STORMWATER CHALLENGES & OPPORTUNITIES

City Council Meeting: April 25, 2023

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What is stormwater?

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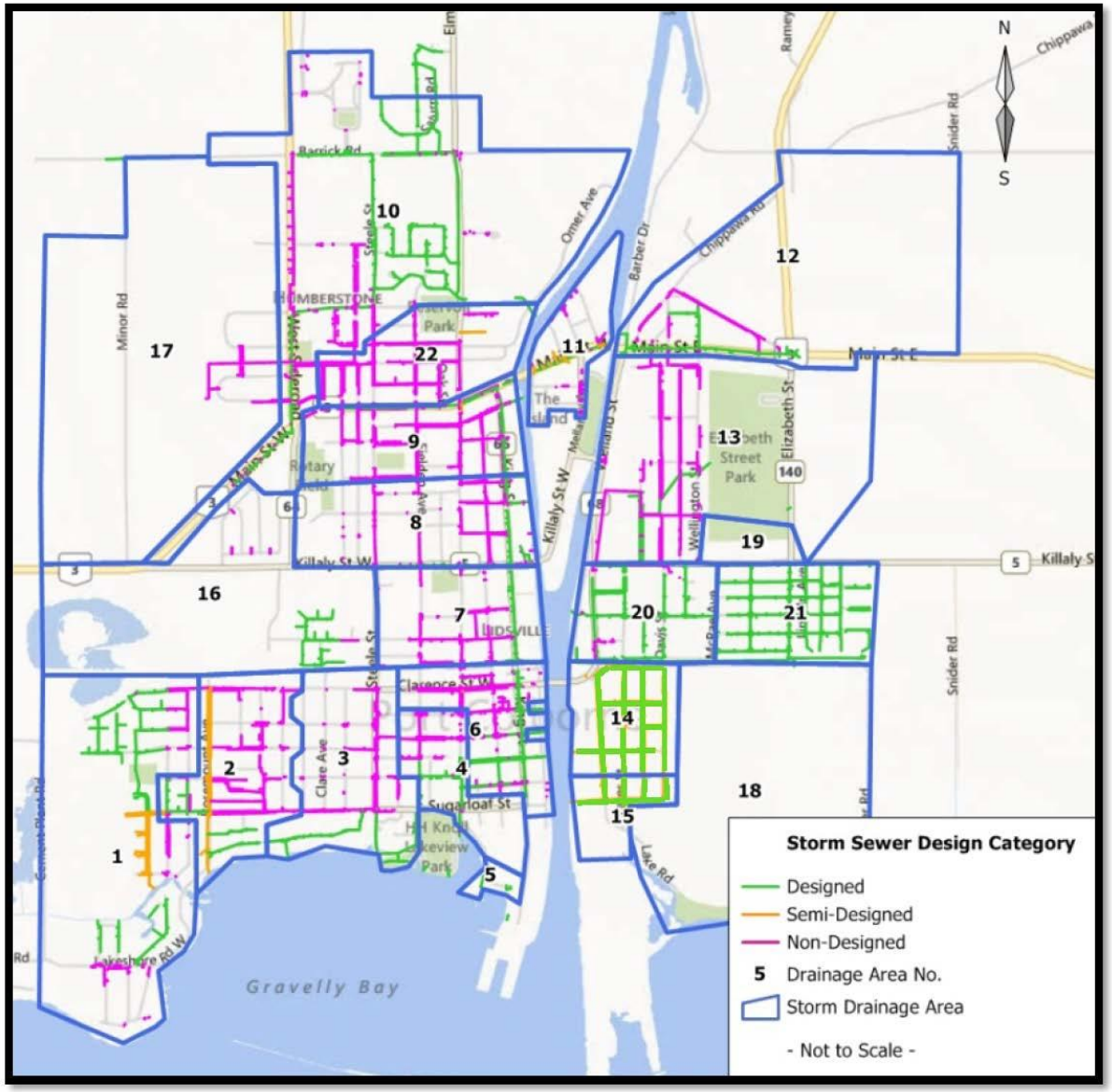
Stormwater Challenges

Lack of proper storm infrastructure

- Some areas have systems that are designed to manage stormwater
- Some areas have systems that have been partially/semi designed
- Some areas have no stormwater management systems
- Significant investments needed to properly manage stormwater throughout Port Colborne



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Stormwater Challenges

Climate change and geography

- Significant storm events
- Rising lake levels
- Shoreline flooding
- Backflow into nearby pipes
- Flat topography, many fields
- Seiche events
  - Prevailing winds cause sudden flooding
  - Lake can rapidly rise 2.5-5m
  - 1-2 events per year

Lower photo credit: St. Catharines Standard

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Stormwater Challenges

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Stormwater Challenges

Inflow

- When stormwater enters the sanitary sewer pipes through
  - Eavestroughs
  - Downspouts
  - Basement sump pumps
  - Foundation drains

Infiltration

- When stormwater seeps into sanitary sewer pipes through
  - Cracks
  - Leaky pipe joints
  - Deteriorated maintenance holes

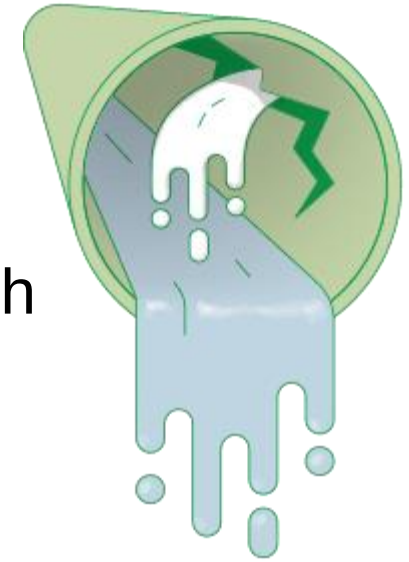

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Image credit: Envirosight

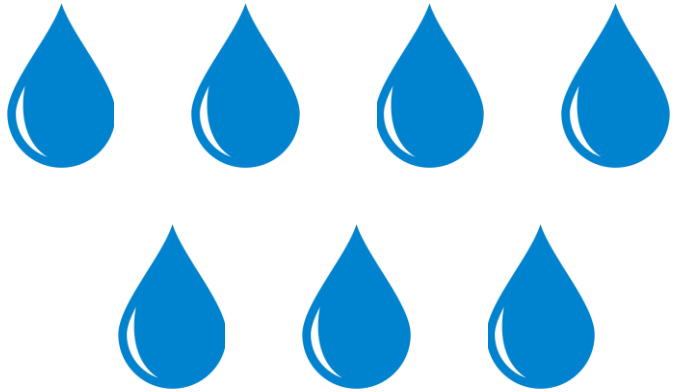
Stormwater Challenges

High costs of managing stormwater

- Costs paid to Niagara Region
  - We purchase clean water
  - We send back wastewater
- Infrastructure needs
- Property damage – private and public

Clean water coming from Niagara Region:

Wastewater sent back to the Niagara Region treatment plant:



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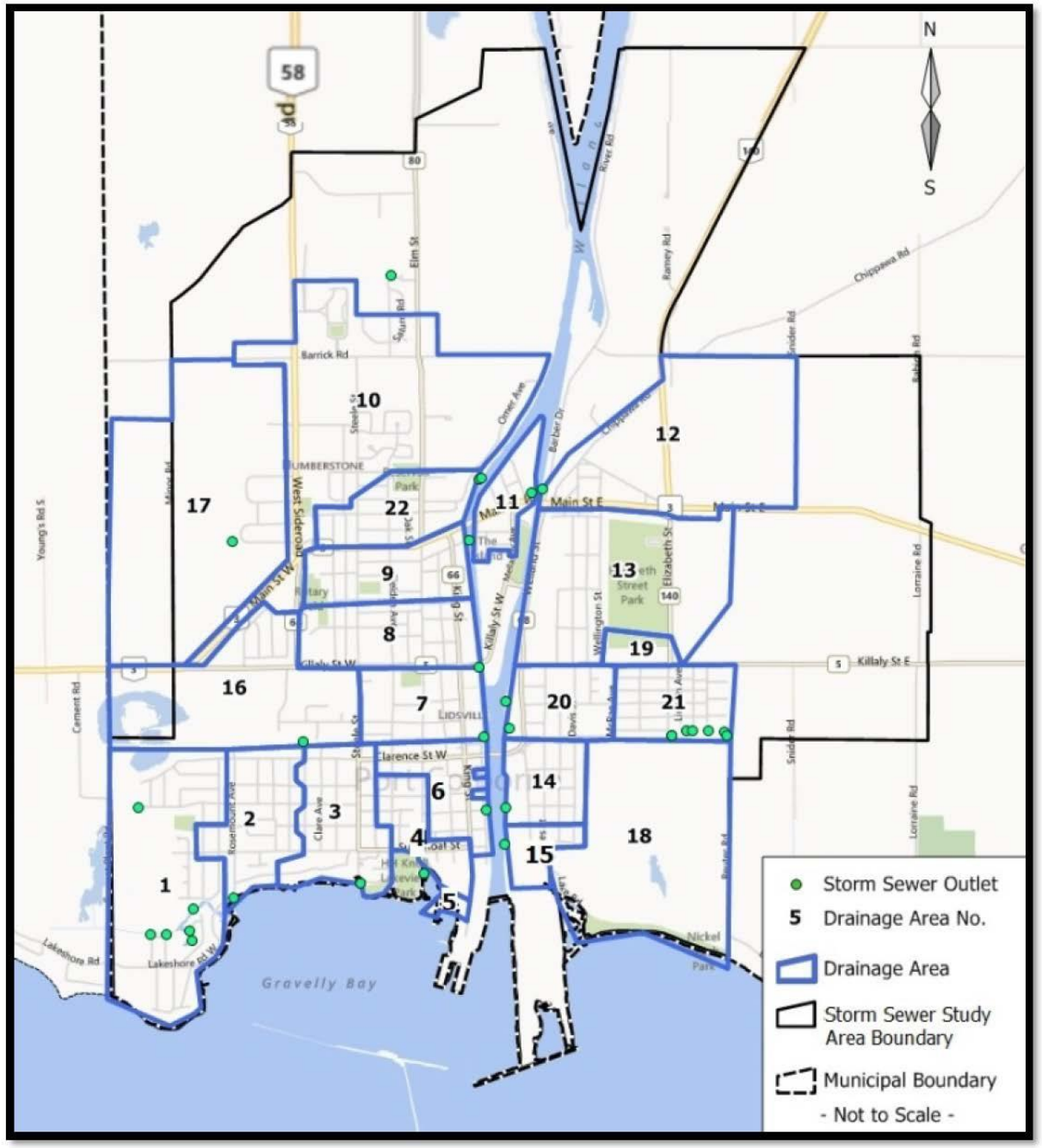
Drainage Areas

Planning for today and tomorrow

- Opportunities for improvement in all areas of Port Colborne
- 22 drainage areas identified with infrastructure needs
- Priorities based on:
  - Council direction
  - Age of the infrastructure
  - Absence of infrastructure
  - Proximity to the lake/canal



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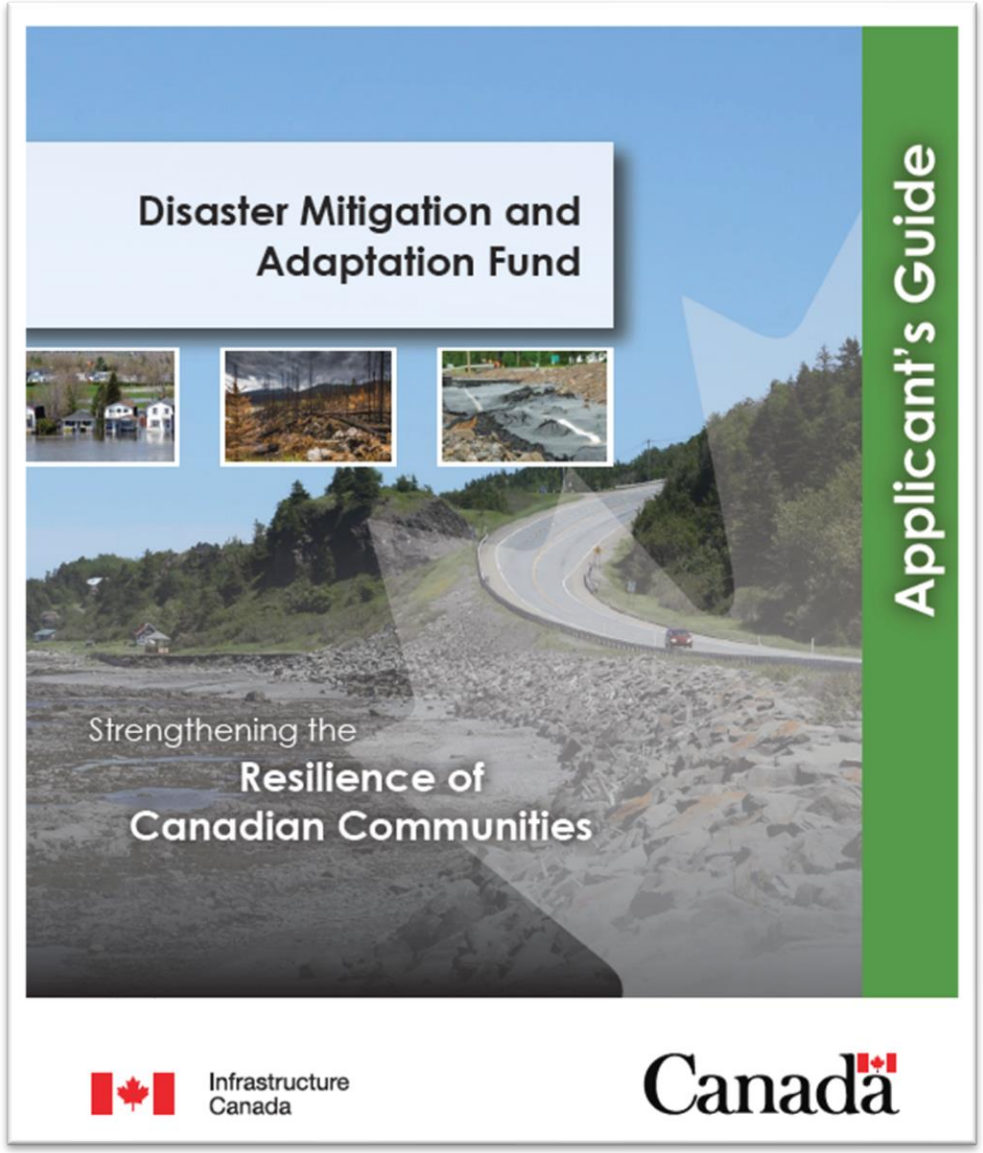
Disaster Mitigation & Adaptation Fund

Grant Opportunity: DMAF

- Disaster Mitigation and Adaptation Fund (DMAF)
- Maximum 40% federal contribution
- Investments in structural and natural infrastructure projects
- Meant to increase resiliency of communities impacted by natural disasters, climate change



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Disaster Mitigation & Adaptation Fund

Grant criteria

- Eligible projects:
  - New construction
  - Modification/reinforcement of existing public infrastructure
- Capital costs, planning and design
- Bundled projects
- Substantial completion: December 31, 2032
- Application deadline July 19, 2023

Other Successful Municipalities

City of Kitchener

- $49.9 million in funding
- Flood protection for over 11,500 residents
- Building and upgrading storm sewer system
- Dyke upgrade and trail replacement

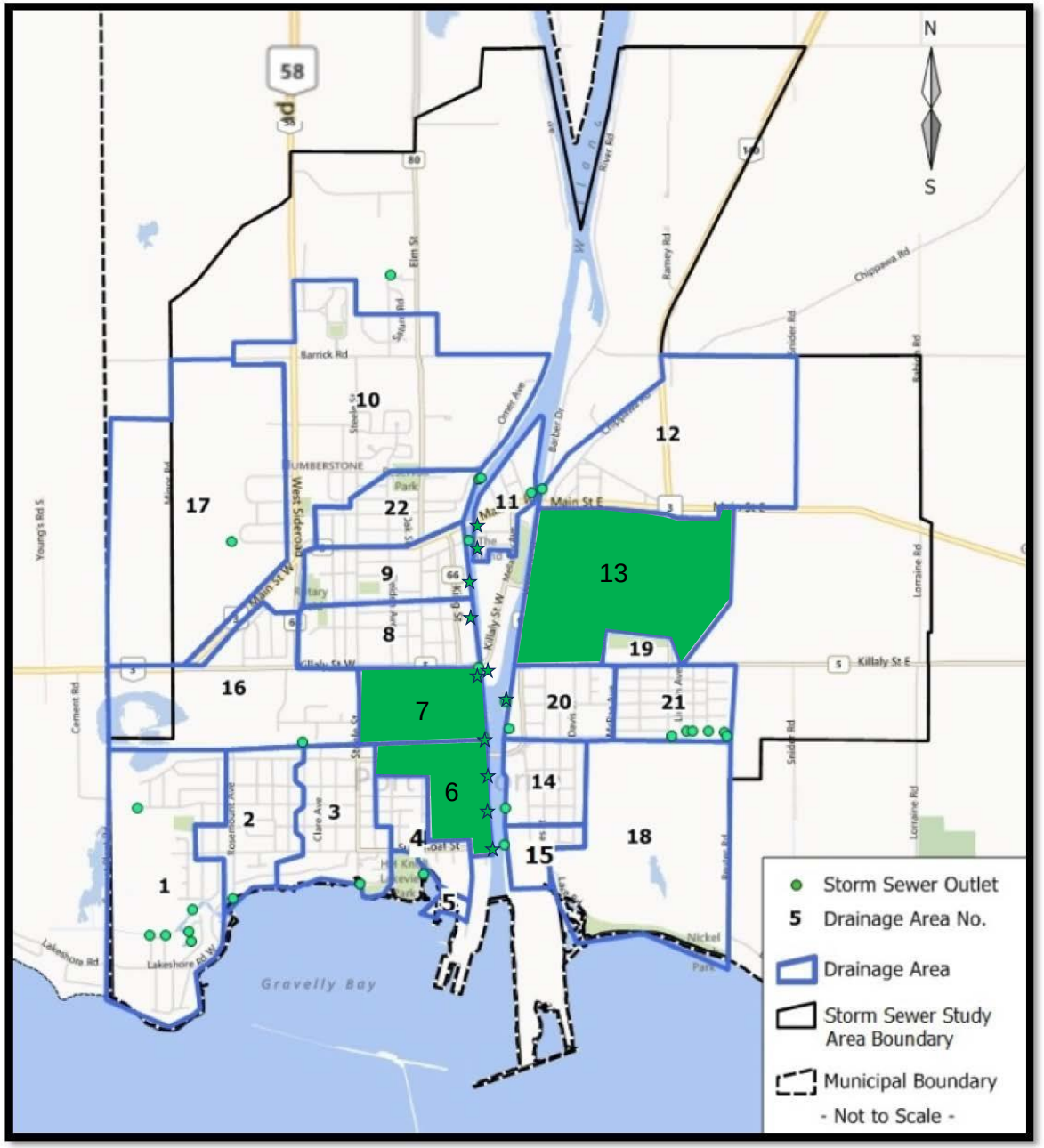
City of Hamilton

- $12.7 million in funding
- Flood protection
- Installation of backflow devices to prevent lake water entering storm sewer system during severe storms
- Shoreline rehabilitation

Town of Tecumseh

- $10.7 million - largest federal investment in Tecumseh's history
- Flood protection
- Constructing storm pumping station, storm sewer improvements

DMAF Drainage Areas



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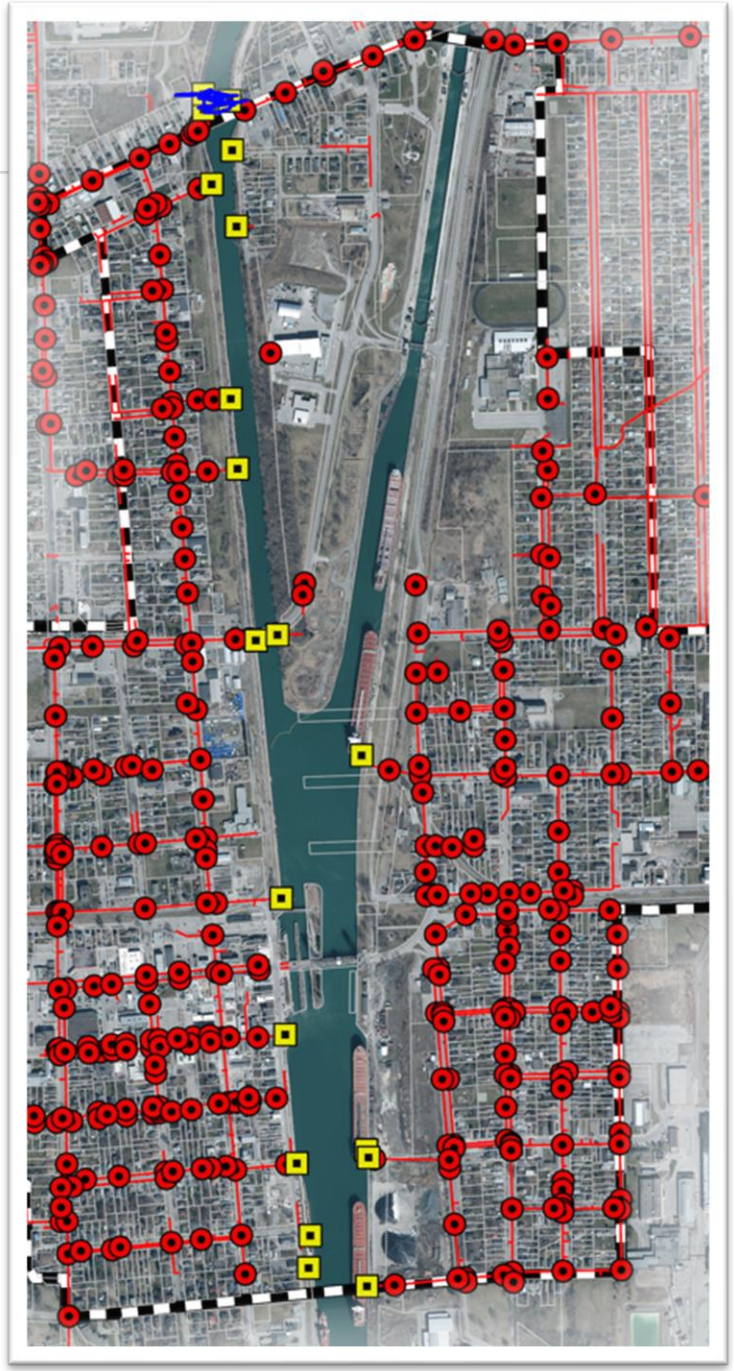
Proposed Project #1

Storm sewer outlet protection

- Outlets south of the weir and lock
- Vulnerable to flooding during seiche and/or storm surge events
- Add outlet protection to prevent water from going the wrong way in the pipes



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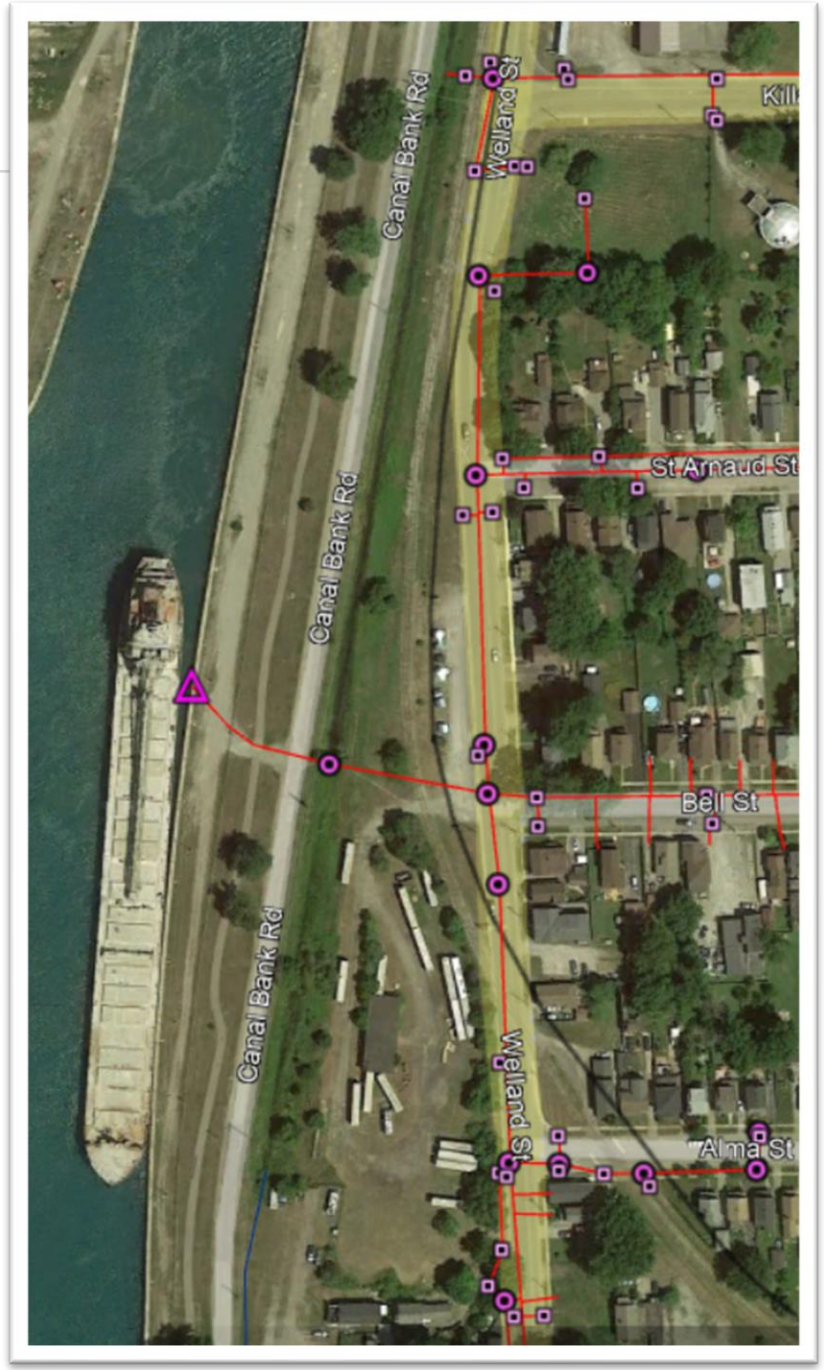
Proposed Project #2

Storm sewer outlet pumping

- Once Project #1 has added protection to the outlets, there won't be a good place for rainwater to go when lake levels rise
- Project #2 suggests adding pumps to ensure the rainwater can get back to the Lake once backflow isn't possible
- Welland Street storm sewer outlet is a prime candidate



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Proposed Project #3

Storm sewer and sump pump drains

- Replace storm sewer systems in drainage areas 6, 7, and 13 (directly impacted by seiche events)
- Install dedicated sump pump drains
- Permits sump pumps to be redirected from sanitary sewer to drains
- City can proceed with a sump pump/ downspout disconnection program
- City could replace all water and sanitary sewer pipes identified in the 2011 Downtown Community Improvement Plan (CIP)

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Project Timeline

Phasing reduces risk

2024

Planning and Design Area 13

Environmental Assessment

Preliminary Design

Detail Design

Area 13, Storm Outlet Protection & Pumping

2025

Planning and Design Cont

Finalize Detail Design and phasing plan

Procure Contractor

Construction

Area 13, Storm Outlet Protection & Pumping

2026

Construction Area 13 Cont

Construction of Outlet Protection & Pumping (cont)

Planning and Design

Design Area 6 & 7 and implement phasing strategy

2027

Construction Area 6/7

Procure Contractor

Implement phasing strategy

2028

Construction Area 6/7 Cont

Complete construction and reinstatement

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Financial Implications

Project Costs & Financial Impact

- Total estimated project cost is $32 million
- DMAF will contribute a maximum of 40%, if approved
- City’s portion would be $19.2 million
- Debenture would be required

Financial Implications

Year	Project	In-Year	Grant	Debt Financing
Storm	25,200,000		12,800,000	12,400,000
Roads	5,000,000	5,000,000		
Water	1,400,000	1,400,000		
Wastewater	400,000	400,000		
Total	32,000,000	6,800,000	12,800,000	12,400,000

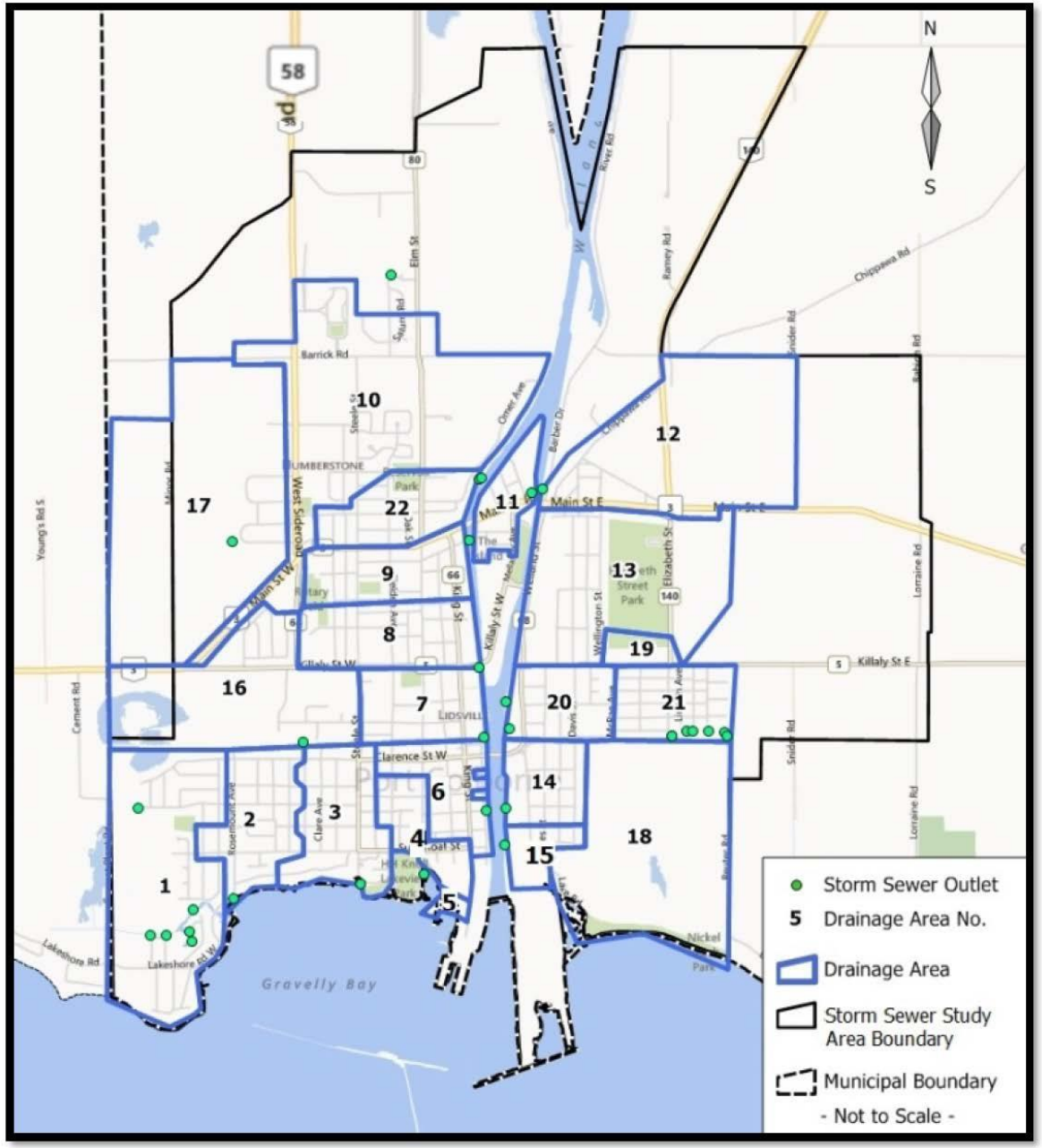
Class D estimate

Approx.
$85 per house
@ 5%
interest rate
30 years

Looking Ahead

Next Steps

- Completion of Infrastructure Needs Study
- Completion of Storm Sewer Inventory and Condition Assessment
- Present plan to Council and implement upgrades



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Looking Ahead

Stream 1

Focus Areas:
- Area 6
- Area 7
- Area 13

DMAF

Stream 2

Focus Areas:
- Area 2
- Area 3
- Area 22

Dependent on:
- Infrastructure Needs Study
- Pollution Prevention Control Plan

Stream 3

Focus Areas:
- TBD

Dependent on:
- Infrastructure Needs Study
- Pollution Prevention Control Plan

Stream 4

Not currently required

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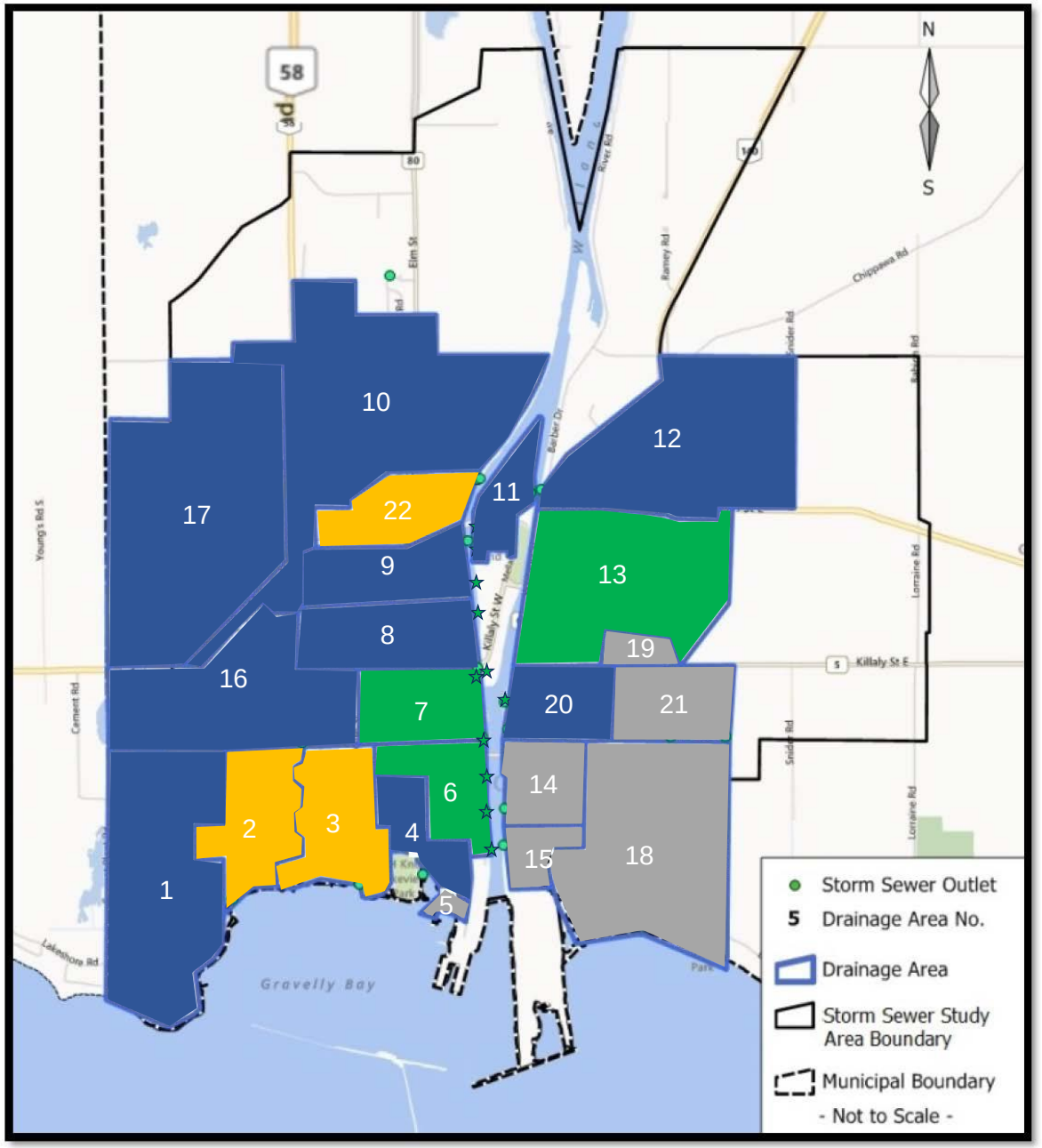
Looking Ahead



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Appendix

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A Note on Estimated Infrastructure Costs

Costs presented were taken from one of three sources:

- 2014 Storm Sewer Infrastructure Needs Study (INS)
  - High level costs completed by a consultant, costs have not been adjusted for inflation
  - Costs likely to increase at conceptual design stage
- Class D estimates
  - At the conceptual design stage. Contingency within 20% to 30%
  - Most capital budget requests are Class D
- Class C estimates
  - At the preliminary design stage, and may be referred to as pre-tendering estimates. Contingency within 15% to 20%.

Drainage Area 1

Main issues:

- Development capacity
- Deficient storm sewers
- Inflow and infiltration

Infrastructure needs:

- Upgrade and reconstruct storm sewers

Estimated infrastructure cost:

- $1.9 million (Based on 2014 Storm INS)

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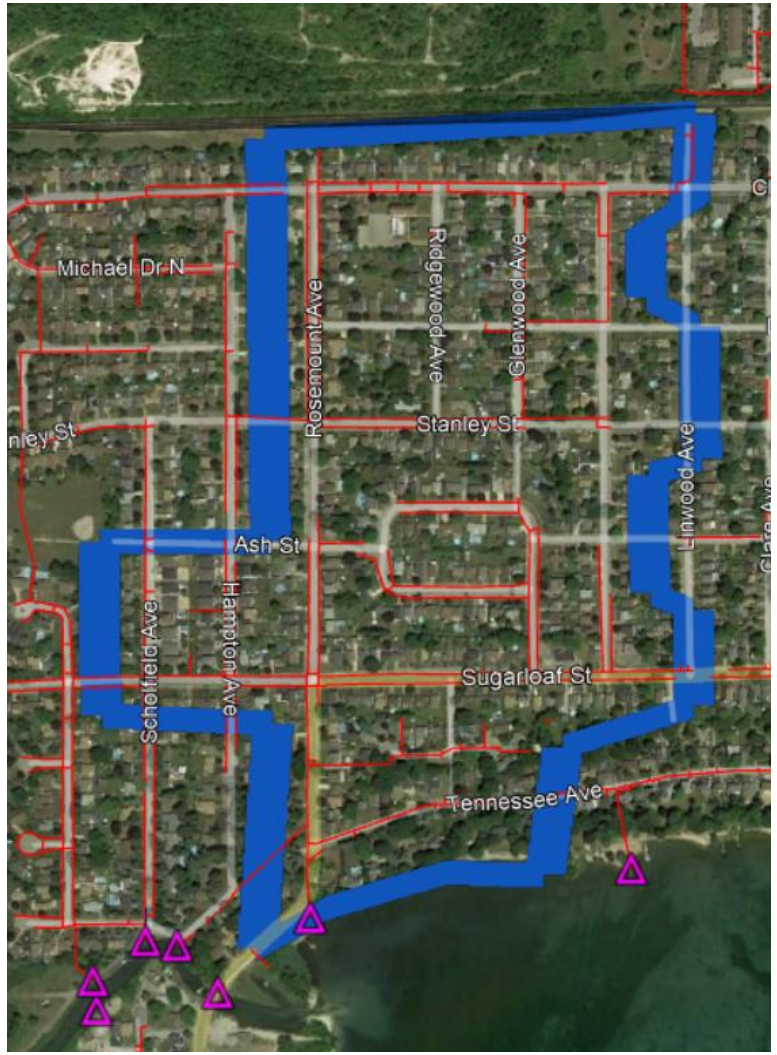
**Public Works will be presenting a fulsome Infrastructure Needs Study later in 2023 with even more precise data about water, wastewater and stormwater infrastructure.

Drainage Area 2



Main issues:

- Non-designed storm sewers
- Inflow and infiltration

Infrastructure needs:

- Upgrade and reconstruct storm sewers

Estimated infrastructure cost:

- $5 million (Based on 2014 Storm INS)

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Drainage Area 3

Main issues:

- Non-designed storm sewers
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Reconstruct storm sewers
- Install dedicated sump pump drains

Estimated infrastructure cost:

- $3.7 million (Based on 2014 Storm INS)

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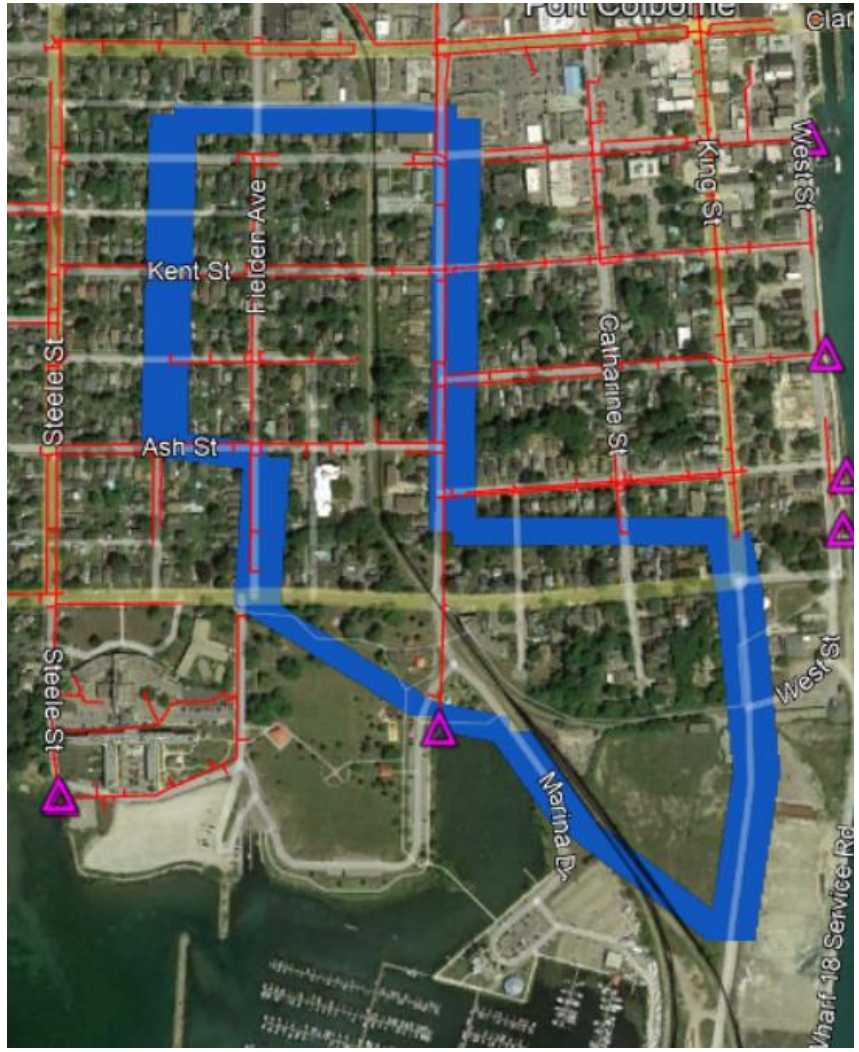
Drainage Area 4



Main issues:

- Non-designed storm sewers
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Upgrade and reconstruct storm sewers
- Install dedicated sump pump drains

Estimated infrastructure cost:

- $2 million (Based on 2014 Storm INS)

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Drainage Area 5

Main issues:

- None

Infrastructure needs:

- None – no storm sewer infrastructure in the area

Estimated infrastructure cost:

- N/A

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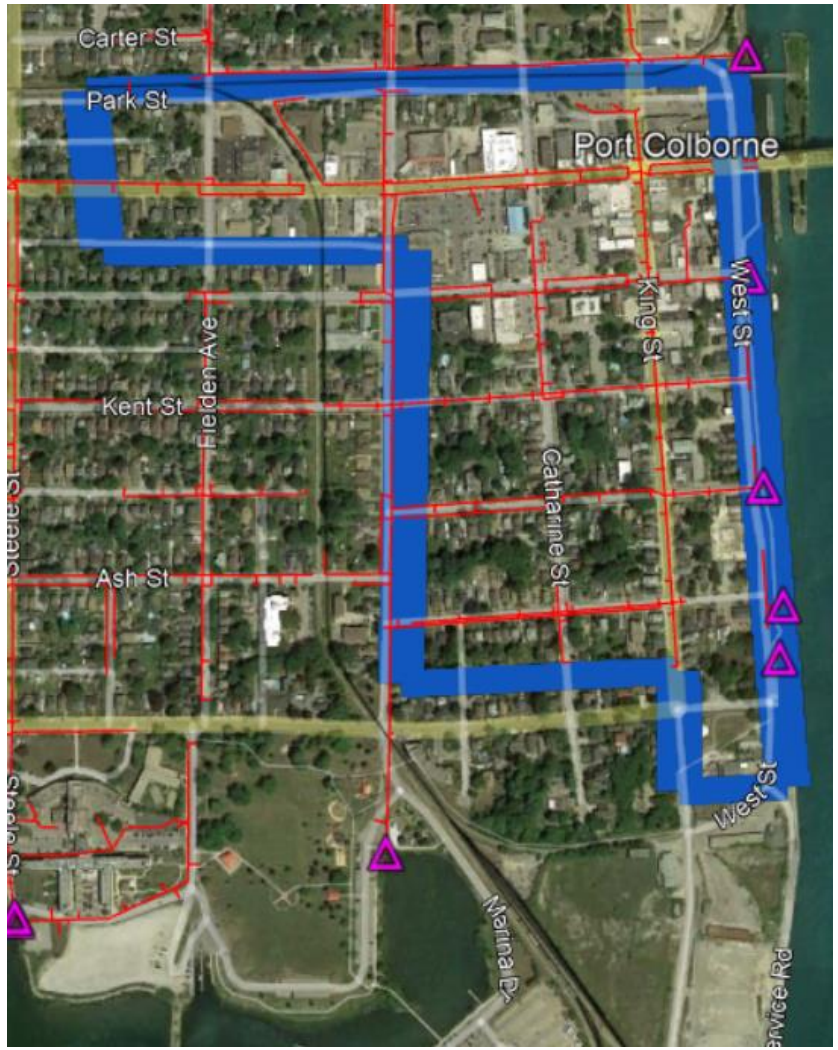
Drainage Area 6



Main issues:

- Seiche flooding
- Non-designed storm sewers
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Outlet protection/pumping
- Upgrade and reconstruct storm sewers, install sump pump drains

Estimated infrastructure cost:

- $4.5 million (Class D estimate)

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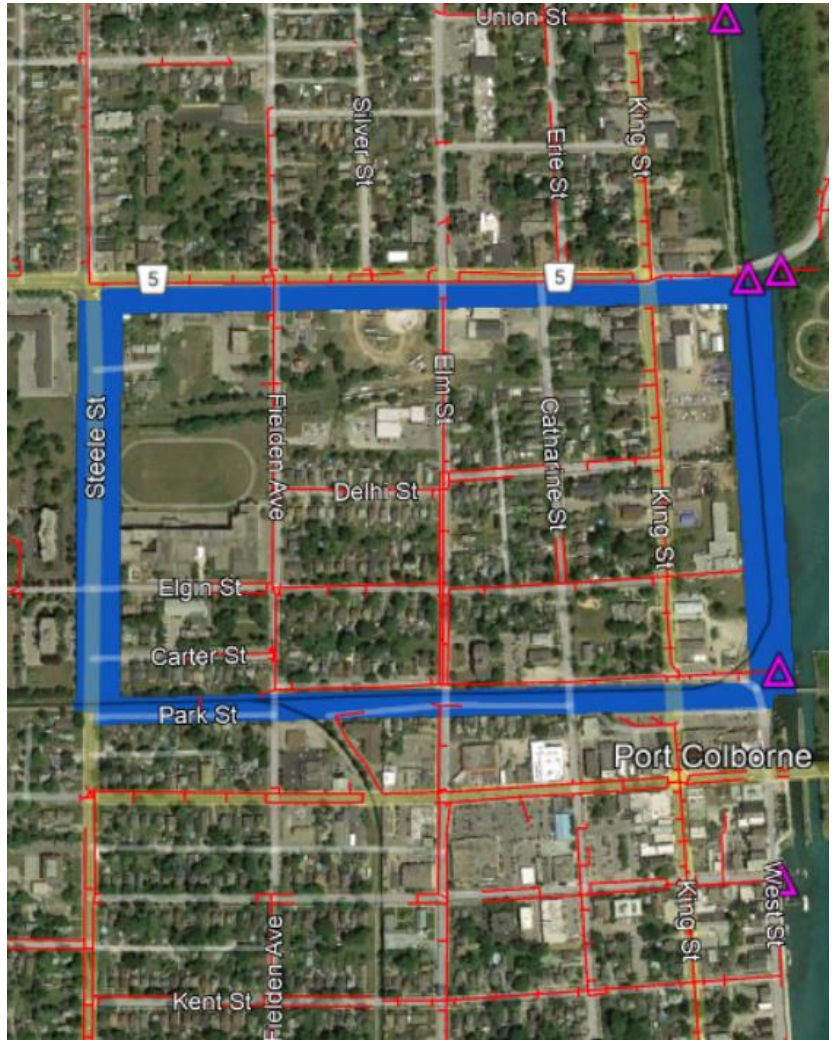
Drainage Area 7



Main issues:

- Seiche flooding
- Non-designed storm sewers
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Outlet protection/pumping
- Upgrade and reconstruct storm sewers, install sump pump drains

Estimated infrastructure cost:

- $4.5 million (Class D estimate)

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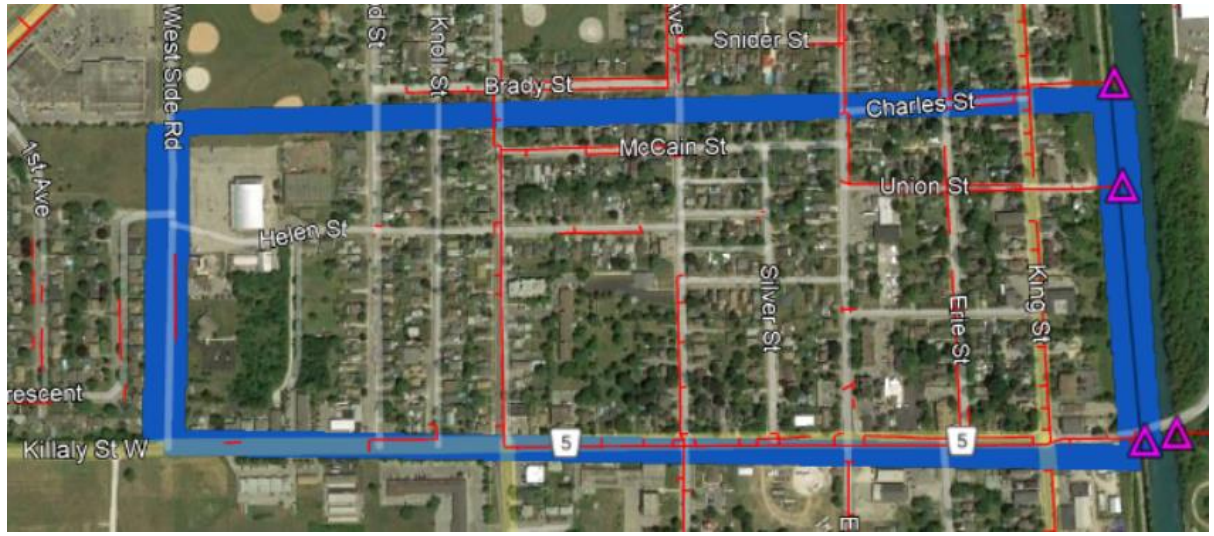
Drainage Area 8



Main issues:

- Non-designed storm sewers
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Outlet protection/pumping
- Upgrade and reconstruct storm sewers

Estimated infrastructure cost:

- $3.2 million (Based on 2014 Storm INS)

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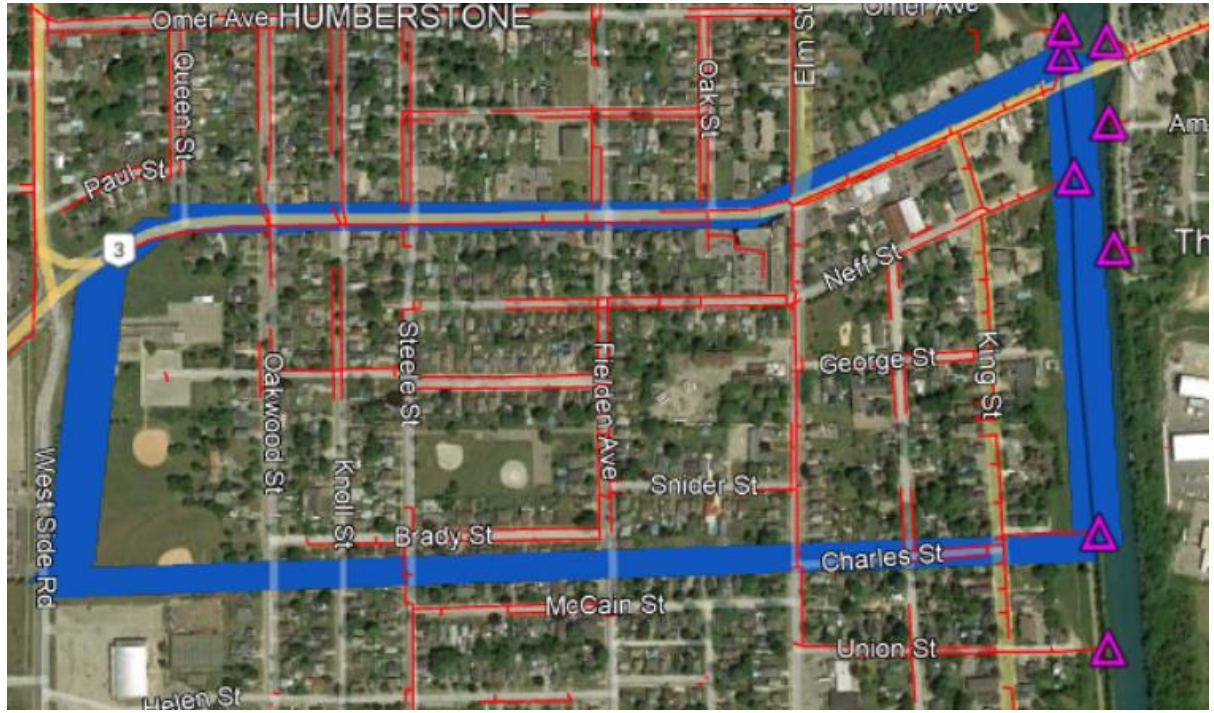
Drainage Area 9



Main issues:

- Non-designed storm sewers
- Infill development
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Outlet protection (Neff outfall)
- Upgrade and reconstruct storm sewers

Estimated infrastructure cost:

- $5.2 million (Based on 2014 Storm INS)

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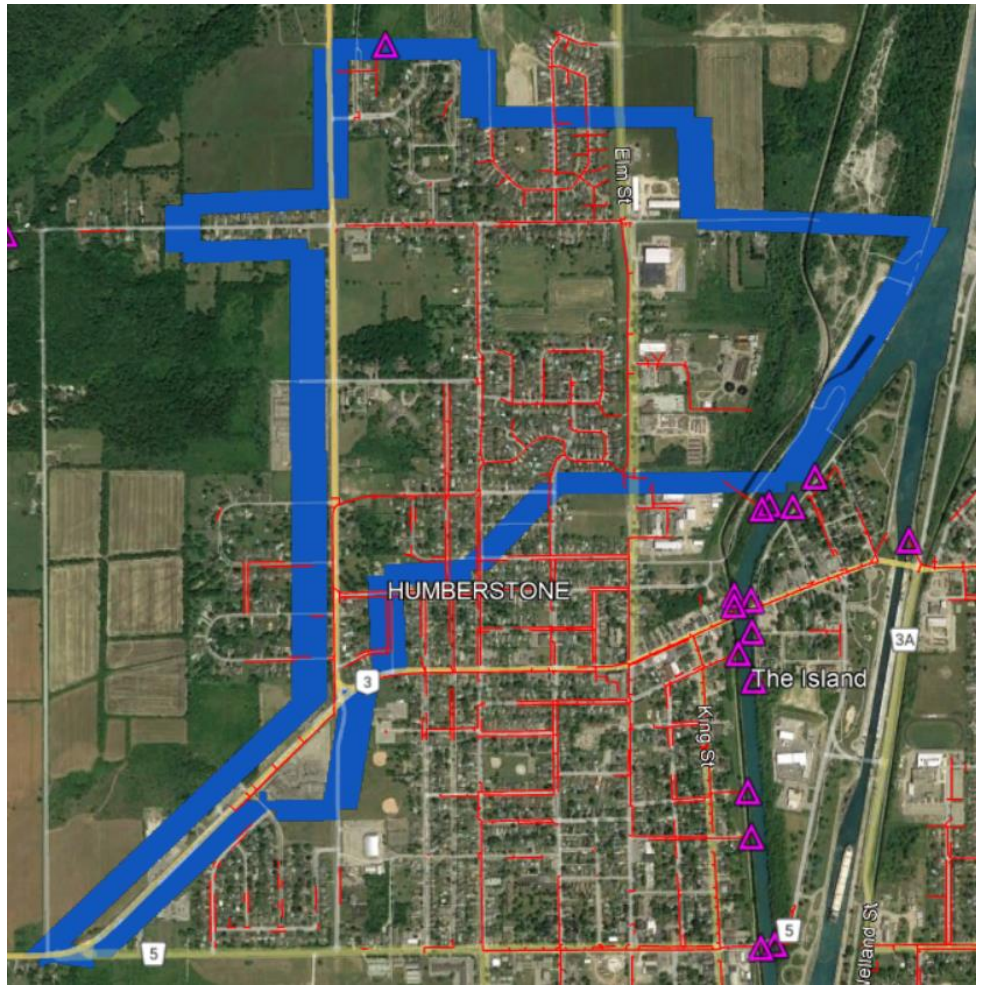
Drainage Area 10



Main issues:

- Development capacity
- Non-designed storm sewers
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Construct, upgrade and reconstruct storm sewers
- Install dedicated sump pump drains

Estimated infrastructure cost:

- $5.4 million (Based on 2014 Storm INS)

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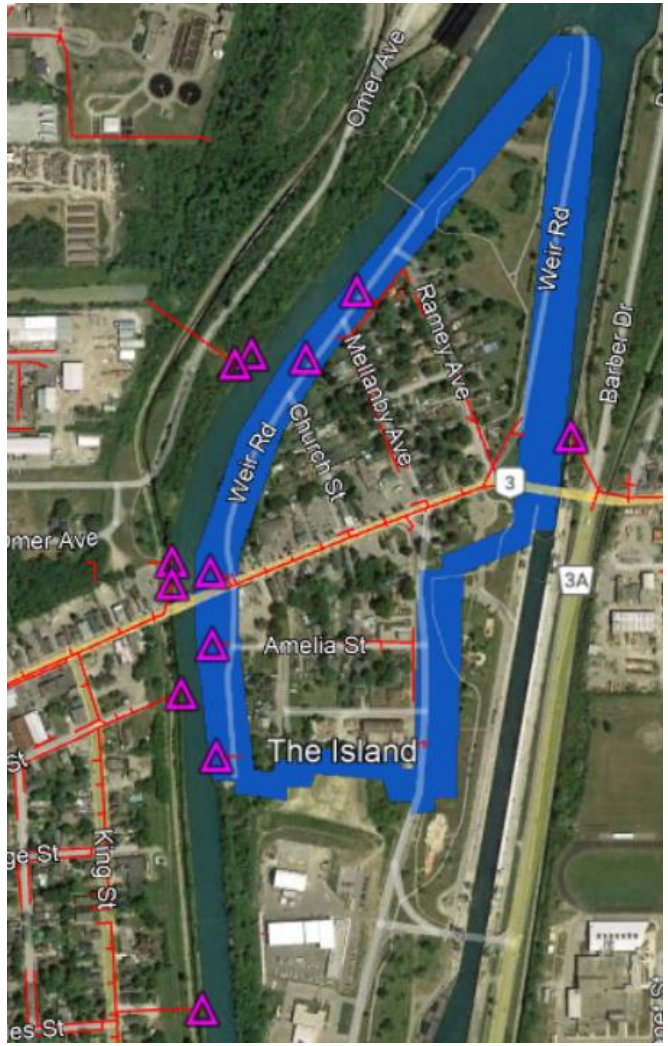
Drainage Area 11



Main issues:

- Non-designed storm sewers
- Infill development
- Inflow and infiltration

Infrastructure needs:

- Outlet protection
- Construct and upgrade storm sewers

Estimated infrastructure cost:

- $1.6 million (Based on 2014 Storm INS)

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Drainage Area 12

Main issues:

- Development capacity
- Non-designed storm sewers
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Construct, upgrade and reconstruct storm sewers

Estimated infrastructure cost:

- $2.3 million (Based on 2014 Storm INS)

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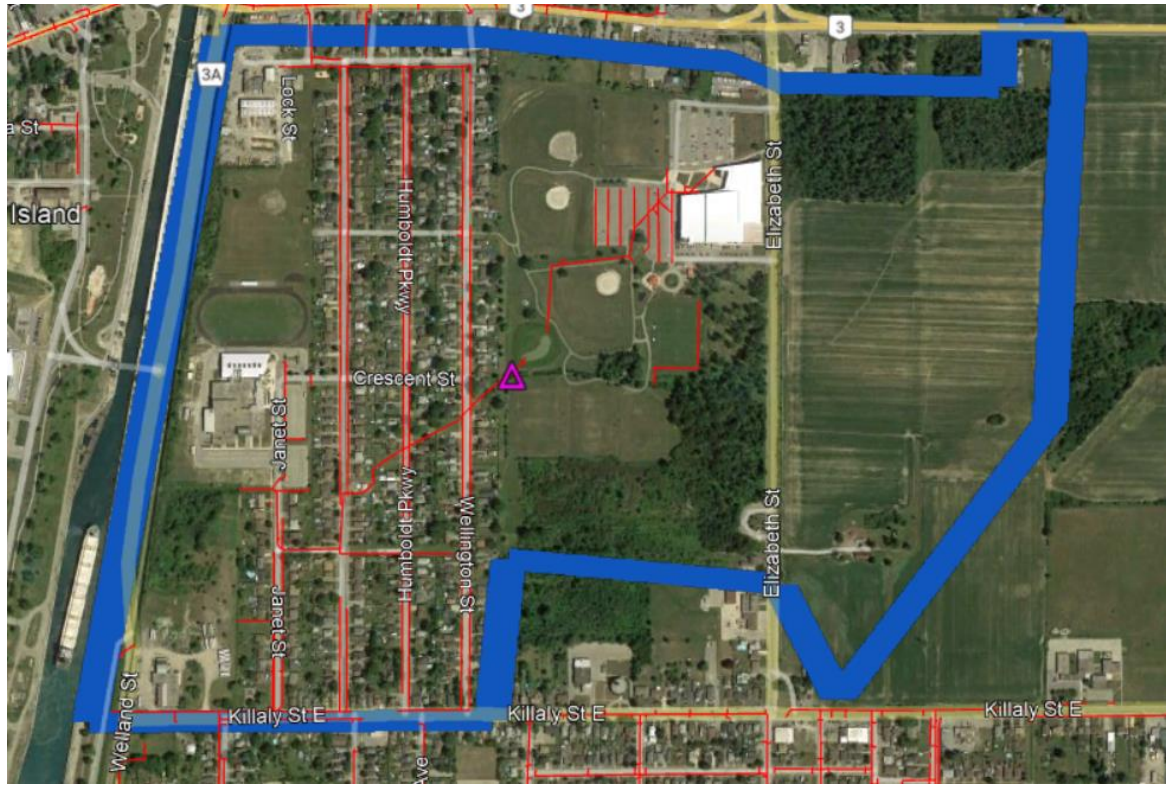
Drainage Area 13



Main issues:

- Seiche flooding
- Non-designed storm sewers
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Outlet protection/pumping
- Construct and reconstruct storm sewers, install sump pump drains

Estimated infrastructure cost:

- $17.7 million (Class C estimate)

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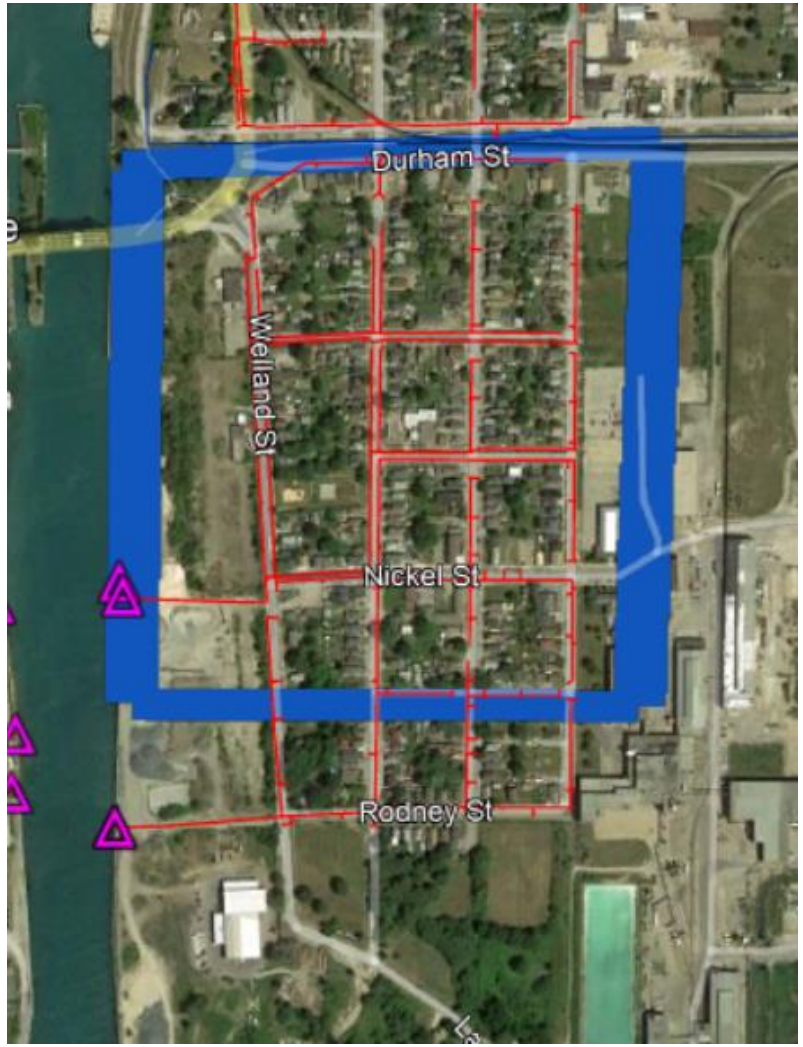
Drainage Area 14



Main issues:

- None

Infrastructure needs:

- None – Nickel storm system reconstructed in 2017
- Total of 95 sump pumps redirected

Estimated infrastructure cost:

- N/A

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**Public Works will be presenting a fulsome Infrastructure Needs Study later in 2023 with even more precise data about water, wastewater and stormwater infrastructure.

Drainage Area 15

Main issues:

- None

Infrastructure needs:

- None – Nickel storm system reconstructed in 2017
- Total of 95 sump pumps redirected

Estimated infrastructure cost:

- N/A

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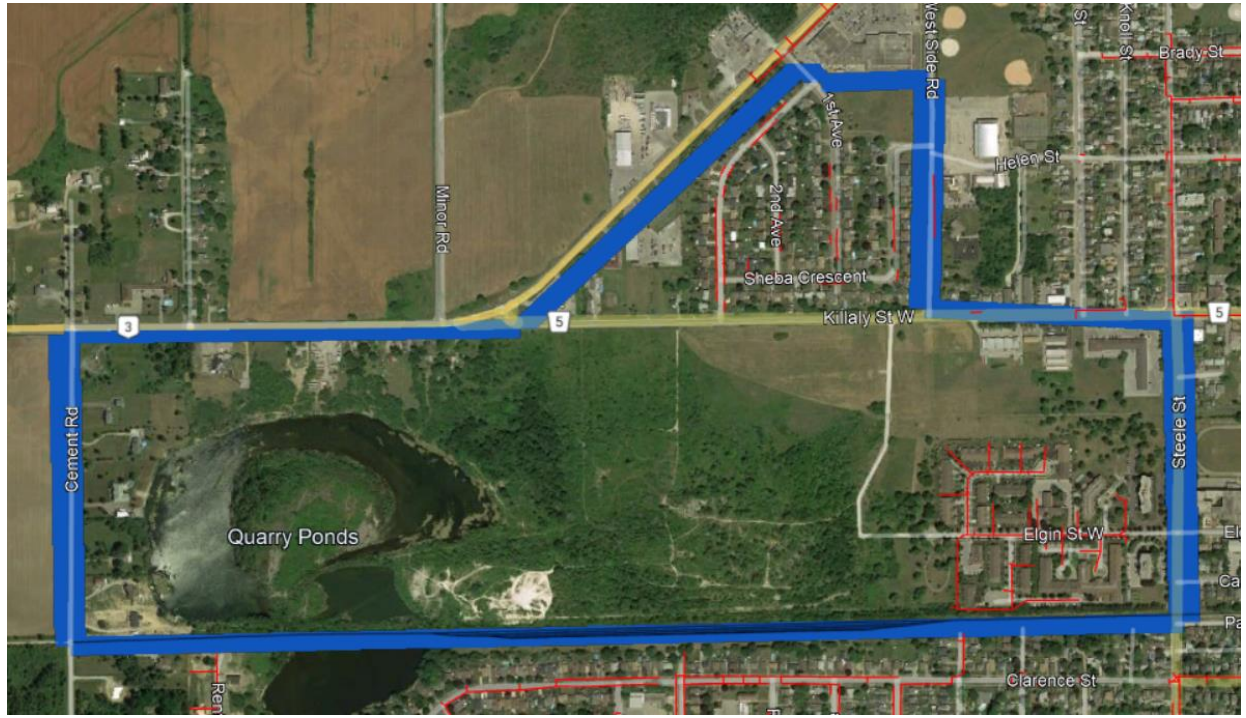
Drainage Area 16



Main issues:

- Development capacity
- Mostly ditched
- Inflow and infiltration

Infrastructure needs:

- Not addressed in 2014 Storm Infrastructure Needs Study
- Further investigation required

Estimated infrastructure cost:

- N/A

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Drainage Area 17

Main issues:

- Development capacity
- Non-designed storm sewers
- Inflow and infiltration

Infrastructure needs:

- Reconstruct storm sewers

Estimated infrastructure cost:

- $1.2 million (Based on 2014 Storm INS)

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Drainage Area 18

Main issues:

- None

Infrastructure needs:

- None – Nickel storm system reconstructed in 2017
- Separated Vale and City storm systems

Estimated infrastructure cost:

- N/A

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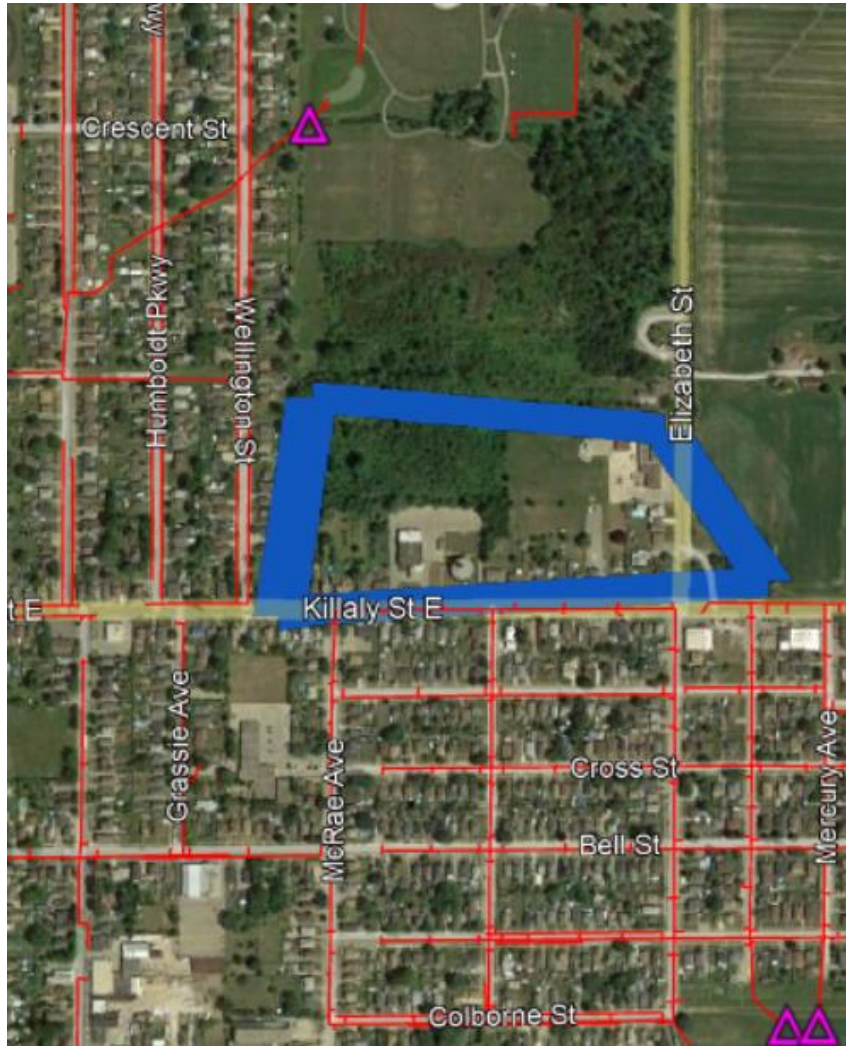
Drainage Area 19



Main issues:

- None

Infrastructure needs:

- None

Estimated infrastructure cost:

- N/A

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Drainage Area 20

Main issues:

- Seiche flooding
- Some non-designed storm sewers
- Sump pumps connected to sanitary
- Inflow and infiltration

Infrastructure needs:

- Outlet protection/pumping (Addressed under Area 13)
- Upgrade and reconstruct storm sewers, install sump pump drains

Estimated infrastructure cost:

- $1 million (Based on 2014 Storm INS)

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Drainage Area 21

Main issues:

- Development capacity

Infrastructure needs:

- Upgrade storm sewer
- Entire storm system upgraded in 1999, disconnected all sump pumps from sanitary

Estimated infrastructure cost:

- $200,000 (Based on 2014 Storm INS)

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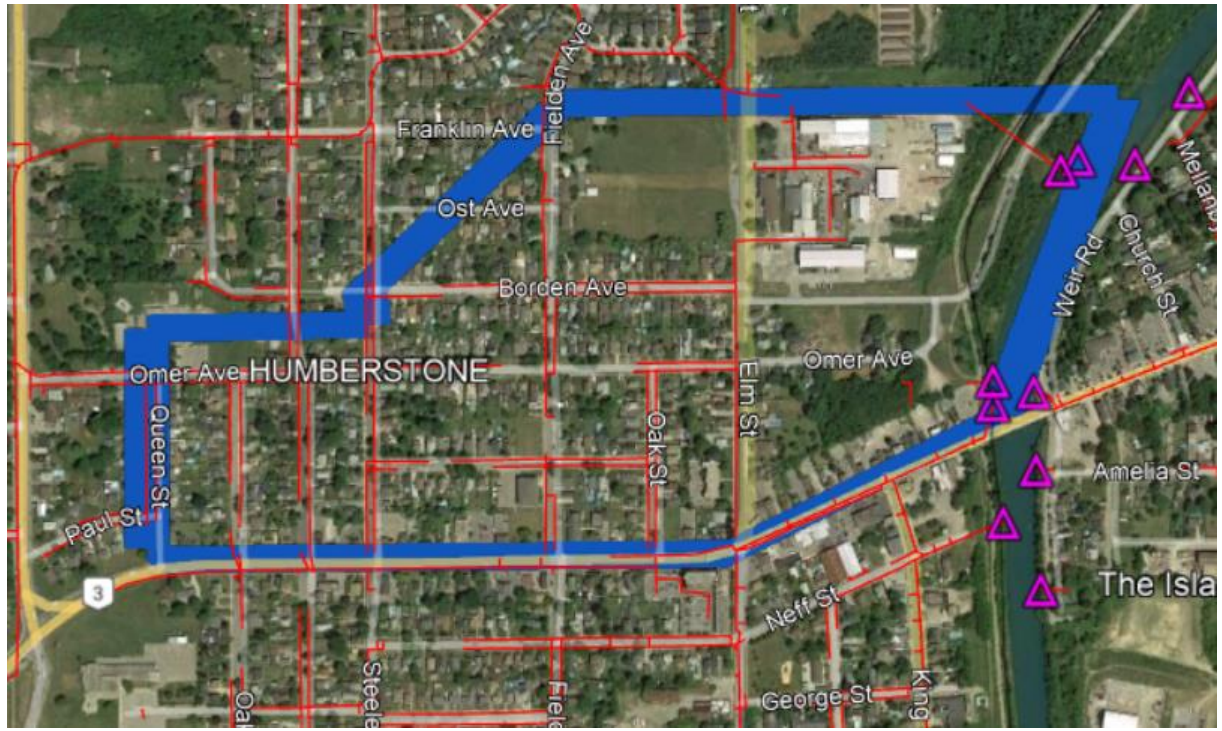
Drainage Area 22



Main issues:

- Non-designed storm sewers
- Inflow and infiltration (54 sump pumps connected to sanitary)

Infrastructure needs:

- Construct new storm sewers
- Innovative storm sewer study in progress

Estimated infrastructure cost:

- $7 million (Based on 2014 Storm INS)

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