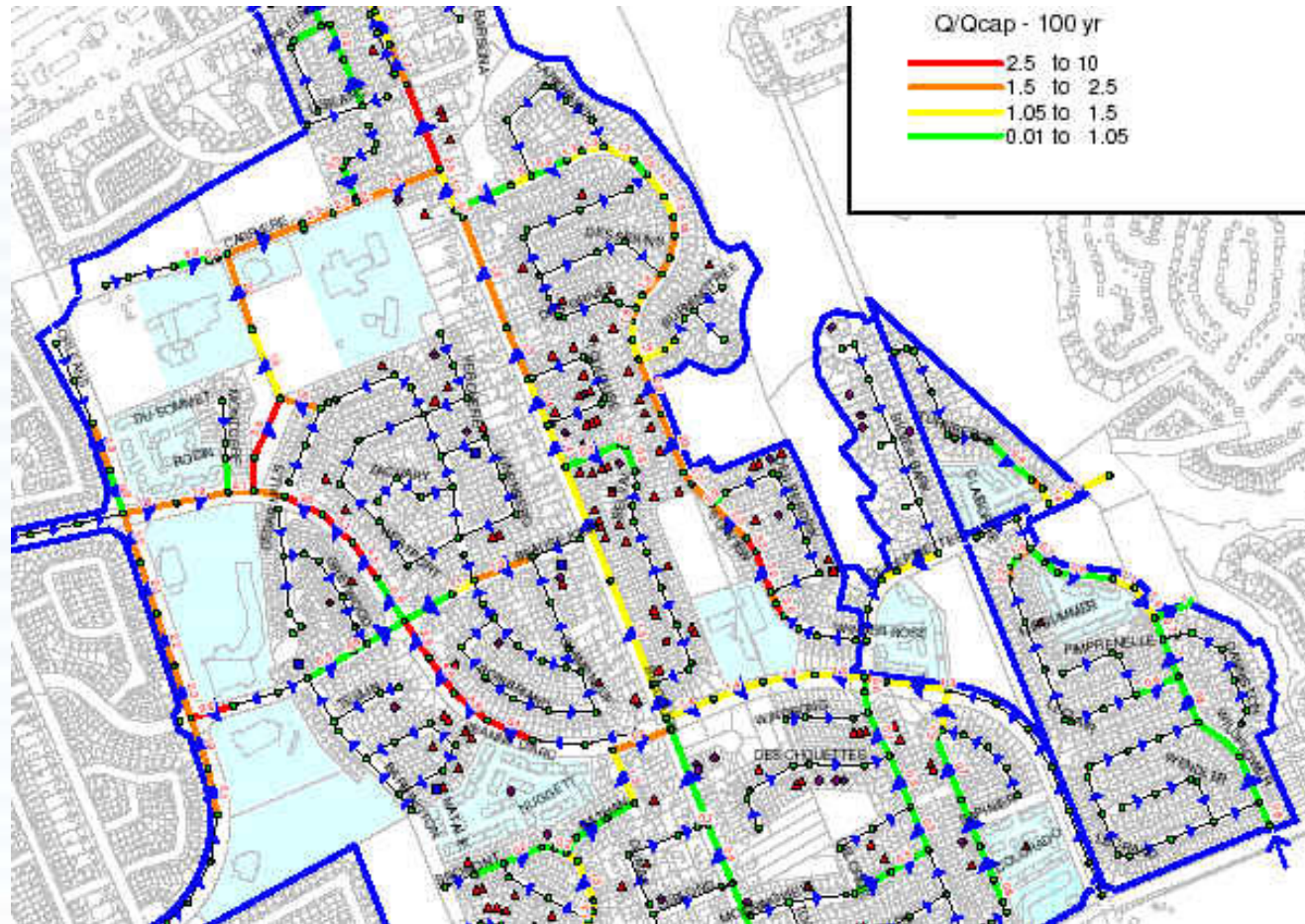
Orleans Flood Investigation



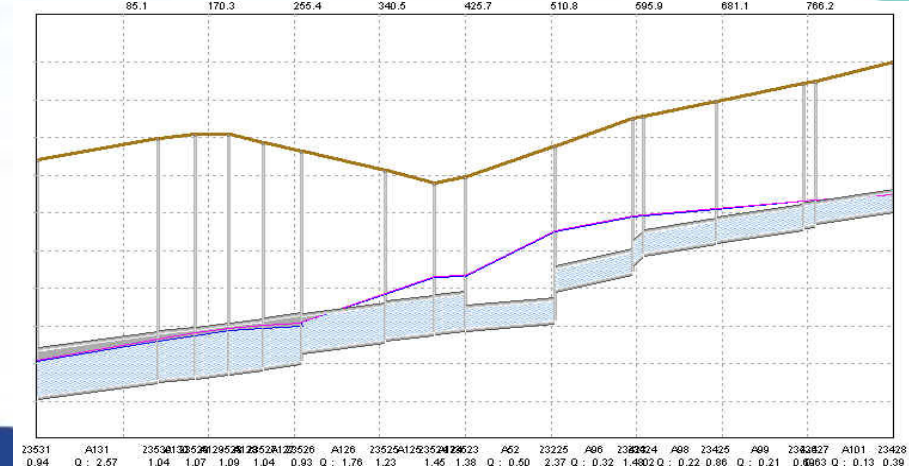
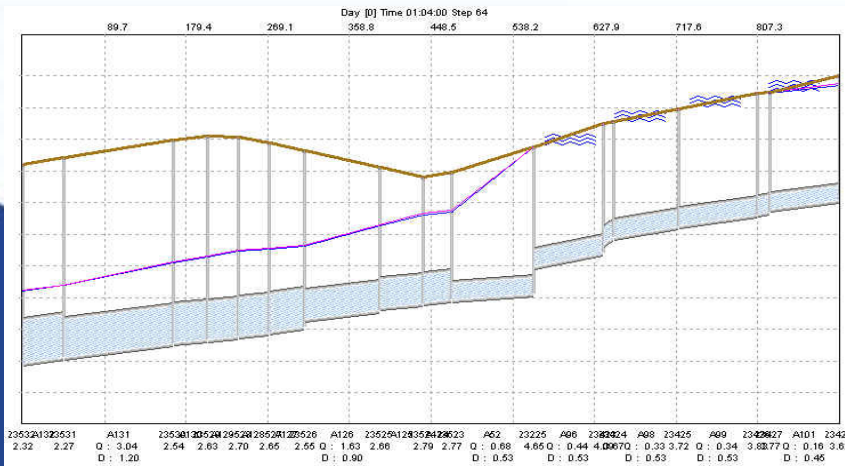
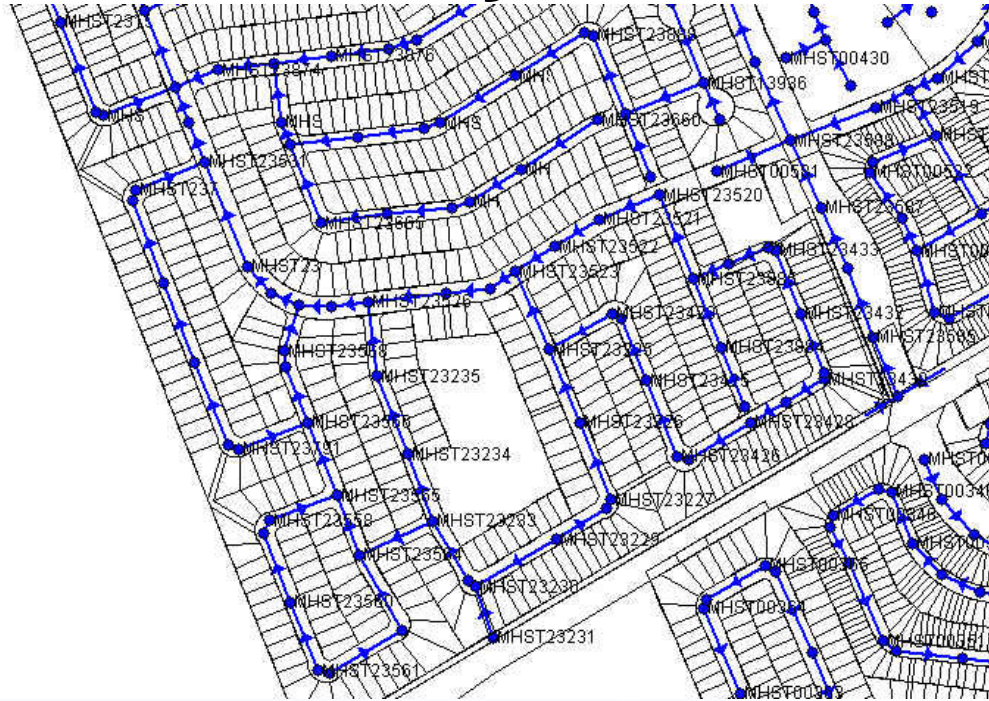
Orleans Flood Investigation

- **Basement flooding due to surcharge of Storm Sewers. Over 800 basements flooded in 2006.**
- **Poor overland drainage system was also an issue.**
- **Most homes did not have backwater valves.**

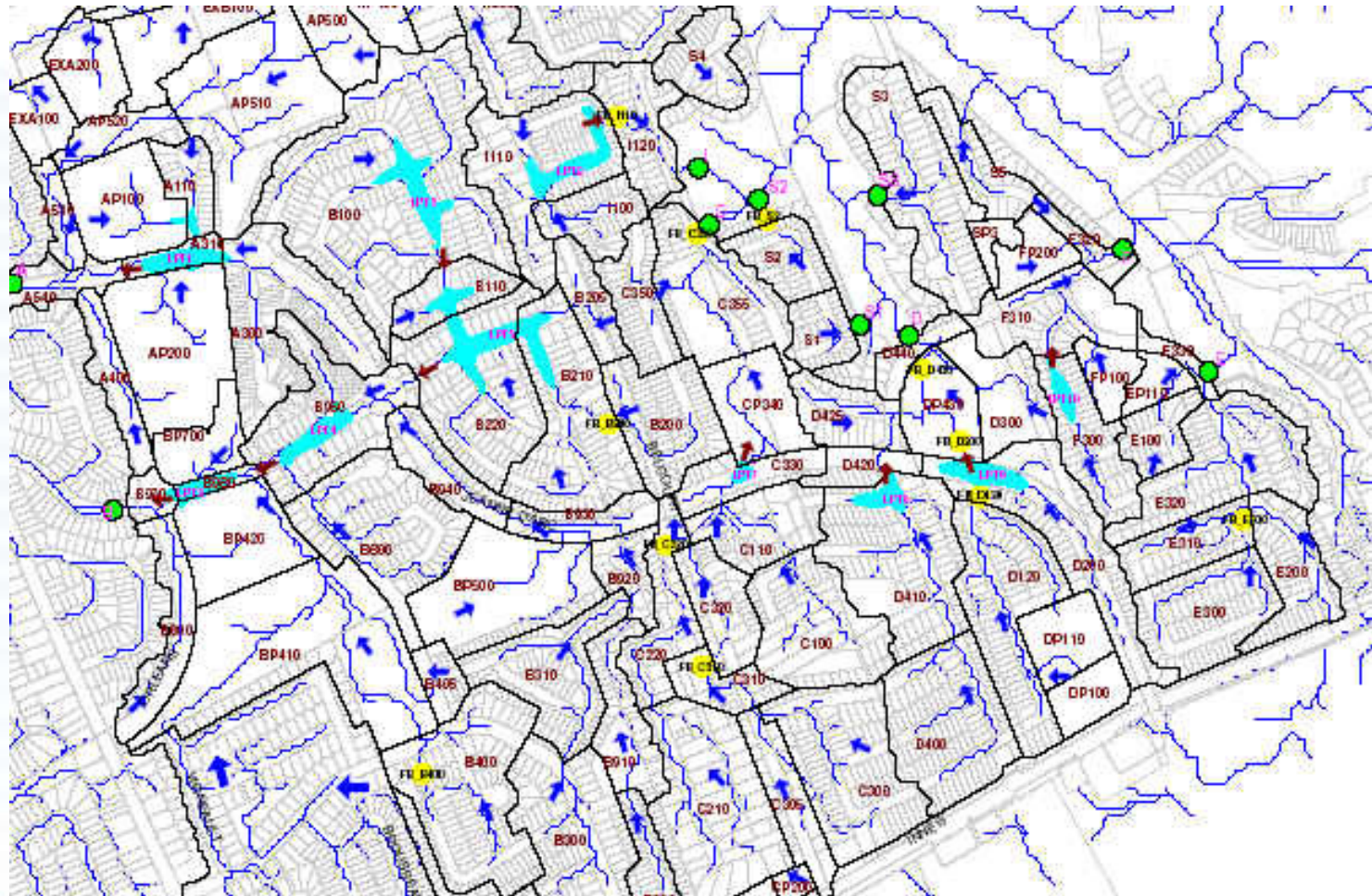
Minor system analysis



Hydraulic Analysis – XP-SWMM



Major system analysis



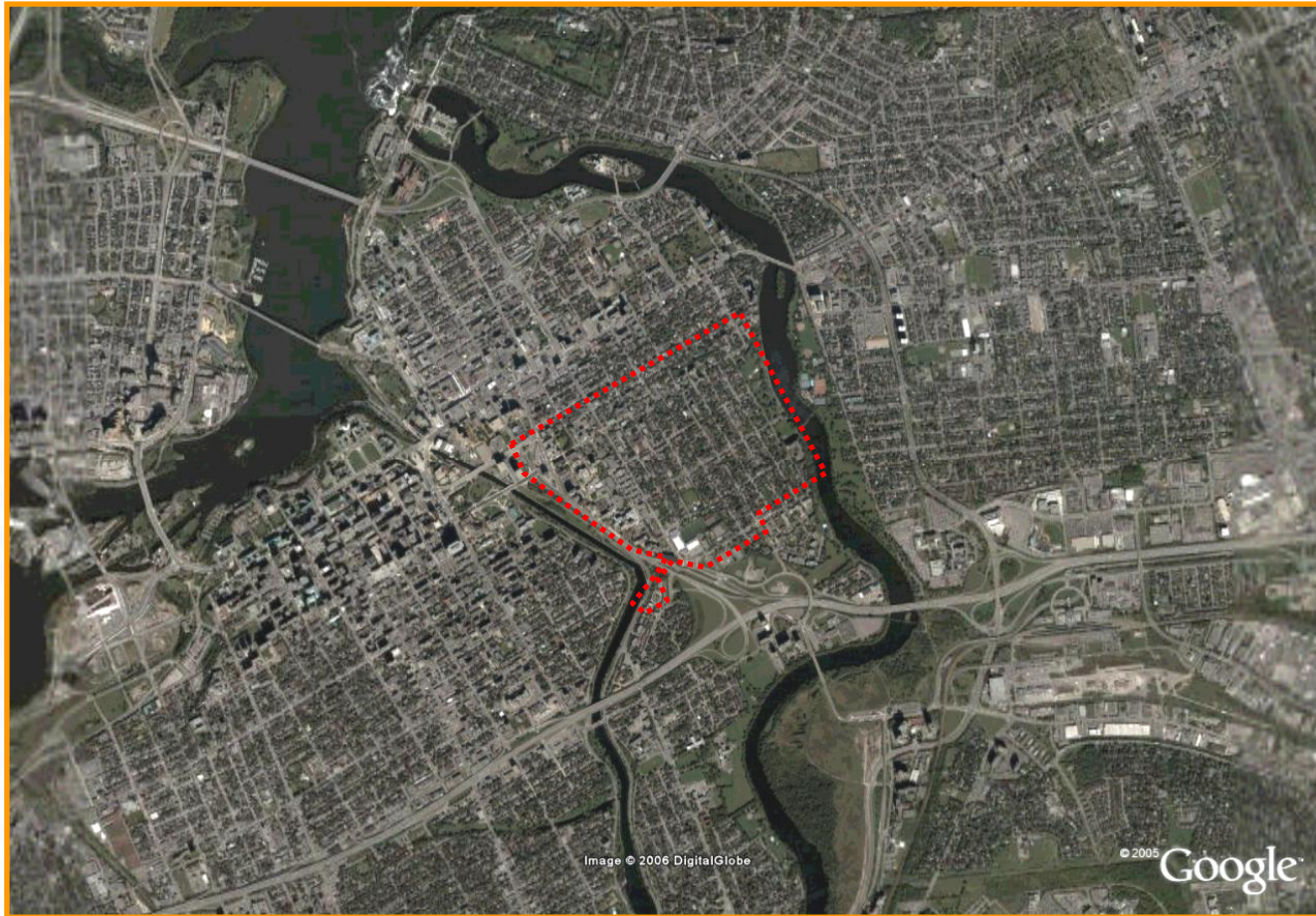
Alternatives



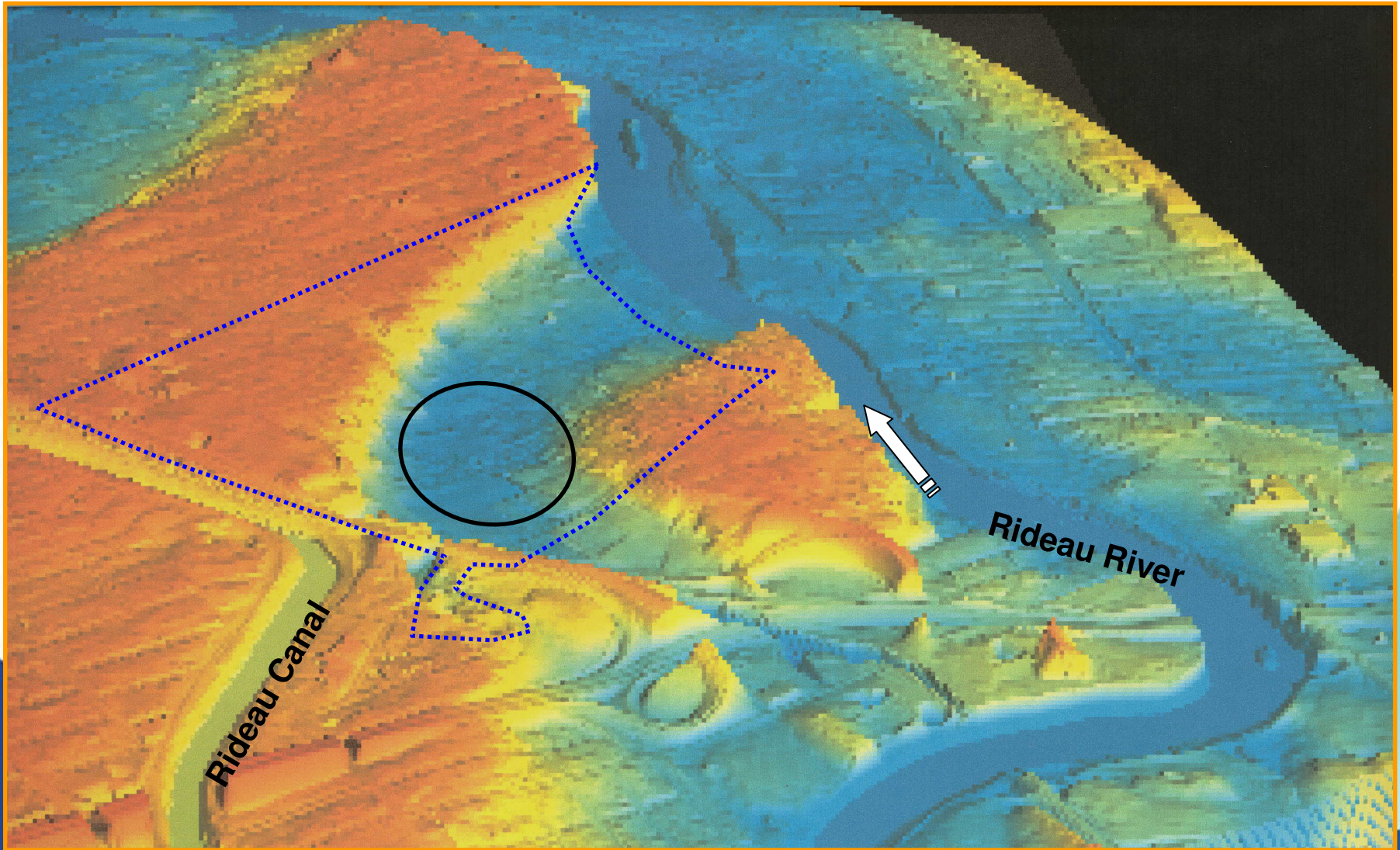
Orleans Dual Drainage Project

- **Flood remediation measures were completed in 2008 and 2009.**
- **In 2011, a large event again hit the area. There were no reports of basement flooding.**
- **Some overland drainage issues were reported (excessive ponding) and are currently being addressed.**

SANDY HILL FLOOD CONTROL STUDY

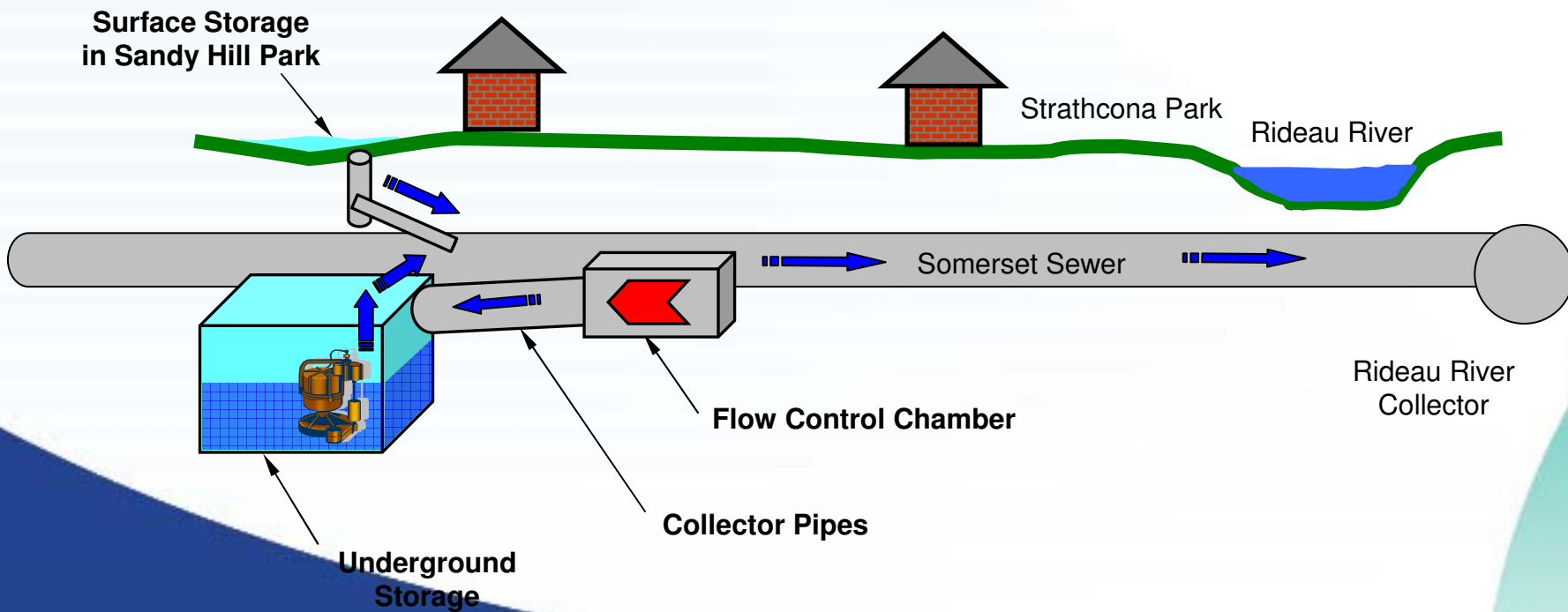


Sandy Hill Topography



SANDY HILL FLOOD CONTROL STUDY

Storage in Sandy Hill Park

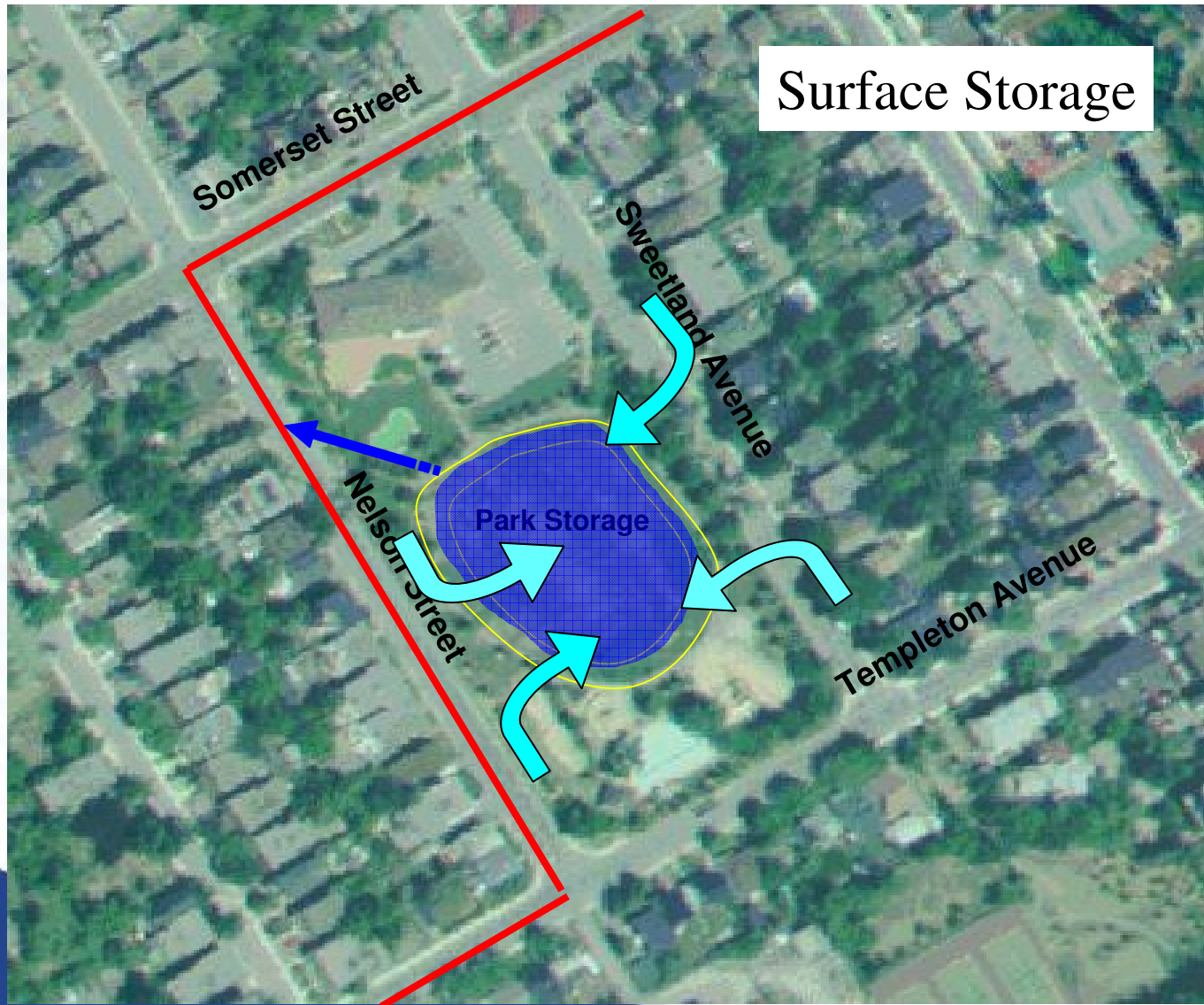


SANDY HILL FLOOD CONTROL STUDY

Storage in Sandy Hill Park



SANDY HILL FLOOD CONTROL STUDY



SANDY HILL FLOOD CONTROL STUDY

Construction



SANDY HILL FLOOD CONTROL STUDY

Park Before and After



Sandy Hill Tank

- Since being in service in 2009, the tank has been used 8 times, protecting the community during storm events, including the large 2009 event.
- Even during construction, the tank unexpectedly protected the community (and made the contractor very unhappy)

Tanks a lot!

Major project will stop flooding in Sandy Hill as well as help cut down sewage from spilling into Ottawa River

DEREK PUDDOCCHINI
City Hall Bureau

Next summer when children are kicking around the ball, picnicking with mom and dad, or just having fun in Sandy Hill Park, they will be doing so on top of a massive sewage storage tank.

When completed, city officials say there won't be any evidence a 11,236-cubic-metre underground storage tank — with the capacity to hold 12.5 million litres of combined storm water and raw sewage — lies beneath the park.

Once the tank is built, the park, located behind the Sandy Hill Community Centre, will also get a major facelift.

Sewer backup
The \$15-million tank, the



Acts like bowl

sewer line can handle the contents stored in the tank, the sewage will be released gradually and flow to a wastewater treatment facility.

The tank will also help minimize the combined sewer overflow into the Ottawa

PHOTO: MCGRAW-HILL CONSTRUCTION

Dixon Weir, director of water and wastewater services, stands inside the underground storage tank in Sandy Hill.



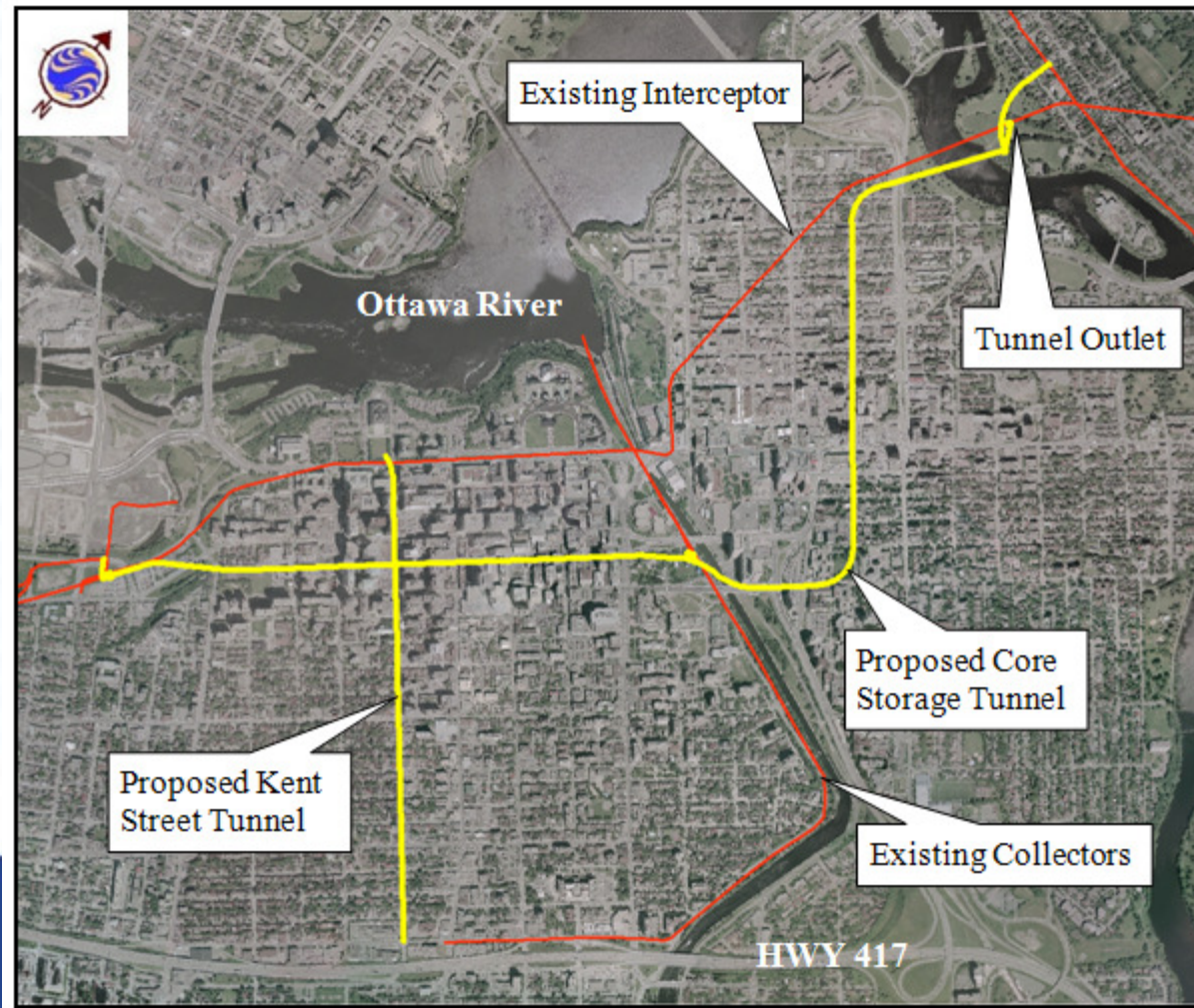
Other initiatives by the City

- **Revising design guidelines to account for new densities.**
- **Temporary orifice controls during subdivision construction.**
- **Climate Change: Stress test storm system by adding 20% to 100 year IDF curve.**



Other initiatives by the City

- CSO reduction: Real Time Control, Storage Tunnel



THANK YOU

QUESTIONS?