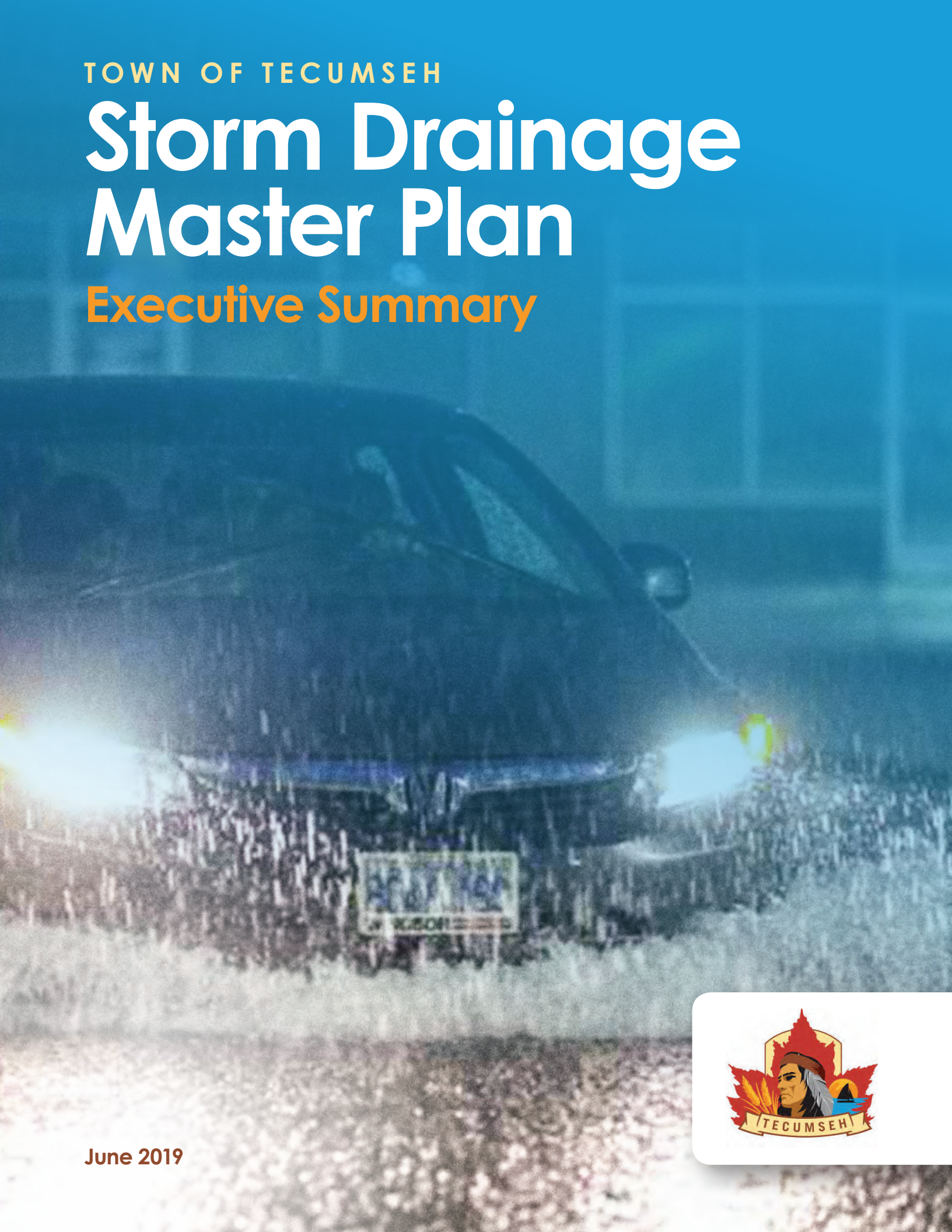
TOWN OF TECUMSEH

# Storm Drainage Master Plan

## Executive Summary



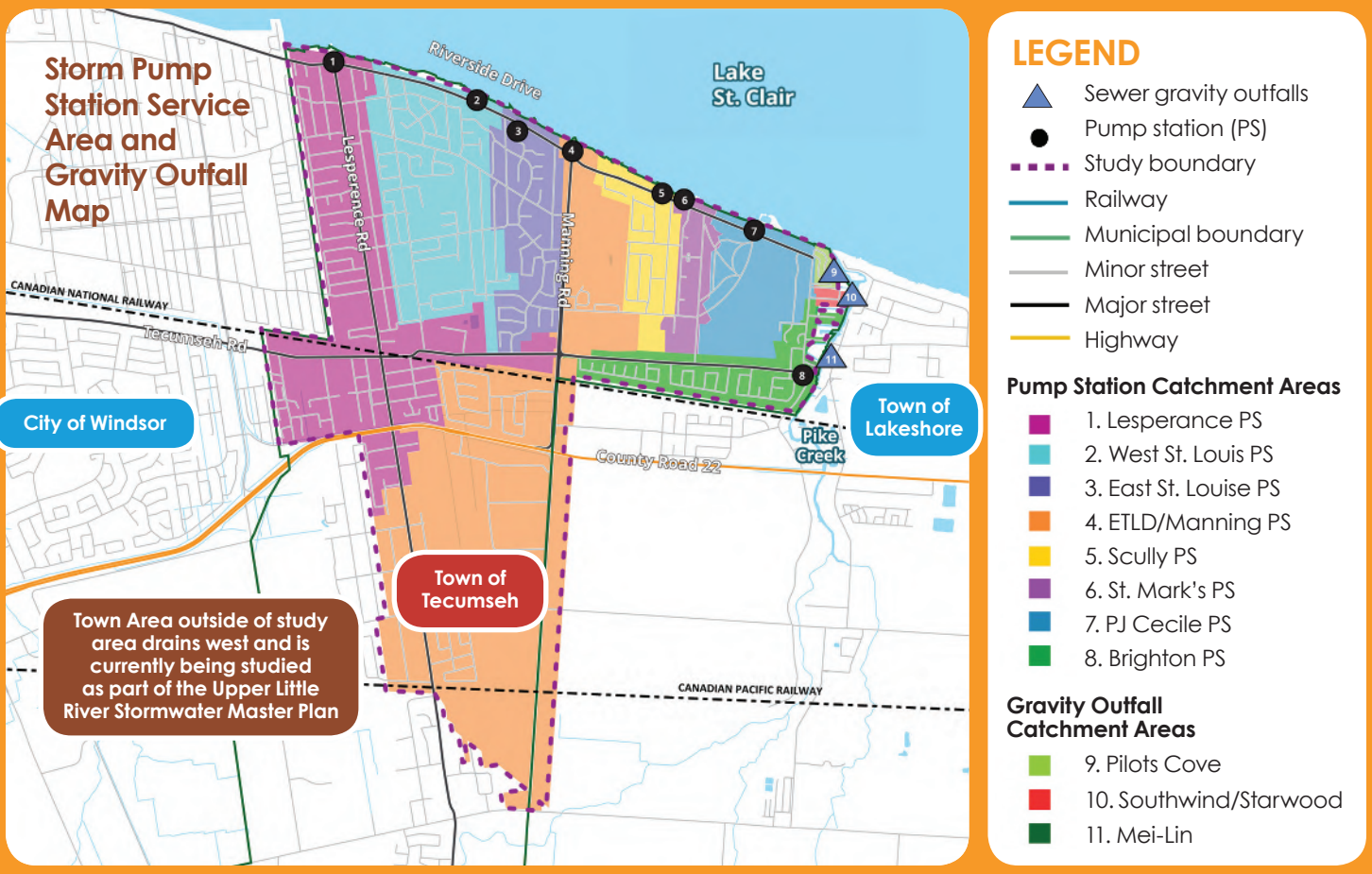
June 2019

# Welcome to the Storm Drainage Master Plan

**The Town of Tecumseh has experienced several significant storm events over the years that have resulted in widespread surface and basement flooding. In order to build on the Town's previous studies and the ongoing infrastructure improvements that have been completed, the Town has undertaken this storm drainage Master Plan to confirm the long-term storm drainage infrastructure solutions that are required to address the risks of surface flooding in the northern urban communities, as shown below.**

**This storm drainage Master Plan followed an approach that allowed several specific projects to meet the applicable Schedule B Municipal Class Environmental Assessment requirements.**

**This executive summary document is intended to provide a summary of the findings and recommendations of the Town's storm drainage Master Plan. Further details are available in the Master Plan Environmental Assessment report, to which the blue dots with page numbers included below refer for each related section.**



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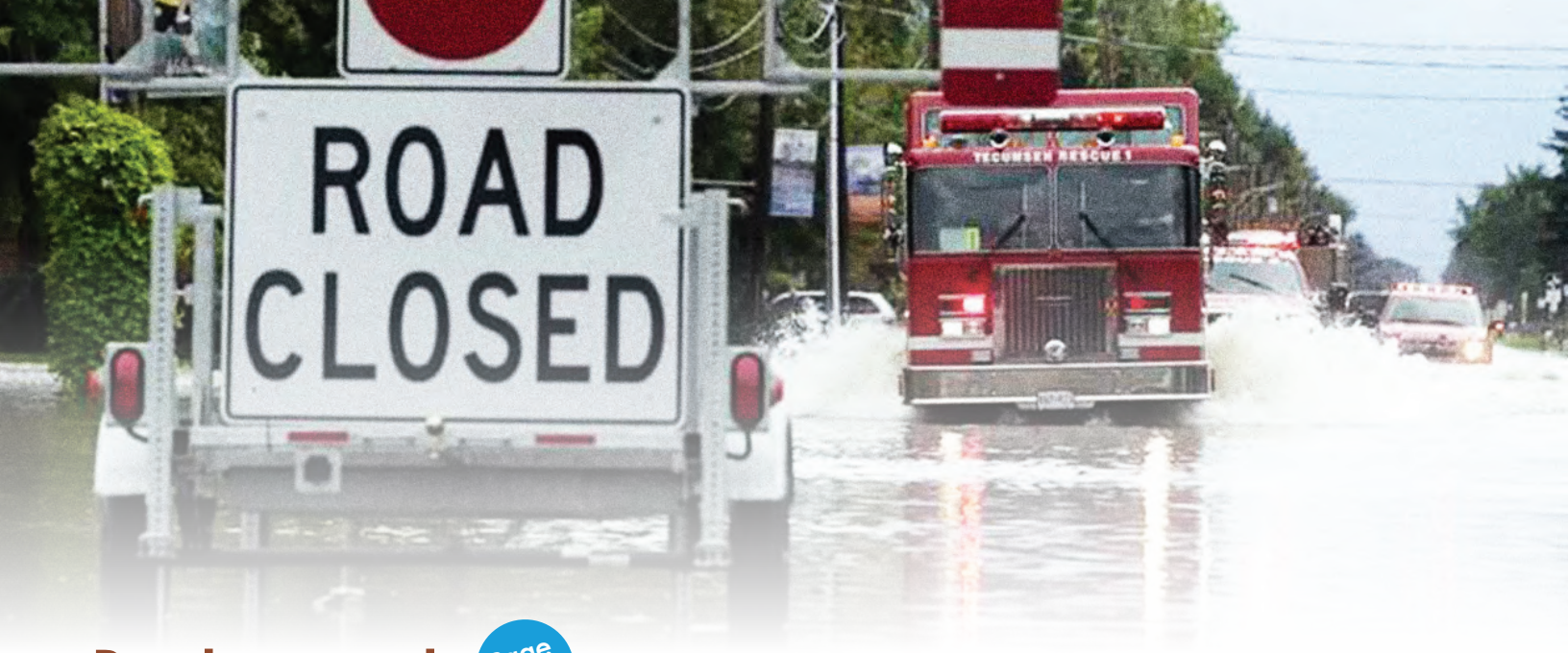


## Background

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Over a 24-hour period, between September 28 and 29, 2016, an extreme rainfall event hit the region, which overwhelmed the existing storm sewer system and storm pump stations. This led to widespread surface flooding along roadways and private property. The surface flooding made vehicular traffic impassable in many areas. The flooding also overwhelmed the municipal sanitary system, leading to extensive basement flooding. **Following this extreme rainfall event, the Town initiated this Storm Drainage Master Plan process.**

## Why a Master Plan?

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The Master Plan **identifies impacts of surface flooding on the mainly urbanized residential areas of the Town, and outlines a strategy to improve municipal infrastructure to better handle similar events in the future**. This includes reviewing storm pump stations, gravity outfalls and the respective service areas minor (sewer) and major (roadway) systems discharging to Lake St. Clair and Pike Creek. The Master Plan process includes the following:

- Confirm factors contributing to surface flooding
- Determine surface flooding problem areas
- Identify future development and incorporate into modelling
- Identify and evaluate alternative solutions
- Simulate effects of climate change to develop resilient solutions
- Confirm recommended solutions
- Develop long-term implementation strategy

# Municipal Class Environmental Assessment (EA) Process

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| Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 |
|---|---|---|---|---|
| Problem or Opportunity | Alternative Solutions | Alternative Design Concepts for Preferred Solution | Environmental Study Report | Implementation |
| *Optional Consultation* | *Mandatory Consultation* | *Mandatory Consultation* | *Mandatory Consultation* | *Optional Consultation* |
| Schedule B Projects<br>Master Plans | Schedule B Projects<br>Master Plans | | | Schedule B Projects |

**Phases 1 and 2 of the Master Plan are being completed following Approach No. 2 of the Municipal Class Environmental Assessment (EA) master planning process to address any Schedule B projects** (2000, as amended). The purpose of a Master Plan is to outline long-term servicing objectives for a geographic area that will be implemented over a period of time. This Storm Drainage Master Plan identifies a number of projects that are classified as Schedule B projects under the Class EA process. Schedule B projects include "improvements and minor expansions to existing facilities" on public or private property that have "potential for adverse environmental impacts" and require consultation with those potentially affected by the project.

# Public Engagement at a Glance

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## Engagement Opportunities

- Email updates
- Website
- Public, agency & Indigenous Community consultation events & meetings
- Social Media

**60** attendees at two Public Information Centres

Indigenous Community Consultation, including one meeting with Aamjiwnaang First Nation

Comments include concerns over localized surface/ basement flooding, and water quality, and comments in support of the solutions proposed.

**26** comments received from the public

**7** meetings held with residents directly impacted by pump station improvements and surface flooding solutions which impact private property

# Levels of Service (LOS)

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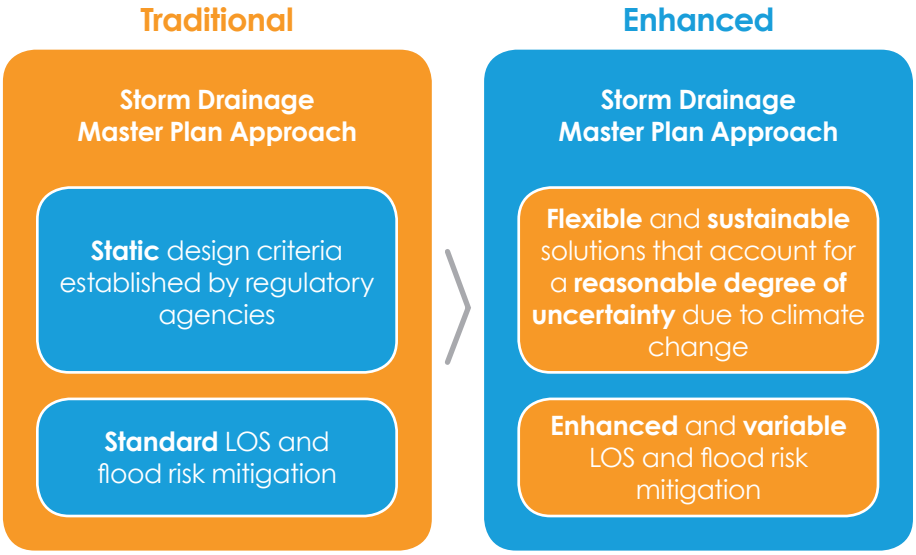
In developing alternative solutions, the design level of service applied is based **on local surface flooding conditions**. In some instances, a traditional approach is applied, which involves meeting the requirements of regulatory agencies. In other instances, an enhanced approach is applied that accounts for climate change considerations, adding more resiliency to the storm system.




# Decision-making Framework

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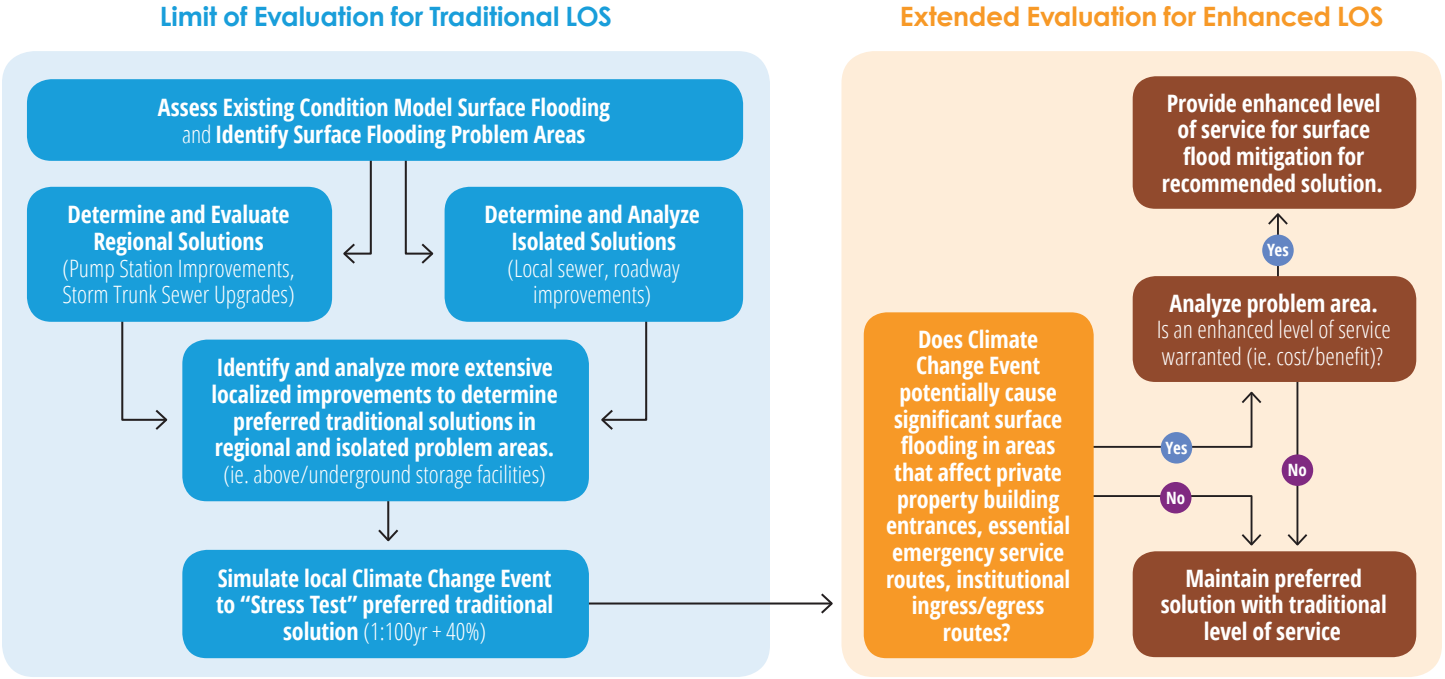
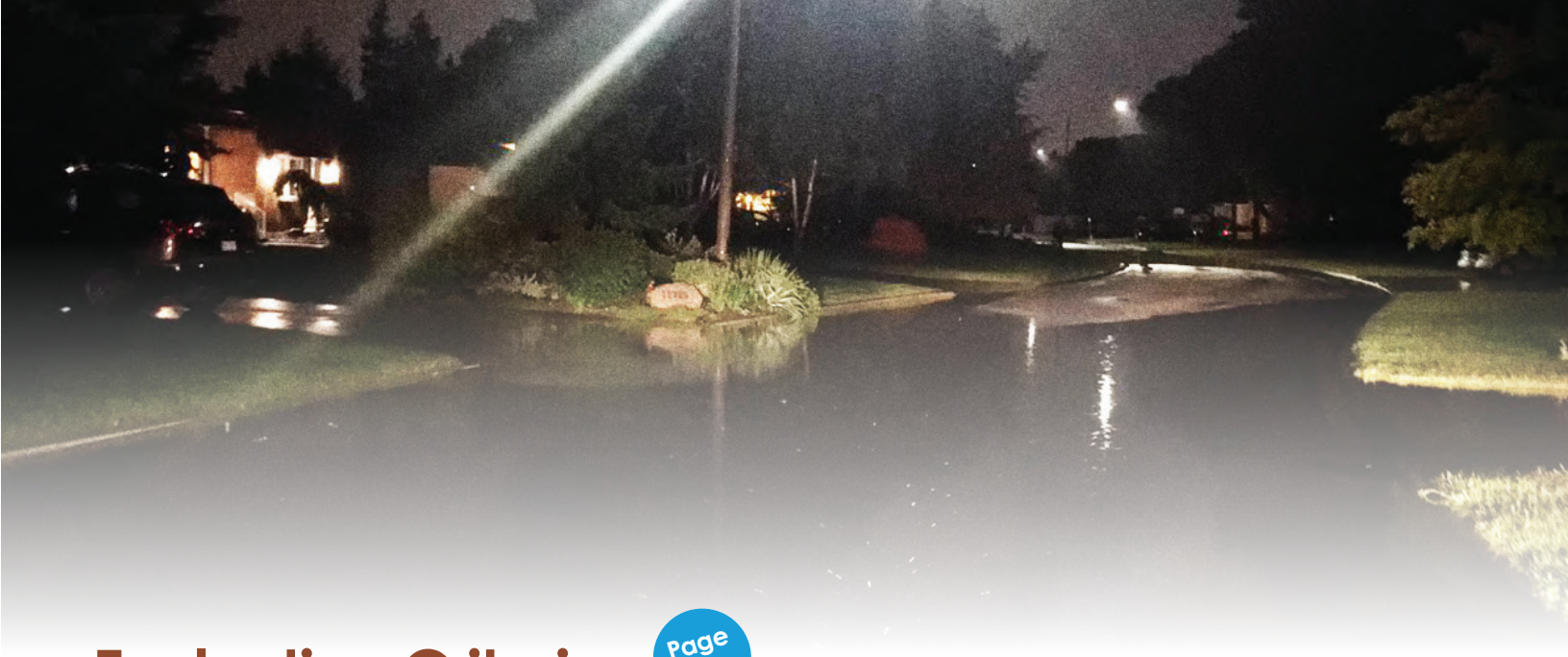
A surface flooding solution decision framework outlines an approach to developing solutions that **address both the required LOS and added resiliency for each surface flooding problem area**, as appropriate. It determines the scope of the preferred design solution and identifies the appropriate LOS to suit the risks and vulnerability of the area. Below illustrates the decision process used to determine the level of design for the preferred solutions. The design process includes a climate change analysis of the proposed design in areas where surface flooding is more problematic.





# Evaluation Criteria

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As part of the decision making process, a comparative evaluation of the alternative solutions was completed for each problem area identified. The evaluation criteria included:

### Addresses Study Problem/ Opportunity Statement

If the alternative does not address the objective, it was not considered further.

### Impact on Minor System (sewers) drainage

Ability to increase flow conveyance during minor storm events.

### Impact on Major system (overland) drainage

Ability to enhance flow routing and reduce ponding.

### Ease of construction and implementation

Based on technical, regulatory and constructability considerations. Alternatives that are easier to construct/ implement are preferred.

### Future land uses

Potential to accommodate infill development in developed areas.

### Impact on urban community

Potential for disruption or displacement of existing residents, greenspace/ recreational use.

### Natural Environment

Potential for significant negative impacts on terrestrial and aquatic resources, including Species at Risk.

### Archaeological resources

Potential to impact lands with archaeological resources.

### Built Heritage resources

Potential impacts on built heritage and/or cultural heritage resources

### Capital cost

Relative capital costs, including restoration/enhancement for alternative. Cost effective alternatives are preferred.

# Alternative Solutions & Roadway/Sewer Reconstruction Improvement Areas

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The study area was divided into smaller service areas based on existing storm pump station areas. After analysis of the regional surface problem areas, a number of alternatives were developed.

### 1) Lesperance Pump Station Service Area

1) Do nothing
2) Improve Lesperance Trunk Sewer & Pump Station
3) New St. Pierre Trunk Sewer & improve Pump Station
4) New St. Pierre Trunk Sewer and improve existing Lesperance Trunk Sewer and Pump Station

### 2) West St. Louis Pump Station Service Area

1) Do nothing
2) West St. Louis Pump Station improvements

### 3) Scully, St. Mark's Pump Station Service Area

1) Do nothing
2) Scully, St. Mark's & PJ Cecile Pump Station upgrades
3) Consolidated Scully/St. Mark's Pump Station & PJ Cecile Pump Station upgrades
4) Consolidated Scully/ St. Mark's/PJ Cecile Pump Station upgrades

### 4) PJ Cecile Pump Station Service Area

1) Do nothing
2) Improve existing pump station with alternative locations

### 5) New Southwind Cres. Pump Station

1) Do nothing
2) Construct a new pump station with alternative locations

### 6) St. Gregory's Road

1) Do nothing
2) Create surface storage area at the existing northern soccer fields
3) Underground storage along St. Gregory's Rd. within the municipal right-of-way

### 7) Buster Reaume Park

1) Do nothing
2) Create surface storage area within Buster Reaume Park and redirect Lemire/ Lanoue storm sewers to parkland stormwater system and maintain outlet into existing CN Railway Ditch.
3) Underground storage along Lemire St. and Lanoue St. within the right-of-way

### 8) Tecumseh Centre Park

1) Do nothing
2) Create surface storage area in existing green space within Tecumseh Centre Park and construct an underground storage system

### 9) East St. Louis/East Townline Drain Pump Station Service Areas

1) Do nothing
2) Connect storm sewer overflow along St. Thomas Street to Lakewood Park Drainage Channel
3) Connect storm sewer overflow along St. Thomas Street to proposed local Manning Road sewer
4) East St. Louis Pump Station improvements and trunk storm sewer upgrades

### 11) Baillargeon Drain Service Area

1) Do nothing
2) Create storm relief sewer along Charlene Lane connecting to future development area trunk sewer
3) Underground storage along Charlene Lane, St Martin Crescent and St Agnes Crescent municipal right-of-way

### Future Areas for Roadway and Sewer Reconstruction

1) Coronado Dish Area
3) Arlington Boulevard, Edgewater Boulevard and St. Marks Road
4) Kensington Dish Area
9) Manning Road Phase 2 Drain Enclosure
10) Tecumseh Road Storm Sewer Extension
11) St. Anne Area


# Alternative Solutions Location Map

# Preferred Solutions

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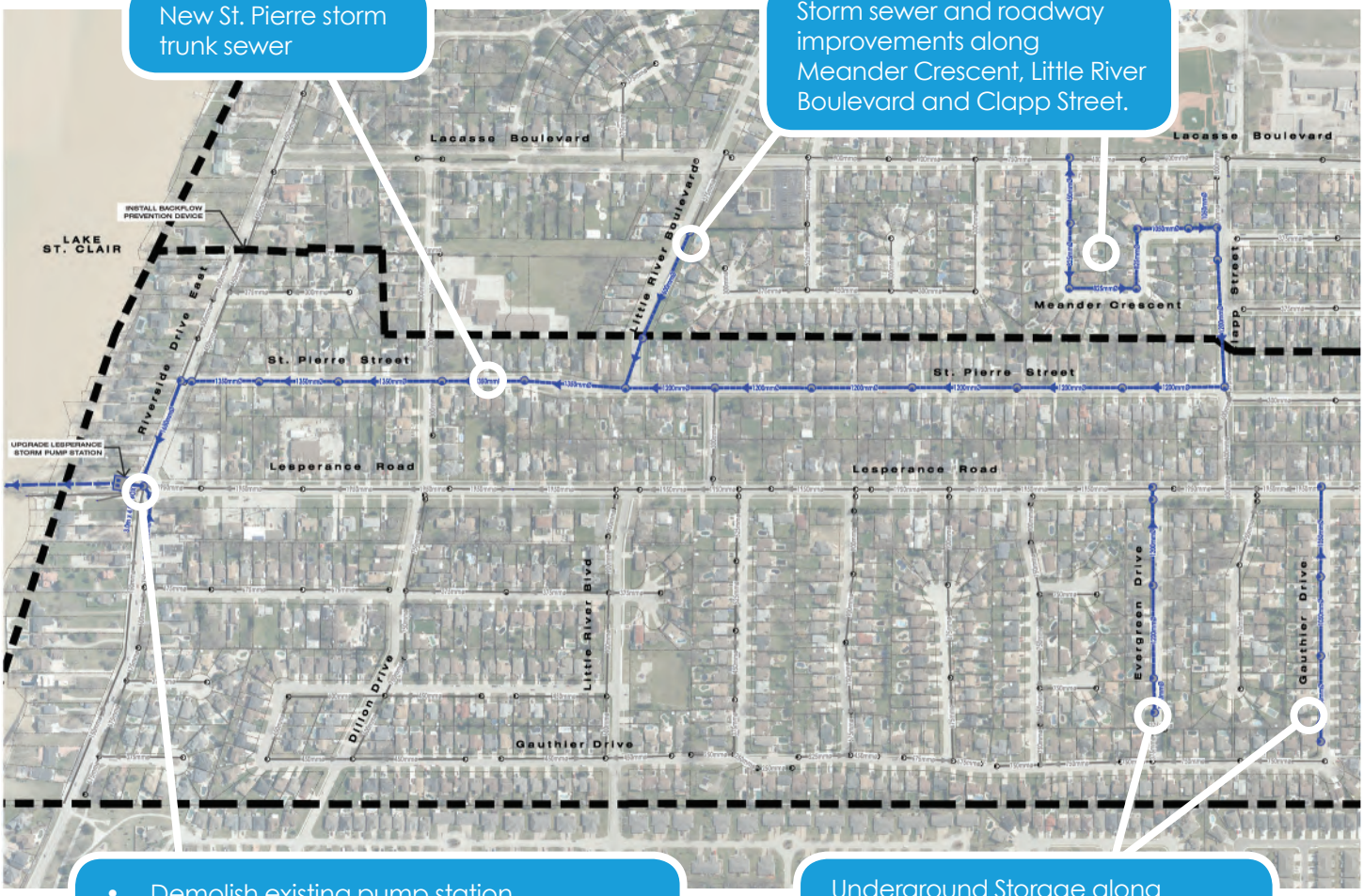
The following summarizes the preferred solutions to address regional surface flooding.

## 1) Lesperance Pump Station Service Area




- Demolish existing pump station
- New larger capacity pump station equipped with vertical submersible axial flow pumps
- Modify existing outfall to accommodate increased pump station capacity
- Install backflow prevention device at Lesperance/West St. Louis service area storm interconnection

Underground Storage along Evergreen Drive and Gauthier Drive

### LEGEND

- Proposed manhole
- 450mmØ — Proposed storm sewer
- Proposed catch basin
- Existing manhole
- 1200mm — Existing storm sewer
- Pump Station service area boundary

## 2) West St. Louis Pump Station Service Area

- Leave existing pump station in service
- Increase capacity of the pump station with an expansion to the east

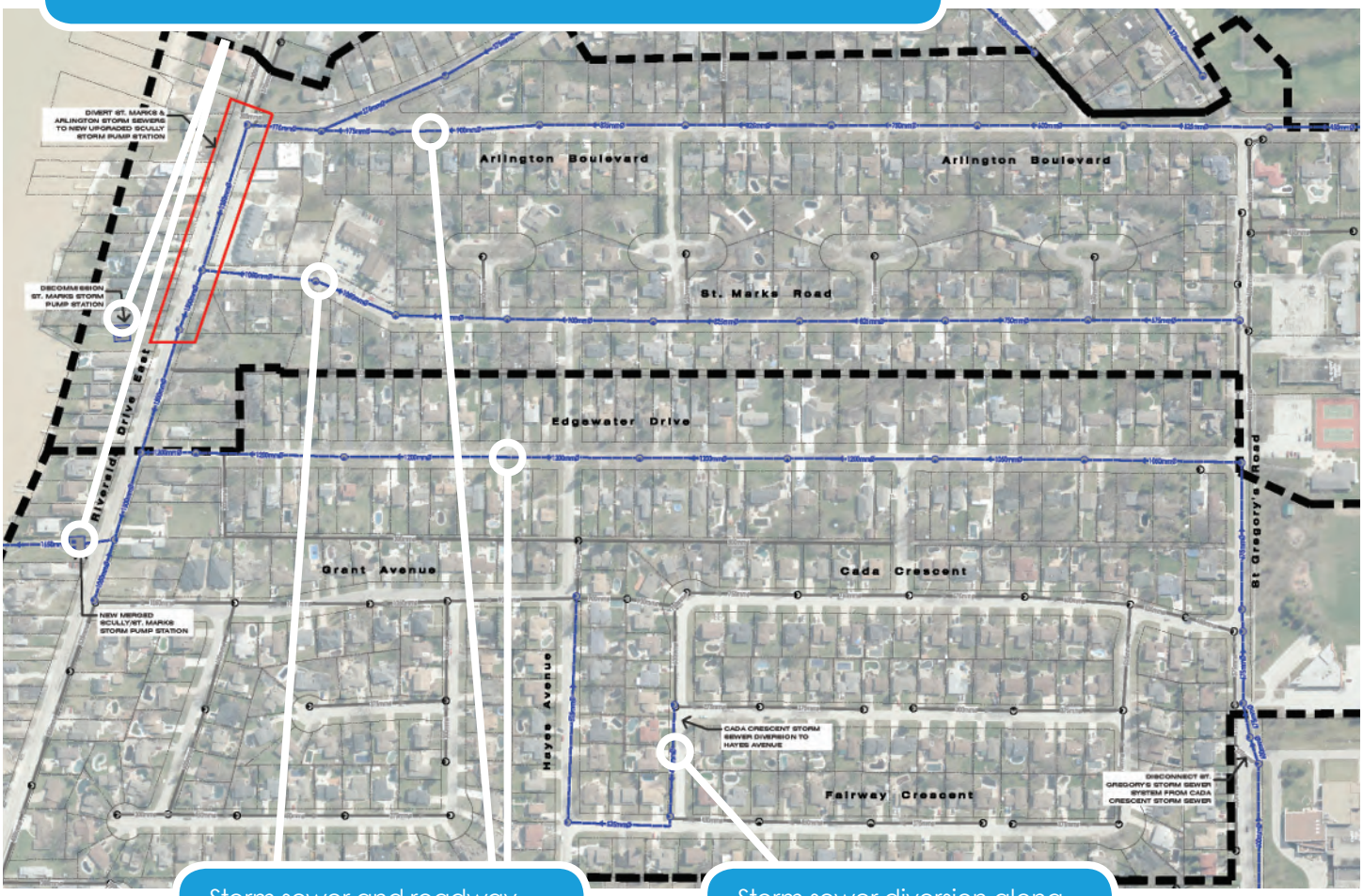

Storm sewer and roadway improvements along Coronado Dish area, Lacasse Boulevard, Little River Boulevard and Kimberly Drive and Jelso Place

### LEGEND

- Proposed manhole
- 450mmØ — Proposed storm sewer
- Proposed catch basin
- Existing manhole
- 1200mmØ — Existing storm sewer
- Pump Station service area boundary

## 3) Scully, St. Mark's Pump Station Service Area

- Decommission St. Mark's pump station and construct a new pump station at the Scully pump station site to handle flow from a consolidated service area
- Locate station north of the existing structure. New inlet, outfall pipe, and expanded outfall structure required.




Storm sewer and roadway improvements along Arlington Boulevard, St. Mark's Road, Edgewater Drive, St.Gregory's Road and Riverside Drive.

Storm sewer diversion along Cada Crescent to Hayes Avenue.

### LEGEND

- Proposed manhole
- 450mmØ — Proposed storm sewer
- Proposed catch basin
- Existing manhole
- 1200mmØ — Existing storm sewer
- Pump Station service area boundary

## 4) PJ Cecile Pump Station Service Area

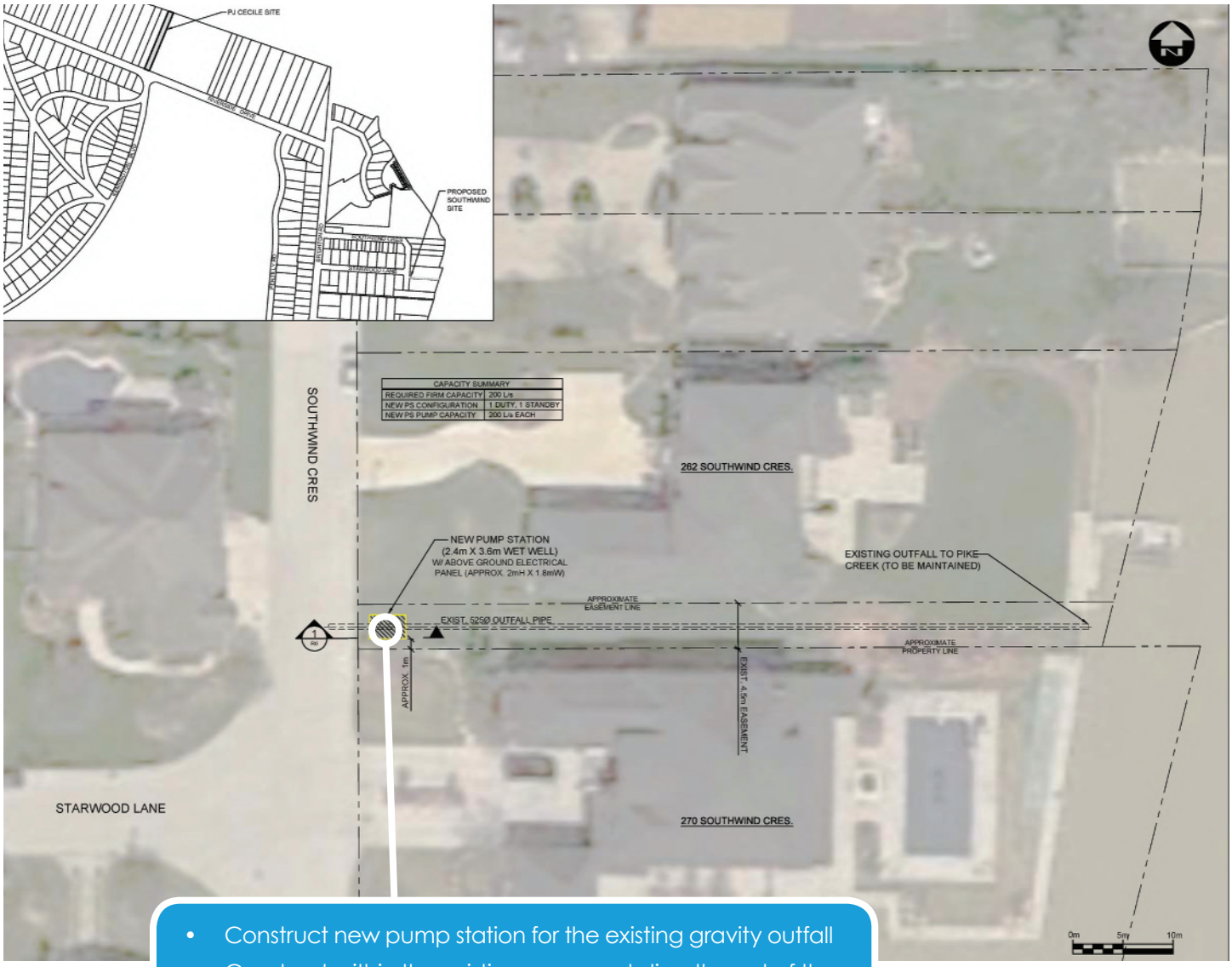
- Construct a new pump station at the PJ Cecile site over the footprint of the existing structure
- Install new outfall pipe to increase flow capacity
- Extend new outfall to northern end of the jetty bank
- Replace inlet pipe with a larger diameter pipe in the existing alignment


Storm sewer and roadway improvements along Kensington Dish Area

### LEGEND

- Proposed manhole
- 450mmØ — Proposed storm sewer
- Proposed catch basin
- Existing manhole
- 100mmØ — Existing storm sewer
- Pump Station service area boundary

## 5) New Southwind Crescent Pump Station




- Construct new pump station for the existing gravity outfall
- Construct within the existing easement directly east of the Southwind right-of-way
- Maintain existing outfall pipe

## 6) St. Gregory's Road


Depress northern portion of Tecumseh Soccer Fields Park by 0.70m to provide approximately 3,200 $m^3$ of aboveground surface storage

### LEGEND

- Proposed manhole
- 450mmØ — Proposed storm sewer
- Proposed catch basin
- Existing manhole
- 100mmø — Existing storm sewer
- Pump Station service area boundary
- Roadway grading improvements
- Depressed area

## 7) Buster Reaume Park

Redirect Lemire and Lanoue Street storm sewers to Buster Reaume Park stormwater facility.

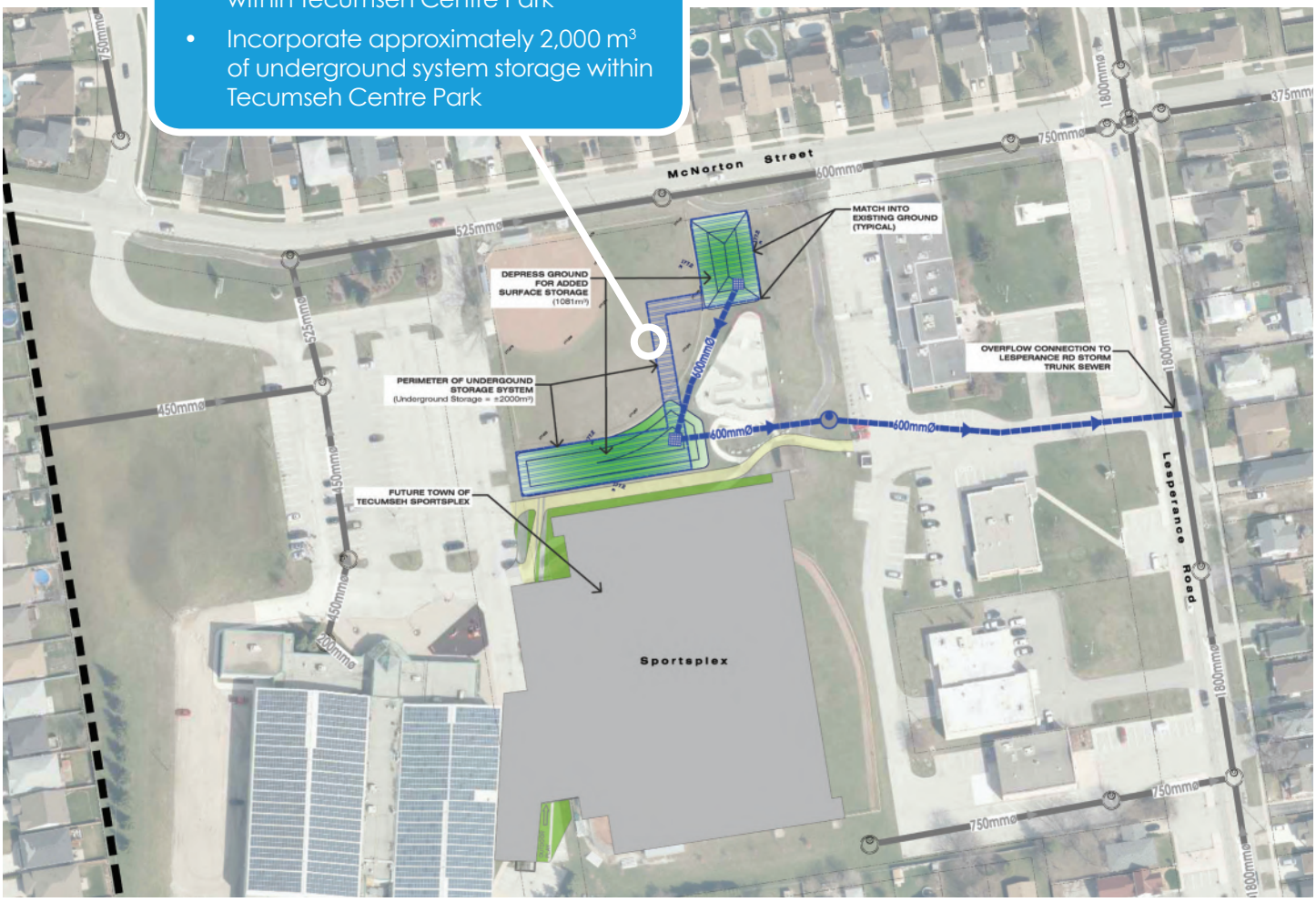

Depress southwestern portion of Buster Reaume Park by 0.80m to provide approximately 4,100 m3 of aboveground surface storage with a connection to the upgraded municipal storm sewers.

### LEGEND

- Proposed manhole
- 450mmØ — Proposed storm sewer
- Proposed catch basin
- Existing manhole
- 100mmØ — Existing storm sewer
- Pump Station service area boundary
- Roadway grading improvements
- Depressed area

## 8) Tecumseh Centre Park

- Construct a depression for approximately 1,080 $m^3$ of surface storage behind Tecumseh Town Hall within Tecumseh Centre Park
- Incorporate approximately 2,000 $m^3$ of underground system storage within Tecumseh Centre Park




### LEGEND

- Proposed manhole
- 450mmØ Proposed storm sewer
- Proposed catch basin
- Existing manhole
- 100mmØ Existing storm sewer
- Pump Station service area boundary
- Roadway grading improvements
- Depressed area
- Underground Storage Chambers

## 9) East St. Louis/East Townline Drain Pump Station Service Areas


Incorporate storm sewer overflow for existing storm sewer along St. Thomas Street to Lakewood Park Drainage Channel via proposed box culvert (to be constructed as part of Manning Road Phase 2 Drain Enclosure).


- Enclosure of East Townline Drain between existing culvert outlet north of St. Gregory's Road to proposed outlet at St. Thomas Street to Lakewood Park Drainage Channel.
- Construction of a local storm sewer system servicing Manning Road residential properties, between Riverside Drive and St. Thomas Street.

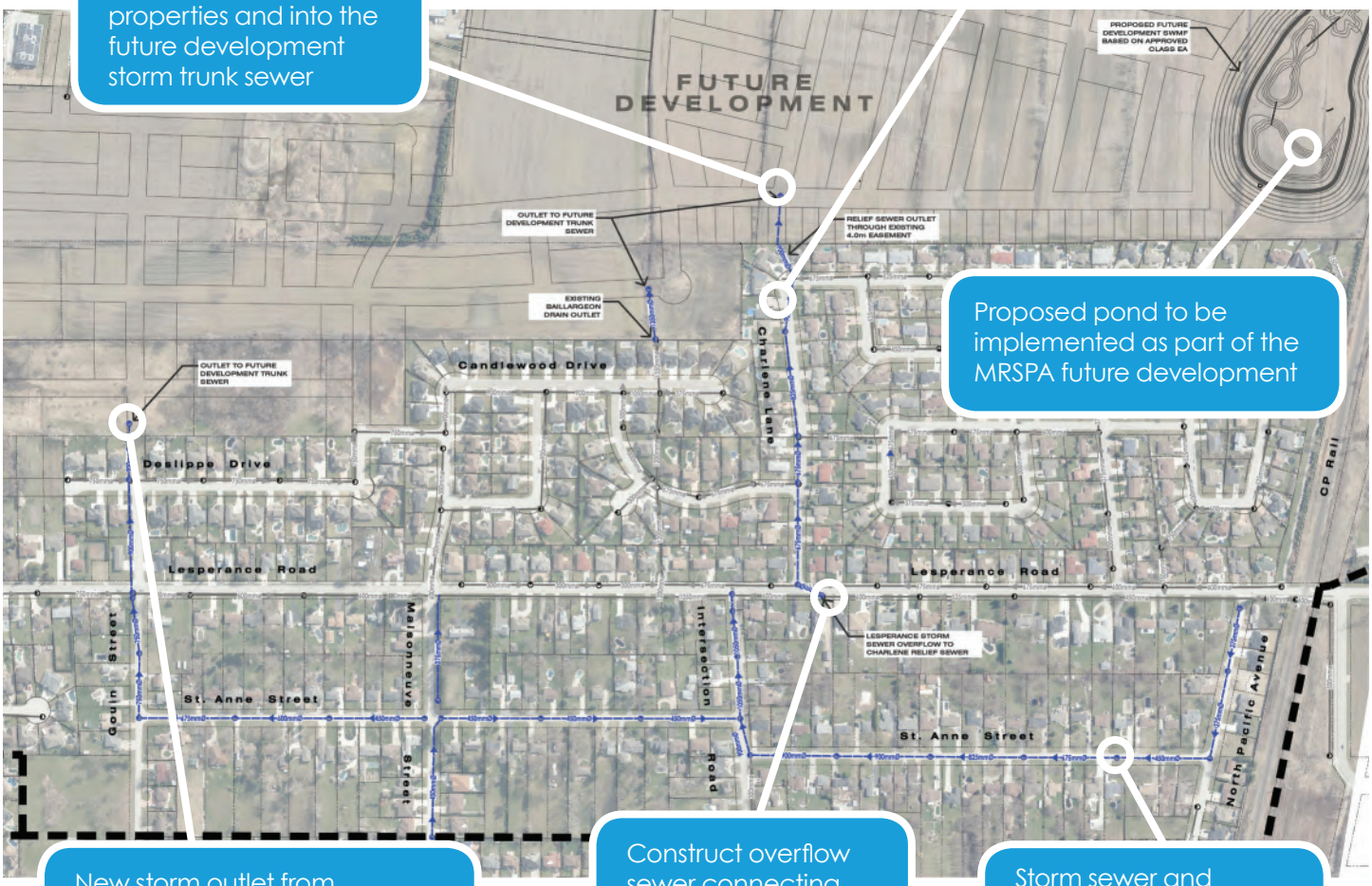
## 10) Tecumseh Road Storm Sewer Extension


Enclosure of the Tecumseh Road Ditch and Storm Sewer Extension from existing stub west of D.M. Eagle School.

## 11) Baillargeon Drain Service Area (Option 1)

Construct relief sewer outlet through the existing storm easement between two residential properties and into the future development storm trunk sewer

Construct storm sewer along Charlene Lane to intercept storm sewer runoff east of Lesperance Road and south of Charlene Lane from the existing residential lands




Proposed pond to be implemented as part of the MRSPA future development

New storm outlet from Gouin Street into the future development storm trunk sewer

Construct overflow sewer connecting Charlene relief sewer from the Lesperance storm sewer system

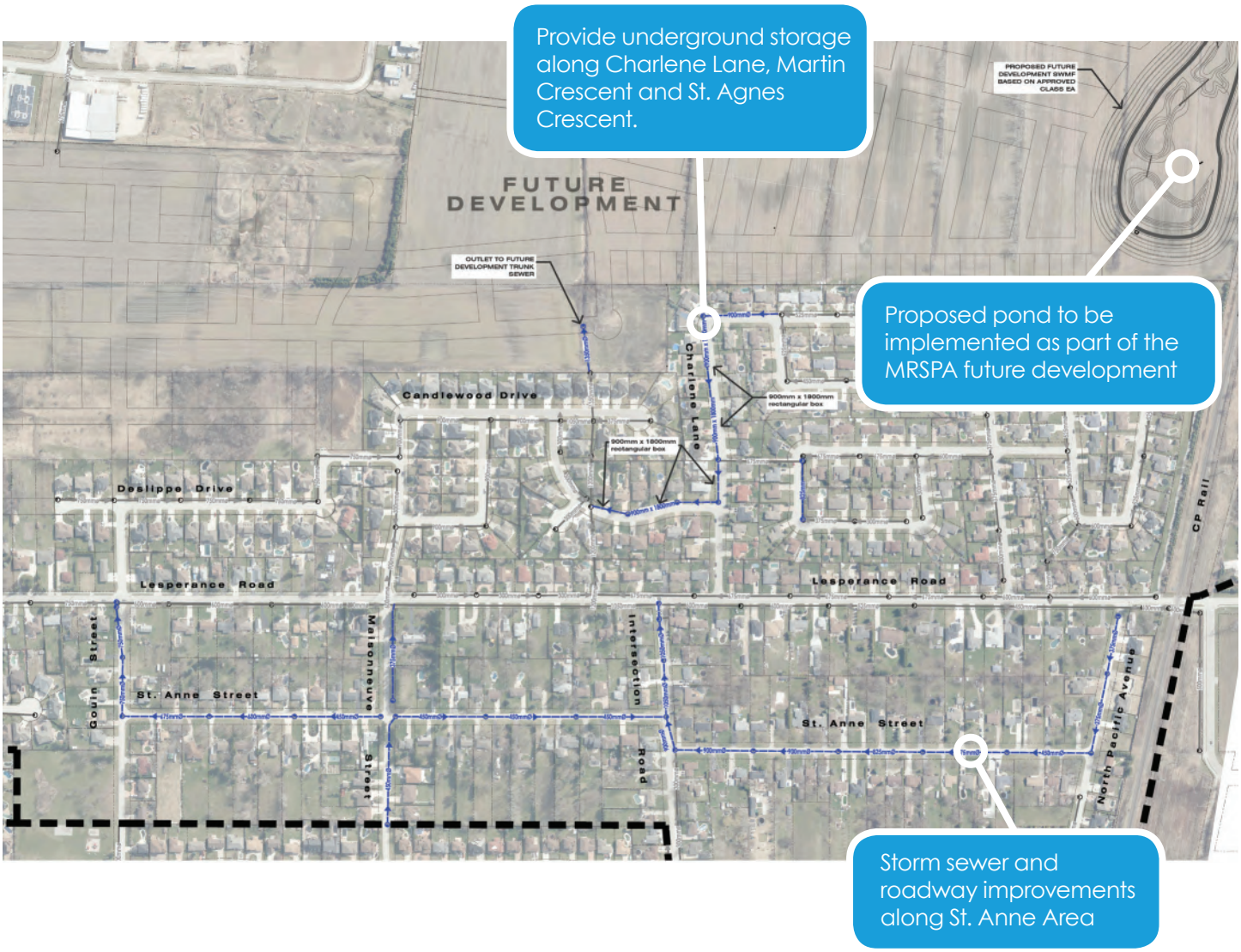
Storm sewer and roadway improvements along St. Anne Area

### LEGEND

- Proposed manhole
- 450mmØ — Proposed storm sewer
- Proposed catch basin
- Existing manhole
- 1200mm — Existing storm sewer
- Pump Station service area boundary

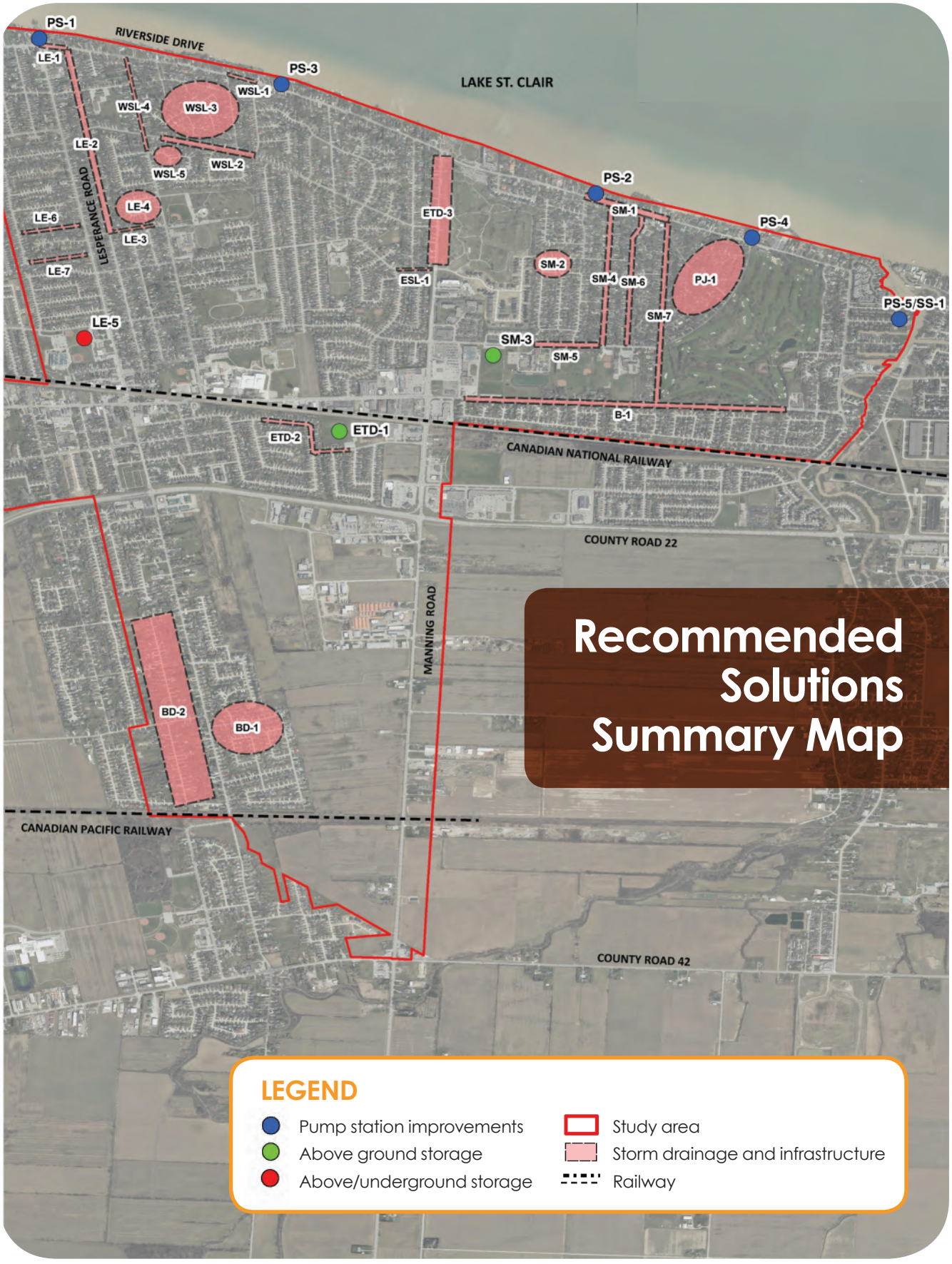
## 11) Baillargeon Drain Service Area (Option 2)

Alternative 1 is considered the preferred for this area, but is entirely dependent on agreements with the land owners and developers of the future development lands. Alternative 2 is presented as a secondary recommended option.




**LEGEND**

- Proposed manhole
- 450mmØ — Proposed storm sewer
- Proposed catch basin
- Existing manhole
- 1200mm — Existing storm sewer
- Pump Station service area boundary




# Recommended Solutions Summary Map

# Estimated Capital Costs

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The recommended surface flooding solutions outlined within this document have been designed to a functional level of detail. Cost estimates for all the recommended infrastructure solutions are outlined below.

| Project Code | Recommended Solution | Estimated Construction Cost & Contingency | Engineering | Total |
|---|---|---|---|---|
| **LESPERANCE PUMP STATION SERVICE AREA** | | | | |
| PS-1 | Lesperance Pump Station Improvements+ | $14.30M | $2.43M | $16.73M |
| LE-1 | Lesperance PS Storm Trunk Sewer – Riverside Drive (St. Pierre Street to PS) | $1.30M | $0.22M | $1.52M |
| LE-2 | St. Pierre Street Trunk Sewer | $3.93M | $0.67M | $4.60M |
| LE-3 | Clapp Street Local Sewers | $0.64M | $0.11M | $0.75M |
| LE-4 | Meander Crescent Local Sewers | $0.90M | $0.15M | $1.05M |
| LE-5 | Underground/Aboveground Storage (Tecumseh Centre Park)+ | $3.21M | $0.55M | $3.76M |
| LE-6 | Evergreen Drive Local Sewers | $0.93M | $0.16M | $1.09M |
| LE-7 | Gauthier Drive Local Sewers | $0.88M | $0.15M | $1.03M |
| | **SUBTOTAL =** | **$26.09M** | **$4.44M** | **$30.53M** |
| **CONSOLIDATED SCULLY/ST. MARK'S PUMP STATION SERVICE AREA** | | | | |
| PS-2 | New Consolidated Scully/St. Mark's Pump Station+ | $9.88 M | $1.68M | $11.56M |
| SM-1 | Scully/St. Mark's PS Storm Trunk Sewer – Riverside Drive (Arlington Boulevard to PS) | $1.63M | $0.28M | $1.91M |
| SM-2 | Grant Avenue Diversion Sewer | $0.58M | $0.10M | $0.68M |
| SM-3 | Aboveground Storage (Tecumseh Soccer Fields)+ | $0.25M | $0.04M | $0.29M |
| SM-4 | Edgewater Drive Local Sewers | $2.22M | $0.38M | $2.60M |
| SM-5 | St. Gregory's Road Local Sewers and Diversion | $0.68M | $0.12M | $0.80M |
| SM-6 | St. Marks Road Local Sewers | $1.83M | $0.31M | $2.14M |
| SM-7 | Arlington Boulevard Local Sewers | $2.34M | $0.40M | $2.74M |
| | **SUBTOTAL =** | **$19.39M** | **$3.31M** | **$22.70M** |
| **WEST ST. LOUIS PUMP STATION SERVICE AREA** | | | | |
| PS-3 | West St. Louis Pump Station Improvements+ | $7.15M | $1.21M | $8.36M |
| WSL-1 | West St. Louis PS Storm Trunk Sewer – Riverside Drive (Barry Avenue to existing 2000mm storm sewer) | $1.72M | $0.30M | $2.02M |
| WSL-2 | Little River Boulevard Underground Storage | $2.24M | $0.38M | $2.62M |
| WSL-3 | Coronado Dish Local Sewers* | $5.14M | $0.88M | $6.02M |
| WSL-4 | Lacasse Boulevard Local Sewers | $0.98M | $0.17M | $1.15M |
| WSL-5 | Kimberly Drive and Jelso Place Local Sewers | $0.73M | $0.05M | $0.78M |
| | **SUBTOTAL =** | **$17.96M** | **$2.99M** | **$20.95M** |
| **EAST ST. LOUIS PUMP STATION SERVICE AREA** | | | | |
| ESL-1 | St. Thomas Street Overflow Sewer to Lakewood Park & Backflow Prevention | $0.62M | $0.10M | $0.72M |
| | **SUBTOTAL =** | **$0.62M** | **$0.10M** | **$0.72M** |

| Project Code | Recommended Solution | Estimated Construction Cost & Contingency | Engineering | Total |
|---|---|---|---|---|
| **EAST TOWNLINE DRAIN SERVICE AREA** | | | | |
| ETD-1 | Aboveground Storage (Buster Reaume Park)+ and Backflow Prevention Device | $0.18M | $0.03M | $0.21M |
| ETD-2 | Lemire/Lanoue Street Local Sewers and Sewer Diversion | $1.46M | $0.25M | $1.71M |
| ETD-3 | Manning Road Phase 2 Drain Enclosure | $3.70M | $0.63M | $4.33M |
| | **SUBTOTAL =** | **$5.34M** | **$0.91M** | **$6.25M** |
| **BAILLARGEON DRAIN SERVICE AREA (OPTION 1)** | | | | |
| BD-1 | Charlene Lane Flooding Solution (Governing Cost - Option 2) | $3.00M | $0.51M | $3.51M |
| BD-2 | St. Anne Area Local Sewers* | $3.60M | $0.62M | $4.22M |
| | **SUBTOTAL =** | **$6.60M** | **$1.13M** | **$7.73M** |
| **PJ CECILE PUMP STATION SERVICE AREA** | | | | |
| PS-4 | PJ Cecile Pump Station Improvements+ | $7.02M | $1.20M | $8.22M |
| PJ-1 | Kensington Dish Area Local Sewers | $3.96M | $0.68M | $4.64M |
| | **SUBTOTAL =** | **$10.98 M** | **$1.88M** | **$12.86M** |
| **SOUTHWIND/STARWOOD AREA** | | | | |
| PS-5/SS-1 | New Starwood/Southwind Pump Station+ and Backflow Prevention Device | $0.90M | $0.15M | $1.05M |
| | **SUBTOTAL =** | **$0.90M** | **$0.15M** | **$1.05M** |
| **BRIGHTON PUMP STATION SERVICE AREA** | | | | |
| B-1 | Tecumseh Road Storm Sewer Extension | $3.25M | $0.55M | $3.80M |
| | **SUBTOTAL =** | **$3.25M** | **$0.55M** | **$3.80M** |
| | **TOTAL =** | **$91.13M** | **$15.46M** | **$106.59M** |

**Costing Notes:**

Storm Sewer Infrastructure Improvements

- Include removal and restoration of one lane width.
- Exclude full roadway reconstruction and the potential for utility relocation.

**Pump Station Improvements**

- Include costs for flow control chambers, temporary pipes and pumps, decommissioning and demolishing of old stations and costing for new outfalls or improvements to existing outfalls.

Construction costs include 30% contingency, Engineering costs include 15% engineering and 2% Geotechnical Investigations

All estimated costs above exclude applicable taxes

*Lumped areas for storm sewer reconstruction have the potential to be phased to implement upstream solutions earlier

No Property Acquisition is expected at this time for any improvements listed above

| **Schedule B Class EA Projects *(indicated above with +)*** |
|---|
| 1. Lesperance Storm Pump Station Improvements |
| 2. West St. Louis Storm Pump Station Improvements |
| 3. New Consolidated Scully/St. Mark's Storm Pump Station |
| 4. PJ Cecile Storm Pump Station Improvements |
| 5. New Southwind Crescent Storm Pump Station |
| 6. Surface storage within the "Tecumseh Soccer Fields" Park at École Secondaire L'Essor |
| 7. Surface Storage within Buster Reaume Park |
| 8. Surface and Underground Storage within Tecumseh Centre Park |

# Next Steps

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The following studies, design and approval requirements will be required for the implementation of the recommended solutions:

- **Updates to the recommended solutions based on any future developments (greenfield or infill) not assessed within this study that could impact the design of each solution;**
- **Detailed design of all recommended improvements;**
- **Environmental Compliance Approvals from the Ministry of Environment, Conservation and Parks (MECP);**
- **Essex Region Conservation Authority and municipal permitting and approvals; and**
- **Other regulatory approvals, as required.**

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