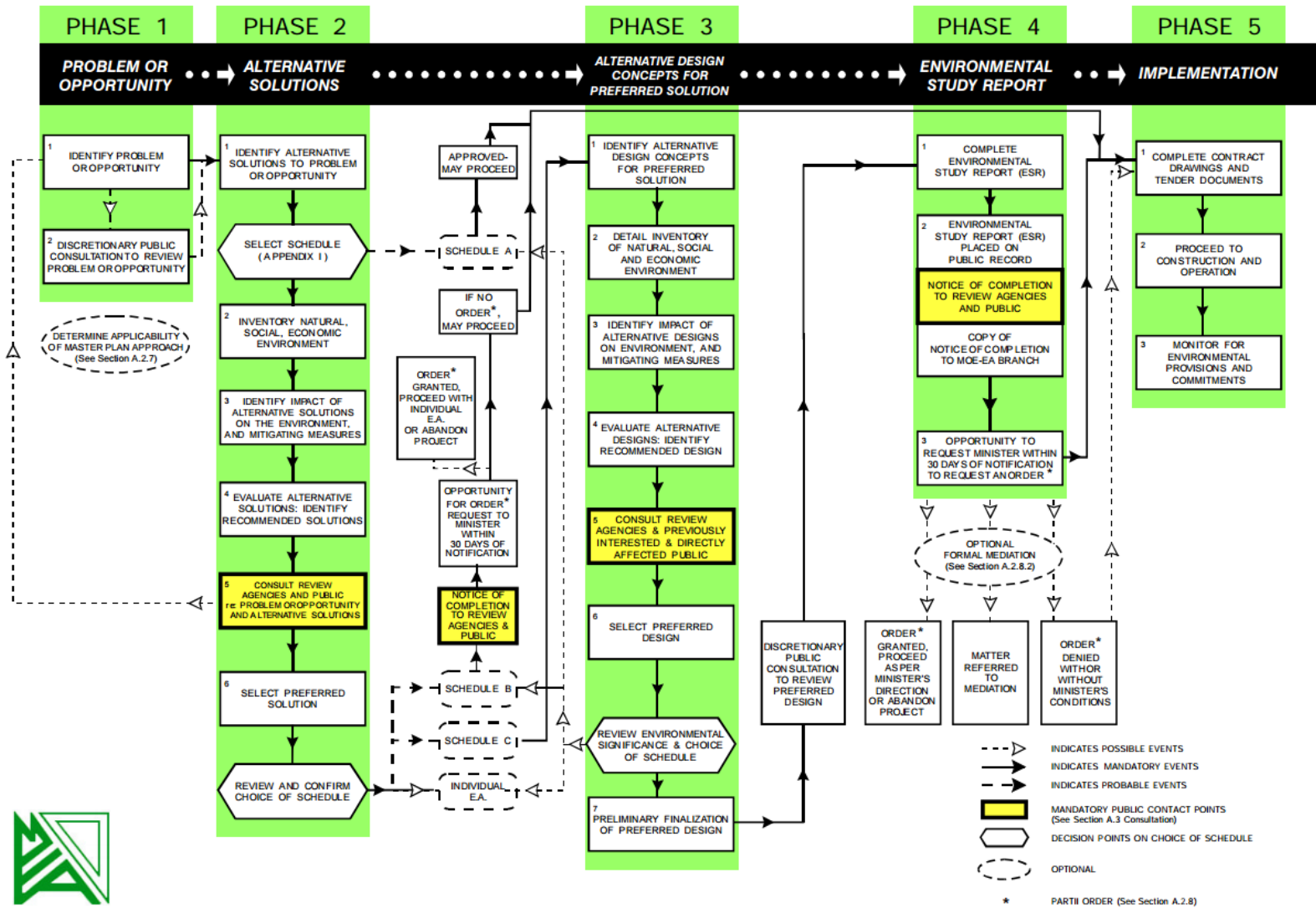


Figures

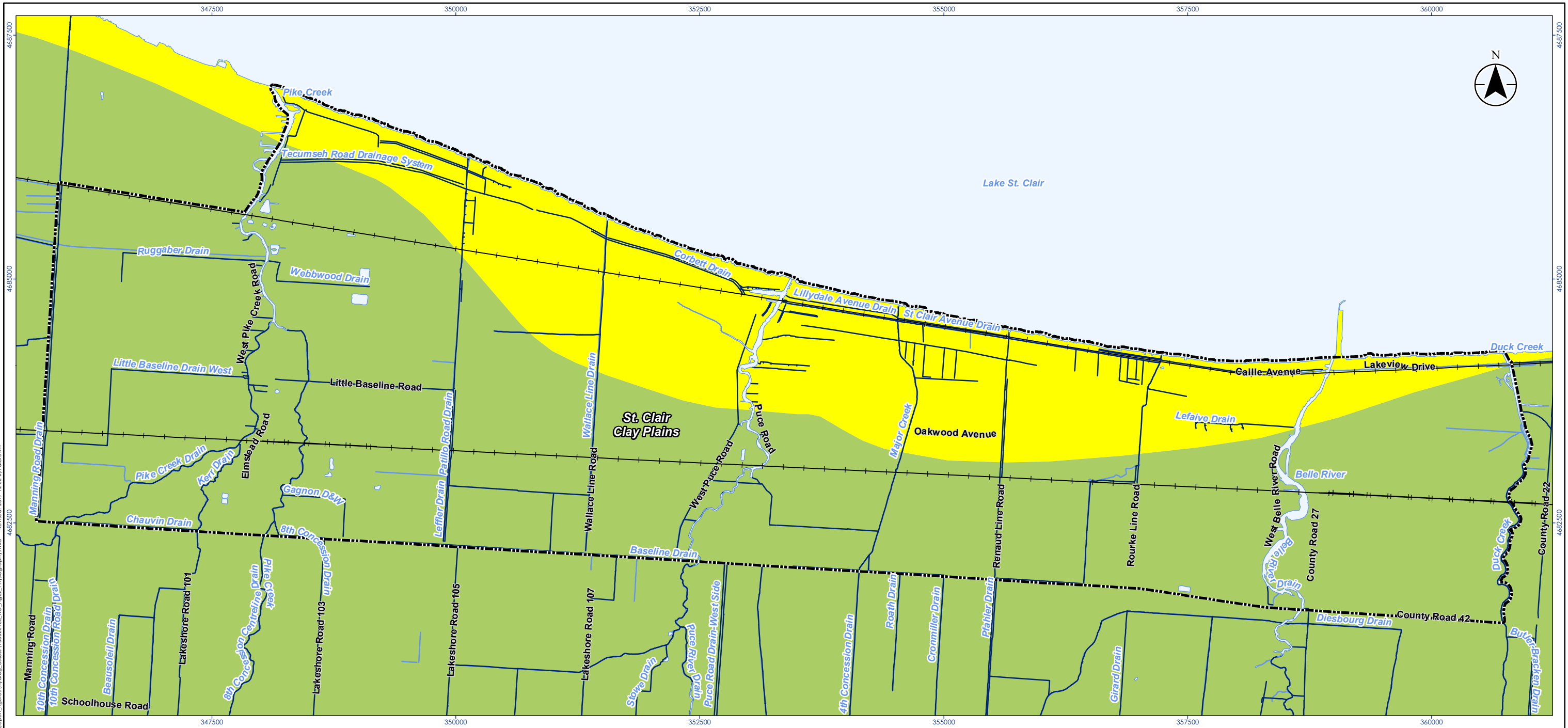
**FIGURES**



Figure 2.1 – Municipal Class Environmental Assessment Planning Process



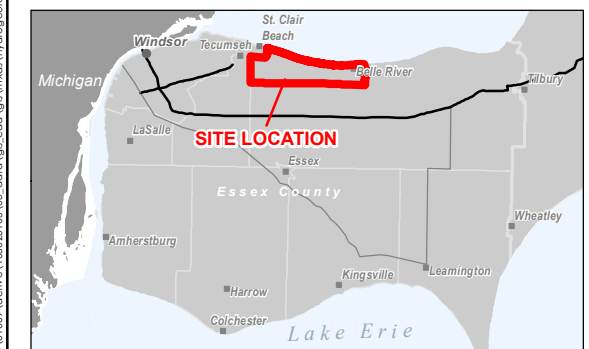




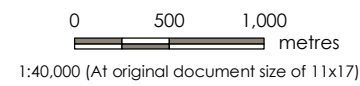
347500 350000 352500 355000 357500 360000

4687500 4685000 4682500 4680000 4677500 4675000

Pike Creek  
 Tecumseh Road Drainage System  
 Ruggaber Drain  
 Webbwood Drain  
 Corbett Drain  
 Lillydale Avenue Drain  
 St. Clair Avenue Drain  
 Duck Creek  
 Gaille Avenue  
 Lakeview Drive  
 Lefaive Drain  
 Belle River  
 West Belle River Road  
 County Road 27  
 Duck Creek  
 County Road 22  
 St. Clair Clay Plains  
 Oakwood Avenue  
 Major Creek  
 Puce Road  
 West Puce Road  
 Wallace Line Road  
 Wallace Line Drain  
 Baseline Drain  
 Puce Road Drain West Side  
 Puce Road Drain  
 4th Concession Drain  
 Roath Drain  
 Cronmiller Drain  
 Fahler Drain  
 Rourke Line Road  
 Rourke Line Road  
 County Road 42  
 Diesbourg Drain  
 Burker Bracken Drain  
 Manning Road  
 10th Concession Drain  
 10th Concession Road Drain  
 Beausoleil Drain  
 Lakeshore Road 101  
 8th Concession Centraline Drain  
 Pike Creek  
 8th Concession Road Drain  
 Lakeshore Road 103  
 Lakeshore Road 105  
 Lakeshore Road 107  
 Slove Drain  
 Gagnon D&W  
 Leffler Drain  
 Pettibon Road Drain  
 Kerri Drain  
 Elmstead Road  
 West Pike Creek Road  
 Schoolhouse Road  
 County Road 42



- Legend**
- Study Area
  - Railway - Active
  - Constructed Drain
  - Watercourse
  - Waterbody
  - Physiographic Region Boundary
- Physiography**
- 11: Sand Plains
  - 8: Bevelled Till Plains



Project Location: Municipality of  
 Prepared by CMC on 2019-12-02  
 Technical Review by ABC on yyyy-mm-dd

Client/Project: TOWN OF LAKESHORE  
 STORMWATER MASTER PLAN PHASE I

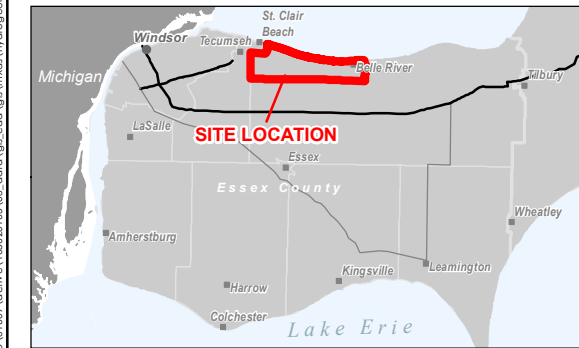
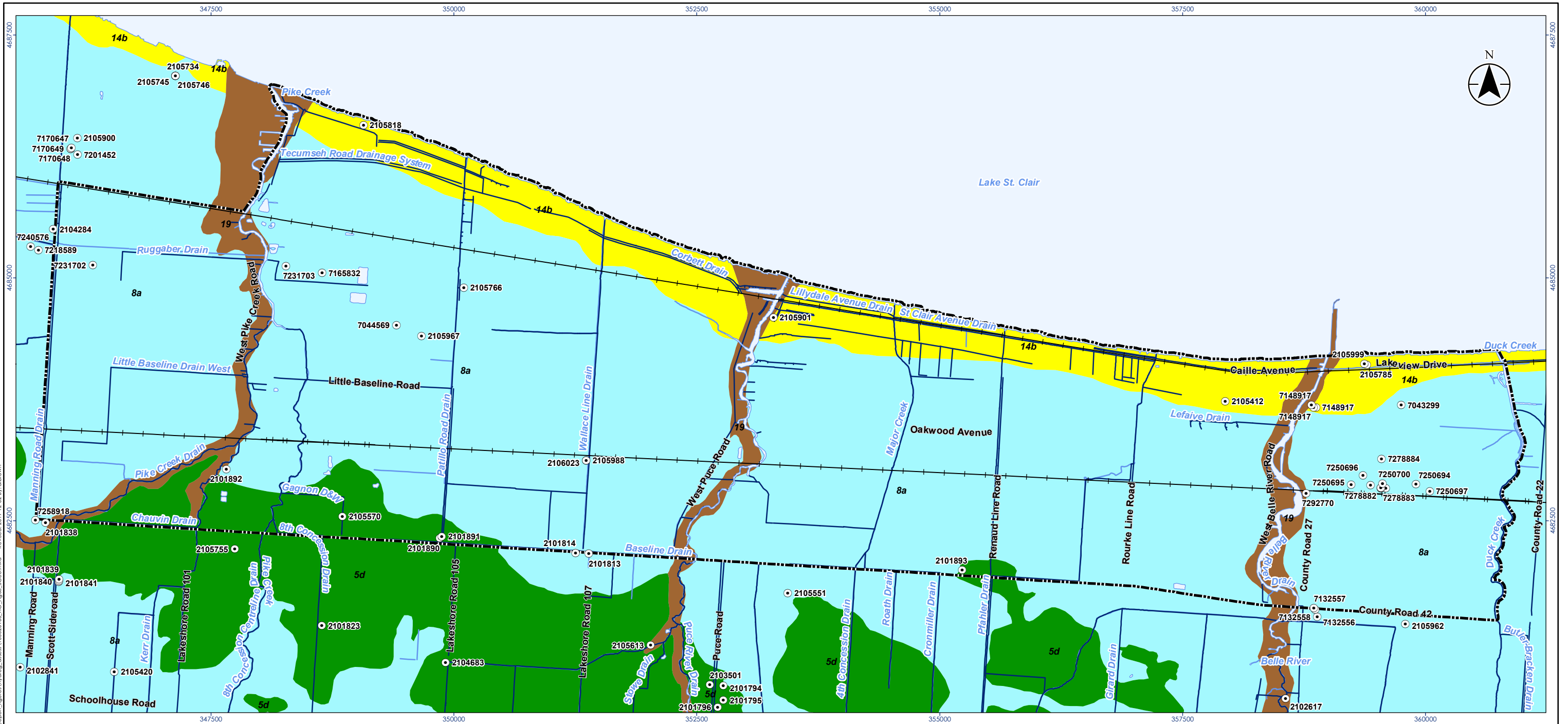
Figure No.: **5.1**

Title: **Physiography**

**Notes**

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
- Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.

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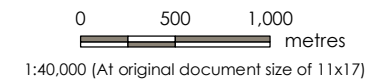


**Legend**

- Study Area
- MECP Water Well Record
- Railway - Active
- Constructed Drain
- Watercourse
- Waterbody

**Surficial Geology**

- 19: Modern alluvial deposits
- 14b: Coarse-textured lacustrine deposits (Littoral-foreshore deposits)
- 8a: Fine-textured glaciolacustrine deposits (Massive-well laminated)
- 5d: Glaciolacustrine-derived silty to clayey till



Project Location: Municipality of  
 165620165 REVA  
 Prepared by CMC on 2019-12-02  
 Technical Review by ABC on yyyy-mm-dd

Client/Project: TOWN OF LAKESHORE  
 STORMWATER MASTER PLAN PHASE I

Figure No.

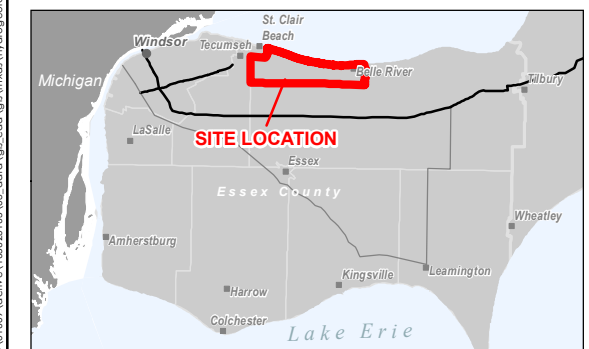
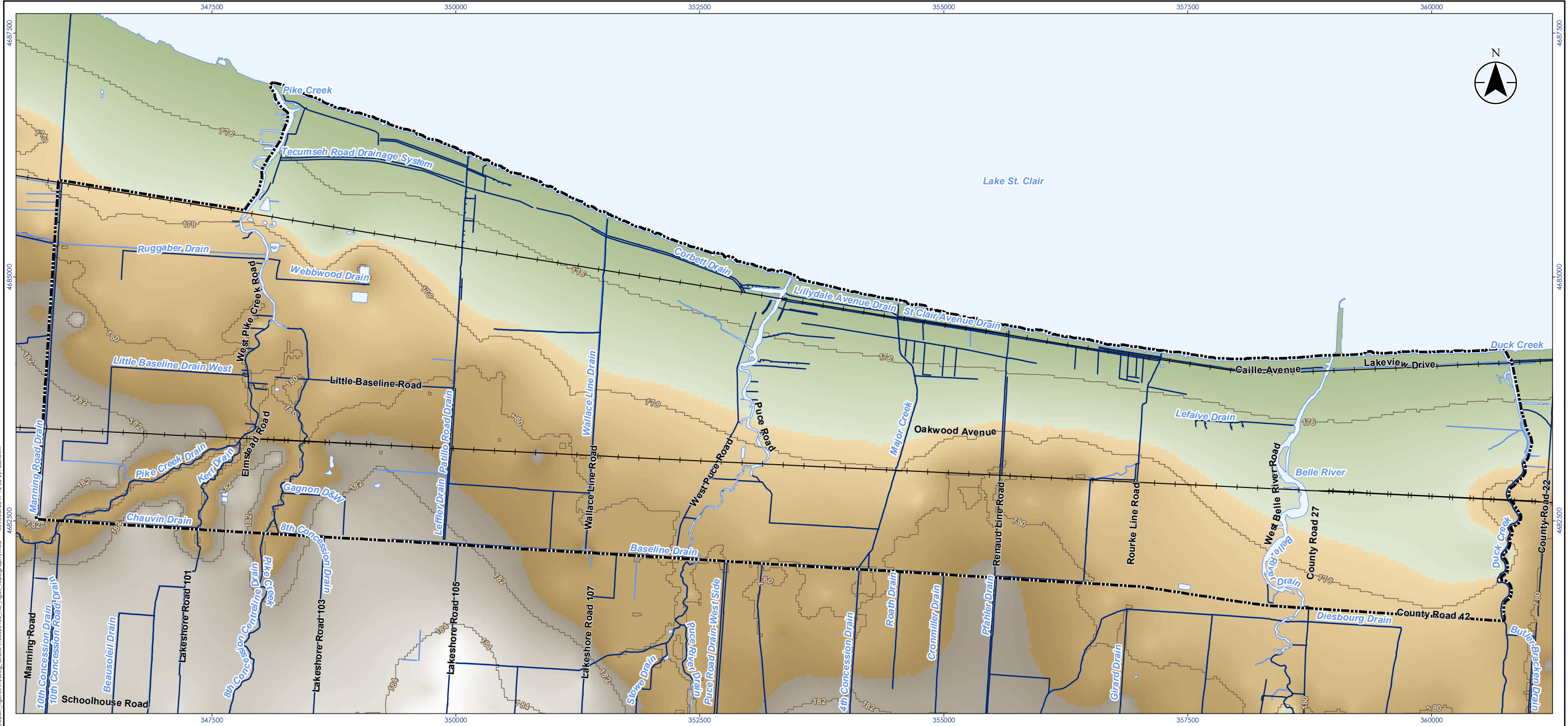
**5.2**

Title

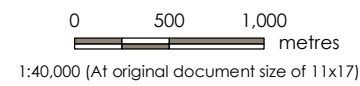
**Surficial Geology**

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 17N  
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.  
 3. Ontario Geological Survey 2010. Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV ISBN 978-1-4435-2483-4

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- Legend**
- Study Area
  - Railway - Active
  - Constructed Drain
  - Watercourse
  - Waterbody
  - Topographic Contour (m ASL)
  - Ground Surface Elevation (m ASL)**
  - High : 185.016
  - Low : 173.83



Project Location: Municipality of  
 Prepared by CMC on 2019-12-02  
 Technical Review by ABC on yyyy-mm-dd

Client/Project: TOWN OF LAKESHORE  
 STORMWATER MASTER PLAN PHASE I

Figure No.: **5.3**

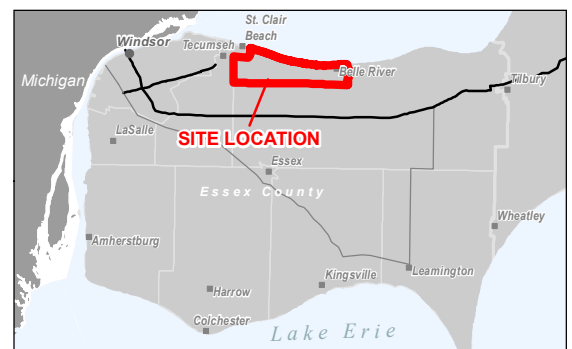
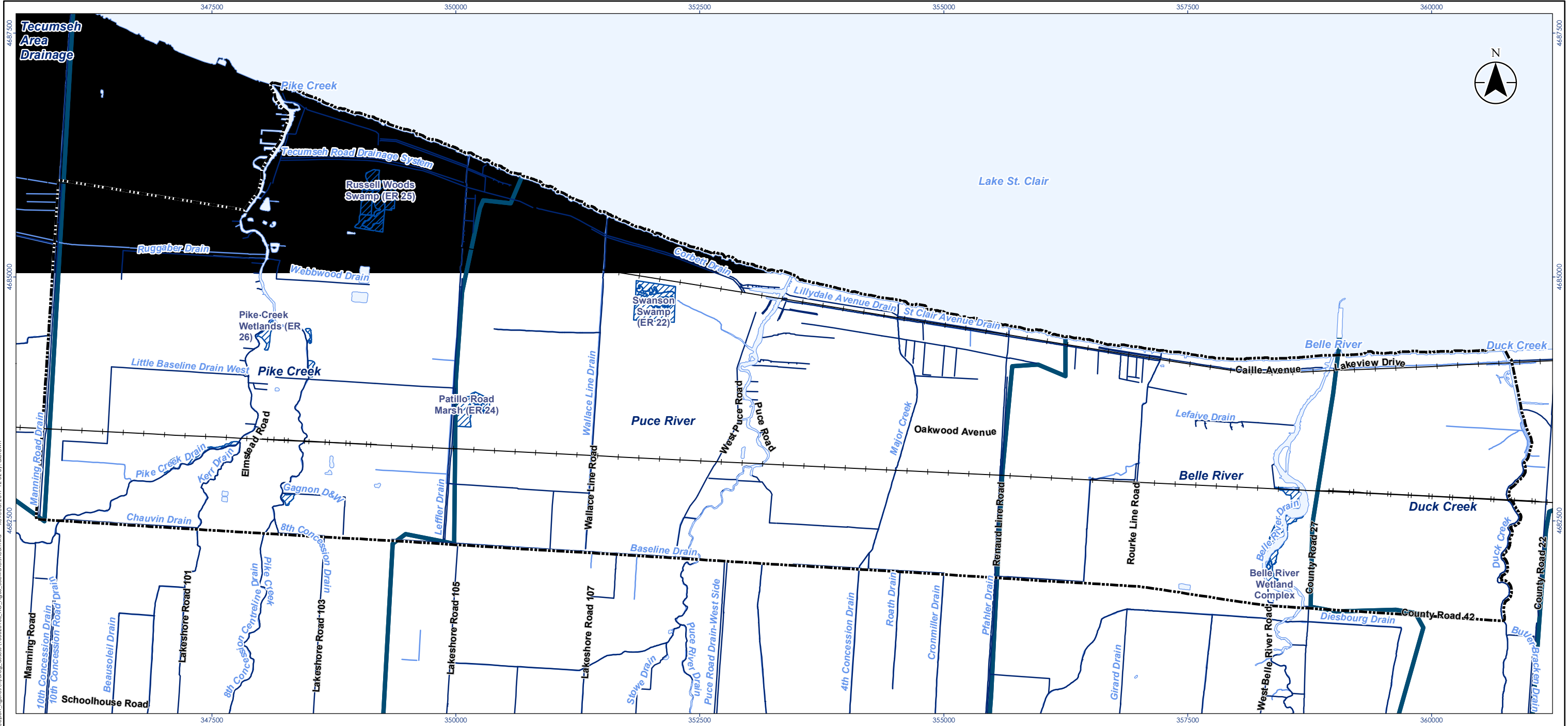
Title: **Topography**

**Notes**

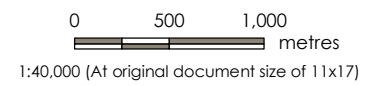
- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
- Topography derived from the Provincial Digital Elevation Model (DEM) - Version 3.0 © Queen's Printer for Ontario, 2013.

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- Legend**
- Study Area
  - Railway - Active
  - Constructed Drain
  - Watercourse
  - Subwatershed Boundary
  - Waterbody
  - Wetland - Evaluated (Provincial)



Project Location: 165620165 REVA  
 Municipality of: Prepared by CMC on 2019-12-02  
 Technical Review by ABC on yyyy-mm-dd

Client/Project: TOWN OF LAKESHORE  
 STORMWATER MASTER PLAN PHASE I

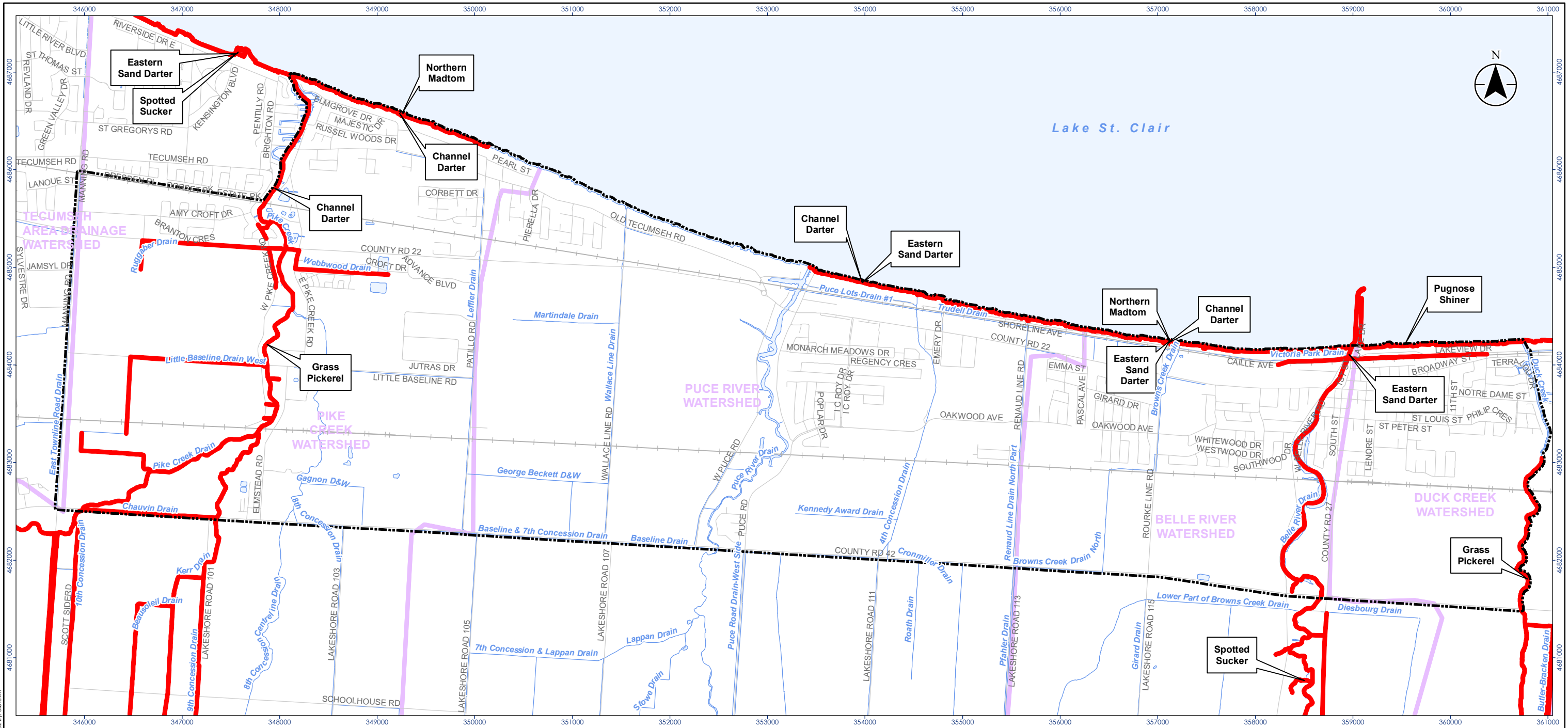
Figure No.: **5.4**

Title: **Subwatersheds and Surface Water Features**

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 17N  
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.  
 3. Orthoimagery © First Base Solutions, 2018. Imagery Date, 2019.

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\\cd\02\4\01\work\_group\01\609\active\165620165\165620165\_HG\_Fig05\_Subwatershed.mxd Revised: 2019-12-02 By: abrown  
 4682500 4685000



- Legend**
- Study Area
  - Aquatic SAR Distribution
  - Subwatershed

0 250 500  
metres  
1:40,000 (At original document size of 11x17)



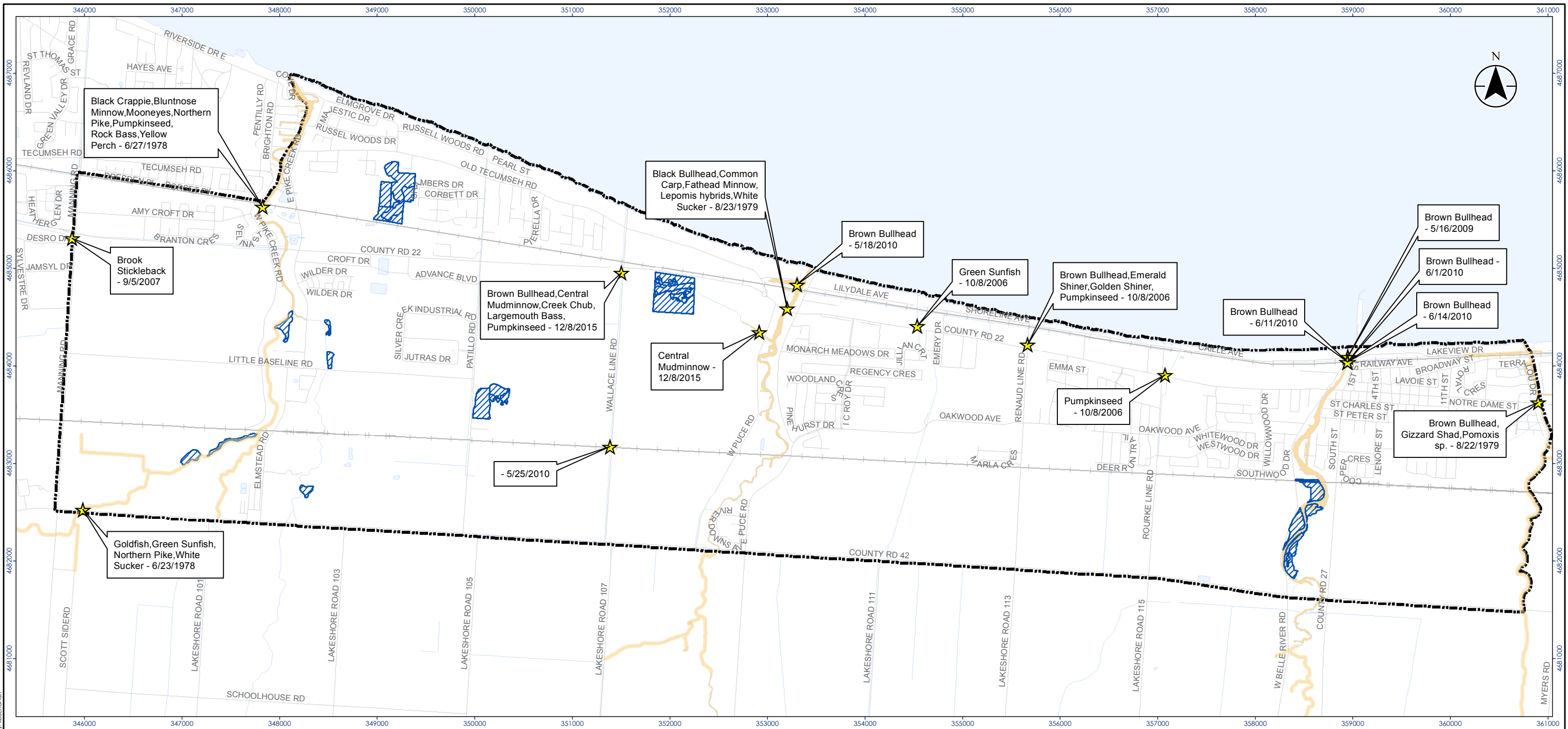
Project Location: Municipality of  
165620165 REVA  
Prepared by KDB on 2019-12-02

Client/Project: TOWN OF LAKESHORE  
STORMWATER MASTER PLAN PHASE I

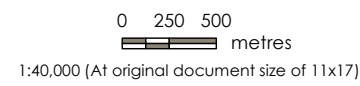
Figure No.: **5.5**  
Title: Aquatic Species At Risk Habitat

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
  2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
  3. Labels are representative of larger extents, not exact locations.

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- Legend**
- Study Area
  - Fish Survey Point
  - Warm Thermal Regime
  - Wetland - Evaluated (Provincial)



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Project Location  
Municipality of \_\_\_\_\_ Prepared by KDB on 2019-09-16  
Technical Review by ABC on yyyy-mm-dd  
Independent Review by ABC on yyyy-mm-dd

Client/Project  
**TOWN OF LAKESHORE**  
**STORMWATER MASTERPLAN PHASE 1**

Figure No.

**5.6**

Title

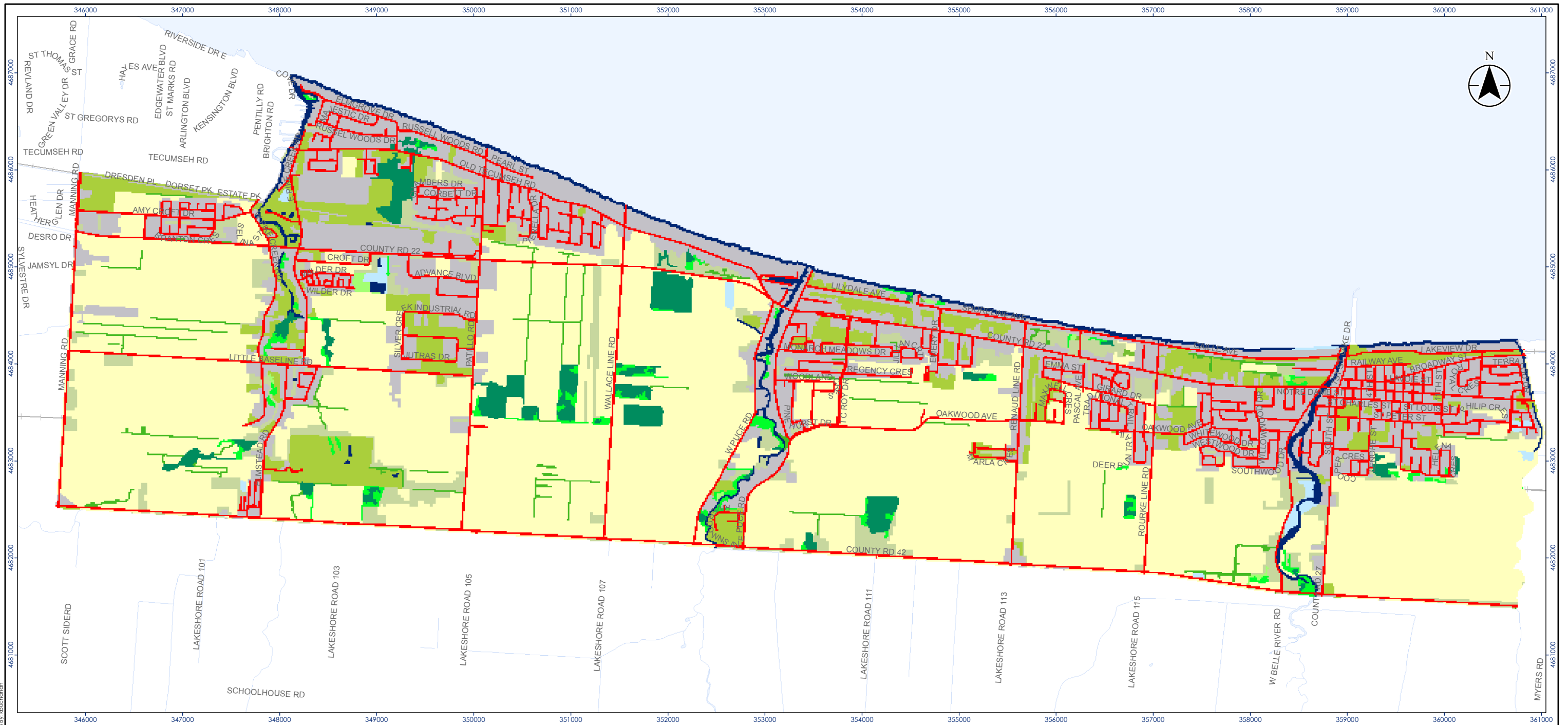
**Species at Risk Locations**

V:\01658\active\1652016\5\WMD\1652016\_5\_NatEnv\_Fg3\_Aquatic.mxd Reviewed: 2019-09-16 By: kbuchanan

- Notes**
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- Legend**
- |                      |                                 |
|----------------------|---------------------------------|
| Study                | 201. Transportation             |
| 90. Forest           | 202. Built Up Area - Pervious   |
| 93. Deciduous Forest | 203. Built Up Area - Impervious |
| 131. Treed Swamp     | 250. Undifferentiated           |
| 135. Thicket Swamp   |                                 |
| 160. Marsh           |                                 |
| 170. Open Water      |                                 |
| 192. Hedge Row       |                                 |
| 193. Tilled          |                                 |

0 250 500 metres  
 1:40,000 (At original document size of 11x17)



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Project Location: XXXXXXXX-XXXX REVA  
 Municipality of: Prepared by KDB on 2019-09-15  
 Technical Review by ABC on yyyy-mm-dd  
 Independent Review by ABC on yyyy-mm-dd

Client/Project: TOWN OF LAKESHORE  
 STORMWATER MASTERPLAN PHASE 1

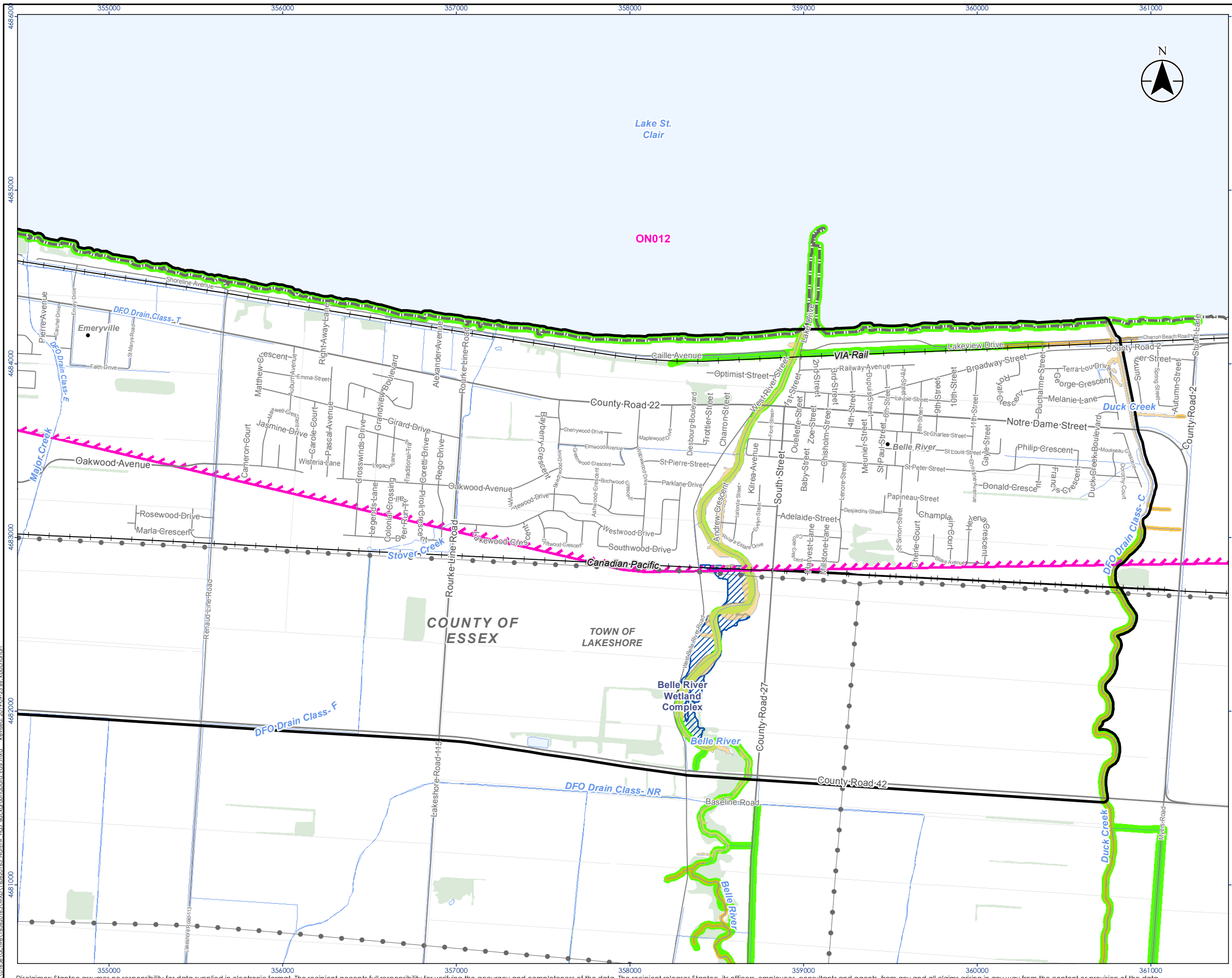
Figure No. 5.7

Title: Natural Environment SOLRIS Data

V:\01658\active\16582016\S\MXD\16582016\_NatEnv\_Fg2\_SOLRIS\_V2.mxd Revised: 2019-09-15 by: mbuchanan

**Notes**  
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 3. Orthoimagery © First Base Solutions, 2018. Imagery Date, 20XX.

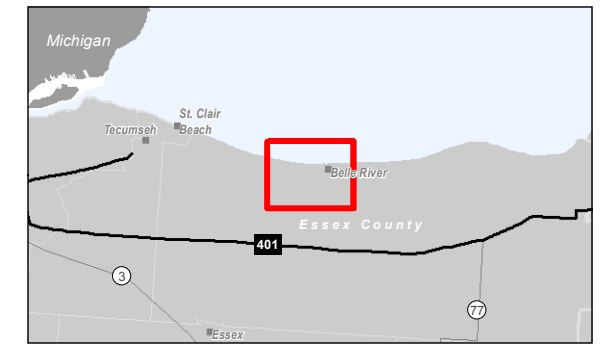
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- Legend**
- Constructed Drain
  - Thermal Regime, Warm
  - Railway
  - Hydro Line
  - Watercourse (Permanent)
  - Thermal Regime, Warm
  - Aquatic Species at Risk Distribution
  - Waterbody
  - Wetland, Provincially Significant
  - Wooded Area
  - Important Bird Area
  - Lot
  - Municipal Boundary, Upper
  - Municipal Boundary, Lower



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
  2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.



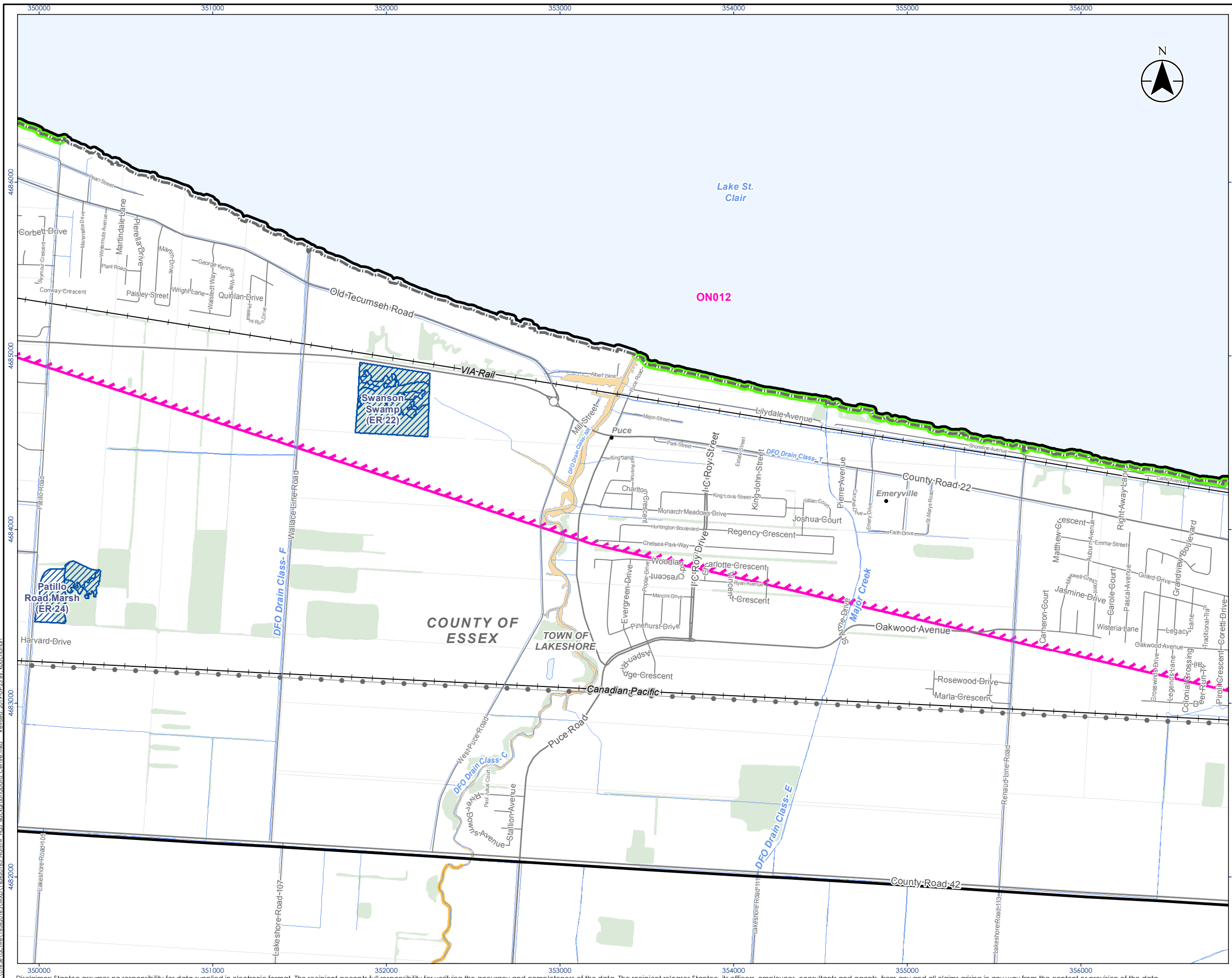
Project Location  
Municipality of \_\_\_\_\_ Prepared by ABC on 2019-09-23  
Technical Review by ABC on yyyy-mm-dd  
Independent Review by ABC on yyyy-mm-dd

Client/Project  
**TOWN OF LAKESHORE**  
**STORMWATER MASTER PLAN PHASE 1**

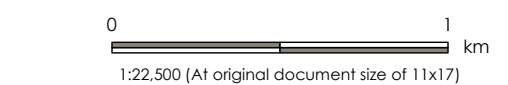
Figure No.  
**5.8**

Title  
**Provincially Significant Wetlands**

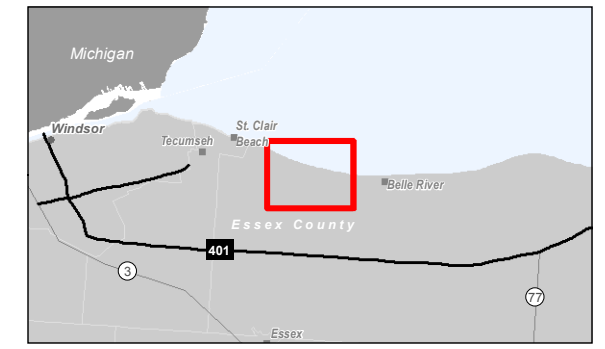




- Legend
- Constructed Drain
  - Thermal Regime, Warm
  - Railway
  - Hydro Line
  - Watercourse (Permanent)
  - Thermal Regime, Warm
  - Aquatic Species at Risk Distribution
  - Waterbody
  - Wetland, Provincially Significant
  - Wooded Area
  - Important Bird Area
  - Lot
  - Municipal Boundary, Upper
  - Municipal Boundary, Lower



- Notes
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Project Location  
Municipality of \_\_\_\_\_ Prepared by ABC on 2019-09-23  
Technical Review by ABC on yyyy-mm-dd  
Independent Review by ABC on yyyy-mm-dd

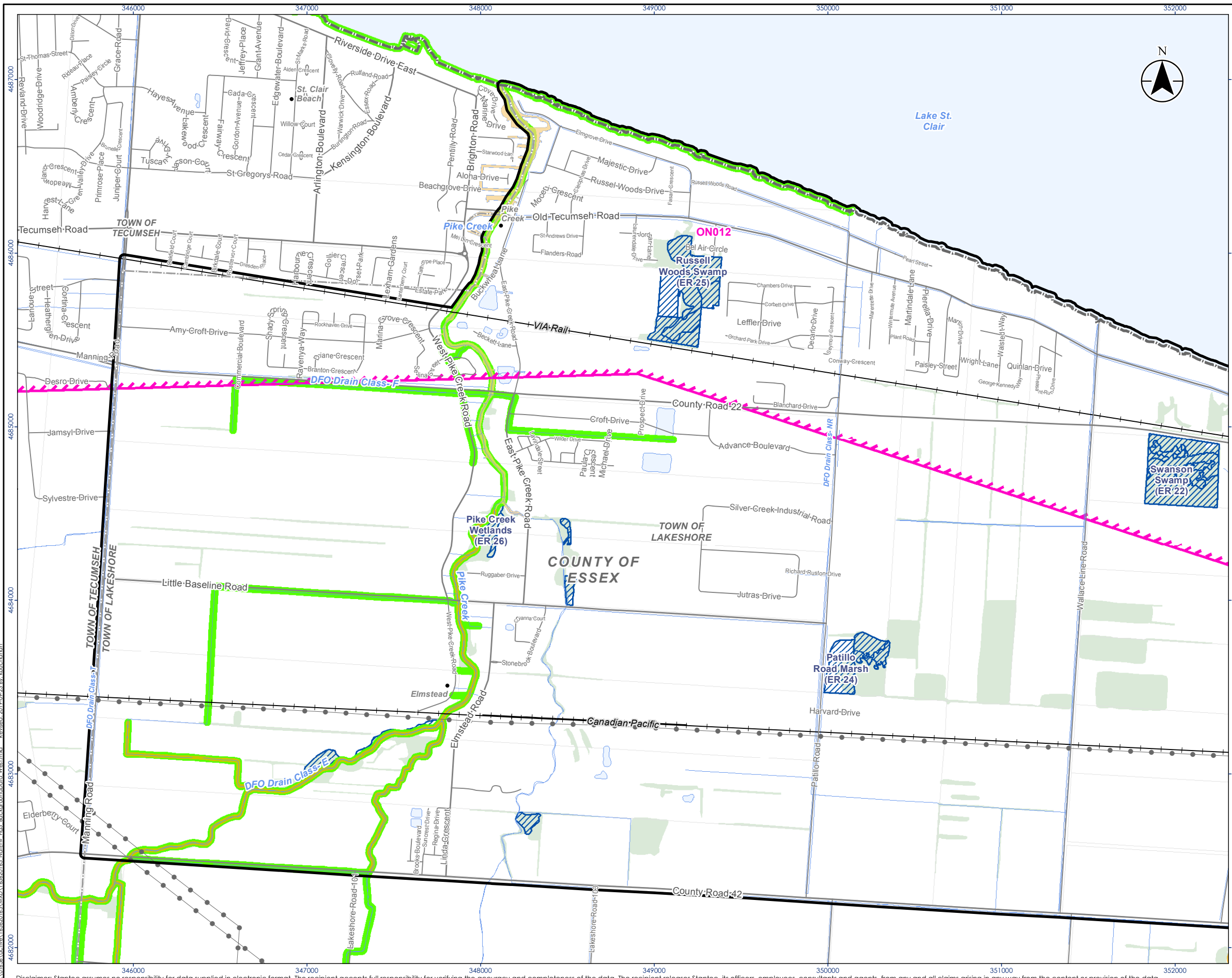
Client/Project  
TOWN OF LAKESHORE  
STORMWATER MASTER PLAN PHASE 1

Figure No.  
**5.9**

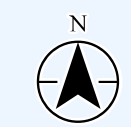
Title  
**Provincially Significant Wetlands**

V:\0165A\essex\16520165\W01\16520165\_HatEx\_Fig5\_BackgroundData\_Centre.mxd - Revised: 2019-09-23 By: kbuchanan

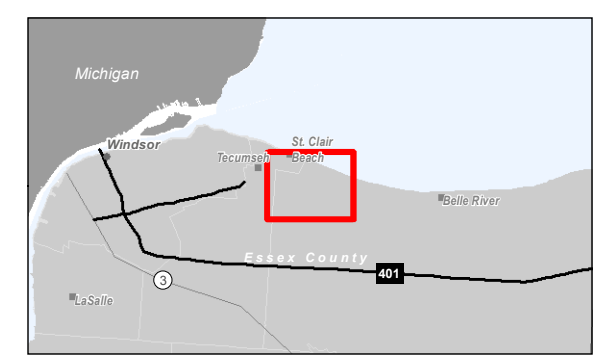
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- Legend**
- Constructed Drain
  - Thermal Regime, Warm
  - Railway
  - Hydro Line
  - Watercourse (Permanent)
  - Thermal Regime, Warm
  - Aquatic Species at Risk Distribution
  - Waterbody
  - Wetland, Provincially Significant
  - Wooded Area
  - Important Bird Area
  - Lot
  - Municipal Boundary, Upper
  - Municipal Boundary, Lower



- Notes**
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Project Location  
Municipality of \_\_\_\_\_ Prepared by ABC on 2019-09-23  
Technical Review by ABC on yyyy-mm-dd  
Independent Review by ABC on yyyy-mm-dd

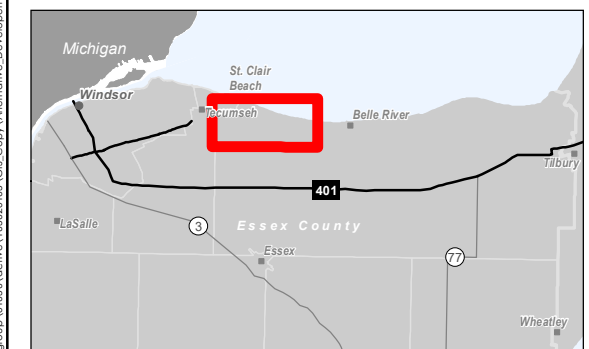
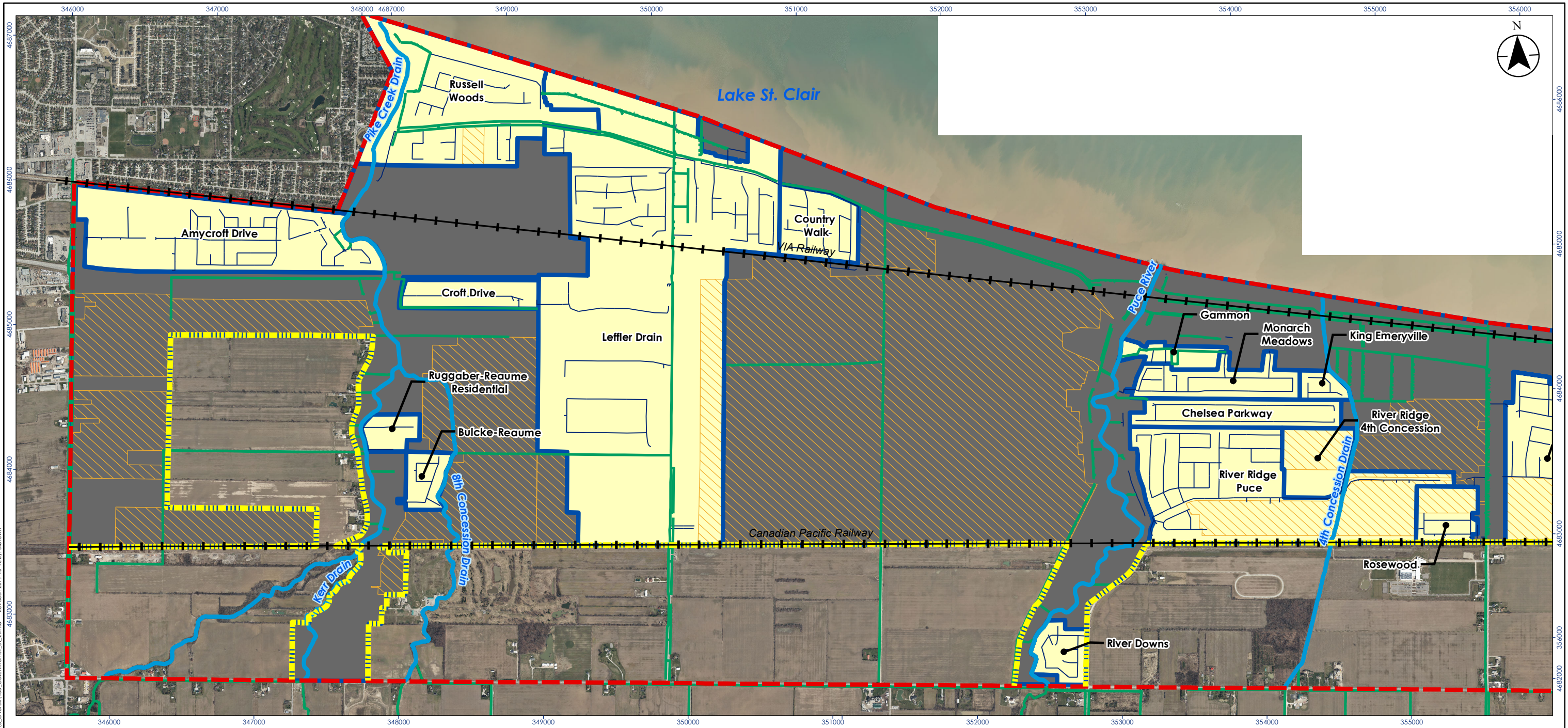
Client/Project  
**TOWN OF LAKESHORE**  
**STORMWATER MASTER PLAN PHASE 1**

Figure No.  
**5.10**

Title  
**Provincially Significant Wetlands**

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- Legend**
- Future Development Per Lakeshore Official Plan
  - Existing Development Served By Town Owned Drainage Infrastructure
  - Existing Development Served by Municipal Drains Only
  - Study Area Limit
  - Catchment Area
  - Development Limit per Lakeshore Official Plan
  - Watercourse
  - Municipal Drains
  - Storm Sewers
  - Railway

0 250 500 metres  
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-16

Client/Project: LAKESHORE SWMP

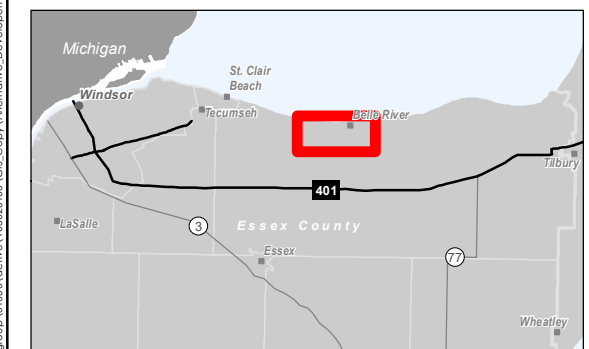
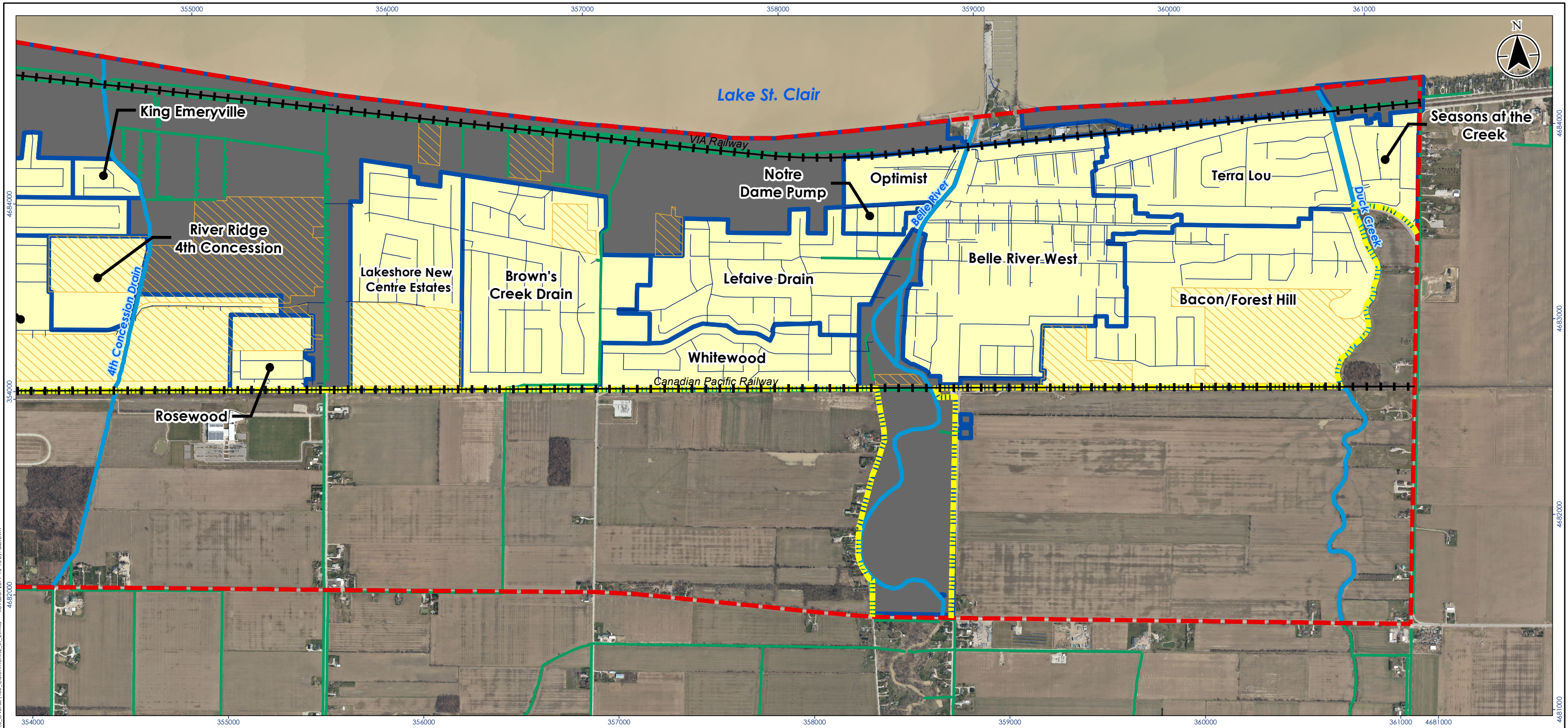
Figure No.: **5.11**

Title: **Catchment Areas**

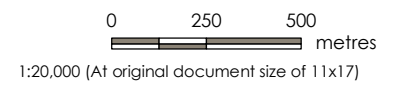
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- Legend**
- Future Development Per Lakeshore Official Plan
  - Existing Development Served By Town Owned Drainage Infrastructure
  - Existing Development Served by Municipal Drains Only
  - Study Area Limit
  - Catchment Area
  - Development Limit per Lakeshore Official Plan
  - Watercourse
  - Municipal Drains
  - Storm Sewers
  - Railway



Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-16

Client/Project: LAKESHORE SWMP

Figure No.: **5.12**

Title: **Catchment Areas**

**Notes**

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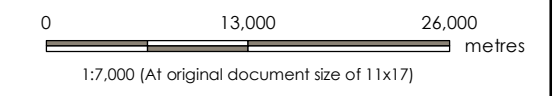
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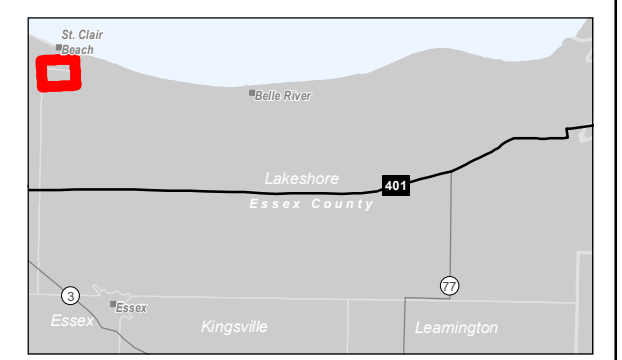


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Existing Ditch
- Overland Flow Direction
- Localized Ponding > 0.3 m and < 0.5m
- Localized Ponding > 0.5 m
- Outfalls



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
  2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
  3. Orthoimagery © First Base Solutions, 2016.



Project Location: Town of Lakeshore  
 Prepared by: 165620165 REVA / LMF on 2019-10-11

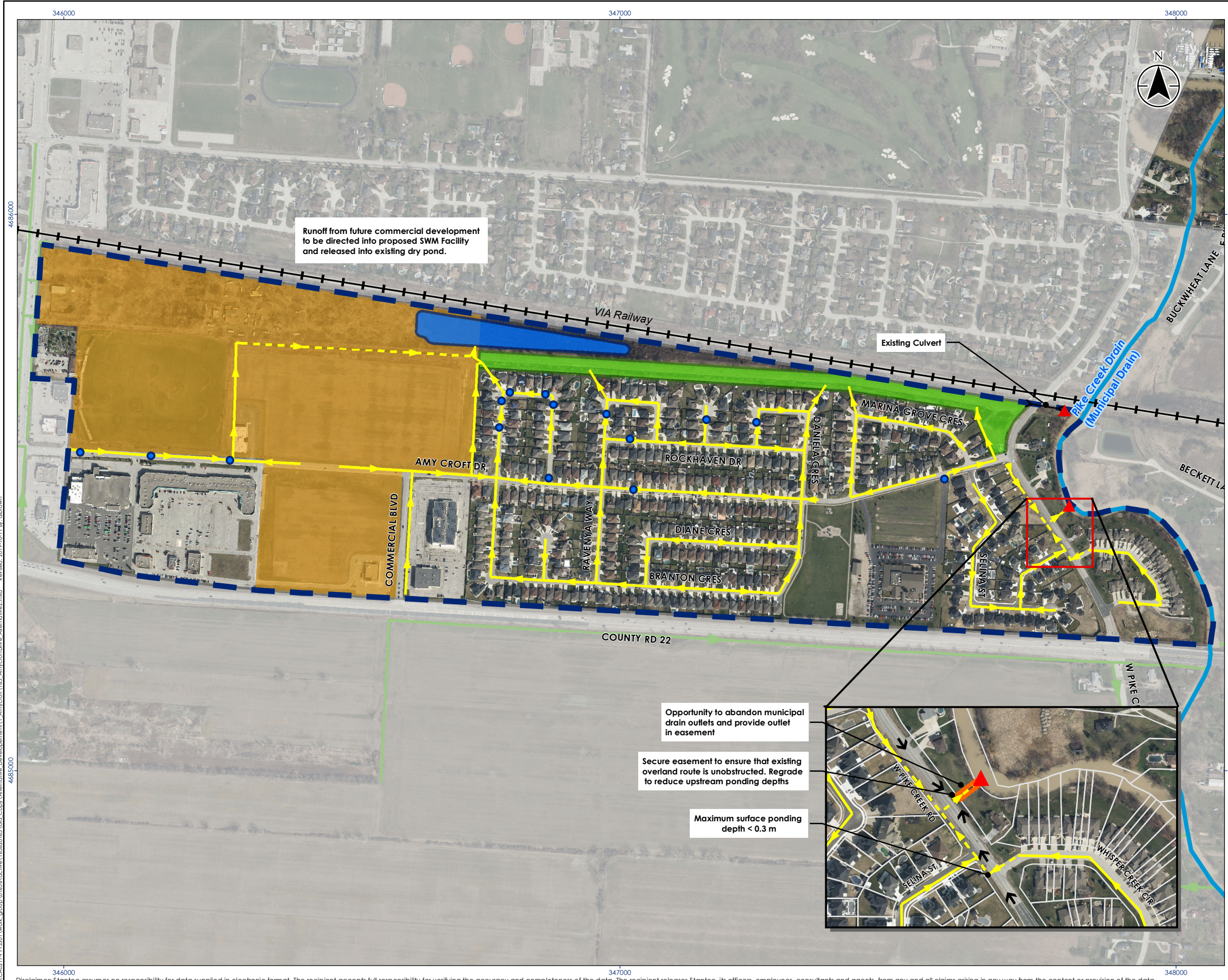
Client/Project: LAKESHORE SWMP

Figure No.: **6.1.1**

Title: **AMY CROFT CATCHMENT ALTERNATIVE 1 - DO NOTHING**

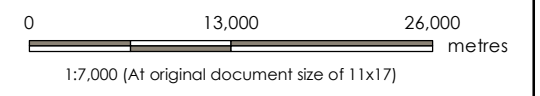
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 Revised: 2019-10-11 by: abrown  
 4685000





### Legend

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Proposed SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewer
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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  3. Orthoimagery © First Base Solutions, 2016.



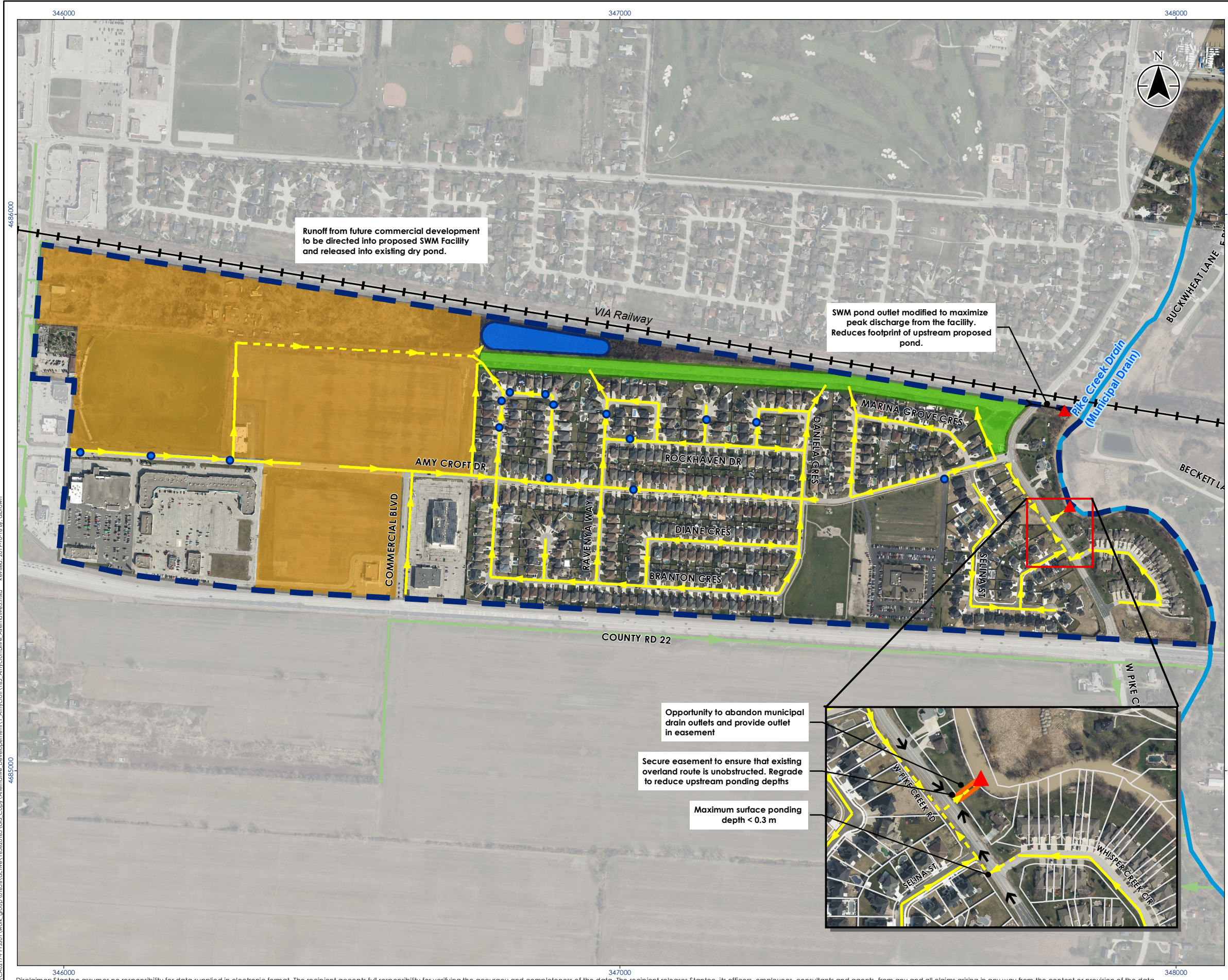
Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: **6.1.2**

Title: **AMY CROFT CATCHMENT  
 ALTERNATIVE 2 - PROVIDE UPSTREAM SWM  
 SERVICING**





Runoff from future commercial development to be directed into proposed SWM Facility and released into existing dry pond.

SWM pond outlet modified to maximize peak discharge from the facility. Reduces footprint of upstream proposed pond.

Opportunity to abandon municipal drain outlets and provide outlet in easement

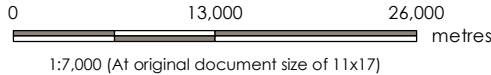
Secure easement to ensure that existing overland route is unobstructed. Regrade to reduce upstream ponding depths

Maximum surface ponding depth < 0.3 m

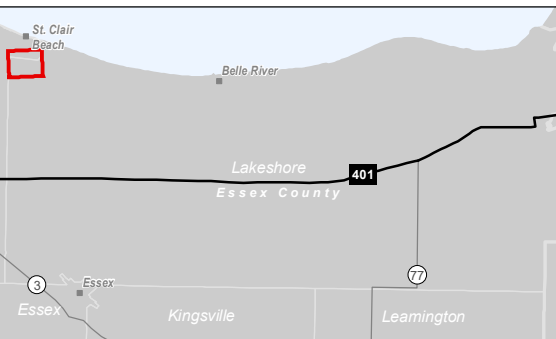


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Proposed SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewer
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-18

Client/Project: LAKESHORE SWMP

Figure No.: **6.1.3**

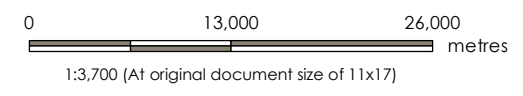
Title: **AMY CROTT CATCHMENT ALTERNATIVE 3 - INCREASED RELEASE RATE**





**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: 6.2.1

Title: CROFT DRIVE CATCHMENT ALTERNATIVE 1 - DO NOTHING

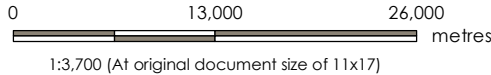
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 Revised: 2019-10-11 10:11 By: albrown  
 4485000



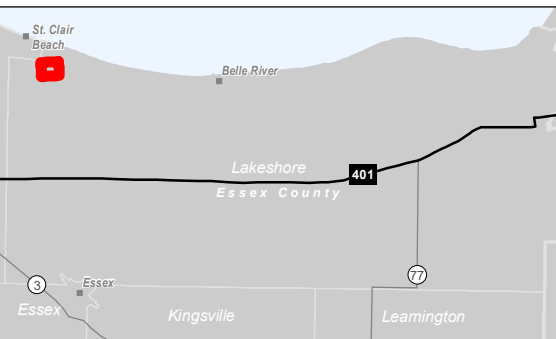


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Proposed Easement
- Railway
- Municipal Drains
- Existing Storm Sewers
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Localized Ponding > 0.5 m
- Outfalls



- Notes**
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 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: **6.2.2**

Title: **CROFT DRIVE CATCHMENT  
 ALTERNATIVE 2 - MAJOR NORTH  
 FLOW DIVERSION**

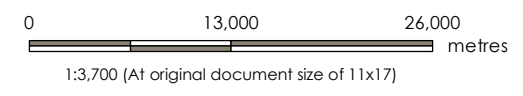
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 Revised: 2019-10-11 10:11 By: albrown  
 4485000



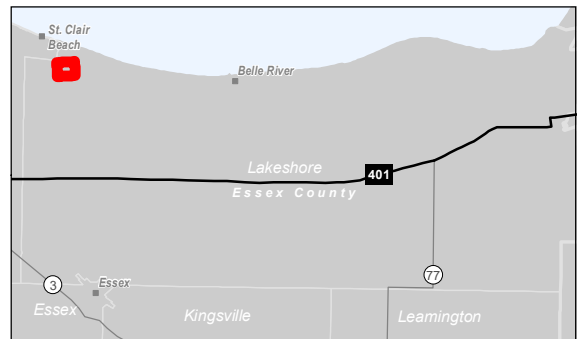


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Proposed Easement
- Railway
- Municipal Drains
- Existing Storm Sewers
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Localized Ponding > 0.5 m
- Outfalls



- Notes**
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 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: 6.2.3

**CROFT DRIVE CATCHMENT  
 ALTERNATIVE 3 - MAJOR SOUTH  
 FLOW DIVERSION**

\\CA0217\FPS01\work\_group\0165\active\16520165\GIS\_Copy\Alternative\_Development\14\_CroftDrive\165\_CroftDrive\_Alternative3.mxd  
 Revised: 2019-10-11 10:11 By: albrown  
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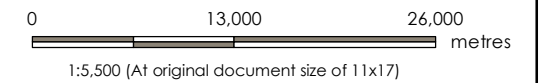


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 Revised: 2019-10-11 By: abrown

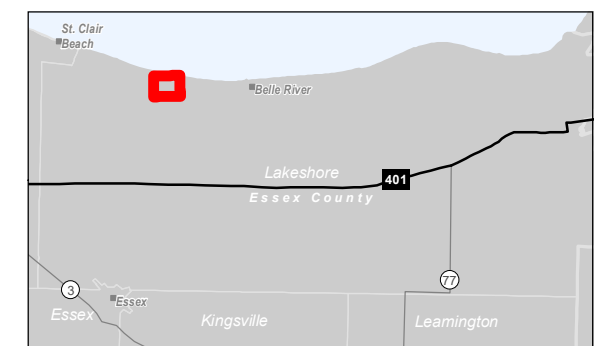


### Legend

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Localized Ponding > 0.5 m
- Outfalls



- Notes**
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 Prepared by LMF on 2019-10-11

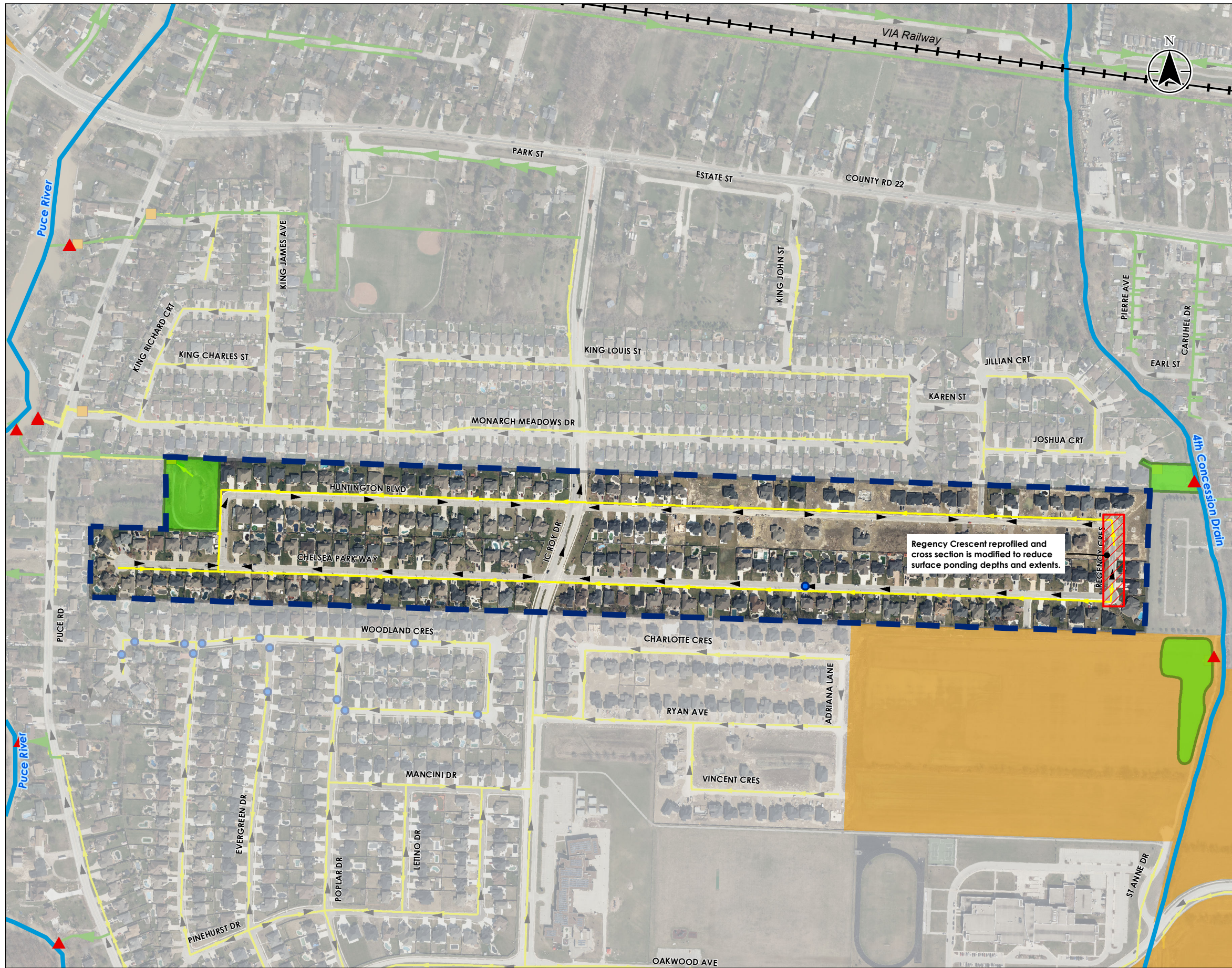
Client/Project: LAKESHORE SWMP

Figure No.: 6.3.1

Title: **CHELSEA PARKWAY CATCHMENT  
 ALTERNATIVE 1 - DO NOTHING**

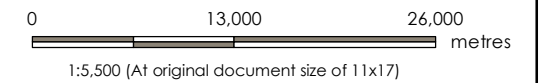


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 Revised: 2019-10-11 By: abrown



### Legend

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
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 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

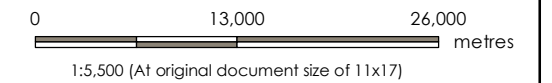
Figure No.: 6.3.2

Title: **CHELSEA PARKWAY CATCHMENT  
 ALTERNATIVE 2 - REPROFILE  
 REGENCY CRESCENT**



### Legend

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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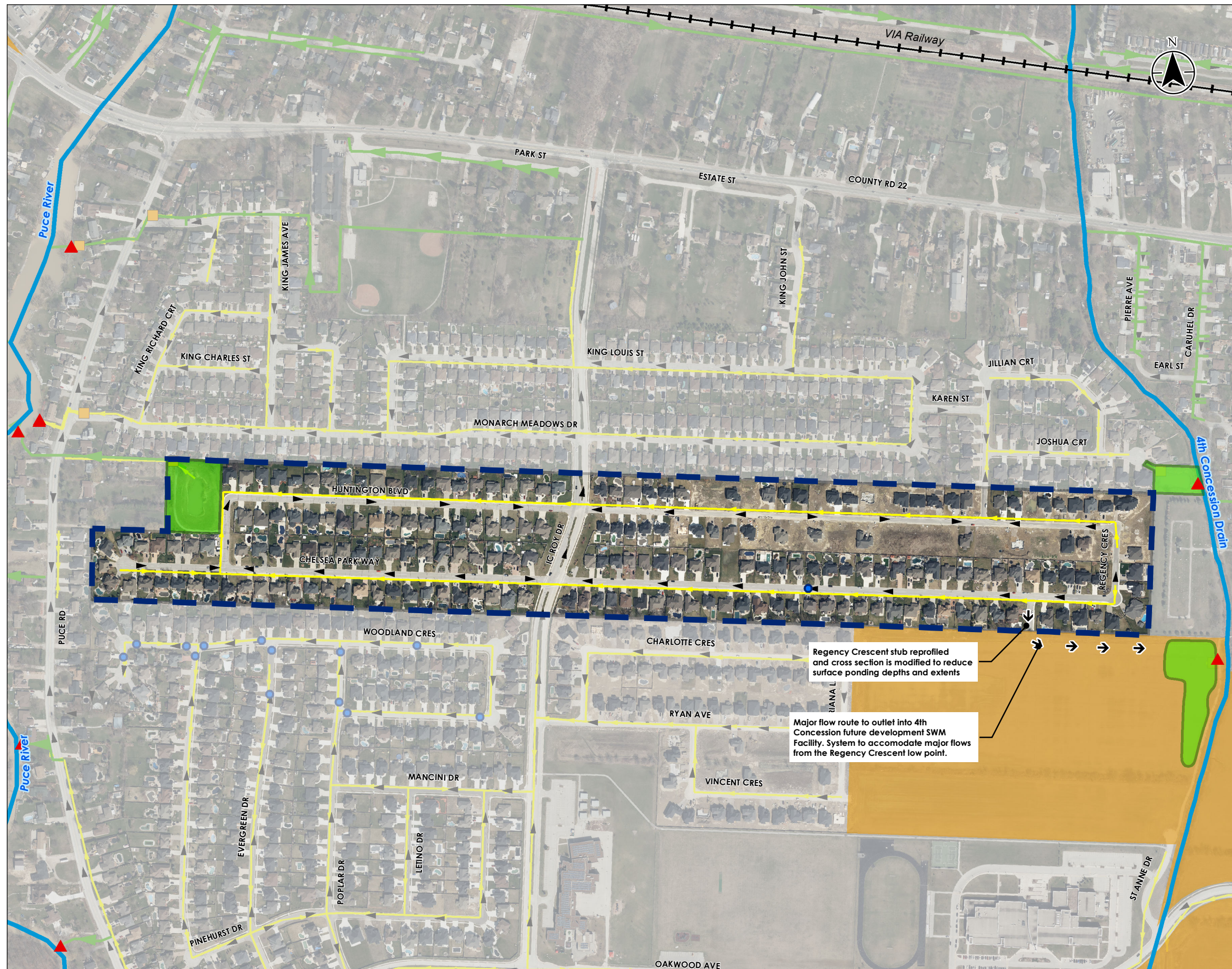


Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: 6.3.3

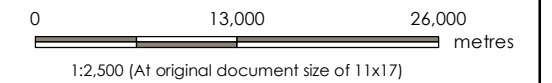
Title: **CHELSEA PARKWAY CATCHMENT  
 ALTERNATIVE 3 - RIVER RIDGE 4TH  
 CONCESSION FUTURE DEVELOPMENT**





### Legend

- Catchment Boundary
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Proposed Pump Station
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.

**6.4.1**

Title

**OPTIMIST CATCHMENT  
 ALTERNATIVE 1 - DO NOTHING**



\\CA0217\FPS01\work\_group\01656\active\165620165\GIS\_Copy\Alternative\_Development\3\_Optimist\_Alternative1.mxd Revised: 2019-10-11 By: abrown

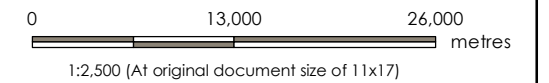


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**Legend**

- Catchment Boundary
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewer
- Overland Flow Direction
- Storm Pump Stations
- Proposed Pump Station
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-11  
 165620165 REVA

Client/Project: LAKESHORE SWMP

Figure No.: 6.4.2

Title: OPTIMIST CATCHMENT  
 ALTERNATIVE 2 - NEW PUMP STATION

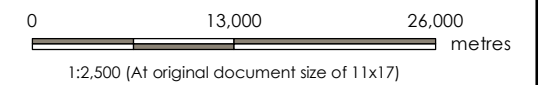


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**Legend**

- Catchment Boundary
- Existing SWM Facility
- Proposed Pond
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewer
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by: 165620165 REVA / LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

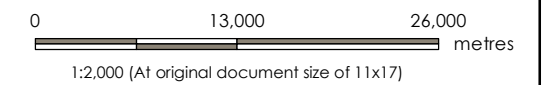
Figure No.: 6.4.3

Title: **OPTIMIST CATCHMENT  
 ALTERNATIVE 3 - NEW PUMP STATION  
 AND OFFLINE DRY SWM POND**



### Legend

- Catchment Boundary
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Outfalls



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
  2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
  3. Orthoimagery © First Base Solutions, 2016.

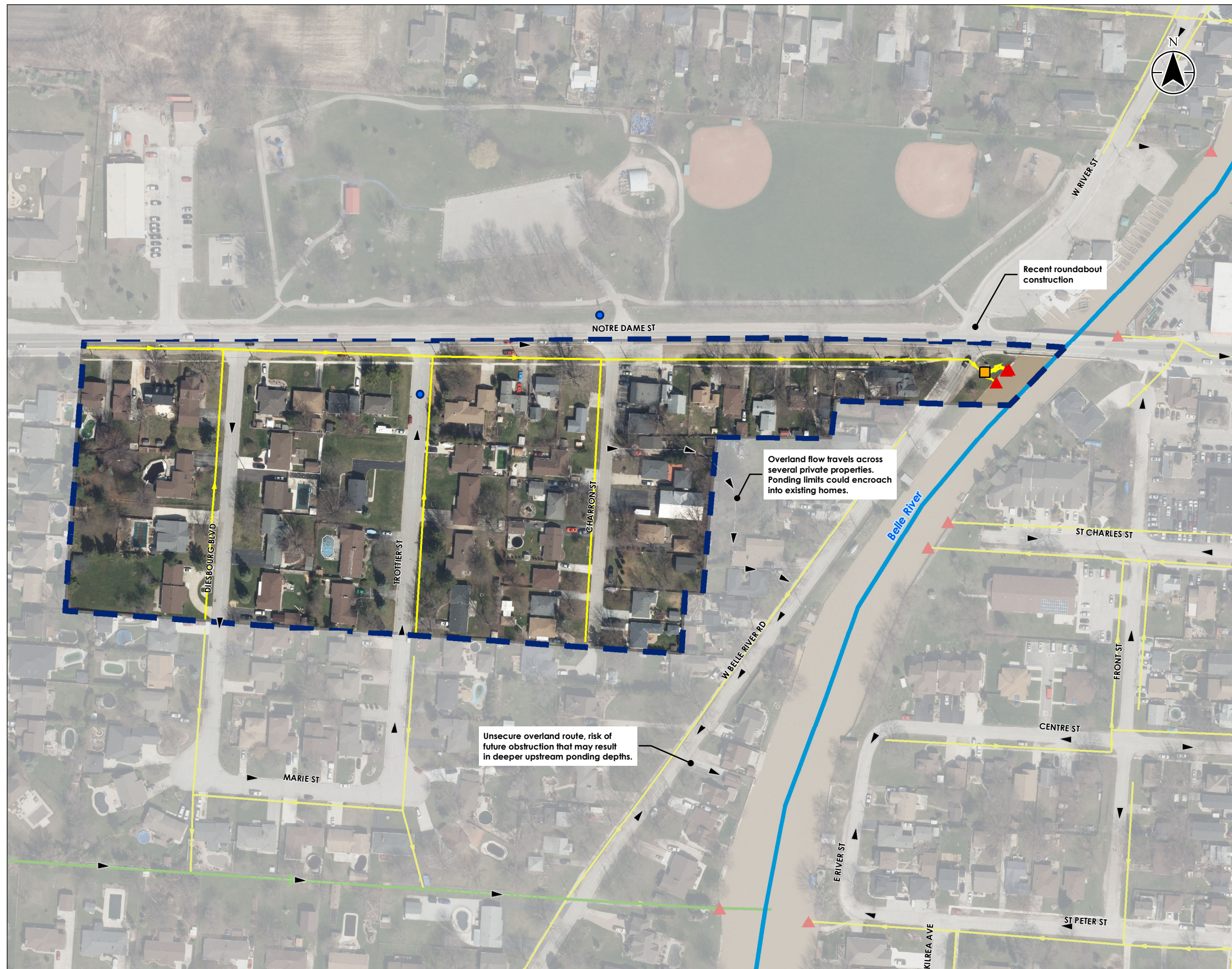


Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-18  
 165620165 REVA

Client/Project: LAKESHORE SWMP

Figure No.: 6.5.1

Title: **NOTRE DAME CATCHMENT  
 ALTERNATIVE 1 - DO NOTHING**

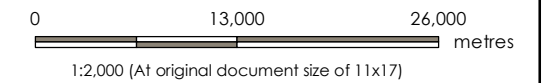


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 Revised: 2019-10-18 By: abrown



### Legend

- Catchment Boundary
- Existing SWM Facility
- Proposed Pond
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewer
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Outfalls



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
  2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
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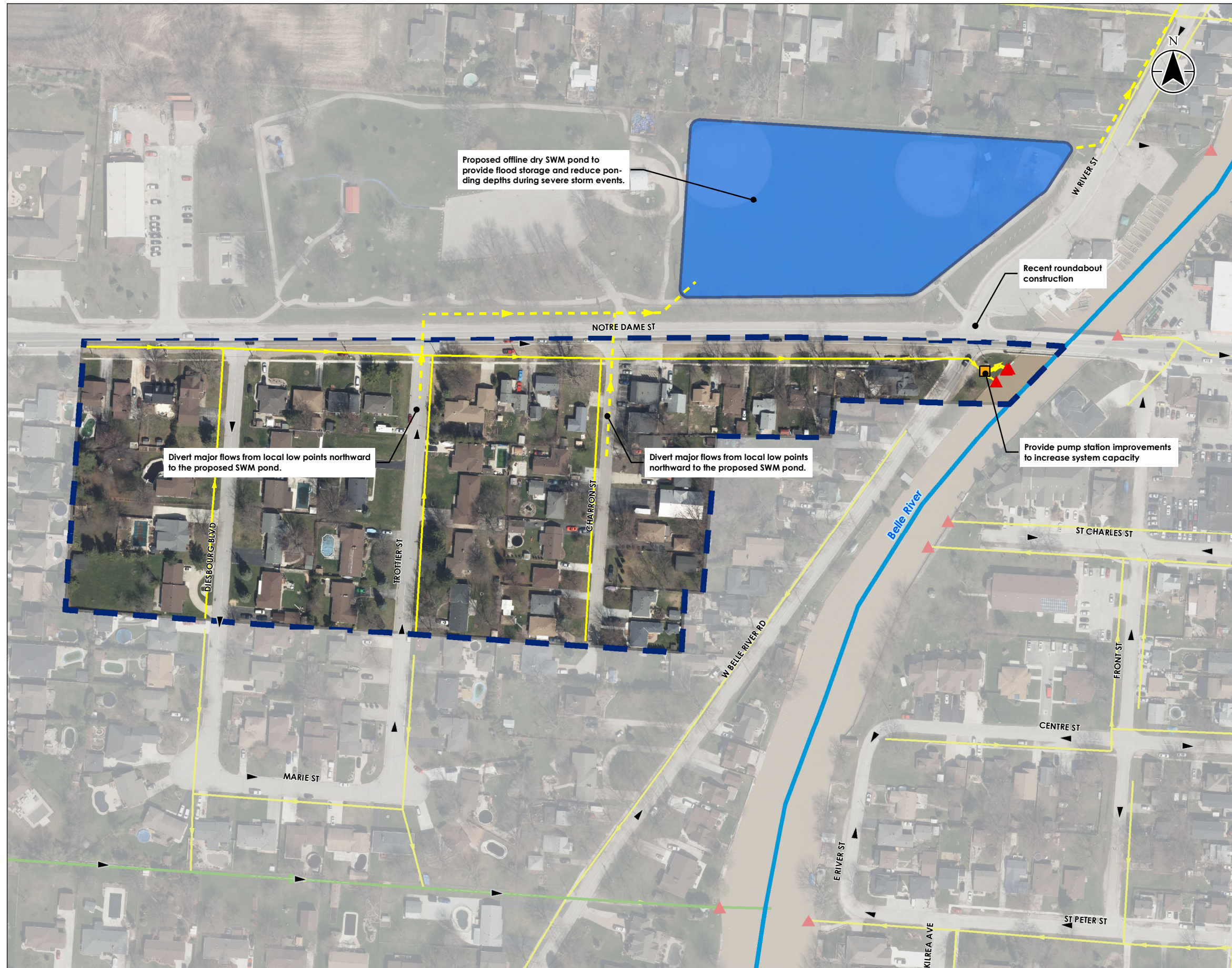


Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-18  
 165620165 REVA

Client/Project: LAKESHORE SWMP

Figure No.: 6.5.2

Title: **NOTRE DAME CATCHMENT  
 ALTERNATIVE 2 - DIVERT MAJOR FLOWS  
 TO PROPOSED OPTIMIST PARK DRY POND**

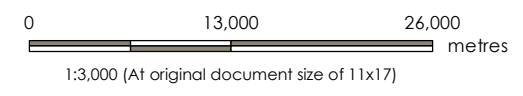




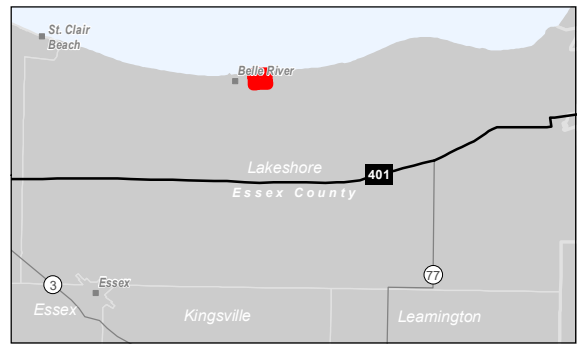


**Legend**

- Catchment Boundary
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: 6.6.1

Title: SEASONS AT THE CREEK CATCHMENT  
 ALTERNATIVE 1 - DO NOTHING

High lake levels force pond to drain entirely via the pump station. The pump was not designed for this, resulting in long drawdown times. This may contribute to future pond overtopping during a severe storm event and frequent pump maintenance.

Overland route through a Town owned easement. To remain unobstructed in order to prevent deeper upstream ponding depths.

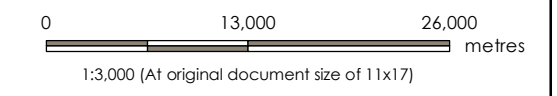
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 Revised: 2019-10-11 By: abrown  
 4684000  
 361000  
 4684000





**Legend**

- Catchment Boundary
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewer
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by: 165620165 REVA / LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: 6.6.2

**SEASONS AT THE CREEK CATCHMENT  
 ALTERNATIVE 2 - POND OUTLET  
 IMPROVEMENTS**

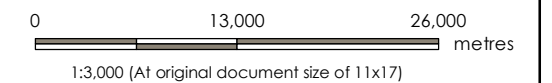
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### Legend

- Catchment Boundary
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewer
- Overland Flow Direction
- Proposed Pump Station
- Localized Ponding > 0.3 m and < 0.5m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by: LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: 6.6.3

Title: SEASONS AT THE CREEK CATCHMENT  
 ALTERNATIVE 3 - PUMP AND OUTLET  
 IMPROVEMENTS

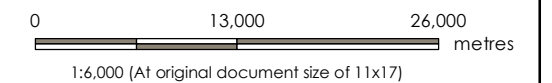






### Legend

- Catchment Boundary
- Existing SWM Facility
- Proposed SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewer
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-16

Client/Project: LAKESHORE SWMP

Figure No.: 6.7.2

Title: **BELLE RIVER WEST  
 ALTERNATIVE 2 - STORMWATER STORAGE**



\\CA0217\FPS01\work\_group\0165\active\16520165\GIS\_Copy\Alternative\_Development\6.5\_BelleRiver\_West\_A1\renovative2.mxd Revised: 2019-10-16 By: abrown



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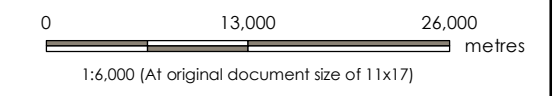
Proposed pump station and outfall provides improved capacity when lake levels are high

Proposed new pump station and outfall provides better capacity than existing station

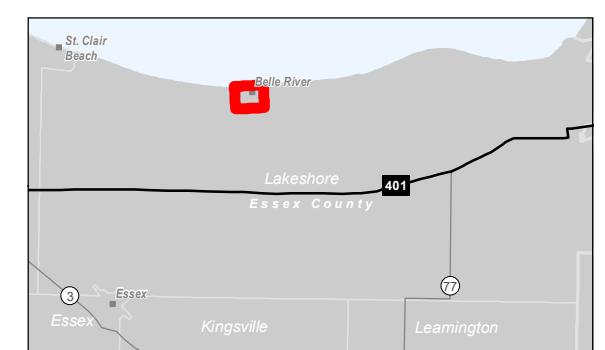


**Legend**

- Catchment Boundary
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewer
- Overland Flow Direction
- Storm Pump Stations
- Proposed Pump Station
- Localized Ponding > 0.3 m and < 0.5 m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-16

Client/Project: LAKESHORE SWMP

Figure No.: 6.7.3

Title: **BELLE RIVER WEST  
 ALTERNATIVE 3 - NEW PUMP STATION**














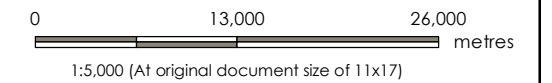
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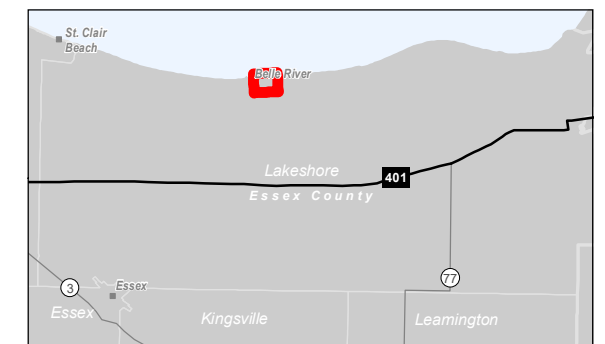


### Legend

-  Catchment Boundary
-  Future Development
-  Existing SWM Facility
-  Railway
-  Municipal Drains
-  Existing Storm Sewers
-  Overland Flow Direction
-  Storm Pump Stations
-  Localized Ponding > 0.3 m and < 0.5m
-  Localized Ponding > 0.5 m
-  Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: 6.8.1

Title: **TERRA LOU CATCHMENT  
 ALTERNATIVE 1 - DO NOTHING**

\\CA0217\FPS01\work\_group\01654\active\165420165\GIS\_Copy\Alternative\_Development\7A\_TerraLou\165\_TerraLou\_East\_A\terraltive1.mxd Reviewed: 2019-10-11 By: atzown













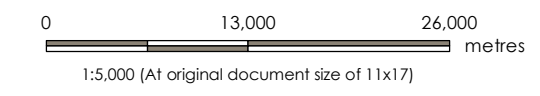
360000

361000



### Legend

-  Catchment Boundary
-  Future Development
-  Existing SWM Facility
-  Railway
-  Municipal Drains
-  Existing Storm Sewers
-  Proposed Storm Sewer
-  Overland Flow Direction
-  Storm Pump Stations
-  Localized Ponding > 0.3 m and < 0.5 m
-  Localized Ponding > 0.5 m
-  Outfalls



- Notes**
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Client/Project: LAKESHORE SWMP

Figure No.: 6.8.2

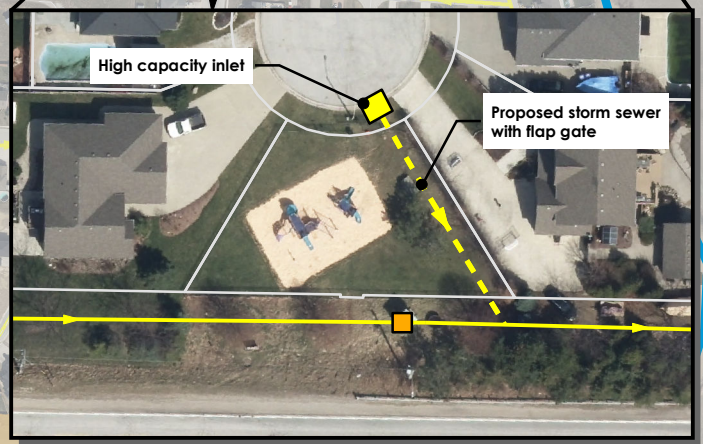
**TERRA LOU CATCHMENT  
 ALTERNATIVE 2 - OVERFLOW PIPE**

\\CA0217\FPS01\work\_group\01656\active\165620165\GIS\_Copy\Alternative\_Development\7A\_TerraLou\165\_TerraLou\_East\_A\terraLou2.mxd Reviewed: 2019-10-11 By: atzown

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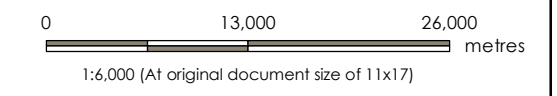


\\CA0217\FPS01\work\_group\0165\active\16520165\GIS\_Copy\Alternative\_Development\78\_BaconForestHill\165\_BaconForestHill\_Alternative1.mxd Revised: 2019-10-11 By: abrown



**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Localized Ponding > 0.5 m
- Outfalls



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 165620165 REVA

Client/Project: LAKESHORE SWMP

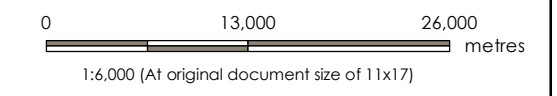
Figure No.: **6.9.1**  
 Title: **BACON/FOREST HILL CATCHMENT ALTERNATIVE 1 - DO NOTHING**



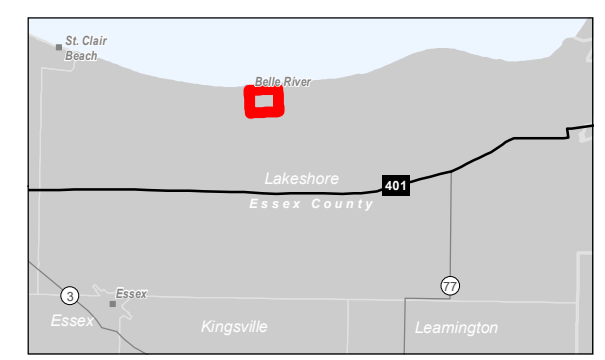


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5m
- Localized Ponding > 0.5 m
- Outfalls



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 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: **6.9.2**  
 Title: **BACON/FOREST HILL CATCHMENT ALTERNATIVE 2 - POND EXPANSION**

\\CA0217\FPS01\work\_group\01656\active\165620165\GIS\_Copy\Alternative\_Development\78\_BaconForestHill\65\_BaconForestHill\_Alternative2.mxd  
 Revised: 2019-10-11 By: abrown  
 4683000

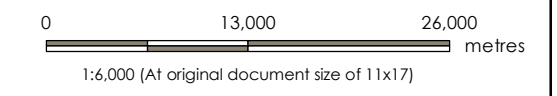


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 Revised: 2019-10-11 10:11 By: abrown  
 4683000

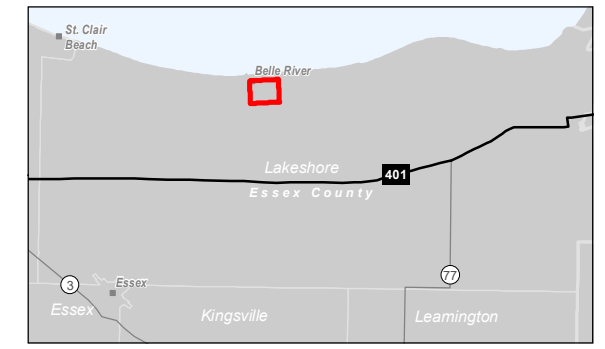


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



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Client/Project: LAKESHORE SWMP

Figure No.: 6.9.3

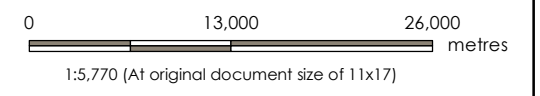
**BACON/FOREST HILL CATCHMENT  
 ALTERNATIVE 3 - INCREASE SWM  
 POND RELEASE RATE**



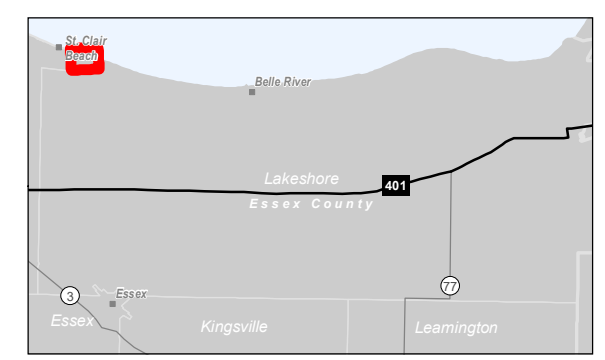


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Municipal Pump Stations
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



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Project Location: Town of Lakeshore  
 Prepared by LMF on 2022-03-24

Client/Project: LAKESHORE SWMP

Figure No.: **6.10.1**  
 Title: **RUSSELL WOODS CATCHMENT ALTERNATIVE 1 - DO NOTHING**

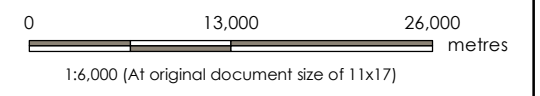
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 Revised: 2022-03-24 By: albrown  
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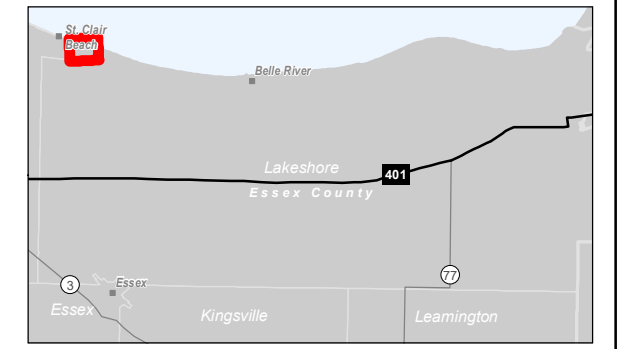


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Proposed Easement
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Municipal Pump Stations
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



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Project Location: Town of Lakeshore  
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Client/Project: LAKESHORE SWMP

Figure No.: **6.10.2**

**RUSSELL WOODS CATCHMENT  
 ALTERNATIVE 2 - PUMP STATION  
 IMPROVEMENTS**

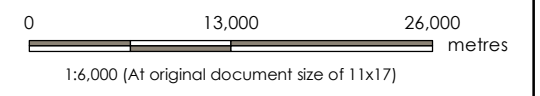
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 Revised: 2022-03-24 By: albrown





### Legend

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Proposed Easement
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Municipal Pump Stations
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



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 Prepared by LMF on 2022-03-24

Client/Project: LAKESHORE SWMP

Figure No. **6.10.3**  
 Title **RUSSELL WOODS CATCHMENT ALTERNATIVE 3 - NEW PUMP STATION**

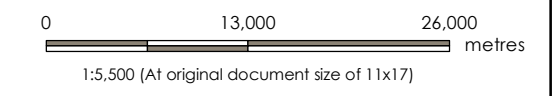
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**Legend**

- Catchment Boundary
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Municipal Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



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Client/Project: LAKESHORE SWMP

Figure No.: 6.11.1

Title: LEFAIVE DRAIN CATCHMENT  
 ALTERNATIVE 1 - DO NOTHING

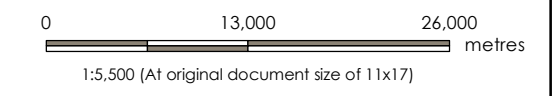
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 Revised: 2022-03-24 By: abrown  
 4683000





**Legend**

- Catchment Boundary
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Proposed Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Municipal Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Outfalls



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 Prepared by: LMF on 2022-03-24  
 165620165 REVA

Client/Project: LAKESHORE SWMP

Figure No.: 6.11.2

**LEFAIVE DRAIN CATCHMENT  
 ALTERNATIVE 2 - ST. PIERRE STREET STORM  
 SEWER IMPROVEMENTS**

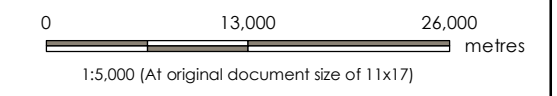
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 Revised: 2022-03-24 By: abrown  
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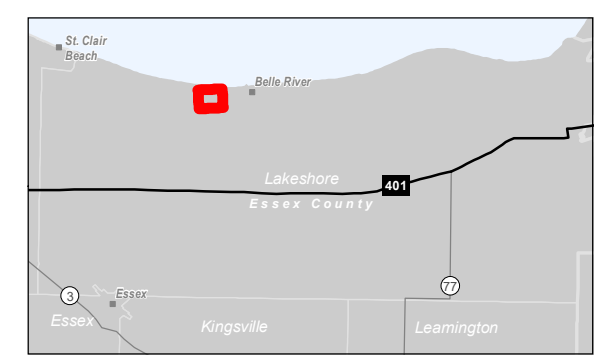


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.5 m
- Localized Ponding > 0.3 m and < 0.5 m
- Outfalls



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Client/Project: LAKESHORE SWMP

Figure No.: **6.12.1**  
 Title: **BROWN'S CREEK DRAIN ALTERNATIVE 1 - DO NOTHING**

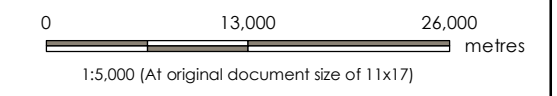
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 Revised: 2019-10-11 By: cabrown  
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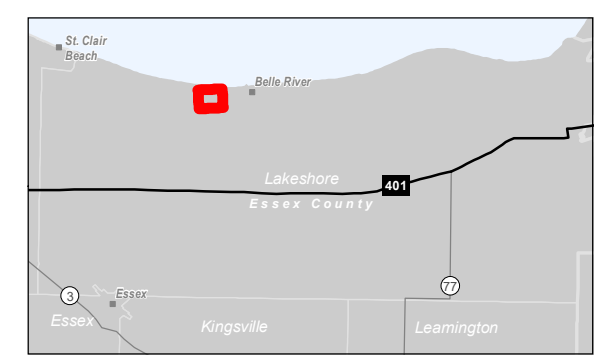


**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Road Reprofiting
- Railway
- Municipal Drains
- Existing Storm Sewers
- Overland Flow Direction
- Storm Pump Stations
- Localized Ponding > 0.3 m and < 0.5 m
- Outfalls



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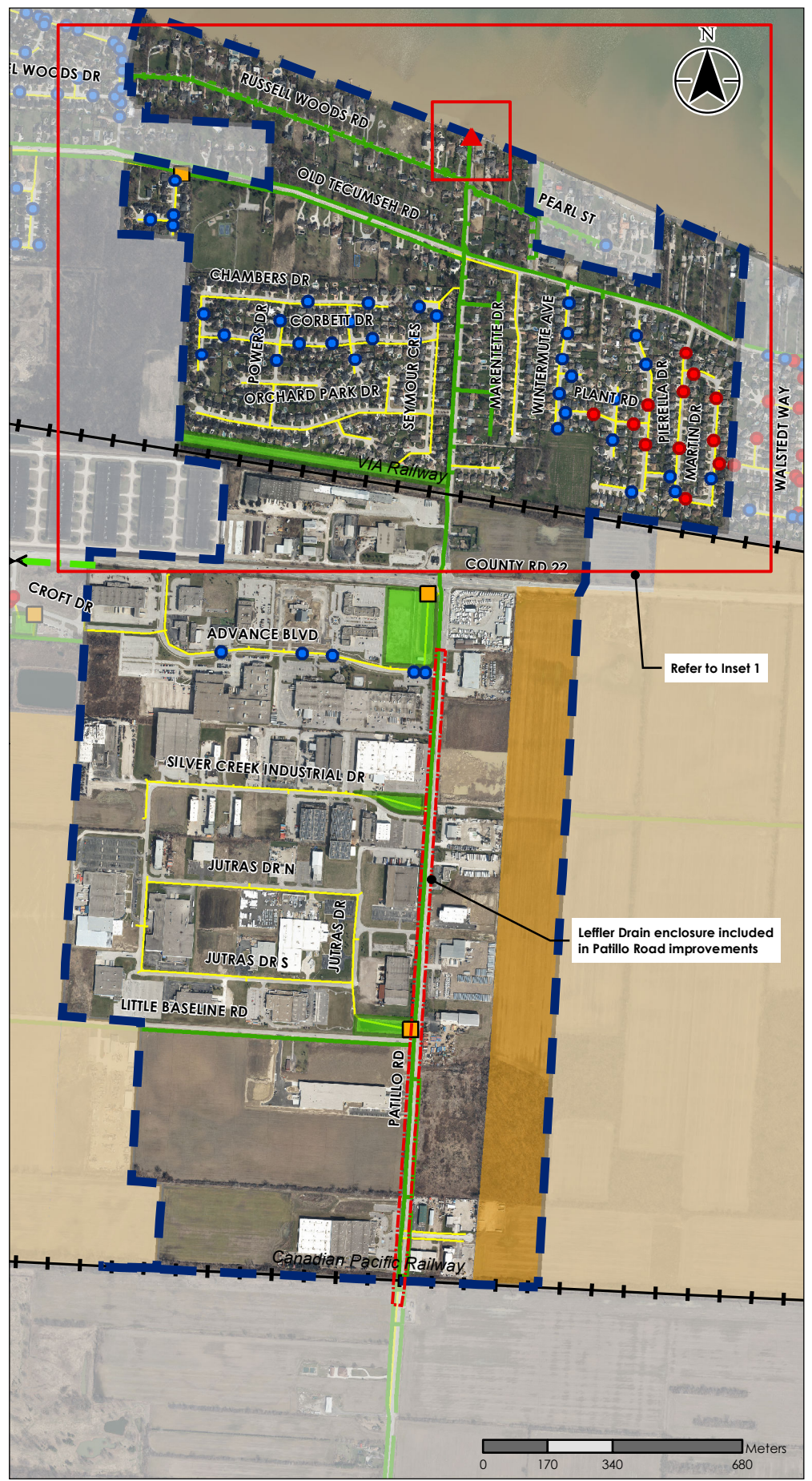
Figure No.: **6.12.2**

Title: **BROWN'S CREEK DRAIN  
 ALTERNATIVE 2 - ROAD REPROFITING**

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 Revised: 2019-10-11 By: cabrown  
 4683000



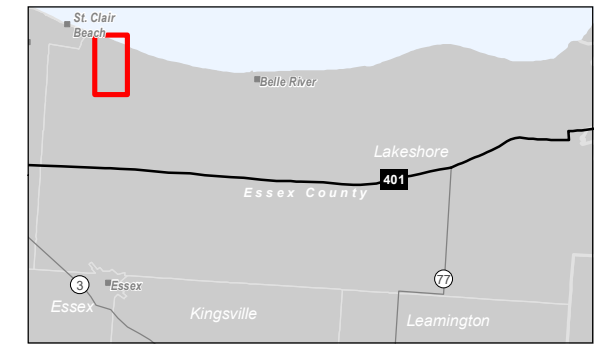
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**Legend**

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Municipal Drains
- Existing Storm Sewers
- Road Improvements and Drain Enclosure Limit
- Storm Pump Stations
- Localized ponding > 0.3 m and < 0.5 m
- Localized ponding > 0.5 m
- Outfalls

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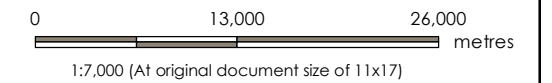
Client/Project: LAKESHORE SWMP

Figure No.: **6.13.1**  
 Title: **LEFFLER/HOOD DRAIN CATCHMENT ALTERNATIVE 1 - DO NOTHING**



### Legend

- Catchment Boundary
- Future Development
- Solution 1: Regional Pond
- Existing SWM Facility
- Railway
- Existing Storm Sewers
- Overland Flow Direction
- Municipal Pump Stations
- Regional Pump Station
- Localized ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



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Client/Project: LAKESHORE SWMP

Figure No.: 6.13.2

Title: LEFFLER/HOOD DRAIN CATCHMENT  
 ALTERNATIVE 2 - REGIONAL POND AT  
 COUNTY ROAD 22



Backup power at the Leffler Pump Station is provided to protect against significant flooding during power outages.

Proposed Leffler Drain enclosure

Regional SWM pond to attenuate peak flows from the upstream portion of the drainage area. The pond discharges to the Leffler Drain via proposed pump station. Alternative reduces surface ponding durations and severity.

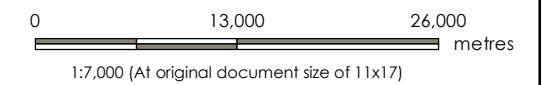
Proposed pump station designed to drain the pond over a 48-hour period.

\\CA0217\FPS01\work\_group\0165\active\16520165\GIS\COPY\Alternative Development\11\_HoodDrain\_LefflerDrain\165\_Hood\_Leffler\_Drain\_Alternative2.mxd Revised: 2019-10-14 By: albowen



### Legend

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Storm Sewers
- Overland Flow Direction
- Municipal Pump Stations
- Regional Pump Station
- Localized ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-16  
 165620165 REVA

Client/Project: LAKESHORE SWMP

Figure No.: 6.13.3

Title: LEFFLER/HOOD DRAIN CATCHMENT  
 ALTERNATIVE 3 - LEFFLER DRAIN PUMP  
 STATION: PUMP REPLACEMENT

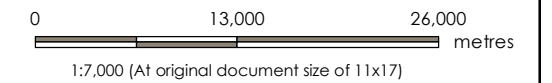


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### Legend

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Railway
- Storm Sewers
- Overland Flow Direction
- Municipal Pump Stations
- Regional Pump Station
- Localized ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



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Client/Project: LAKESHORE SWMP

Figure No.: 6.13.4

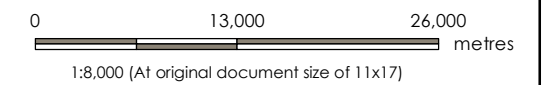
Title: LEFFLER/HOOD DRAIN CATCHMENT  
 ALTERNATIVE 4 - LEFFLER DRAIN PUMP  
 STATION: PTO UPGRADE





### Legend

- Catchment Boundary
- Future Development
- Existing SWM Facility
- Magna SWM Pond
- Railway
- Storm Sewers
- Overland Flow Direction
- Municipal Pump Stations
- Regional Pump Station
- Localized ponding > 0.3 m and < 0.5 m
- Localized Ponding > 0.5 m
- Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-16

Client/Project: LAKESHORE SWMP

Figure No.: **6.13.5**

Title: **LEFFLER/HOOD DRAIN CATCHMENT ALTERNATIVE 5 - MAGNA SWM POND IMPROVEMENTS**





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Unsecured overland flow route, risk of future obstruction that may result in deeper up-stream ponding depths.

Frequent and prolonged road ponding occurs during severe storm events. Minor system provides a level of service less than the 2-year event.












Wallace Line drain recently enclosed

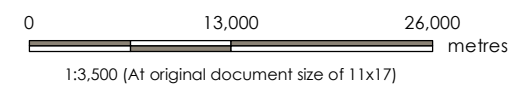
COUNTY RD 22

351000



### Legend

-  Catchment Boundary
-  Future Development
-  Existing SWM Facility
-  Railway
-  Municipal Drains
-  Existing Storm Sewers
-  Overland Flow Direction
-  Storm Pump Stations
-  Localized Ponding > 0.3 m and < 0.5 m
-  Localized Ponding > 0.5 m
-  Outfalls



- Notes**
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Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-18

Client/Project: LAKESHORE SWMP

Figure No.: 6.14.1

Title: COUNTRY WALK CATCHMENT ALTERNATIVE 1 - DO NOTHING




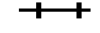







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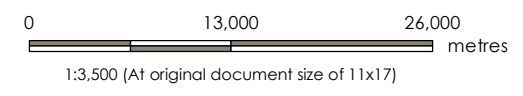


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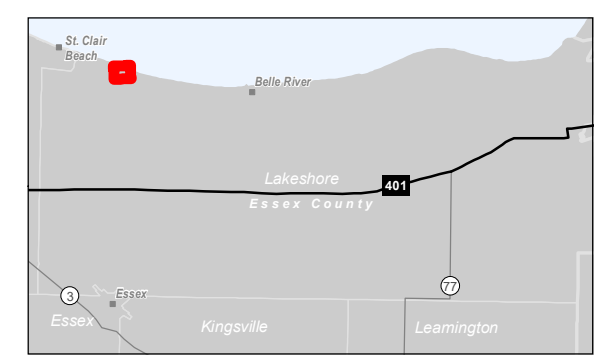


### Legend

-  Catchment Boundary
-  Future Development
-  Existing SWM Facility
-  Railway
-  Municipal Drains
-  Existing Storm Sewers
-  Overland Flow Direction
-  Storm Pump Stations
-  Localized Ponding > 0.3 m and < 0.5 m
-  Localized Ponding > 0.5 m
-  Outfalls



- Notes**
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  2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
  3. Orthoimagery © First Base Solutions, 2016.



Project Location: Town of Lakeshore  
 Prepared by LMF on 2019-10-11

Client/Project: LAKESHORE SWMP

Figure No.: 6.14.2

Title: COUNTRY WALK CATCHMENT  
 ALTERNATIVE 2 - POND IMPROVEMENTS



The existing storm sewer underneath the dry SWM pond is removed and the pond is deepened to existing pipe inverts. Headwalls are provided at inlets and outlet to existing pump station. Alternative will reduce ponding durations and depths.

Emergency overflow weir and pond berm elevations lowered

Wallace Line drain recently enclosed

COUNTY RD 22

351000

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