

**TOWN OF CALEDON  
PLANNING  
RECEIVED**

**April 14, 2023**

**EROSION AND SEDIMENT CONTROL  
REPORT IN SUPPORT OF  
TOPSOIL STRIPPING PERMIT**

**12245 TORBRAM ROAD  
TULLAMORE LANDS**

**TOWN OF CALEDON  
REGION OF PEEL**

**PREPARED FOR:**

**TULLAMORE INDUSTRIAL GP LIMITED**

**PREPARED BY:**

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**CFCA FILE NO. 2022-5842-7**

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Revision Number	Date	Comments
Rev.0	November 2022	Issued for Topsoil Stripping Permit - TRCA
Rev. 1	December 2022	Issued for Topsoil Stripping Permit - TRCA
Rev. 2	April 2023	Issued for Topsoil Stripping Permit - Town

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## **1.0 Introduction**

C.F. Crozier & Associates Inc. (Crozier) was retained by Tullamore Industrial GP Limited (the Owner) to prepare this Erosion and Sediment Control Report in support of a proposed Business Park at 12245 Torbram Road (the Tullamore Lands). This report is in support of the Topsoil Stripping Permit application for the proposed development.

### **1.1 Site Description**

The subject lands (Site) consist of approximately 200 hectares (ha). The Site is bound by Mayfield Road to the south, Airport Road to the east, greenfield lands to the north, and Torbram Road to the west. The Site is owned by Tullamore Industrial GP Limited and consists of primarily agricultural lands and contains a Greenbelt area as well as two tributaries of the West Humber River.

The Greenbelt area of the Site is located north of the Torbram Road and Mayfield Road intersection. A tributary of the West Humber River is conveyed through this Greenbelt area. A second tributary of the West Humber River flows through the middle of the Site. Both tributaries convey stormwater southwards through existing culverts under Mayfield Road.

Note, the Site was granted a Minister's Zoning Order (MZO) by the provincial government earlier this year.

### **1.2 Proposed Development**

The Site is proposed to be developed into an industrial business park. The current development plan according to the Draft Plan of Subdivision (Weston Consulting, 2022) includes industrial buildings, two stormwater management facilities and three (3) 26.0m Right-of-Ways (ROWs).

### **1.3 Topsoil Stripping Phasing**

Topsoil stripping activities on Site are proposed in two phases. Phase 1 includes along the perimeters of the Site and remains completely outside the Toronto and Region Conservation Authority (TRCA) regulated areas and the associated buffers. Therefore, as previously discussed with TRCA, a permit from TRCA is not required during Phase 1, however a permit is required from the Town. Activities during Phase 1 include installation of silt fences, installation of the mud mats at the construction and employee entrances, the construction of two (2) hauling roads, and the construction of interceptor swales and temporary sediment basins.

Phase 2 includes the Phase 1 areas and the remainder of the Site, except for the natural features and the associated buffers that have been delineated by GEI. The silt fences will be installed along the borders of these features however, two crossings are proposed over existing wetlands on Site. These crossings will provide access to the center of the property and require a permit from both TRCA and the Town. Activities during Phase 2 include installation of additional silt fences, the construction of an additional hauling road providing a connection between the two roads constructed during Phase 1, which includes two crossings over the existing wetlands, and construction of additional interceptor swales and temporary sediment basins.

## **2.0 Previous Studies and Reports**

The following background studies provide the basis for the materials provided in the topsoil stripping permit package. These reports have been reviewed to identify constraints that inform the erosion and sediment control (ESC) measures proposed within the Site.

The reports are as follows:

- Erosion and Sediment Control Guide for Urban Construction, Toronto and Region Conservation Authority (TRCA) (2019);
- Stormwater Management Planning and Design Manual, Ministry of the Environment, Conservation, and Parks (March 2003);
- Scoped Subwatershed Study – Final Report, Wood Environment & Infrastructure Solutions (January 2022);
- Geotechnical Investigation 0 & 12245 Torbram Road, Toronto Inspection (June 2021);
- Comprehensive Environmental Impact Study and Management Plan Tullamore Employment Lands, GEI Consultants (2023).

### 3.0 Condition of Existing Receiving Water

All in-stream works must be completed in accordance with MNRF's Construction Timing Window of July 1<sup>st</sup> to March 31<sup>st</sup> (no in-stream works between April 1<sup>st</sup> and June 30<sup>th</sup>) per the guidelines below. The Site is located within the Humber River Watershed and is "contributing" habitat for Redside Dace, therefore making the classification a coldwater creek.

#### **MNR's Fisheries Construction Timing Guideline (MNR, 1989)**

<b>Creek Classification</b>	<b>Construction Permitted</b>
WARMWATER CREEK (supports or contributes to warm water fisheries)	July 1 to March 31
COLDWATER CREEK (supports or contributes to coldwater fisheries)	June 15 to September 15
WARMWATER/COLDWATER SPECIES (both encountered in a watercourse and/or evidence of Redside Dace)	July 1 to September 15

### 4.0 Environmental Features

The information presented in Sections 4.1 and 4.2 is from the Comprehensive Environmental Impact Study and Management Plan Tullamore Employment Lands, GEI Consultants (February 2022).

#### 4.1 Wetlands

The Site consists primarily of anthropogenic vegetation cover, such as agricultural fields and old field meadows. The agricultural fields are actively managed (row crop or actively browsed pasturelands). Wetlands are present, associated with Headwater Drainage Features (HDFs) and ponds.

Surveys completed by GEI show that wetland is present, occupying approximately 4.9 ha overall. The community types observed all have mineral soils and consist of marsh and thicket swamp. These wetlands and associated boundaries were confirmed by GEI staff using the '50/50 rule', where features having over 50% cover of wetland plants were classified as wetland. These boundaries

(excluding wetland within the Greenbelt) were later verified by the TRCA on July 5 and October 22, 2021. All wetland communities present within the Subject Lands are regulated by TRCA; no wetland features exceed 2 ha in size.

A total of 2.20 ha of wetland are proposed for removal and compensation within the Site. Given that the staked wetland limits for a portion of the wetlands proposed for removal are not available, compensation parameters will be increased to provide 2.30 ha of wetland habitat.

## 4.2 Woodlands

Two forested Ecological Land Classification (ELC) community types were identified within the Site. These forested units are located within the Greenbelt and are considered significant. The significant woodland will be retained and enhanced through the establishment of the 30 m vegetated buffers.

## 4.3 Drainage Areas to Wetlands

As requested by TRCA, delineation of areas draining to each existing wetland on Site was completed by Crozier under existing conditions and during topsoil stripping activities. Best efforts were made to provide balance of areas directed to each wetland during topsoil stripping. Refer to **Table 1** for a summary of the areas directed to each wetland under existing, Phase 1 and Phase 2 of topsoil stripping conditions. **Figure 1** also demonstrates the existing wetland drainage areas, while **Drawings TSP-01** and **TSP-02** show the areas directed to each wetland during topsoil stripping Phase 1 and Phase 2, respectively.

**Table 1: Drainage Areas to Wetlands Summary**

Wetland ID	Existing Areas (ha)	Topsoil Stripping Phase 1 Areas (ha)	Topsoil Stripping Phase 2 Areas (ha)
Wetland 1	4.26	4.18	4.57
Wetland 2	52.60	59.60	54.71
Wetland 3	55.52	55.61	59.57
Wetland 4	2.92	3.18	3.18
Wetland 5	15.54	12.58	12.58
Wetland 6	129.15	129.19	128.26
Wetland 7	134.12	134.33	133.40

## 5.0 Soils

The following information is from the Preliminary Hydrogeological Investigation Tullamore Lands, prepared by Toronto Inspection Ltd. (June 2021):

- The overburden material generally consists of topsoil or fill up to depth of approximately 1 m below ground and is underlain by fine-grained glacial deposits of clayey silt to sandy silt. There is an isolated deposit of sand and gravel at the north boundary of the Site.
- The underlying conditions of the Site describe an unconfined clayey silt to sandy silt aquitard formation of very low permeability.

Additional details on the borehole logs, soil classifications, grain size distribution analyses, etc. can be found in the detailed hydrogeological report by Toronto Inspection Ltd. dated June 2021.

The predominant soil types for this project are sandy silt to clayey silt glacial till. In accordance with the Erosion and Sediment Control Guidelines for Urban Construction (TRCA, 2019) this soil type has a "medium to high" soil erodibility rating (refer to Table 6.2). Additionally, according to Table 6.3, the erosion potential for graded slopes and graded conveyance channels with less than 2% slope and slope lengths greater than 30 m, are considered "moderate". Overall, the Site is categorized as "moderate" from an erosion perspective.

## 6.0 Stabilization/Construction Staging

The topsoil stripping permit application is for the entire Site (excluding the Greenbelt as well as areas in TRCA regulated limits and the associated buffers). The sequence of construction activities is described in **Table 2**.

**Table 2: Construction Sequencing**

ESC Measure	Timing for Installation	Inspection / Maintenance Requirements
<b>Phase 1 Works</b>		
<b>Step 1 – Permits</b>		
Ensure that Topsoil Stripping Permit is secured (Town)		
<b>Step 2 – ESC Measures</b>		
<ul style="list-style-type: none"> <li>Install Silt Fence and Mud Mats</li> </ul>	Prior to stripping works	Environmental Consultant to provide weekly inspections / reports and after each rainfall event. Regular maintenance to remove accumulated sediment and repair ESC measures as required.
<b>Step 3 – Topsoil Stripping</b>		
<ul style="list-style-type: none"> <li>Remove topsoil and stock on-site</li> <li>Construct temporary drainage swales</li> <li>Construct temporary sediment basins as per <b>Drawings TSP-01 and TSP-03</b></li> </ul>		Environmental Consultant to provide weekly inspections / reports and after each rainfall event. Regular maintenance to remove accumulated sediment and repair ESC measures as required.
<b>Phase 2 Works</b>		
<b>Step 1 – Permits</b>		
<ul style="list-style-type: none"> <li>Ensure that Topsoil Stripping Permit is secured (TRCA and Town)</li> </ul>		
<b>Step 2 – ESC Measures</b>		
<ul style="list-style-type: none"> <li>Install additional Silt Fence</li> <li>Construct temporary crossings of the TRCA regulated area (see <b>Drawing TSP-02</b>)</li> </ul>	Prior to stripping works	Environmental Consultant to provide weekly inspections / reports and after each rainfall event. Regular maintenance to remove accumulated sediment and repair ESC measures as required.
<b>Step 3 – Topsoil Stripping</b>		
<ul style="list-style-type: none"> <li>Remove topsoil and stock on-site</li> <li>Construct temporary drainage swales</li> <li>Construct temporary sediment basins as per <b>Drawings TSP-02 and TSP-03</b></li> </ul>		Environmental Consultant to provide weekly inspections / reports and after each rainfall event. Regular maintenance to remove accumulated sediment and repair ESC measures as required.

Refer to the Topsoil Stripping Drawings for additional details on ESC measures.

## 7.0 Design Details of Erosion and Sediment Control Measures

The following erosion and sediment control features will be implemented for the project.

### 7.1 Erosion Control Measures

Interceptor Swales – Interceptor swales have been designed with reduced slope gradients to reduce erosion potential during the construction period. The interceptor swales have been designed to convey the 100-year storm event. Refer to **Appendix A** and the Topsoil Stripping Drawings for additional details and calculations related to the interceptor swale design.

### 7.2 Sediment Control Measures

Stone Mud Mat – A stone mud mat will be provided to minimize the migration of unwanted material on to the adjacent ROWs. The construction access must be maintained (cleaned, swept and flushed) to minimize any disruption to the municipal ROW. Construction access for the Site is provided through Airport Road and Mayfield Road only. The access provided through Torbram Road is an employee access only and will not be utilized by construction vehicles. Refer to **Drawings TSP-01** and **TSP-02** for the location of the proposed mud mats.

Silt Fence – Sediment control fence will be installed in accordance with the Topsoil Stripping Drawings. The erosion and sediment control fencing will be monitored on a regular basis and repaired/replaced as required.

Temporary Sediment Basins – The temporary sediment basins have been designed to intercept sediment laden water and allow for settling of suspended soil particles. Refer to **Appendix A** and Topsoil Stripping Drawings for additional details and calculations related to the permanent pool, active storage, and outlet structure designs. The pond outlets are designed to discharge flows upstream of the silt fence where feasible to promote additional removal of sediment as water travels through the silt fence and vegetated areas prior to entering the existing watercourse on Site.

Sediment Curtain – Sediment curtains will be installed in each temporary sediment basin and will be located between the swale inlets and basin outlet. The curtain keeps sediment contained to the area between the curtain and the pond bank and slows the movement of water in the isolated area, providing additional sediment control within the temporary sediment basins. The sediment curtains will be monitored on a regular basis and repaired/replaced as required.

## 8.0 Record Keeping Procedure

In accordance with the Erosion and Sediment Control Guidelines for Urban Construction (TRCA, 2019), the frequency of erosion and sediment control inspections will be conducted as follows:

- On a weekly basis
- After every major rainfall event (greater than 10 mm)
- After every significant snowmelt event
- Daily during extended rain or snowmelt periods

Erosion and sediment control inspections, along with the required record keeping, will be completed by the project environmental consultant in conjunction with the overall environmental monitoring for the project.

## 9.0 Temporary Crossings

The temporary crossings proposed over the existing wetlands on Site have been sized to convey the 25-year storm event as it is the nearest design storm event to the determined flood level that needs to be protected during instream works. A return period (T) of 20 years was determined according to the equation in Appendix A of the Erosion and Sediment Control Guide for Urban Construction (TRCA, 2019):

$$T = \frac{1}{1 - \frac{L}{\sqrt{1-R}}} = \frac{1}{1 - \frac{1}{\sqrt{1-0.05}}} = 20 \text{ year}$$

In the equation above, L is the anticipated service life of the culvert in units of years and R is the specific risk, which is unitless. Refer to **Appendix A** and Topsoil Stripping Drawings for additional details and calculations related to the sizing of the proposed culverts.

## 10.0 Stockpile Details

The topsoil stockpile locations (if necessary) will be constructed in conformance with the following criteria:

- Maximum Topsoil Pile Height: 3.0 m
- Maximum Pile Side Slopes: 2:1
- Any stockpiles left for more than 30 days will be stabilized. All other areas will be stabilized immediately upon completion of works.
- Any topsoil stockpiled for over six (6) months should be amended with compost.
- Plant material and leaf litter, except for invasive species, that are generated by clearing the Site, are to be chipped and removed from the Site.

## 11.0 Emergency Contacts

### Rice Group

Contact: Michael Mendes, Vice President, Development

Office: 905-888-1277 x 227

Cell: 416-899-5877

Email: michael.mendes@ricegroup.ca

### Project Manager – Civil Consultant: C.F. Crozier & Associates Inc.

Contact: Julie Scott, P.Eng.

Office: 416-842-0032

Email: jscott@cfcrozier.ca

### Project Manager – Environmental Consultant: GEI

Contact: Shelley Lohnes, H.BSc.

Office: 289-971-7389

Email: slohnes@geiconsultants.com

We trust the information provided above satisfies the requirements for erosion and sediment control measures within the indicated topsoil stripping area and we recommend the approval of the topsoil stripping permit.

Respectfully submitted,

**C.F. CROZIER & ASSOCIATES INC.**



Julie Scott, P.Eng.  
Project Manager

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# APPENDIX A

## Supporting Calculations

**PROJECT#: 2022-5842-3**  
**PROJECT: TULLAMORE LANDS**  
**ESC SWALE SIZING**

**RATIONAL METHOD - 100 YEAR**

Computed 100-year peak flow to interceptor swale Type A

These calculations are based upon the flattest swale grade

Outlet ID	Drainage Area (ha)	Runoff Coefficient	Time $t_c$ (min)	Intensity $i=a/(t_c+b)$ (mm/hr)	Flow $Q=CiA/360$ (m <sup>3</sup> /s)
Swale 1A	4.65	0.50	10	167.1	1.08
Swale 2A	1.59	0.50	10	167.1	0.37
Swale 3A	1.61	0.50	10	167.1	0.37
Swale 4A	5.85	0.50	10	167.1	1.36
Swale 5A	3.72	0.50	10	167.1	0.86
Swale 6A	3.65	0.50	10	167.1	0.85
Swale 7A	2.56	0.50	10	167.1	0.59
Swale 8A	7.00	0.50	10	167.1	<b>1.62</b>
Swale 9A	0.64	0.50	10	167.1	0.15
Swale 10A	3.98	0.50	10	167.1	0.92
Swale 11A	4.56	0.50	10	167.1	1.06
Swale 12A	3.27	0.50	10	167.1	0.76

Where: a, b, c = rainfall equation coefficients

a = 4688  
b = 17  
c = 0.9624

100-Year Storm  
IDF Parameters as per  
Town of Caledon

**\*Dimensions of swale - Excluding 0.2 m Filtrex check dams**

Trapezoidal Channel Mannings' Equation			
Flow Depth (m) =	0.20	/1	Top width
Side Slope Ratio (H:V) =	3.0		2.20 m
Bed Width (m) =	1.00		Hyd. Rad, 'R'
Area (m <sup>2</sup> ) =	0.320		0.14 m
Wetted Perimeter (m) =	2.265	m	Friction Slope Sf
Slope (%) =	0.30		0.003 m/m
Manning 'n' =	0.017		Velocity
Channel Capacity, Q =	0.28	m <sup>3</sup> /sec	0.874 m/s

**\*Actual Conveyance Capacity of Swale (above the Filtrex check dam)**

Trapezoidal Channel Mannings' Equation			
Flow Depth (m) =	0.37	/1	Top width
Side Slope Ratio (H:V) =	3.0		4.42 m
Bed Width (m) =	2.20		Hyd. Rad, 'R'
Area (m <sup>2</sup> ) =	1.225		0.27 m
Wetted Perimeter (m) =	4.540	m	Friction Slope Sf
Slope (%) =	0.30		0.003 m/m
Manning 'n' =	0.017		Velocity
Channel Capacity, Q =	1.65	m <sup>3</sup> /sec	1.345 m/s

**PROJECT#: 2022-5842-3**  
**PROJECT: TULLAMORE LANDS**  
**ESC SWALE SIZING**

**RATIONAL METHOD - 100 YEAR**

Computed 100-year peak flow to interceptor swale Type B

These calculations are based upon the flatest swale grade

Outlet ID	Drainage Area (ha)	Runoff Coefficient	Time $t_c$ (min)	Intensity $i=a/(t_c+b)^c$ (mm/hr)	Flow $Q=CiA/360$ (m <sup>3</sup> /s)
Swale 1B	4.42	0.50	10	167.1	1.03
Swale 2B	2.47	0.50	10	167.1	0.57
Swale 3B	2.33	0.50	10	167.1	0.54
Swale 4B	6.56	0.50	10	167.1	<b>1.52</b>
Swale 5B	5.25	0.50	10	167.1	1.22
Swale 6B	1.40	0.50	10	167.1	0.32
Swale 7B	4.03	0.50	10	167.1	0.94
Swale 8B	2.84	0.50	10	167.1	0.66
Swale 9B	3.61	0.50	10	167.1	0.84

Where: a, b, c = rainfall equation coefficients

a = 4688  
b = 17  
0.9624

100-Year Storm  
IDF Parameters as per  
Town of Caledon

**\*Dimensions of swale - Excluding 0.2 m Filtrex check dams**

Trapezoidal Channel Mannings' Equation					
Flow Depth (m) =	0.20	/1	Top width		
Side Slope Ratio (H:V) =	3.0		2.20 m		
Bed Width (m) =	1.00		Hyd. Rad, 'R'		
Area (m <sup>2</sup> ) =	0.320		0.14 m		
Wetted Perimeter (m) =	2.265	m	Friction Slope Sf		
Slope (%) =	0.70	0.017	0.007 m/m		
Manning 'n' =			Velocity		
Channel Capacity, Q =	0.43		m <sup>3</sup> /sec	1.335	m/s

**\*Actual Conveyance Capacity of Swale (above the Filtrex check dam)**

Trapezoidal Channel Mannings' Equation					
Flow Depth (m) =	0.29	/1	Top width		
Side Slope Ratio (H:V) =	3.0		3.94 m		
Bed Width (m) =	2.20		Hyd. Rad, 'R'		
Area (m <sup>2</sup> ) =	0.890		0.22 m		
Wetted Perimeter (m) =	4.034	m	Friction Slope Sf		
Slope (%) =	0.70	0.017	0.007 m/m		
Manning 'n' =			Velocity		
Channel Capacity, Q =	1.60		m <sup>3</sup> /sec	1.797	m/s

**PROJECT#: 2022-5842-3**  
**PROJECT: TULLAMORE LANDS**  
**ESC SWALE SIZING**

**RATIONAL METHOD - 100 YEAR**

Computed 100-year peak flow to interceptor swale Type C

These calculations are based upon the flatest swale grade

Outlet ID	Drainage Area (ha)	Runoff Coefficient	Time $t_c$ (min)	Intensity $i=a/(t_c+b)^c$ (mm/hr)	Flow $Q=CiA/360$ (m <sup>3</sup> /s)
Swale 1C	5.00	0.50	10	167.1	1.16
Swale 2C	1.33	0.50	10	167.1	0.31
Swale 3C	1.26	0.50	10	167.1	0.29
Swale 4C	3.55	0.50	10	167.1	0.82
Swale 5C	4.35	0.50	10	167.1	1.01
Swale 6C	3.04	0.50	10	167.1	0.71
Swale 7C	6.39	0.50	10	167.1	1.48
Swale 8C	2.68	0.50	10	167.1	0.62
Swale 9C	6.99	0.50	10	167.1	<b>1.62</b>
Swale 10C	2.62	0.50	10	167.1	0.61

Where: a, b, c = rainfall equation coefficients

a = 4688

b = 17

0.9624



100-Year Storm  
IDF Parameters as per  
Town of Caledon

**\*Dimensions of swale - Excluding 0.2 m Filtrex check dams**

Trapezoidal Channel Mannings' Equation			
Flow Depth (m) =	0.30	Top width	
Side Slope Ratio (H:V) =	3.0 /1		2.80 m
Bed Width (m) =	1.00	Hyd. Rad, 'R'	
Area (m <sup>2</sup> ) =	0.570		0.20 m
Wetted Perimeter (m) =	2.897 m	Friction Slope Sf	
Slope (%) =	1.10		0.011 m/m
Manning 'n' =	0.017	Velocity	
Channel Capacity, Q =	1.19 m <sup>3</sup> /sec		2.087 m/s

**\*Actual Conveyance Capacity of Swale (above the Filtrex check dam)**

Trapezoidal Channel Mannings' Equation			
Flow Depth (m) =	0.23	Top width	
Side Slope Ratio (H:V) =	3.0 /1		4.18 m
Bed Width (m) =	2.80	Hyd. Rad, 'R'	
Area (m <sup>2</sup> ) =	0.803		0.19 m
Wetted Perimeter (m) =	4.255 m	Friction Slope Sf	
Slope (%) =	1.10		0.011 m/m
Manning 'n' =	0.017	Velocity	
Channel Capacity, Q =	1.63 m <sup>3</sup> /sec		2.029 m/s

**PROJECT#: 2022-5842-3**  
**PROJECT: TULLAMORE LANDS**  
**ESC SWALE SIZING**

**RATIONAL METHOD - 100 YEAR**

Computed 100-year peak flow to interceptor swale Type D

These calculations are based upon the flattest swale grade

Outlet ID	Drainage Area (ha)	Runoff Coefficient	Time $t_c$ (min)	Intensity $i=a/(t_c+b)^c$ (mm/hr)	Flow $Q=CiA/360$ (m <sup>3</sup> /s)
Swale 1D	1.66	0.50	10	167.1	0.39
Swale 2D	1.32	0.50	10	167.1	0.31
Swale 3D	3.16	0.50	10	167.1	0.73
Swale 4D	3.15	0.50	10	167.1	0.73
Swale 5D	2.88	0.50	10	167.1	0.67
Swale 6D	6.56	0.50	10	167.1	<b>1.52</b>

Where: a, b, c = rainfall equation coefficients

a = 4688

b = 17

0.9624



100-Year Storm  
IDF Parameters as per  
Town of Caledon

**\*Dimensions of swale - Excluding 0.2 m Filtrex check dams**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.30	/1	Top width	
Side Slope Ratio (H:V) =	3.0		2.80	m
Bed Width (m) =	1.00		Hyd. Rad, 'R'	
Area (m <sup>2</sup> ) =	0.570		0.20	m
Wetted Perimeter (m) =	2.897	m	Friction Slope Sf	
Slope (%) =	1.50		0.015	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	1.39	m <sup>3</sup> /sec	2.437	m/s

**\*Actual Conveyance Capacity of Swale (above the Filtrex check dam)**

Trapezoidal Channel Mannings' Equation				
Flow Depth (m) =	0.21	/1	Top width	
Side Slope Ratio (H:V) =	3.0		4.06	m
Bed Width (m) =	2.80		Hyd. Rad, 'R'	
Area (m <sup>2</sup> ) =	0.720		0.17	m
Wetted Perimeter (m) =	4.128	m	Friction Slope Sf	
Slope (%) =	1.50		0.015	m/m
Manning 'n' =	0.017		Velocity	
Channel Capacity, Q =	1.62	m <sup>3</sup> /sec	2.250	m/s

Filtrex Check Dam Spacing Calculations					
Interceptor Swale	Length of Channel Between Check Dams	Swale Slope (%)	Swale/Channel Slope m/m	Change in Elevation from U/S to D/S Dam	Check Dam Height
A	65	0.30	0.0030	0.20	0.20
B	28	0.70	0.0070	0.20	0.20
C	27	1.10	0.0110	0.30	0.30
D	20	1.50	0.0150	0.30	0.30



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 1

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	9.79	ha
Permanent Pool Volume:	1,811	m <sup>3</sup>
Active Storage Volume:	1,224	m <sup>3</sup>
Total:	3,035	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

### Temporary Settlement Basin Sizing - POND 1

#### Proposed Basin Dimensions

##### Depth

Freeboard:	0.30	m
Active Storage:	0.80	m
Permanent Pool:	3.00	m

**Total Depth of Basin:** **4.10** m

##### Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

##### Length

Top of Basin:	45.5	m
Bottom of Freeboard:	43.1	m
Bottom of Active Storage:	36.7	m
Bottom of Basin:	12.7	m
Buffer:	0.0	m

**Total Top Length of Basin:** **45.5** m

##### Elevations

Top of Pond / Freeboard:	245.00	m
Active Storage:	244.70	m
Permanent Pool:	243.90	m
Bottom of Basin:	240.90	m

##### Width

Top of Basin:	45.5	m
Bottom Freeboard:	43.1	m
Bottom of Active Storage:	36.7	m
Bottom of Basin:	12.7	m
Buffer:	0	m

**Total Top Width of Basin:** **45.5** m

**Total Basin Surface Area:** 2,070 m<sup>2</sup>  
**0.21** ha

**Total Active Storage Area:** 1,858 m<sup>2</sup>  
**Total Permanent Pool Area:** 1,347 m<sup>2</sup>

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	589	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,274	m <sup>3</sup>	1,224	m <sup>3</sup>
Permanent Pool Volume:	1,830	m <sup>3</sup>	1,811	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>3,693</b>	<b>m<sup>3</sup></b>	<b>3,035</b>	<b>m<sup>3</sup></b>

### Temporary Forebay Sizing - POND 1

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	243.9	m	
Forebay Length:	12.2	m	
Forebay Width:	12.2	m	
Bottom Length:	4.2	m	
Bottom Width:	4.2	m	
Forebay Volume:	67.8	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	97900	m <sup>2</sup>	
Extended Detention Volume:	2447.5	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.014	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
<b>Minimum Forebay Length for Settling:</b>	<b>6.9</b>	<b>m</b>	
<b>Provided Forebay Length for Settling:</b>	<b>12.2</b>	<b>m</b>	

## Modified Rational & Weir Calculations - POND 1

### Storm Data: Town of Caledon

**Time of Concentration:**  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 1 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond1	9.79	97900	0.50

Intensity  
 $i(T_d) = A / (T + B)^C$

Peak Flow  
 $Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.29

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	2.29
Maximum Head (m)	0.30
Required Length (m)	8.17
Provided Length (m)	9.00
Calculated Flow (m3/s)	2.52

## Hickenbottom Drawdown Time - ESC Pond - POND 1

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	1,224	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	48483	s
<b>Hickenbottom Drawdown Time</b>	<b>13</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,274	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	50459	s
<b>Hickenbottom Drawdown Time</b>	<b>14</b>	<b>hrs</b>

### Temporary Settlement Basin - Required Volume Specifications - POND 2

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	8.26	ha
Permanent Pool Volume:	1,528	m <sup>3</sup>
Active Storage Volume:	1,033	m <sup>3</sup>
Total:	2,561	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

### Temporary Settlement Basin Sizing - POND 2

#### Proposed Basin Dimensions

##### Depth

Freeboard:	0.30	m
Active Storage:	0.80	m
Permanent Pool:	3.00	m

**Total Depth of Basin:** **4.10** m

##### Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

##### Length

Top of Basin:	43.5	m
Bottom of Freeboard:	41.1	m
Bottom of Active Storage:	34.7	m
Bottom of Basin:	10.7	m
Buffer:	0.0	m

**Total Top Length of Basin:** **43.5** m

##### Elevations

Top of Pond / Freeboard:	242.20	m
Active Storage:	241.90	m
Permanent Pool:	241.10	m
Bottom of Basin:	238.10	m

##### Width

Top of Basin:	43.5	m
Bottom Freeboard:	41.1	m
Bottom of Active Storage:	34.7	m
Bottom of Basin:	10.7	m
Buffer:	0	m

**Total Top Width of Basin:** **43.5** m

**Total Basin Surface Area:** 1,892 m<sup>2</sup>  
**0.19** ha

**Total Active Storage Area:** 1,689 m<sup>2</sup>  
**Total Permanent Pool Area:** 1,204 m<sup>2</sup>

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	537	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,149	m <sup>3</sup>	1,033	m <sup>3</sup>
Permanent Pool Volume:	1,546	m <sup>3</sup>	1,528	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>3,232</b>	<b>m<sup>3</sup></b>	<b>2,561</b>	<b>m<sup>3</sup></b>

## Temporary Forebay Sizing - POND 2

### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	241.10	m	
Forebay Length:	11.6	m	
Forebay Width:	11.6	m	
Bottom Length:	3.6	m	
Bottom Width:	3.6	m	
Forebay Volume:	57.3	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

### Minimum Forebay Length for Settling

Catchment Area:	82600	m <sup>2</sup>	
Extended Detention Volume:	2065.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.012	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
<b>Minimum Forebay Length for Settling:</b>	<b>6.3</b>	<b>m</b>	
<b>Provided Forebay Length for Settling:</b>	<b>11.6</b>	<b>m</b>	

## Modified Rational & Weir Calculations - POND 2

### Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 2 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond2	8.26	82600	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	1.93

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	1.93
Maximum Head (m)	0.30
Required Length (m)	6.90
Provided Length (m)	7.00
Calculated Flow (m3/s)	1.96

**Hickenbottom Drawdown Time - ESC Pond - POND 2****Calculations****REQUIRED Pond Active Storage Volume**

Depth for Active Storage	1,033	m <sup>3</sup>
Target Drawdown Time	0.80	m
	48	hrs

Hickenbottom Specifications

**0.127m intake with 24 - 25mm holes per 0.305m**

Hickenbottom Capacity 25.24 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	40906	s
<b>Hickenbottom Drawdown Time</b>	<b>11</b>	<b>hrs</b>

**PROVIDED Pond Active Storage Volume**

Depth for Active Storage	1,149	m <sup>3</sup>
Target Drawdown Time	0.80	m
	48	hrs

Hickenbottom Specifications

**0.127m intake with 24 - 25mm holes per 0.305m**

Hickenbottom Capacity 25.24 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	45527	s
<b>Hickenbottom Drawdown Time</b>	<b>13</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 3

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	3.18	ha
Permanent Pool Volume:	588	m <sup>3</sup>
Active Storage Volume:	398	m <sup>3</sup>
Total:	986	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ DATE: 2022.08.30  
CHECKED BY: JS UPDATED: 2023.04.06

### Temporary Settlement Basin Sizing - POND 3

#### Proposed Basin Dimensions

##### Depth

Freeboard: 0.30 m  
Active Storage: 0.40 m  
Permanent Pool: 3.00 m

**Total Depth of Basin: 3.70 m**

##### Side Slope

Freeboard: 4 :1  
Active Storage: 4 :1  
Permanent Pool: 4 :1

##### Length

Top of Basin: 35.8 m  
Bottom of Freeboard: 33.4 m  
Bottom of Active Storage: 30.2 m  
Bottom of Basin: 6.2 m  
Buffer: 0.0 m

**Total Top Length of Basin: 35.8 m**

##### Elevations

Top of Pond / Freeboard: 243.70 m  
Active Storage: 243.40 m  
Permanent Pool: 243.00 m  
Bottom of Basin: 240.00 m

##### Width

Top of Basin: 35.8 m  
Bottom Freeboard: 33.4 m  
Bottom of Active Storage: 30.2 m  
Bottom of Basin: 6.2 m  
Buffer: 0 m

**Total Top Width of Basin: 35.8 m**

**Total Basin Surface Area:** 1,282 m<sup>2</sup>  
**0.13 ha**

**Total Active Storage Area:** 1,116 m<sup>2</sup>  
**Total Permanent Pool Area:** 912 m<sup>2</sup>

#### Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	359	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	404	m <sup>3</sup>	398	m <sup>3</sup>
Permanent Pool Volume:	994	m <sup>3</sup>	588	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>1,757</b>	<b>m<sup>3</sup></b>	<b>986</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 3

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	243.00	m	
Forebay Length:	10.1	m	
Forebay Width:	10.1	m	
Bottom Length:	2.1	m	
Bottom Width:	2.1	m	
Forebay Volume:	36.8	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	31800	m <sup>2</sup>	
Extended Detention Volume:	795.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.005	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	3.9	m	
Provided Forebay Length for Settling:	10.1	m	

### Modified Rational & Weir Calculations - POND 3

#### Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 3 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond3	3.18	31800	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	0.74

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	0.74
Maximum Head (m)	0.30
Required Length (m)	2.66
Provided Length (m)	3.00
Calculated Flow (m3/s)	0.84

### Hickenbottom Drawdown Time - ESC Pond - POND 3

#### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	398	m <sup>3</sup>
Depth for Active Storage	0.40	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	8.91 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	44599	s
<b>Hickenbottom Drawdown Time</b>	<b>12</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	404	m <sup>3</sup>
Depth for Active Storage	0.40	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	8.91 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	45384	s
<b>Hickenbottom Drawdown Time</b>	<b>13</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.11

### Temporary Settlement Basin - Required Volume Specifications - POND 4

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	9.58	ha
Permanent Pool Volume:	1,772	m <sup>3</sup>
Active Storage Volume:	1,198	m <sup>3</sup>
Total:	2,970	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ DATE: 2022.08.30  
CHECKED BY: JS UPDATED: 2023.04.11

### Temporary Settlement Basin Sizing - POND 4

#### Proposed Basin Dimensions

##### Depth

Freeboard: 0.30 m  
Active Storage: 0.80 m  
Permanent Pool: 3.00 m

**Total Depth of Basin: 4.10 m**

##### Side Slope

Freeboard: 4 :1  
Active Storage: 4 :1  
Permanent Pool: 4 :1

##### Length

Top of Basin: 47.3 m  
Bottom of Freeboard: 44.9 m  
Bottom of Active Storage: 38.5 m  
Bottom of Basin: 14.5 m  
Buffer: 0.0 m

**Total Top Length of Basin: 47.3 m**

##### Elevations

Top of Pond / Freeboard: 237.10 m  
Active Storage: 236.80 m  
Permanent Pool: 236.00 m  
Bottom of Basin: 233.00 m

##### Width

Top of Basin: 47.3 m  
Bottom Freeboard: 44.9 m  
Bottom of Active Storage: 38.5 m  
Bottom of Basin: 14.5 m  
Buffer: 0 m

**Total Top Width of Basin: 47.3 m**

**Total Basin Surface Area:** 2,237 m<sup>2</sup>  
**0.22 ha**

**Total Active Storage Area:** 2,016 m<sup>2</sup>  
**Total Permanent Pool Area:** 1,482 m<sup>2</sup>

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	638	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,391	m <sup>3</sup>	1,198	m <sup>3</sup>
Permanent Pool Volume:	2,107	m <sup>3</sup>	1,772	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>4,135</b>	<b>m<sup>3</sup></b>	<b>2,970</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.11

### Temporary Forebay Sizing - POND 4

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	236.00	m	
Forebay Length:	12.8	m	
Forebay Width:	12.8	m	
Bottom Length:	4.8	m	
Bottom Width:	4.8	m	
Forebay Volume:	78.0	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	95800	m <sup>2</sup>	
Extended Detention Volume:	2395.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.014	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	6.8	m	
Provided Forebay Length for Settling:	12.8	m	

## Modified Rational & Weir Calculations - POND 4

### Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 4 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond4	9.85	98500	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.30

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	2.30
Maximum Head (m)	0.30
Required Length (m)	8.23
Provided Length (m)	9.00
Calculated Flow (m3/s)	2.52

## Hickenbottom Drawdown Time - ESC Pond - POND 4

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	1,198	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	22.91 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	52272	s
<b>Hickenbottom Drawdown Time</b>	<b>15</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,391	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	22.91 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	60723	s
<b>Hickenbottom Drawdown Time</b>	<b>17</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 5

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	3.17	ha
Permanent Pool Volume:	586	m <sup>3</sup>
Active Storage Volume:	396	m <sup>3</sup>
Total:	983	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

### Temporary Settlement Basin Sizing - POND 5

#### Proposed Basin Dimensions

<u>Depth</u>			<u>Side Slope</u>		
Freeboard:	0.30	m	Freeboard:	4 :1	
Active Storage:	0.50	m	Active Storage:	4 :1	
Permanent Pool:	3.00	m	Permanent Pool:	4 :1	
<b>Total Depth of Basin:</b>	<b>3.80</b>	<b>m</b>			
<u>Length</u>			<u>Elevations</u>		
Top of Basin:	32.9	m	Top of Pond / Freeboard:	236.45	m
Bottom of Freeboard:	30.5	m	Active Storage:	236.15	m
Bottom of Active Storage:	26.5	m	Permanent Pool:	235.65	m
Bottom of Basin:	2.5	m	Bottom of Basin:	232.65	m
Buffer:	0.0	m			
<b>Total Top Length of Basin:</b>	<b>32.9</b>	<b>m</b>			
<u>Width</u>			<b>Total Basin Surface Area:</b>		
Top of Basin:	32.9	m		1.082	m <sup>2</sup>
Bottom Freeboard:	30.5	m		<b>0.11</b>	ha
Bottom of Active Storage:	26.5	m			
Bottom of Basin:	2.5	m	<b>Total Active Storage Area:</b>	930	m <sup>2</sup>
Buffer:	0	m	<b>Total Permanent Pool Area:</b>	702	m <sup>2</sup>
<b>Total Top Width of Basin:</b>	<b>32.9</b>	<b>m</b>			

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	301	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	406	m <sup>3</sup>	396	m <sup>3</sup>
Permanent Pool Volume:	631	m <sup>3</sup>	586	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>1,338</b>	<b>m<sup>3</sup></b>	<b>983</b>	<b>m<sup>3</sup></b>

## Temporary Forebay Sizing - POND 5

### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	235.7	m	
Forebay Length:	8.8	m	
Forebay Width:	8.8	m	
Bottom Length:	0.8	m	
Bottom Width:	0.8	m	
Forebay Volume:	23.4	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

### Minimum Forebay Length for Settling

Catchment Area:	31700	m <sup>2</sup>	
Extended Detention Volume:	792.5	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.005	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
<b>Minimum Forebay Length for Settling:</b>	<b>3.9</b>	<b>m</b>	
<b>Provided Forebay Length for Settling:</b>	<b>8.8</b>	<b>m</b>	

## Modified Rational & Weir Calculations - POND 5

Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 5 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond5	3.17	31700	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	0.74

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	0.74
Maximum Head (m)	0.30
Required Length (m)	2.65
Provided Length (m)	3.00
Calculated Flow (m3/s)	0.84

## Hickenbottom Drawdown Time - ESC Pond - POND 5

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	396	m <sup>3</sup>
Depth for Active Storage	0.50	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	12.46 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	31799	s
<b>Hickenbottom Drawdown Time</b>	<b>9</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	406	m <sup>3</sup>
Depth for Active Storage	0.50	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	12.46 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	32592	s
<b>Hickenbottom Drawdown Time</b>	<b>9</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.11

### Temporary Settlement Basin - Required Volume Specifications - POND 6

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	5.17	ha
Permanent Pool Volume:	956	m <sup>3</sup>
Active Storage Volume:	646	m <sup>3</sup>
Total:	1,603	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

### Temporary Settlement Basin Sizing - POND 6

#### Proposed Basin Dimensions

<u>Depth</u>			<u>Side Slope</u>		
Freeboard:	0.30	m	Freeboard:	4 : 1	
Active Storage:	0.65	m	Active Storage:	4 : 1	
Permanent Pool:	3.00	m	Permanent Pool:	4 : 1	
<b>Total Depth of Basin:</b>	<b>3.95</b>	<b>m</b>			
<u>Length</u>			<u>Elevations</u>		
Top of Basin:	37.6	m	Top of Pond / Freeboard:	233.50	m
Bottom of Freeboard:	35.2	m	Active Storage:	233.20	m
Bottom of Active Storage:	30.0	m	Permanent Pool:	232.55	m
Bottom of Basin:	6.0	m	Bottom of Basin:	229.55	m
Buffer:	0.0	m			
<b>Total Top Length of Basin:</b>	<b>37.6</b>	<b>m</b>			
<u>Width</u>			<b>Total Basin Surface Area:</b>		
Top of Basin:	37.6	m		1,414	m <sup>2</sup>
Bottom Freeboard:	35.2	m		<b>0.14</b>	ha
Bottom of Active Storage:	30.0	m			
Bottom of Basin:	6.0	m	<b>Total Active Storage Area:</b>	1,239	m <sup>2</sup>
Buffer:	0	m	<b>Total Permanent Pool Area:</b>	900	m <sup>2</sup>
<b>Total Top Width of Basin:</b>	<b>37.6</b>	<b>m</b>			

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	397	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	691	m <sup>3</sup>	646	m <sup>3</sup>
Permanent Pool Volume:	972	m <sup>3</sup>	956	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>2,060</b>	<b>m<sup>3</sup></b>	<b>1,603</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.11

### Temporary Forebay Sizing - POND 6

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	232.6	m	
Forebay Length:	10.0	m	
Forebay Width:	10.0	m	
Bottom Length:	2.0	m	
Bottom Width:	2.0	m	
Forebay Volume:	36.0	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	51700	m <sup>2</sup>	
Extended Detention Volume:	1292.5	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.007	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	5.0	m	
Provided Forebay Length for Settling:	10.0	m	

## Modified Rational & Weir Calculations - POND 6

### Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 6 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond6	5.17	51700	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{\text{post}} = 0.0028 \cdot C_{\text{post}} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	1.21

Emergency Overflow Weir	
Flow (100-year) (m3/s)	1.21
Maximum Head (m)	0.30
Required Length (m)	4.32
Provided Length (m)	5.00
Calculated Flow (m3/s)	1.40

## Hickenbottom Drawdown Time - ESC Pond - POND 6

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	646	m <sup>3</sup>
Depth for Active Storage	0.65	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	18.48	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	34973	s
<b>Hickenbottom Drawdown Time</b>	<b>10</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	691	m <sup>3</sup>
Depth for Active Storage	0.65	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	18.48	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	37383	s
<b>Hickenbottom Drawdown Time</b>	<b>10</b>	<b>hrs</b>

**Temporary Settlement Basin - Required Volume Specifications - POND 7****Specifications**

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

**Required Volume Calculations**

Temporary Drainage Area:	7.30	ha
Permanent Pool Volume:	1,351	m <sup>3</sup>
Active Storage Volume:	913	m <sup>3</sup>
Total:	2,263	m <sup>3</sup>

**References/Notes**

TRCA Erosion and Sediment Control Guide - Appendix B



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ DATE: 2022.08.30  
CHECKED BY: JS UPDATED: 2023.04.11

### Temporary Settlement Basin Sizing - POND 7

#### Proposed Basin Dimensions

##### Depth

Freeboard:	0.30	m
Active Storage:	0.60	m
Permanent Pool:	3.00	m

**Total Depth of Basin:** 3.90 m

##### Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

##### Length

Top of Basin:	44.2	m
Bottom of Freeboard:	41.8	m
Bottom of Active Storage:	37.0	m
Bottom of Basin:	13.0	m
Buffer:	0.0	m

**Total Top Length of Basin:** 44.2 m

##### Elevations

Top of Pond / Freeboard:	243.90	m
Active Storage:	243.60	m
Permanent Pool:	243.00	m
Bottom of Basin:	240.00	m

##### Width

Top of Basin:	44.2	m
Bottom Freeboard:	41.8	m
Bottom of Active Storage:	37.0	m
Bottom of Basin:	13.0	m
Buffer:	0	m

**Total Top Width of Basin:** 44.2 m

**Total Basin Surface Area:** 1,954 m<sup>2</sup>  
0.20 ha

**Total Active Storage Area:** 1,747 m<sup>2</sup>  
**Total Permanent Pool Area:** 1,369 m<sup>2</sup>

#### Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	555	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	931	m <sup>3</sup>	913	m <sup>3</sup>
Permanent Pool Volume:	1,875	m <sup>3</sup>	1,351	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>3,361</b>	<b>m<sup>3</sup></b>	<b>2,263</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.11

### Temporary Forebay Sizing - POND 7

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	243.0	m	
Forebay Length:	12.3	m	
Forebay Width:	12.3	m	
Bottom Length:	4.3	m	
Bottom Width:	4.3	m	
Forebay Volume:	69.4	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	73000	m <sup>2</sup>	
Extended Detention Volume:	1825.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.011	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	5.9	m	
Provided Forebay Length for Settling:	12.3	m	

## Modified Rational & Weir Calculations - POND 7

### Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 7 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond7	7.30	73000	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m <sup>3</sup> /s)
100	1.71

Emergency Overflow Weir	
Flow (100-year) ( m <sup>3</sup> /s)	1.71
Maximum Head (m)	0.30
Required Length (m)	6.10
Provided Length (m)	7.00
Calculated Flow (m <sup>3</sup> /s)	1.96

## Hickenbottom Drawdown Time - ESC Pond - POND 7

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	913	m <sup>3</sup>
Depth for Active Storage	0.60	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	16.39 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	55689	s
<b>Hickenbottom Drawdown Time</b>	<b>15</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	931	m <sup>3</sup>
Depth for Active Storage	0.60	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	16.39 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	56843	s
<b>Hickenbottom Drawdown Time</b>	<b>16</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 8

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	9.42	ha
Permanent Pool Volume:	1,743	m <sup>3</sup>
Active Storage Volume:	1,178	m <sup>3</sup>
Total:	2,920	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ DATE: 2022.08.30  
CHECKED BY: JS UPDATED: 2023.04.06

### Temporary Settlement Basin Sizing - POND 8

#### Proposed Basin Dimensions

##### Depth

Freeboard: 0.30 m  
Active Storage: 0.70 m  
Permanent Pool: 3.00 m

**Total Depth of Basin: 4.00 m**

##### Side Slope

Freeboard: 4 :1  
Active Storage: 4 :1  
Permanent Pool: 4 :1

##### Length

Top of Basin: 47.4 m  
Bottom of Freeboard: 45.0 m  
Bottom of Active Storage: 39.4 m  
Bottom of Basin: 15.4 m  
Buffer: 0.0 m

**Total Top Length of Basin: 47.4 m**

##### Elevations

Top of Pond / Freeboard: 240.30 m  
Active Storage: 240.00 m  
Permanent Pool: 239.30 m  
Bottom of Basin: 236.30 m

##### Width

Top of Basin: 47.4 m  
Bottom Freeboard: 45.0 m  
Bottom of Active Storage: 39.4 m  
Bottom of Basin: 15.4 m  
Buffer: 0 m

**Total Top Width of Basin: 47.4 m**

**Total Basin Surface Area:** 2,247 m<sup>2</sup>  
**0.22** ha

**Total Active Storage Area:** 2,025 m<sup>2</sup>  
**Total Permanent Pool Area:** 1,552 m<sup>2</sup>

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	640	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,247	m <sup>3</sup>	1,178	m <sup>3</sup>
Permanent Pool Volume:	2,252	m <sup>3</sup>	1,743	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>4,139</b>	<b>m<sup>3</sup></b>	<b>2,920</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 8

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	239.3	m	
Forebay Length:	13.1	m	
Forebay Width:	13.1	m	
Bottom Length:	5.1	m	
Bottom Width:	5.1	m	
Forebay Volume:	83.4	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	94200	m <sup>2</sup>	
Extended Detention Volume:	2355.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.014	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	6.7	m	
Provided Forebay Length for Settling:	13.1	m	

## Modified Rational & Weir Calculations - POND 8

Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 8 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond8	9.42	94200	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.20

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	2.20
Maximum Head (m)	0.30
Required Length (m)	7.87
Provided Length (m)	8.00
Calculated Flow (m3/s)	2.24

## Hickenbottom Drawdown Time - ESC Pond - POND 8

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	1,178	m <sup>3</sup>
Depth for Active Storage	0.70	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	20.65 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	57010	s
<b>Hickenbottom Drawdown Time</b>	<b>16</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,247	m <sup>3</sup>
Depth for Active Storage	0.70	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	20.65 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	60355	s
<b>Hickenbottom Drawdown Time</b>	<b>17</b>	<b>hrs</b>

### Temporary Settlement Basin - Required Volume Specifications - POND 9

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	9.01	ha
Permanent Pool Volume:	1,667	m <sup>3</sup>
Active Storage Volume:	1,126	m <sup>3</sup>
Total:	2,793	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

### Temporary Settlement Basin Sizing - POND 9

#### Proposed Basin Dimensions

<u>Depth</u>			<u>Side Slope</u>		
Freeboard:	0.30	m	Freeboard:	4	:1
Active Storage:	0.60	m	Active Storage:	4	:1
Permanent Pool:	3.00	m	Permanent Pool:	4	:1
<b>Total Depth of Basin:</b>	<b>3.90</b>	<b>m</b>			
<u>Length</u>			<u>Elevations</u>		
Top of Basin:	48.2	m	Top of Pond / Freeboard:	240.65	m
Bottom of Freeboard:	45.8	m	Active Storage:	240.35	m
Bottom of Active Storage:	41.0	m	Permanent Pool:	239.75	m
Bottom of Basin:	17.0	m	Bottom of Basin:	236.75	m
Buffer:	0.0	m			
<b>Total Top Length of Basin:</b>	<b>48.2</b>	<b>m</b>			
<u>Width</u>			<b>Total Basin Surface Area:</b>		
Top of Basin:	48.2	m		2,323	m <sup>2</sup>
Bottom Freeboard:	45.8	m		<b>0.23</b>	ha
Bottom of Active Storage:	41.0	m			
Bottom of Basin:	17.0	m	<b>Total Active Storage Area:</b>	2,098	m <sup>2</sup>
Buffer:	0	m	<b>Total Permanent Pool Area:</b>	1,681	m <sup>2</sup>
<b>Total Top Width of Basin:</b>	<b>48.2</b>	<b>m</b>			

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	663	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,130	m <sup>3</sup>	1,126	m <sup>3</sup>
Permanent Pool Volume:	2,523	m <sup>3</sup>	1,667	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>4,316</b>	<b>m<sup>3</sup></b>	<b>2,793</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 9

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	239.8	m	
Forebay Length:	13.7	m	
Forebay Width:	13.7	m	
Bottom Length:	5.7	m	
Bottom Width:	5.7	m	
Forebay Volume:	93.4	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	90100	m <sup>2</sup>	
Extended Detention Volume:	2252.5	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.013	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	6.6	m	
Provided Forebay Length for Settling:	13.7	m	

## Modified Rational & Weir Calculations - POND 9

**Storm Data: Town of Caledon**

**Time of Concentration:**  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 9 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond9	9.01	90100	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.11

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	2.11
Maximum Head (m)	0.30
Required Length (m)	7.52
Provided Length (m)	8.00
Calculated Flow (m3/s)	2.24

## Hickenbottom Drawdown Time - ESC Pond - POND 9

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	1,126	m <sup>3</sup>
Depth for Active Storage	0.60	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	16.39	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	68733	s
<b>Hickenbottom Drawdown Time</b>	<b>19</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,130	m <sup>3</sup>
Depth for Active Storage	0.60	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	16.39	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	68971	s
<b>Hickenbottom Drawdown Time</b>	<b>19</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 10

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	9.07	ha
Permanent Pool Volume:	1,678	m <sup>3</sup>
Active Storage Volume:	1,134	m <sup>3</sup>
Total:	2,812	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

### Temporary Settlement Basin Sizing - POND 10

#### Proposed Basin Dimensions

##### Depth

Freeboard:	0.30	m
Active Storage:	0.70	m
Permanent Pool:	3.00	m

**Total Depth of Basin: 4.00 m**

##### Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

##### Length

Top of Basin:	46.0	m
Bottom of Freeboard:	43.6	m
Bottom of Active Storage:	38.0	m
Bottom of Basin:	14.0	m
Buffer:	0.0	m

**Total Top Length of Basin: 46.0 m**

##### Elevations

Top of Pond / Freeboard:	238.50	m
Active Storage:	238.20	m
Permanent Pool:	237.50	m
Bottom of Basin:	234.50	m

##### Width

Top of Basin:	46.0	m
Bottom Freeboard:	43.6	m
Bottom of Active Storage:	38.0	m
Bottom of Basin:	14.0	m
Buffer:	0	m

**Total Top Width of Basin: 46.0 m**

**Total Basin Surface Area:** 2,116 m<sup>2</sup>  
**0.21 ha**

**Total Active Storage Area:** 1,901 m<sup>2</sup>  
**Total Permanent Pool Area:** 1,444 m<sup>2</sup>

#### Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	602	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,165	m <sup>3</sup>	1,134	m <sup>3</sup>
Permanent Pool Volume:	2,028	m <sup>3</sup>	1,678	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>3,795</b>	<b>m<sup>3</sup></b>	<b>2,812</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 10

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	237.5	m	
Forebay Length:	12.7	m	
Forebay Width:	12.7	m	
Bottom Length:	4.7	m	
Bottom Width:	4.7	m	
Forebay Volume:	75.1	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	90700	m <sup>2</sup>	
Extended Detention Volume:	2267.5	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.013	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	6.6	m	
Provided Forebay Length for Settling:	12.7	m	

## Modified Rational & Weir Calculations - POND 10

Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 10 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond10	9.07	90700	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.12

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	2.12
Maximum Head (m)	0.30
Required Length (m)	7.57
Provided Length (m)	8.00
Calculated Flow (m3/s)	2.24

## Hickenbottom Drawdown Time - ESC Pond - POND 10

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	1,134	m <sup>3</sup>
Depth for Active Storage	0.70	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	20.65	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	54892	s
<b>Hickenbottom Drawdown Time</b>	<b>15</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,165	m <sup>3</sup>
Depth for Active Storage	0.70	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	20.65	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	56417	s
<b>Hickenbottom Drawdown Time</b>	<b>16</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 11

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	2.32	ha
Permanent Pool Volume:	429	m <sup>3</sup>
Active Storage Volume:	290	m <sup>3</sup>
Total:	719	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ DATE: 2022.08.30  
CHECKED BY: JS UPDATED: 2023.04.06

### Temporary Settlement Basin Sizing - POND 11

#### Proposed Basin Dimensions

##### Depth

Freeboard:	0.30	m
Active Storage:	0.40	m
Permanent Pool:	3.00	m

**Total Depth of Basin:** 3.70 m

##### Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

##### Length

Top of Basin:	31.0	m
Bottom of Freeboard:	28.6	m
Bottom of Active Storage:	25.4	m
Bottom of Basin:	1.4	m
Buffer:	0.0	m

**Total Top Length of Basin:** 31.0 m

##### Elevations

Top of Pond / Freeboard:	240.30	m
Active Storage:	240.00	m
Permanent Pool:	239.60	m
Bottom of Basin:	236.60	m

##### Width

Top of Basin:	31.0	m
Bottom Freeboard:	28.6	m
Bottom of Active Storage:	25.4	m
Bottom of Basin:	1.4	m
Buffer:	0	m

**Total Top Width of Basin:** 31.0 m

**Total Basin Surface Area:** 961 m<sup>2</sup>  
0.10 ha

**Total Active Storage Area:** 818 m<sup>2</sup>  
**Total Permanent Pool Area:** 645 m<sup>2</sup>

#### Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	266	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	292	m <sup>3</sup>	290	m <sup>3</sup>
Permanent Pool Volume:	539	m <sup>3</sup>	429	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>1,097</b>	<b>m<sup>3</sup></b>	<b>719</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 11

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	239.6	m	
Forebay Length:	8.5	m	
Forebay Width:	8.5	m	
Bottom Length:	0.5	m	
Bottom Width:	0.5	m	
Forebay Volume:	20.0	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	23200	m <sup>2</sup>	
Extended Detention Volume:	580.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.003	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	3.3	m	
Provided Forebay Length for Settling:	8.5	m	

## Modified Rational & Weir Calculations - POND 11

### Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

### Pond 11 Catchment

Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond11	2.32	23200	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	0.54

### Emergency Overflow Weir

Flow (100-year) ( m3/s)	0.54
Maximum Head (m)	0.30
Required Length (m)	1.94
Provided Length (m)	2.00
Calculated Flow (m3/s)	0.56

## Hickenbottom Drawdown Time - ESC Pond - POND 11

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	290	m <sup>3</sup>
Depth for Active Storage	0.40	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	8.91	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	32538	s
<b>Hickenbottom Drawdown Time</b>	<b>9</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	292	m <sup>3</sup>
Depth for Active Storage	0.40	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	8.91	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	32717	s
<b>Hickenbottom Drawdown Time</b>	<b>9</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: AM/IC/MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.11

### Temporary Settlement Basin - Required Volume Specifications - POND 12

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	8.05	ha
Permanent Pool Volume:	1,489	m <sup>3</sup>
Active Storage Volume:	1,006	m <sup>3</sup>
Total:	2,496	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B

### Temporary Settlement Basin Sizing - POND 12

#### Proposed Basin Dimensions

##### Depth

Freeboard:	0.30	m
Active Storage:	0.80	m
Permanent Pool:	3.00	m

**Total Depth of Basin:** 4.10 m

##### Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

##### Length

Top of Basin:	43.3	m
Bottom of Freeboard:	40.9	m
Bottom of Active Storage:	34.5	m
Bottom of Basin:	10.5	m
Buffer:	0.0	m

**Total Top Length of Basin:** 43.3 m

##### Elevations

Top of Pond / Freeboard:	241.00	m
Active Storage:	240.70	m
Permanent Pool:	239.90	m
Bottom of Basin:	236.90	m

##### Width

Top of Basin:	43.3	m
Bottom Freeboard:	40.9	m
Bottom of Active Storage:	34.5	m
Bottom of Basin:	10.5	m
Buffer:	0	m

**Total Top Width of Basin:** 43.3 m

**Total Basin Surface Area:** 1,875 m<sup>2</sup>  
0.19 ha

**Total Active Storage Area:** 1,673 m<sup>2</sup>  
**Total Permanent Pool Area:** 1,190 m<sup>2</sup>

#### Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	532	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,137	m <sup>3</sup>	1,006	m <sup>3</sup>
Permanent Pool Volume:	1,519	m <sup>3</sup>	1,489	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>3,188</b>	<b>m<sup>3</sup></b>	<b>2,496</b>	<b>m<sup>3</sup></b>



## Temporary Forebay Sizing - POND 12

### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	239.9	m	
Forebay Length:	11.5	m	
Forebay Width:	11.5	m	
Bottom Length:	3.5	m	
Bottom Width:	3.5	m	
Forebay Volume:	56.3	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

### Minimum Forebay Length for Settling

Catchment Area:	80500	m <sup>2</sup>	
Extended Detention Volume:	2012.5	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.012	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
<b>Minimum Forebay Length for Settling:</b>	<b>6.2</b>	<b>m</b>	
<b>Provided Forebay Length for Settling:</b>	<b>11.5</b>	<b>m</b>	

## Modified Rational & Weir Calculations - POND 12

### Storm Data: Town of Caledon

**Time of Concentration:**  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 12 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond1 2	8.05	80500	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	1.88

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	1.88
Maximum Head (m)	0.30
Required Length (m)	6.72
Provided Length (m)	7.00
Calculated Flow (m3/s)	1.96

## Hickenbottom Drawdown Time - ESC Pond - POND 12

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	1,006	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	39866	s
<b>Hickenbottom Drawdown Time</b>	<b>11</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,137	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	45048	s
<b>Hickenbottom Drawdown Time</b>	<b>13</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: IC/MJ      DATE: 2022.08.30  
CHECKED BY: JS      UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 13

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	4.45	ha
Permanent Pool Volume:	823	m <sup>3</sup>
Active Storage Volume:	556	m <sup>3</sup>
Total:	1,380	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide -  
Appendix B



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: IC/MJ DATE: 2022.08.30  
CHECKED BY: JS UPDATED: 2023.04.06

### Temporary Settlement Basin Sizing - POND 13

#### Proposed Basin Dimensions

##### Depth

Freeboard: 0.30 m  
Active Storage: 0.70 m  
Permanent Pool: 3.00 m

**Total Depth of Basin: 4.00 m**

##### Side Slope

Freeboard: 4 :1  
Active Storage: 4 :1  
Permanent Pool: 4 :1

##### Length

Top of Basin: 37.0 m  
Bottom of Freeboard: 34.6 m  
Bottom of Active Storage: 29.0 m  
Bottom of Basin: 5.0 m  
Buffer: 0.0 m

**Total Top Length of Basin: 37.0 m**

##### Elevations

Top of Pond / Freeboard: 244.00 m  
Active Storage: 243.70 m  
Permanent Pool: 243.00 m  
Bottom of Basin: 240.00 m

##### Width

Top of Basin: 37.0 m  
Bottom Freeboard: 34.6 m  
Bottom of Active Storage: 29.0 m  
Bottom of Basin: 5.0 m  
Buffer: 0 m

**Total Top Width of Basin: 37.0 m**

**Total Basin Surface Area:** 1,369 m<sup>2</sup>  
**0.14** ha

**Total Active Storage Area:** 1,197 m<sup>2</sup>  
**Total Permanent Pool Area:** 841 m<sup>2</sup>

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	384	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	708	m <sup>3</sup>	556	m <sup>3</sup>
Permanent Pool Volume:	867	m <sup>3</sup>	823	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>1,959</b>	<b>m<sup>3</sup></b>	<b>1,380</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 13

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	243.0	m	
Forebay Length:	9.7	m	
Forebay Width:	9.7	m	
Bottom Length:	1.7	m	
Bottom Width:	1.7	m	
Forebay Volume:	32.1	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	44500	m <sup>2</sup>	
Extended Detention Volume:	1112.5	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.006	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	4.6	m	
Provided Forebay Length for Settling:	9.7	m	

### Modified Rational & Weir Calculations - POND 13

#### Storm Data: Town of Caledon

**Time of Concentration:**  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 13 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond13	4.45	44500	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	1.04

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	1.04
Maximum Head (m)	0.30
Required Length (m)	3.72
Provided Length (m)	7.00
Calculated Flow (m3/s)	1.96

## Hickenbottom Drawdown Time - ESC Pond - POND 13

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	556	m <sup>3</sup>
Depth for Active Storage	0.70	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	20.65	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	26932	s
<b>Hickenbottom Drawdown Time</b>	<b>7</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	708	m <sup>3</sup>
Depth for Active Storage	0.70	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	20.65	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	34272	s
<b>Hickenbottom Drawdown Time</b>	<b>10</b>	<b>hrs</b>

**Temporary Settlement Basin - Required Volume Specifications - POND 14****Specifications**

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

**Required Volume Calculations**

Temporary Drainage Area:	9.93	ha
Permanent Pool Volume:	1,837	m <sup>3</sup>
Active Storage Volume:	1,241	m <sup>3</sup>
Total:	3,078	m <sup>3</sup>

**References/Notes**TRCA Erosion and Sediment Control Guide - Appendix  
B

### Temporary Settlement Basin Sizing - POND 14

#### Proposed Basin Dimensions

##### Depth

Freeboard:	0.30	m
Active Storage:	0.80	m
Permanent Pool:	3.00	m

**Total Depth of Basin:**      **4.10**      m

##### Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

##### Length

Top of Basin:	45.8	m
Bottom of Freeboard:	43.4	m
Bottom of Active Storage:	37.0	m
Bottom of Basin:	13.0	m
Buffer:	0.0	m

**Total Top Length of Basin:**      **45.8**      m

##### Elevations

Top of Pond / Freeboard:	247.60	m
Active Storage:	247.30	m
Permanent Pool:	246.50	m
Bottom of Basin:	243.50	m

##### Width

Top of Basin:	45.8	m
Bottom Freeboard:	43.4	m
Bottom of Active Storage:	37.0	m
Bottom of Basin:	13.0	m
Buffer:	0	m

**Total Top Width of Basin:**      **45.8**      m

**Total Basin Surface Area:**      2,098      m<sup>2</sup>  
    **0.21**      ha

**Total Active Storage Area:**      1,884      m<sup>2</sup>  
**Total Permanent Pool Area:**      1,369      m<sup>2</sup>

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	597	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,293	m <sup>3</sup>	1,241	m <sup>3</sup>
Permanent Pool Volume:	1,875	m <sup>3</sup>	1,837	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>3,765</b>	<b>m<sup>3</sup></b>	<b>3,078</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 14

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	246.5	m	
Forebay Length:	12.3	m	
Forebay Width:	12.3	m	
Bottom Length:	4.3	m	
Bottom Width:	4.3	m	
Forebay Volume:	69.4	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	99300	m <sup>2</sup>	
Extended Detention Volume:	2482.5	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.014	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
<b>Minimum Forebay Length for Settling:</b>	<b>6.9</b>	<b>m</b>	
<b>Provided Forebay Length for Settling:</b>	<b>12.3</b>	<b>m</b>	

## Modified Rational & Weir Calculations - POND 14

Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 14 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond14	9.93	99300	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.32

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	2.32
Maximum Head (m)	0.30
Required Length (m)	8.29
Provided Length (m)	9.00
Calculated Flow (m3/s)	2.52

## Hickenbottom Drawdown Time - ESC Pond - POND 14

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	1,241	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	49177	s
<b>Hickenbottom Drawdown Time</b>	<b>14</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,293	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	25.24	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	51220	s
<b>Hickenbottom Drawdown Time</b>	<b>14</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: IC/MJ      DATE: 2022.08.30  
CHECKED BY: JS      UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 15

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	7.22	ha
Permanent Pool Volume:	1,336	m <sup>3</sup>
Active Storage Volume:	903	m <sup>3</sup>
Total:	2,238	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide -  
Appendix B

### Temporary Settlement Basin Sizing - POND 15

#### Proposed Basin Dimensions

<u>Depth</u>			<u>Side Slope</u>		
Freeboard:	0.30	m	Freeboard:	4	:1
Active Storage:	0.75	m	Active Storage:	4	:1
Permanent Pool:	3.00	m	Permanent Pool:	4	:1
<b>Total Depth of Basin:</b>	<b>4.05</b>	<b>m</b>			
<u>Length</u>			<u>Elevations</u>		
Top of Basin:	42.0	m	Top of Pond / Freeboard:	247.70	m
Bottom of Freeboard:	39.6	m	Active Storage:	247.40	m
Bottom of Active Storage:	33.6	m	Permanent Pool:	246.65	m
Bottom of Basin:	9.6	m	Bottom of Basin:	243.65	m
Buffer:	0.0	m			
<b>Total Top Length of Basin:</b>	<b>42.0</b>	<b>m</b>			
<u>Width</u>			<b>Total Basin Surface Area:</b>		
Top of Basin:	42.0	m		1,764	m <sup>2</sup>
Bottom Freeboard:	39.6	m		<b>0.18</b>	ha
Bottom of Active Storage:	33.6	m			
Bottom of Basin:	9.6	m	<b>Total Active Storage Area:</b>	1,568	m <sup>2</sup>
Buffer:	0	m	<b>Total Permanent Pool Area:</b>	1,129	m <sup>2</sup>
<b>Total Top Width of Basin:</b>	<b>42.0</b>	<b>m</b>			

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	499	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,005	m <sup>3</sup>	903	m <sup>3</sup>
Permanent Pool Volume:	1,400	m <sup>3</sup>	1,336	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>2,904</b>	<b>m<sup>3</sup></b>	<b>2,238</b>	<b>m<sup>3</sup></b>

### Temporary Forebay Sizing - POND 15

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	246.7	m	
Forebay Length:	11.2	m	
Forebay Width:	11.2	m	
Bottom Length:	3.2	m	
Bottom Width:	3.2	m	
Forebay Volume:	51.8	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	72200	m <sup>2</sup>	
Extended Detention Volume:	1805.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.010	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
<b>Minimum Forebay Length for Settling:</b>	<b>5.9</b>	<b>m</b>	
<b>Provided Forebay Length for Settling:</b>	<b>11.2</b>	<b>m</b>	

## Modified Rational & Weir Calculations - POND 15

### Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 15 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond15	7.22	72200	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	1.69

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	1.69
Maximum Head (m)	0.30
Required Length (m)	6.03
Provided Length (m)	6.00
Calculated Flow (m3/s)	1.68

## Hickenbottom Drawdown Time - ESC Pond - POND 15

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	903	m <sup>3</sup>
Depth for Active Storage	0.75	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	22.91 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	39395	s
<b>Hickenbottom Drawdown Time</b>	<b>11</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,005	m <sup>3</sup>
Depth for Active Storage	0.75	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	22.91 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	43855	s
<b>Hickenbottom Drawdown Time</b>	<b>12</b>	<b>hrs</b>

### Temporary Settlement Basin - Required Volume Specifications - POND 16

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	7.15	ha
Permanent Pool Volume:	1,323	m <sup>3</sup>
Active Storage Volume:	894	m <sup>3</sup>
Total:	2,217	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide -  
Appendix B



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: IC/MJ    DATE: 2022.08.30  
CHECKED BY: JS    UPDATED: 2023.04.06

### Temporary Settlement Basin Sizing - POND 16

#### Proposed Basin Dimensions

##### Depth

Freeboard: 0.30 m  
Active Storage: 0.70 m  
Permanent Pool: 3.00 m

**Total Depth of Basin: 4.00 m**

##### Side Slope

Freeboard: 4 :1  
Active Storage: 4 :1  
Permanent Pool: 4 :1

##### Length

Top of Basin: 41.5 m  
Bottom of Freeboard: 39.1 m  
Bottom of Active Storage: 33.5 m  
Bottom of Basin: 9.5 m  
Buffer: 0.0 m

**Total Top Length of Basin: 41.5 m**

##### Elevations

Top of Pond / Freeboard: 246.00 m  
Active Storage: 245.70 m  
Permanent Pool: 245.00 m  
Bottom of Basin: 242.00 m

##### Width

Top of Basin: 41.5 m  
Bottom Freeboard: 39.1 m  
Bottom of Active Storage: 33.5 m  
Bottom of Basin: 9.5 m  
Buffer: 0 m

**Total Top Width of Basin: 41.5 m**

**Total Basin Surface Area:** 1,722 m<sup>2</sup>  
0.17 ha

**Total Active Storage Area:** 1,529 m<sup>2</sup>  
**Total Permanent Pool Area:** 1,122 m<sup>2</sup>

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	487	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	922	m <sup>3</sup>	894	m <sup>3</sup>
Permanent Pool Volume:	1,387	m <sup>3</sup>	1,323	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>2,796</b>	<b>m<sup>3</sup></b>	<b>2,217</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 16

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	245.0	m	
Forebay Length:	11.2	m	
Forebay Width:	11.2	m	
Bottom Length:	3.2	m	
Bottom Width:	3.2	m	
Forebay Volume:	51.4	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	71500	m <sup>2</sup>	
Extended Detention Volume:	1787.5	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.010	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	5.9	m	
Provided Forebay Length for Settling:	11.2	m	

## Modified Rational & Weir Calculations - POND 16

### Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 16 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond16	7.15	71500	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	1.67

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	1.67
Maximum Head (m)	0.30
Required Length (m)	5.97
Provided Length (m)	6.00
Calculated Flow (m3/s)	1.68

## Hickenbottom Drawdown Time - ESC Pond - POND 16

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	894	m <sup>3</sup>
Depth for Active Storage	0.70	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	20.65 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	43272	s
<b>Hickenbottom Drawdown Time</b>	<b>12</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	922	m <sup>3</sup>
Depth for Active Storage	0.70	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	20.65 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	44658	s
<b>Hickenbottom Drawdown Time</b>	<b>12</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: IC/MJ      DATE: 2022.08.30  
CHECKED BY: JS      UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 17

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	8.80	ha
Permanent Pool Volume:	1,628	m <sup>3</sup>
Active Storage Volume:	1,100	m <sup>3</sup>
Total:	2,728	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide -  
Appendix B

### Temporary Settlement Basin Sizing - POND 17

#### Proposed Basin Dimensions

##### Depth

Freeboard:	0.30	m
Active Storage:	0.80	m
Permanent Pool:	3.00	m

**Total Depth of Basin:**      **4.10**      m

##### Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

##### Length

Top of Basin:	45.6	m
Bottom of Freeboard:	43.2	m
Bottom of Active Storage:	36.8	m
Bottom of Basin:	12.8	m
Buffer:	0.0	m

**Total Top Length of Basin:**      **45.6**      m

##### Elevations

Top of Pond / Freeboard:	247.30	m
Active Storage:	247.00	m
Permanent Pool:	246.20	m
Bottom of Basin:	243.20	m

##### Width

Top of Basin:	45.6	m
Bottom Freeboard:	43.2	m
Bottom of Active Storage:	36.8	m
Bottom of Basin:	12.8	m
Buffer:	0	m

**Total Top Width of Basin:**      **45.6**      m

**Total Basin Surface Area:**      2,079      m<sup>2</sup>  
    **0.21**      ha

**Total Active Storage Area:**      1,866      m<sup>2</sup>  
**Total Permanent Pool Area:**      1,354      m<sup>2</sup>

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	591	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,280	m <sup>3</sup>	1,100	m <sup>3</sup>
Permanent Pool Volume:	1,845	m <sup>3</sup>	1,628	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>3,717</b>	<b>m<sup>3</sup></b>	<b>2,728</b>	<b>m<sup>3</sup></b>

### Temporary Forebay Sizing - POND 17

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	246.2	m	
Forebay Length:	12.3	m	
Forebay Width:	12.3	m	
Bottom Length:	4.3	m	
Bottom Width:	4.3	m	
Forebay Volume:	68.3	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	88000	m <sup>2</sup>	
Extended Detention Volume:	2200.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.013	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
<b>Minimum Forebay Length for Settling:</b>	<b>6.5</b>	<b>m</b>	
<b>Provided Forebay Length for Settling:</b>	<b>12.3</b>	<b>m</b>	

## Modified Rational & Weir Calculations - POND 17

Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 17 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond17	8.80	88000	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.06

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	2.06
Maximum Head (m)	0.30
Required Length (m)	7.35
Provided Length (m)	8.00
Calculated Flow (m3/s)	2.24

## Hickenbottom Drawdown Time - ESC Pond - POND 17

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	1,100	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	25.24 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	43581	s
<b>Hickenbottom Drawdown Time</b>	<b>12</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,280	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	25.24 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	50712	s
<b>Hickenbottom Drawdown Time</b>	<b>14</b>	<b>hrs</b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: IC/MJ      DATE: 2022.08.30  
CHECKED BY: JS      UPDATED: 2023.04.06

### Temporary Settlement Basin - Required Volume Specifications - POND 18

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	9.58	ha
Permanent Pool Volume:	1,772	m <sup>3</sup>
Active Storage Volume:	1,198	m <sup>3</sup>
Total:	2,970	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide -  
Appendix B



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: IC/MJ DATE: 2022.08.30  
CHECKED BY: JS UPDATED: 2023.04.06

### Temporary Settlement Basin Sizing - POND 18

#### Proposed Basin Dimensions

##### Depth

Freeboard:	0.30	m
Active Storage:	0.80	m
Permanent Pool:	3.00	m

**Total Depth of Basin:** 4.10 m

##### Side Slope

Freeboard:	4 :1
Active Storage:	4 :1
Permanent Pool:	4 :1

##### Length

Top of Basin:	45.7	m
Bottom of Freeboard:	43.3	m
Bottom of Active Storage:	36.9	m
Bottom of Basin:	12.9	m
Buffer:	0.0	m

**Total Top Length of Basin:** 45.7 m

##### Elevations

Top of Pond / Freeboard:	247.10	m
Active Storage:	246.80	m
Permanent Pool:	246.00	m
Bottom of Basin:	243.00	m

##### Width

Top of Basin:	45.7	m
Bottom Freeboard:	43.3	m
Bottom of Active Storage:	36.9	m
Bottom of Basin:	12.9	m
Buffer:	0	m

**Total Top Width of Basin:** 45.7 m

**Total Basin Surface Area:** 2,088 m<sup>2</sup>  
0.21 ha

**Total Active Storage Area:** 1,875 m<sup>2</sup>  
**Total Permanent Pool Area:** 1,362 m<sup>2</sup>

#### Basin Volume Calculation

	<u>Provided</u>		<u>Required</u>	
Freeboard Volume:	594	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	1,286	m <sup>3</sup>	1,198	m <sup>3</sup>
Permanent Pool Volume:	1,860	m <sup>3</sup>	1,772	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>3,741</b>	<b>m<sup>3</sup></b>	<b>2,970</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 18

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	246.0	m	
Forebay Length:	12.3	m	
Forebay Width:	12.3	m	
Bottom Length:	4.3	m	
Bottom Width:	4.3	m	
Forebay Volume:	68.9	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	95800	m <sup>2</sup>	
Extended Detention Volume:	2395.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.014	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	6.8	m	
Provided Forebay Length for Settling:	12.3	m	

## Modified Rational & Weir Calculations - POND 18

### Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 18 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond18	9.58	95800	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	2.24

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	2.24
Maximum Head (m)	0.30
Required Length (m)	8.00
Provided Length (m)	8.00
Calculated Flow (m3/s)	2.24

## Hickenbottom Drawdown Time - ESC Pond - POND 18

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	1,198	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	25.24 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	47.443	s
<b>Hickenbottom Drawdown Time</b>	<b>13</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	1,286	m <sup>3</sup>
Depth for Active Storage	0.80	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>
Hickenbottom Capacity	25.24 L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	50.966	s
<b>Hickenbottom Drawdown Time</b>	<b>14</b>	<b>hrs</b>

### Temporary Settlement Basin - Required Volume Specifications - POND 19

#### Specifications

Active Storage Design Requirement:	125	m <sup>3</sup> /ha
Permanent Pool Design Requirement:	185	m <sup>3</sup> /ha
Drawdown Time:	48	hrs
Minimum Depth of Basin:	1	m
Maximum Depth of Basin:	5	m
Length to Width Ratio	4:1	L:W
Maximum Internal Side Slopes	4:1	H:V
Maximum External Side Slopes	2:1	H:V

#### Required Volume Calculations

Temporary Drainage Area:	3.22	ha
Permanent Pool Volume:	596	m <sup>3</sup>
Active Storage Volume:	403	m <sup>3</sup>
Total:	998	m <sup>3</sup>

#### References/Notes

TRCA Erosion and Sediment Control Guide - Appendix B



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: IC/MJ DATE: 2022.08.30  
CHECKED BY: JS UPDATED: 2023.04.06

### Temporary Settlement Basin Sizing - POND 19

#### Proposed Basin Dimensions

##### Depth

Freeboard: 0.30 m  
Active Storage: 0.45 m  
Permanent Pool: 3.00 m

**Total Depth of Basin: 3.75 m**

##### Side Slope

Freeboard: 4 :1  
Active Storage: 4 :1  
Permanent Pool: 4 :1

##### Length

Top of Basin: 34.5 m  
Bottom of Freeboard: 32.1 m  
Bottom of Active Storage: 28.5 m  
Bottom of Basin: 4.5 m  
Buffer: 0.0 m

**Total Top Length of Basin: 34.5 m**

##### Elevations

Top of Pond / Freeboard: 248.50 m  
Active Storage: 248.20 m  
Permanent Pool: 247.75 m  
Bottom of Basin: 244.75 m

##### Width

Top of Basin: 34.5 m  
Bottom Freeboard: 32.1 m  
Bottom of Active Storage: 28.5 m  
Bottom of Basin: 4.5 m  
Buffer: 0 m

**Total Top Width of Basin: 34.5 m**

**Total Basin Surface Area:** 1,190 m<sup>2</sup>  
**0.12 ha**

**Total Active Storage Area:** 1,030 m<sup>2</sup>  
**Total Permanent Pool Area:** 812 m<sup>2</sup>

#### Basin Volume Calculation

	Provided		Required	
Freeboard Volume:	333	m <sup>3</sup>	-	m <sup>3</sup>
Active Storage Volume:	413	m <sup>3</sup>	403	m <sup>3</sup>
Permanent Pool Volume:	817	m <sup>3</sup>	596	m <sup>3</sup>
<b>Total Basin Volume:</b>	<b>1,563</b>	<b>m<sup>3</sup></b>	<b>998</b>	<b>m<sup>3</sup></b>



PROJECT: Tullamore  
PROJECT NO.: 2022-5842-3

CREATED BY: MJ  
CHECKED BY: JS

DATE: 2022.08.30  
UPDATED: 2023.04.06

### Temporary Forebay Sizing - POND 19

#### Proposed Forebay Dimensions

Depth of Forebay:	1.0	m	Minimum of 1m per TRCA Erosion and Sediment Control Guidelines
Spill Elevation:	247.8	m	
Forebay Length:	9.5	m	
Forebay Width:	9.5	m	
Bottom Length:	1.5	m	
Bottom Width:	1.5	m	
Forebay Volume:	30.3	m <sup>3</sup>	
Forebay Volume/PP Volume*100:	3.7	%	Must be less than 33% per TRCA Erosion and Sediment Control Guidelines

#### Minimum Forebay Length for Settling

Catchment Area:	32200	m <sup>2</sup>	
Extended Detention Volume:	805.0	m <sup>3</sup>	Based on 25mm event
Drawdown Time:	48.0	hours	Per TRCA Erosion and Sediment Control Guidelines
Peak Flowrate:	0.005	m <sup>3</sup> /s	From pond during quality design storm
Length to Width Ratio of Forebay:	1.0	:1	
Settling Velocity:	0.0003	m/s	
Minimum Forebay Length for Settling:	3.9	m	
Provided Forebay Length for Settling:	9.5	m	

## Modified Rational & Weir Calculations - POND 19

Storm Data: Town of Caledon

Time of Concentration:  $T_c = 10$  min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
100 yr	4688	17.00	0.9624	167.10

Pond 19 Catchment			
Catchment	Area (ha)	Area (m <sup>2</sup> )	Weighted Average C
Pond19	3.22	32200	0.50

$$i(T_d) = A / (T + B)^C$$

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storm Event (yr)	Peak Flow Rate (m3/s)
100	0.75

Emergency Overflow Weir	
Flow (100-year) ( m3/s)	0.75
Maximum Head (m)	0.30
Required Length (m)	2.69
Provided Length (m)	3.00
Calculated Flow (m3/s)	0.84

## Hickenbottom Drawdown Time - ESC Pond - POND 19

### Calculations

<b>REQUIRED Pond Active Storage Volume</b>	403	m <sup>3</sup>
Depth for Active Storage	0.45	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	10.64	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	37838	s
<b>Hickenbottom Drawdown Time</b>	<b>11</b>	<b>hrs</b>

<b>PROVIDED Pond Active Storage Volume</b>	413	m <sup>3</sup>
Depth for Active Storage	0.45	m
Target Drawdown Time	48	hrs

Hickenbottom Specifications	<b>0.127m intake with 24 - 25mm holes per 0.305m</b>	
Hickenbottom Capacity	10.64	L/s

Note: Hickenbottom specifications and capacity based on Hickenbottom Inc. Product Specifications  
<http://www.hickenbottominc.com/index.html>

Hickenbottom Drawdown Time	38839	s
<b>Hickenbottom Drawdown Time</b>	<b>11</b>	<b>hrs</b>

# Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Thursday, Nov 17 2022

## West Culvert

Invert Elev Dn (m) = 238.5000  
Pipe Length (m) = 48.0000  
Slope (%) = 0.8333  
Invert Elev Up (m) = 238.9000  
Rise (mm) = 900.0  
Shape = Circular  
Span (mm) = 900.0  
No. Barrels = 1  
n-Value = 0.012  
Culvert Type = Circular Corrugate Metal Pipe  
Culvert Entrance = Projecting  
Coeff. K,M,c,Y,k = 0.034, 1.5, 0.0553, 0.54, 0.9

### Embankment

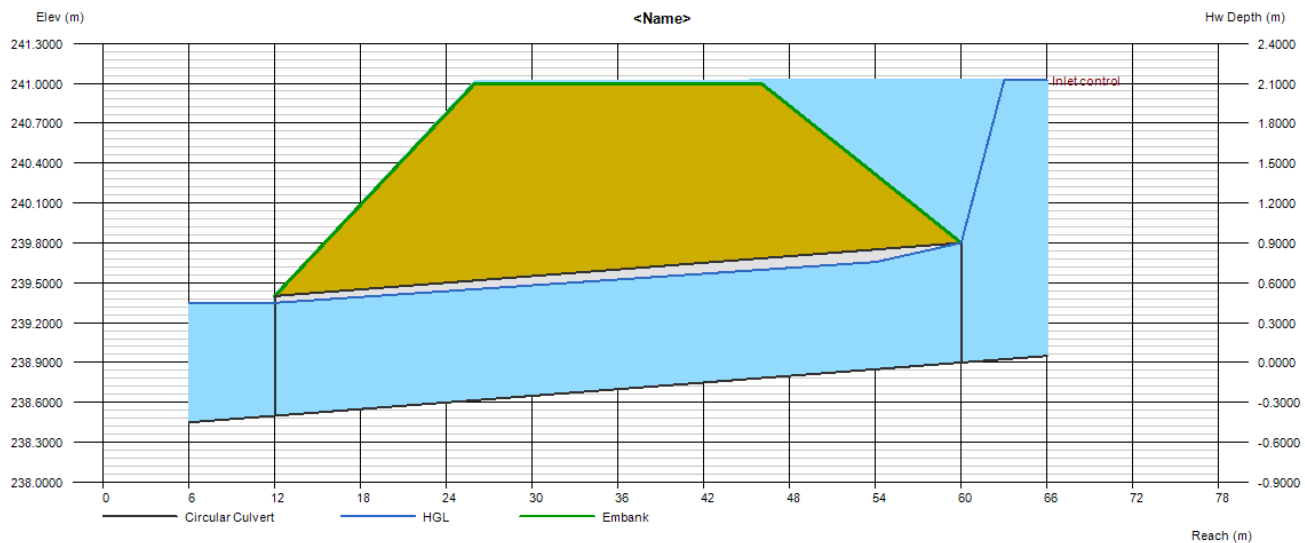
Top Elevation (m) = 241.0000  
Top Width (m) = 20.0000  
Crest Width (m) = 50.0000

### Calculations

Qmin (cms) = 0.0000  
Qmax (cms) = 3.0000  
Tailwater Elev (m) = (dc+D)/2

### Highlighted

Qtotal (cms) = 2.2500  
Qpipe (cms) = 1.9130  
Qovertop (cms) = 0.3370  
Veloc Dn (m/s) = 3.0762  
Veloc Up (m/s) = 3.2031  
HGL Dn (m) = 239.3490  
HGL Up (m) = 239.6994  
Hw Elev (m) = 241.0227  
Hw/D (m) = 2.3586  
Flow Regime = Inlet Control



# Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Thursday, Nov 17 2022

## East

Invert Elev Dn (m) = 236.7000  
Pipe Length (m) = 27.0000  
Slope (%) = 1.8519  
Invert Elev Up (m) = 237.2000  
Rise (mm) = 600.0  
Shape = Circular  
Span (mm) = 600.0  
No. Barrels = 1  
n-Value = 0.012  
Culvert Type = Circular Corrugate Metal Pipe  
Culvert Entrance = Projecting  
Coeff. K,M,c,Y,k = 0.034, 1.5, 0.0553, 0.54, 0.9

### Embankment

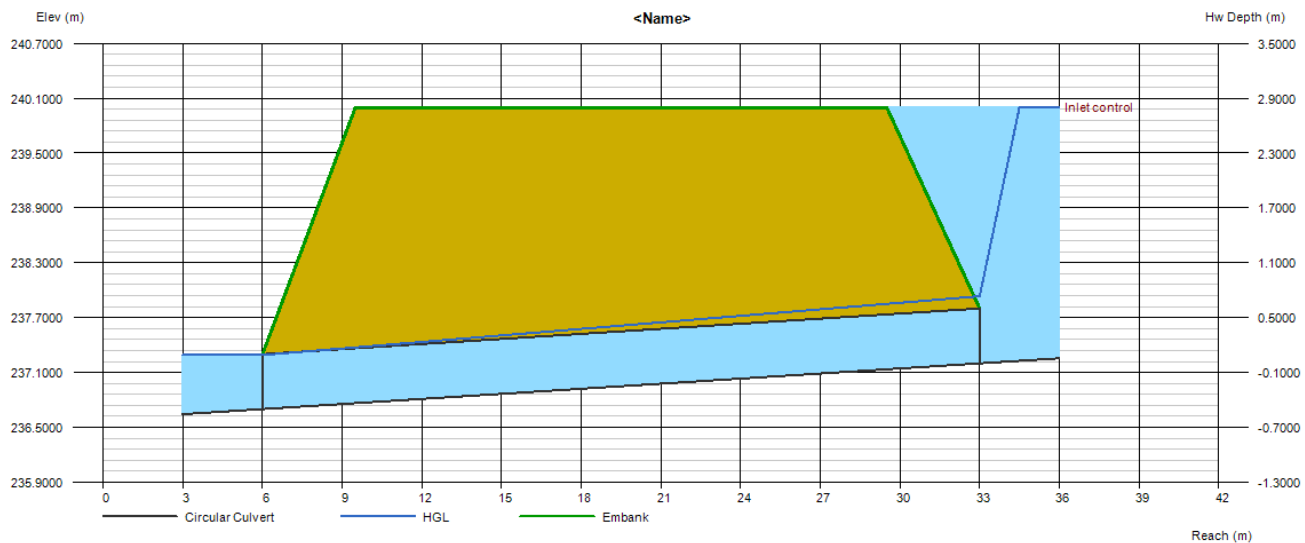
Top Elevation (m) = 240.0000  
Top Width (m) = 20.0000  
Crest Width (m) = 50.0000

### Calculations

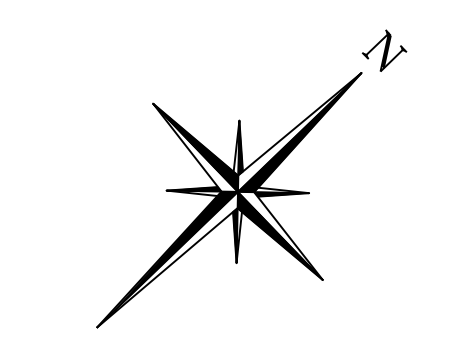
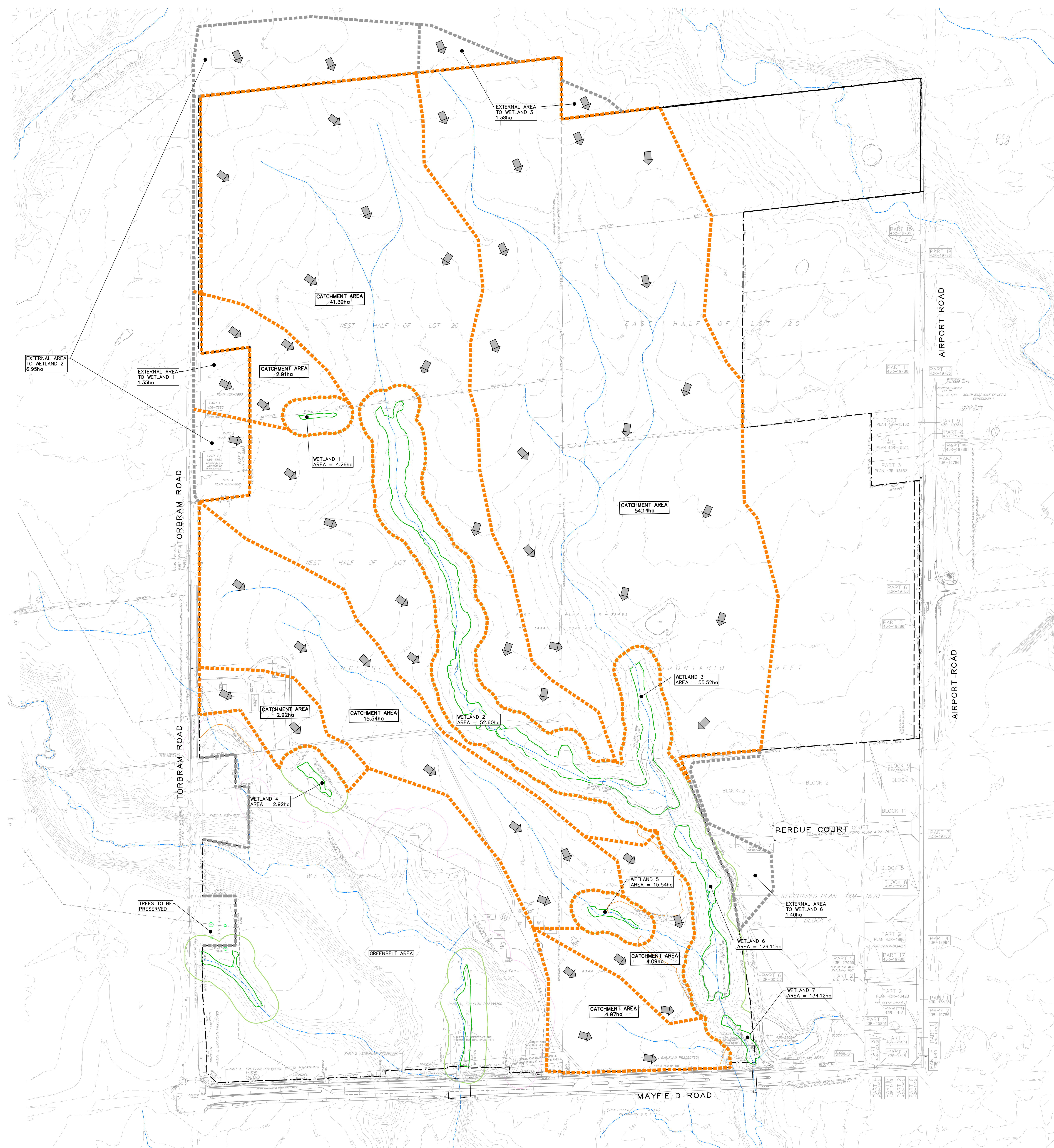
Qmin (cms) = 0.0000  
Qmax (cms) = 3.0000  
Tailwater Elev (m) = (dc+D)/2

### Highlighted

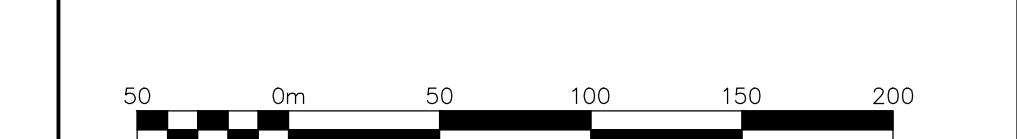
Qtotal (cms) = 2.0000  
Qpipe (cms) = 1.0467  
Qovertop (cms) = 0.9533  
Veloc Dn (m/s) = 3.7124  
Veloc Up (m/s) = 3.7019  
HGL Dn (m) = 237.2916  
HGL Up (m) = 237.9339  
Hw Elev (m) = 240.0049  
Hw/D (m) = 4.6748  
Flow Regime = Inlet Control



# DRAWINGS



LEGEND	
	PROPERTY LINE
	EXISTING CONTOUR (1.0m)
	EXISTING CONTOUR (5.0m)
	EXISTING WETLAND CATCHMENTS
	EXTERNAL WETLAND CATCHMENTS
	WETLAND LIMIT (30m BUFFER, GEI 2022)
	WETLAND LIMIT (GEI, 2022)
	EX. WATERCOURSES
	EXISTING OVERLAND FLOW DIRECTION



2	ISSUED FOR TOPSOIL STRIPPING PERMIT	2023/APR/11
1	ISSUED FOR TOPSOIL STRIPPING PERMIT	2022/DEC/21
0	ISSUED FOR TOPSOIL STRIPPING PERMIT	2022/NOV/24

No.	ISSUE / REVISION	YYYY/MM/DD

**BEARING NOTE:**  
BEARINGS ARE UTM GRID, DERIVED FROM GPS OBSERVATION USING THE "TOPNET" GPS NETWORK OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (1997.0)

**ELEVATION NOTE:**  
ELEVATIONS HEREON ARE GEODETIC IN ORIGIN AND WERE DERIVED FROM GPS OBSERVATION USING THE "TOPNET" GPS NETWORK AND REFERRED TO THE CGVD-1928 1987 DATUM

**SITE BENCHMARK:**  
A CUT CROSS HAVING ELEVATION 242.51 m WAS SET ON THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN MAYFIELD ROAD AND TORBRAM ROAD

**DRAFT PLAN NOTES:**  
DESIGN ELEMENTS ARE BASED ON SITE PLAN BY WESTON CONSULTING INC.  
DRAWING NO.: 180  
PROJECT NO.: 180

**DRAWING NOTES:**  
THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART OF IT WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.  
THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.  
THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.  
ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

TULLAMORE LANDS  
TOWN OF CALEDON

EXISTING DRAINAGE TO WETLANDS

2800 HIGH POINT DRIVE  
SUITE 100  
MILTON, ON L7T 6P4  
905-875-0020 T  
905-875-4311 F  
WWW.CFCROZIER.CA

Drawn: L.E. Design: I.C. Project No: 2022-5842

Check: I.C. Check: J.S. Scale: 1:2500

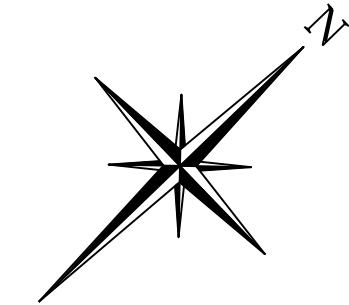
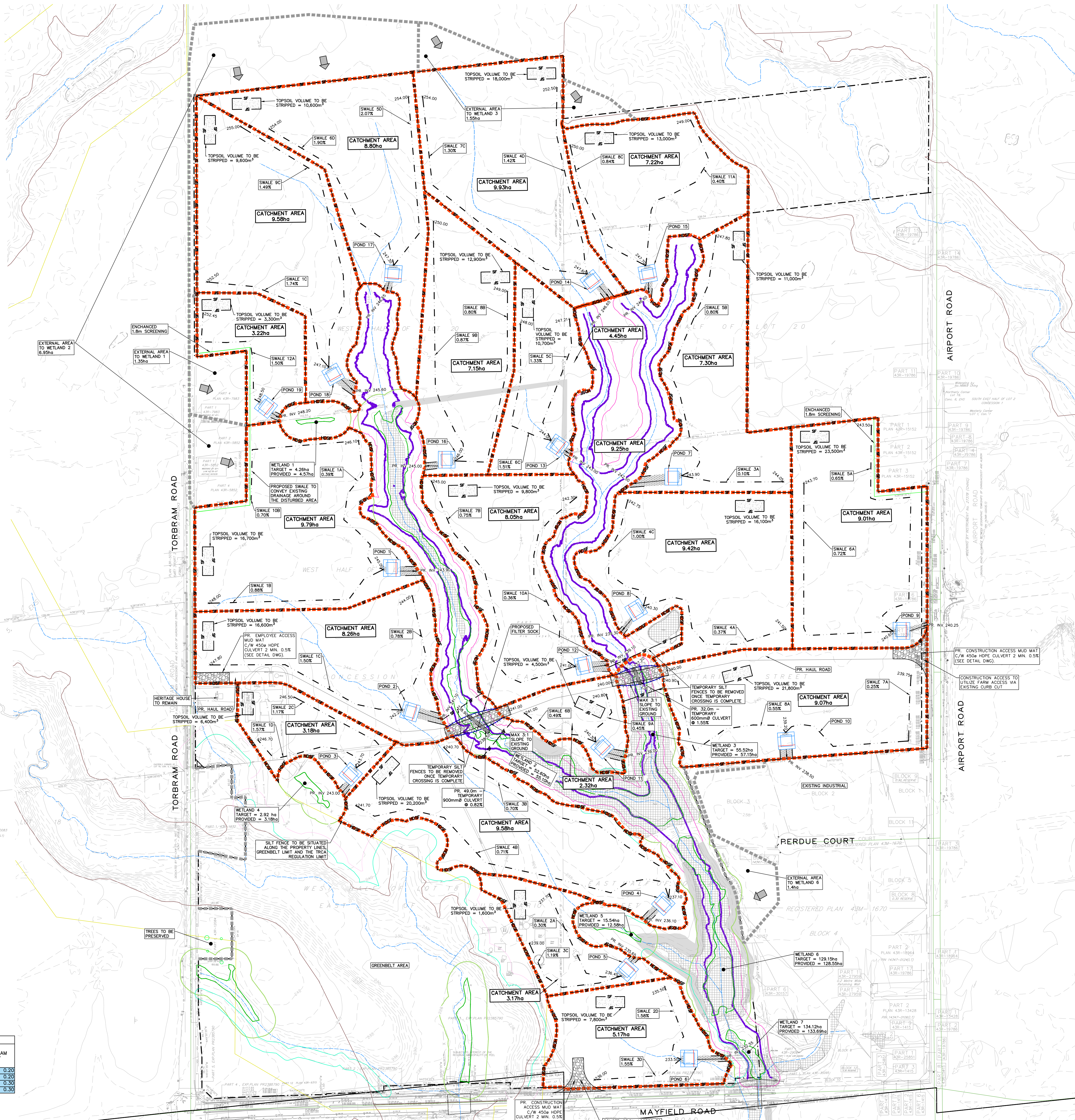
FIGURE 1



- CONSTRUCTION SEQUENCING FOR TEMPORARY CULVERTS:
1. THIS WORK IS ONLY TO BE COMPLETED DURING DRY WEATHER.
  2. INSTALL TEMPORARY SILT FENCE 20M UPSTREAM AND DOWNSTREAM OF THE TEMPORARY CULVERT LOCATIONS.
  3. INSTALL TEMPORARY PUMP AND HOSE TO ROUTE ANY DRY WEATHER FLOWS PAST THE CULVERT AREA. THE PUMP SHOULD DISCHARGE THROUGH THE DRAINAGE TREATMENT TRAIN DETAIL AS SHOWN ON DRAWING TSP-03.
  4. INSTALL TEMPORARY CULVERT.
  5. CONSTRUCT TEMPORARY ROAD ON TOP OF THE CULVERT AND ASSOCIATED MATCH 3:1 GRADING.
  6. INSTALL FILTER SOCK AT BASE OF 3:1 GRADING.
  7. REMOVE TEMPORARY SILT FENCE UPSTREAM AND DOWNSTREAM OF THE CULVERTS.

FILTREX SPACING CALCULATIONS					
INTERCEPTOR SWALE	LENGTH OF CHANNEL BETWEEN CHECK DAMS	SWALE SLOPE (%)	SWALE/CHANNEL SLOPE m/m	CHANGE IN ELEVATION FROM U/S TO D/S DAM	CHECK DAM HEIGHT
A	65	0.30	0.0030	0.20	0.20
B	28	0.70	0.0070	0.20	0.20
C	27	1.10	0.0110	0.30	0.30
D	20	1.50	0.0150	0.30	0.30

NOTE: REFER TO DRAWINGS TSP-03 FROM FILTREX DETAIL



- LEGEND**
- PROPERTY LINE
  - PROPOSED SWALE
  - EXISTING CONTOUR (1.0m)
  - EXISTING CONTOUR (5.0m)
  - GREENBELT BOUNDARY
  - CURRENT PHASE TOPSOIL STRIPPING AREA
  - EXISTING WETLAND CATCHMENTS
  - EXTERNAL WETLAND CATCHMENTS
  - SILT FENCE (OPSD-219.100)
  - DOUBLE SILT FENCE (PER DETAIL ON DWD TSP-03)
  - WETLAND LIMIT (30m BUFFER, GEI 2022)
  - WETLAND LIMIT (GEI 2022)
  - EX. WATERCOURSE
  - PR. SEDIMENT CURTAIN (OPSS 219.260 AND OPSS 219.261)
  - FLOODLINE
  - FLOODLINE + 15m BUFFER
  - ENHANCED 1.8m SCREENING
  - PROPOSED SLOPE (3:1 MAX.)
  - EXISTING WETLANDS (GEI 2022)
  - EXISTING WOODLANDS (GEI 2022)
  - EXISTING OVERLAND FLOW DIRECTION
  - BELOW PROPOSED SURFACE
  - MATCH EXISTING ELEVATION
  - TEMPORARY POND WITH FOREBAY
  - STOCKPILE LOCATION SURROUNDED BY SILT FENCE PER OPSD-219.100
  - 200mm DEPTH, 200mm DIAMETER RIP-RAP

- NOTE:**
1. CONTRACTOR TO ENSURE POSITIVE DRAINAGE FROM EXTERNAL PROPERTIES IS MAINTAINED AND DRAINAGE FROM EXTERNAL PROPERTIES IS NOT BLOCKED.
  2. STOCKPILE TO BE STABILIZED USING EROSION CONTROL MATS AND TERRA SEED WITH 50mm DEPTH OF MULCH.

- NOTE:**
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- NOTE:**
- ANY TOPSOIL STOCKPILED FOR OVER 6 MONTHS SHOULD BE AMENDED WITH COMPOST.

- NOTE:**
- STABILIZE STOCKPILE AND ANY OTHER EXPOSED SOILS ON AREAS INACTIVE FOR 30 DAYS. (REFER TO TSP-03)

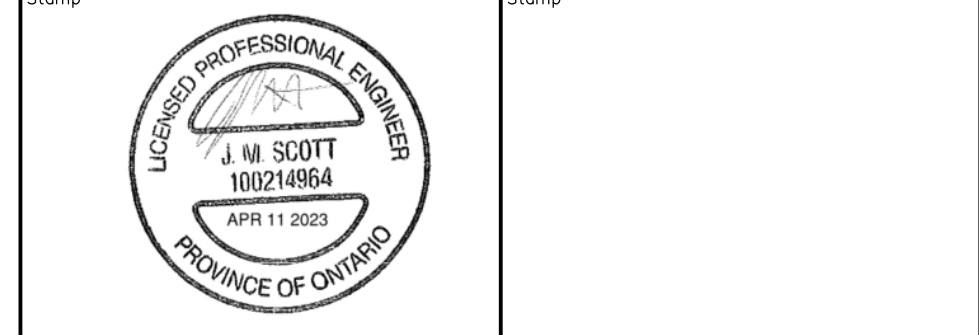
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- NOTE:**
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- NOTE:**
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- NOTE:**
- REFER TO DRAWINGS TSP-03 FOR POND AND SWALE DESIGN DETAILS.

No.	ISSUE / REVISION	DATE
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**SITE BENCHMARK:**  
A CUT CROSS HAVING ELEVATION 242.51 m WAS SET ON THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN MAYFIELD ROAD AND TORBRAM ROAD.

**DRAFT PLAN NOTES:**  
DESIGN ELEMENTS ARE BASED ON SITE PLAN BY WESTON CONSULTING INC. DRAWING No: 180 PROJECT No: 180

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**TULLAMORE LANDS TOWN OF CALEDON**

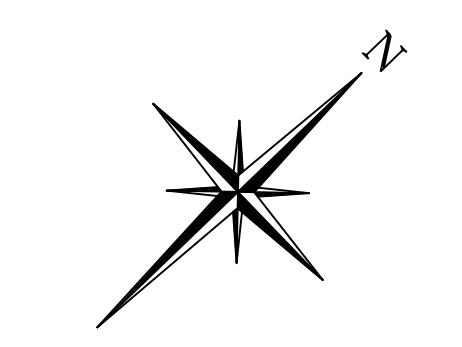
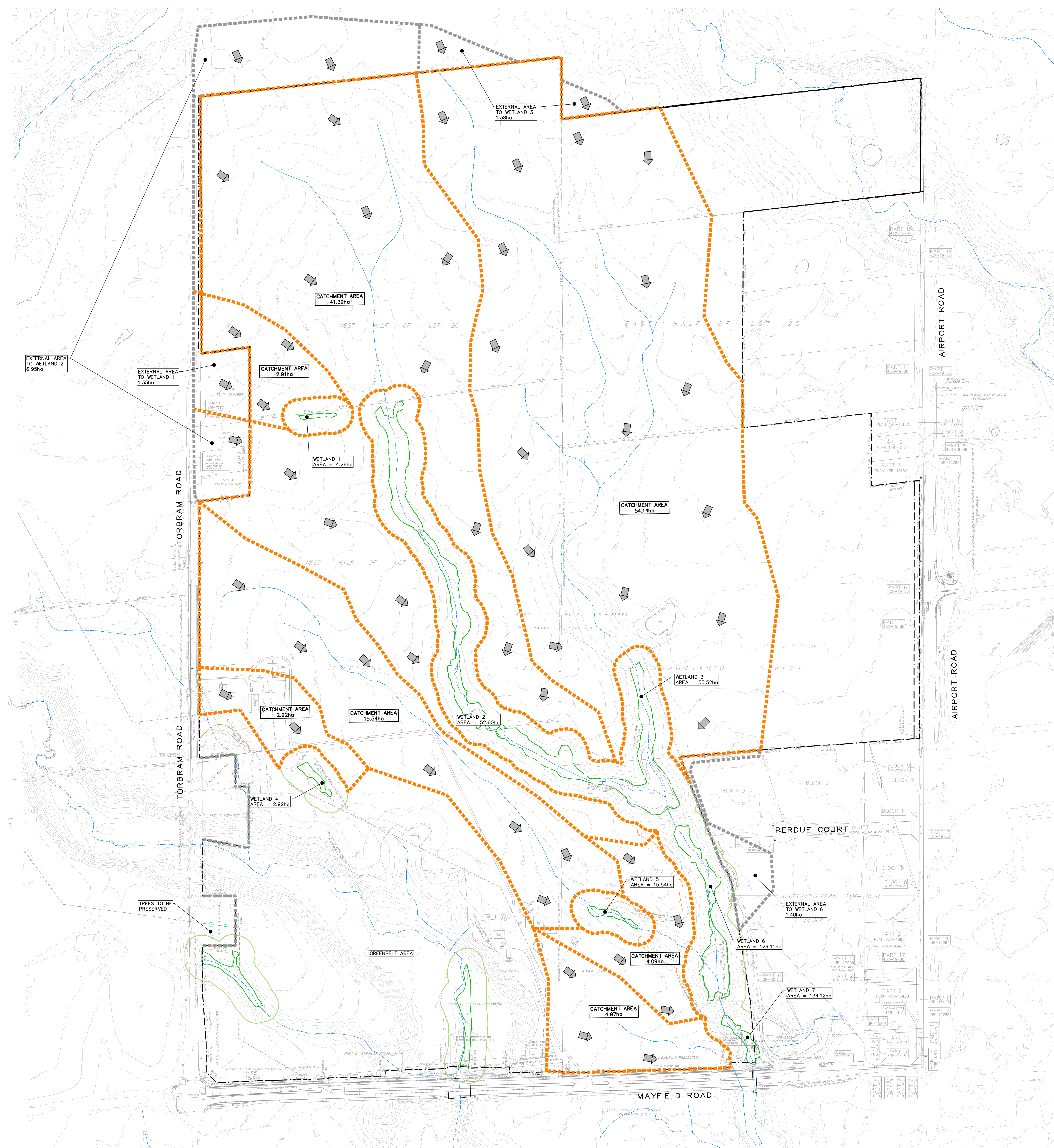
**TOPSOIL STRIPPING PERMIT & DRAINAGE TO WETLAND - PHASE 2**

**CROZIER CONSULTING ENGINEERS**

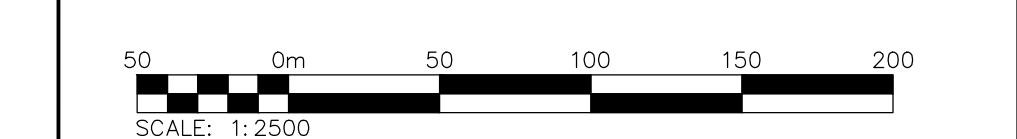
2800 HIGH POINT DRIVE SUITE 100 MILTON, ON L7T 6P4 905-875-0020 T 905-875-4311 F WWW.CFCROZIER.CA

Drawn: L.E. Design: I.C. Project No: 2022-5842  
Check: I.C. Check: J.S. Scale: 1:2500 Date: TSP-02





LEGEND	
	PROPERTY LINE
	EXISTING CONTOUR (1.0m)
	EXISTING CONTOUR (5.0m)
	EXISTING WETLAND CATCHMENTS
	EXTERNAL WETLAND CATCHMENTS
	WETLAND LIMIT (30m BUFFER, GEI 2022)
	WETLAND LIMIT (GEI, 2022)
	EX. WATERCOURSES
	EXISTING OVERLAND FLOW DIRECTION



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Stamp		

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TULLAMORE LANDS  
TOWN OF CALEDON

EXISTING DRAINAGE TO WETLANDS

**CROZIER**  
CONSULTING ENGINEERS

2800 HIGH POINT DRIVE  
SUITE 100  
MILTON, ON L7T 6P4  
905-875-0020 T  
905-875-4311 F  
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Drawn	L.E.	Design	I.C.	Project No.	2022-5842
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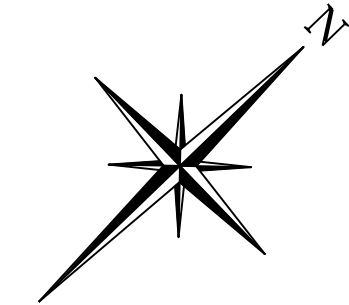
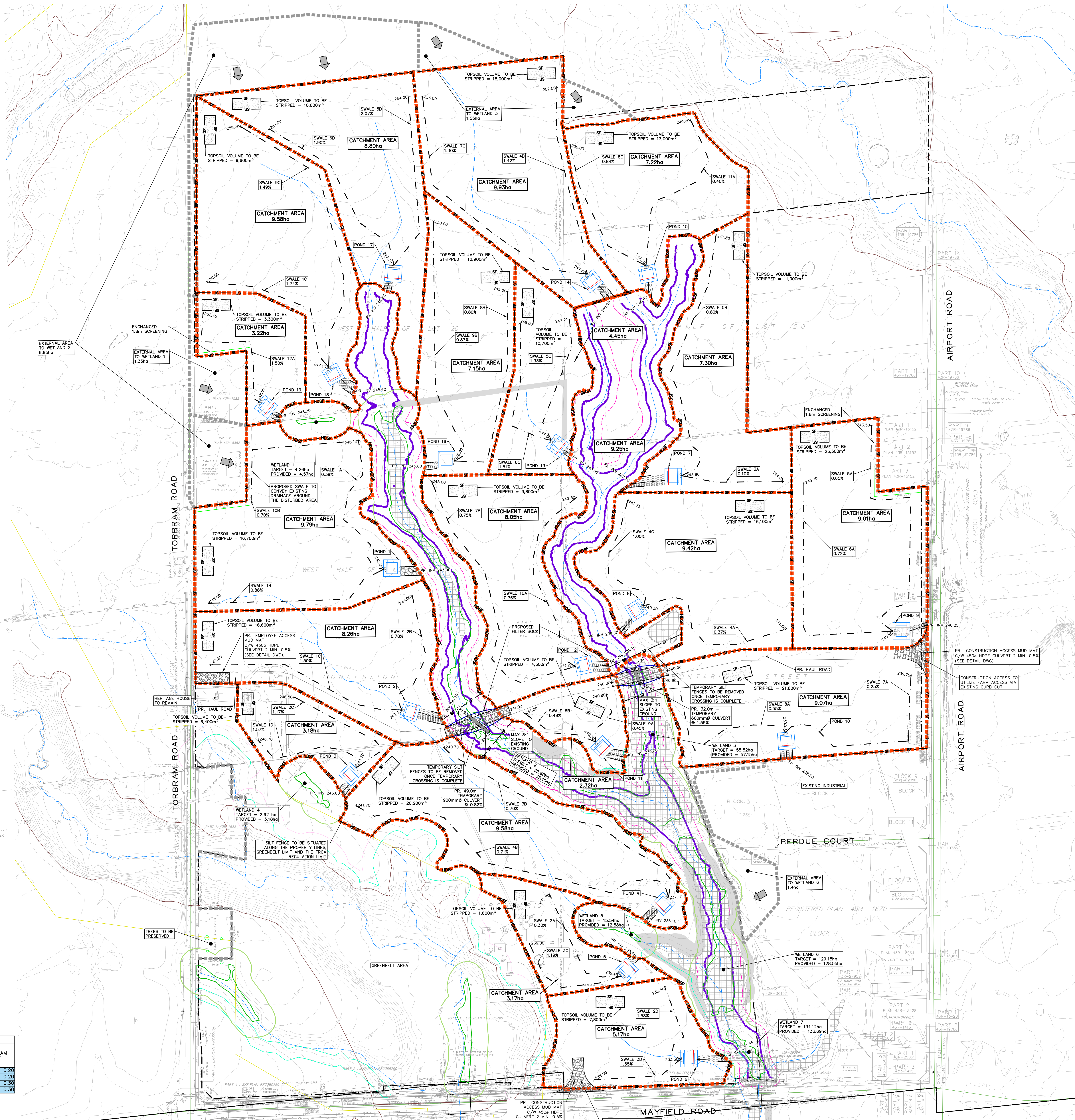
FIGURE 1



- CONSTRUCTION SEQUENCING FOR TEMPORARY CULVERTS:
1. THIS WORK IS ONLY TO BE COMPLETED DURING DRY WEATHER.
  2. INSTALL TEMPORARY SILT FENCE 20M UPSTREAM AND DOWNSTREAM OF THE TEMPORARY CULVERT LOCATIONS.
  3. INSTALL TEMPORARY PUMP AND HOSE TO ROUTE ANY DRY WEATHER FLOWS PAST THE CULVERT AREA. THE PUMP SHOULD DISCHARGE THROUGH THE DRAINAGE TREATMENT TRAIN DETAIL AS SHOWN ON DRAWING TSP-03.
  4. INSTALL TEMPORARY CULVERT.
  5. CONSTRUCT TEMPORARY ROAD ON TOP OF THE CULVERT AND ASSOCIATED MATCH 3:1 GRADING.
  6. INSTALL FILTER SOCK AT BASE OF 3:1 GRADING.
  7. REMOVE TEMPORARY SILT FENCE UPSTREAM AND DOWNSTREAM OF THE CULVERTS.

FILTREXX SPACING CALCULATIONS					
INTERCEPTOR SWALE	LENGTH OF CHANNEL BETWEEN CHECK DAMS	SWALE SLOPE (%)	SWALE/CHANNEL SLOPE m/m	CHANGE IN ELEVATION FROM U/S TO D/S DAM	CHECK DAM HEIGHT
A	65	0.30	0.0030	0.20	0.20
B	28	0.70	0.0070	0.20	0.20
C	27	1.10	0.0110	0.30	0.30
D	20	1.50	0.0150	0.30	0.30

NOTE: REFER TO DRAWINGS TSP-03 FROM FILTREXX DETAIL



- LEGEND**
- PROPERTY LINE
  - PROPOSED SWALE
  - EXISTING CONTOUR (1.0m)
  - EXISTING CONTOUR (5.0m)
  - GREENBELT BOUNDARY
  - CURRENT PHASE TOPSOIL STRIPPING AREA
  - EXISTING WETLAND CATCHMENTS
  - EXTERNAL WETLAND CATCHMENTS
  - SILT FENCE (OPSD-219.100)
  - DOUBLE SILT FENCE (PER DETAIL ON DWD TSP-03)
  - WETLAND LIMIT (30m BUFFER, GEI 2022)
  - WETLAND LIMIT (GEI 2022)
  - EX. WATERCOURSE
  - PR. SEDIMENT CURTAIN (OPSS 219.260 AND OPSS 219.261)
  - FLOODLINE
  - FLOODLINE + 15m BUFFER
  - ENHANCED 1.8m SCREENING
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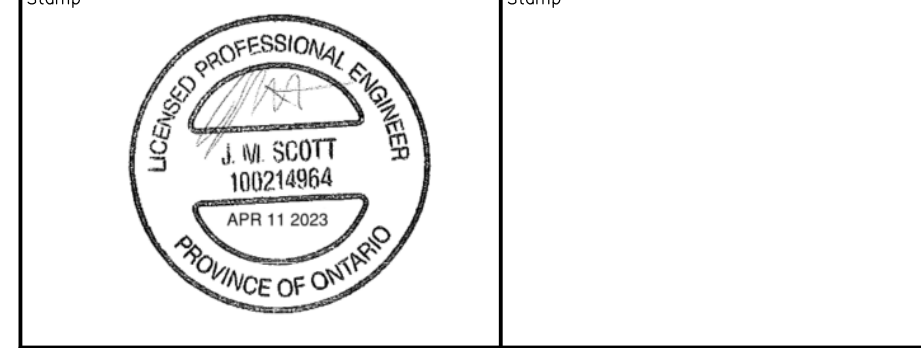
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**TULLAMORE LANDS**  
**TOWN OF CALEDON**

**TOPSOIL STRIPPING PERMIT & DRAINAGE TO WETLAND - PHASE 2**

**CROZIER CONSULTING ENGINEERS**

2800 HIGH POINT DRIVE  
SUITE 100  
MILTON, ON L7T 6P4  
905-875-0020  
905-875-4411 F  
WWW.CFCROZIER.CA

Drawn: L.E. Design: I.C. Project No: 2022-5842  
Check: I.C. Date: J.S. Scale: 1:2500 TSP-02

## TOPSOIL AND EROSION AND SEDIMENT CONTROL (ESC) MANAGEMENT STRATEGY

THE EROSION AND SEDIMENT CONTROLS SHALL BE A MULTI-BARRIER APPROACH TO PREVENT EROSION DURING CONSTRUCTION TO DEAL WITH SEDIMENT TRANSPORT AT SOURCE AND TO MINIMIZE SEDIMENT TRANSPORT FROM LEAVING THE SITE. THE MITIGATION MEASURES OUTLINED BELOW ARE INTENDED TO BE MAINTAINED BY THE CONTRACTOR THROUGHOUT INSPECTIONS, MONITORING AND MAINTENANCE UNTIL THE SLOPE HAS BEEN STABILIZED. THE CONTRACTOR SHALL KEEP A COPY OF THE ESC PLANS AND THE TORQUE AND REGION CONSERVATION AUTHORITY, EROSION AND SEDIMENT CONTROL GUIDELINE, DECEMBER 2006, ON SITE AT ALL TIMES.

### GENERAL NOTES

1. EROSION AND SEDIMENT CONTROL (ESC) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING THE CONSTRUCTION PHASES TO PREVENT ENTRY OF SEDIMENT INTO THE WATER. ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE REPAIRED AND REPLACED WITHIN 48 HOURS OF THE INSPECTION.
2. THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO PREVENT SEDIMENT RELEASES TO THE NATURAL ENVIRONMENT. ANY CHANGES FROM THE APPROVED ESC PLANS WILL BE DOCUMENTED AND REPORTED TO THE ENGINEER IMMEDIATELY.
3. IF THE PRESCRIBED EROSION AND SEDIMENT CONTROL MEASURES ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF A DELETERIOUS SUBSTANCE INCLUDING SEDIMENT, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS. TRCA ENGINEER OFFICER SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES ARE TO BE KEPT ON SITE AND USED AS NECESSARY.
4. AN ENVIRONMENTAL MONITOR WILL ATTEND THE SITE TO INSPECT ALL NEW CONTROLS, AS WELL AS ON A REGULAR BASIS, OR FOLLOWING RAIN/SNOWMELT EVENTS, TO MONITOR ALL WORKS, AND IN PARTICULAR WORKS RELATED TO EROSION AND SEDIMENT CONTROL. MONITORING SHOULD BE CONDUCTED DURING ALL WEATHER CONDITIONS. THE MONITOR WILL CONTACT THE TRCA ENGINEER OFFICER AS WELL AS THE CONTRACTOR.
5. ALL ACTIVITIES INVOLVED WITH THE CONSTRUCTION OF EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELLING AND MAINTENANCE SHALL BE CONDUCTED A MINIMUM OF 30M FROM THE WATER.

### EROSION CONTROLS

1. THE CONTRACTOR SHALL MONITOR THE WEATHER SEVERAL DAYS IN ADVANCE OF THE ONSET OF THE PROJECT TO ENSURE THE WEATHER WILL BE CONDUCTED DURING FAVORABLE WEATHER CONDITIONS. SHOULD AN UNEXPECTED STORM ARISE, THE CONTRACTOR WILL REMOVE ALL UNFIXED ITEMS FROM THE STORM FLOOD PLAN THAT WOULD HAVE THE POTENTIAL TO CAUSE A SPILL, OR AN OBSTRUCTION TO FLOW, E.G. PILE TANKS, PORTA-POTTIES, MACHINERY, EQUIPMENT, CONSTRUCTION MATERIALS, ETC.
2. ALL DISTURBED SLOPE SHALL BE TREATED AND RELEASED TO THE ENVIRONMENT AT LEAST 30M FROM A WATERCOURSE OR WETLAND AND ALLOWED TO DRAIN THROUGH A WELL-VEGETATED AREA. NO DISTURBED EFFLUENT SHALL BE SENT DIRECTLY TO ANY WATERCOURSE, WETLAND OR FOREST, OR ALLOWED TO DRAIN ONTO DISTURBED SOILS WITHIN THE WORK AREA. THESE CONTROL MEASURES SHALL BE MONITORED FOR EFFECTIVENESS AND MAINTAINED OR REVISED TO MEET THE OBJECTIVE OF PREVENTING THE RELEASE OF SEDIMENT LOOSEN WATER.
3. THE CONTRACTOR SHALL MINIMIZE THE AREA OF DISTURBANCE AT ANY ONE TIME TO LIMIT THE DURATION OF SOIL EXPOSURE. CONSTRUCTION SHALL BE PHASED AS NECESSARY AND AREAS STABILIZED AS THE WORK PROGRESSES. AREAS DISTURBED DUE TO A SPILL, OR AN OBSTRUCTION TO FLOW, E.G. PILE TANKS, PORTA-POTTIES, MACHINERY, EQUIPMENT, CONSTRUCTION MATERIALS, ETC.
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### SEDIMENT CONTROLS

1. SILT FENCE TO BE INSTALLED IN LOCATIONS SHOWN ON PLAN AND AS DIRECTED BY SITE ENGINEER.
2. SILT FENCE MUST BE INSPECTED WEEKLY FOR RIPS OR TEARS, BROKEN STAKES, BLOW-OUTS AND ACCUMULATION OF SEDIMENT.
3. SILT FENCE MUST BE INSPECTED FOLLOWING ALL 15mm OR GREATER RAIN STORM EVENT OR AS DIRECTED BY SITE ENGINEER.
4. SEDIMENT MUST BE REMOVED FROM SILT FENCE WHEN ACCUMULATION REACHES BOX OF THE HEIGHT OF FENCE.
5. ALL SILT FENCES MUST BE REMOVED ONLY WHEN THE ENTIRE SITE IS STABILIZED AND AS DIRECTED BY THE ENGINEER.
6. STONE AND MAT TO BE INSTALLED PRIOR TO CONSTRUCTION OF SITE.
7. STONE AND MAT TO BE INSTALLED PRIOR TO CONSTRUCTION OF SITE.
8. SILT REMOVAL FROM FILTER CHECK DAMS MUST BE UNDERTAKEN WITH CARE TO MINIMIZE DOWNSTREAM SEDIMENTATION IN SLOPE OR DITCH.
9. SEDIMENT TO BE CLEANED FROM TEMPORARY POND ONCE ACCUMULATION REACHES BOX OF CAPACITY.
10. SEDIMENT SHALL BE CLEANED FROM PUBLIC ROADS AT THE END OF EACH DAY, OR AS DIRECTED BY THE ENGINEER.

### GENERAL NOTES

1. THE ESC STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO PREVENT SEDIMENT RELEASES TO THE NATURAL ENVIRONMENT. ANY CHANGES FROM THE APPROVED ESC PLANS WILL BE DOCUMENTED AND REPORTED TO THE ENGINEER IMMEDIATELY.
2. INSPECTION OF THE PROPOSED EROSION AND SEDIMENT CONTROL MEASURES WILL OCCUR AT THE FREQUENCY OUTLINED IN SECTION 10.1.2.
3. DISTURBED AREAS LEFT FOR 30 DAYS OR LONGER MUST BE STABILIZED.
4. EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE INSPECTED WEEKLY, AT A MINIMUM, AFTER RAIN AND SOIL WASH EVENTS AND DAILY DURING EXTENDED RAIN OR SNOWMELT PERIODS. DURING INACTIVE PERIODS, WHERE THE SITE IS INACTIVE FOR 30 DAYS OR LONGER, A MONTHLY INSPECTION SHOULD BE CONDUCTED.
5. ALL DAMAGED ESC MEASURES WILL BE REPAIRED AND/OR REPLACED WITHIN 48 HOURS OR SOONER IF ENVIRONMENTAL RECEPTORS ARE AT RISK OF ADVERSE IMPACT.
6. ALL SEDIMENT CONTROL MEASURES SUCH AS SEDIMENT CONTROL FENCE, TEMPORARY POND, CONSTRUCTION ACCESS MATS, SEDIMENT TRAPS, SWALES AND CHECK DAMS MUST BE INSTALLED PRIOR TO THE COMMENCEMENT OF SITE WORKS.
7. ADDITIONAL MATERIALS SUCH AS CLEAR STONE, FILTER FABRIC, PUMPS, HOSES AND SILT/STONE TO BE KEPT ON-SITE AT ALL TIMES FOR CONDUCTING REPAIRS TO SEDIMENT CONTROL MEASURES.
8. ENGINEERED CHANGES TO THE ESC MEASURES MAY BE NEEDED AS SITE CONDITIONS CHANGE THROUGHOUT THE CONSTRUCTION PROCESS. THESE UPDATES MUST REFLECT BEST MANAGEMENT PRACTICES TO CONTROL SEDIMENT AND EROSION ON-SITE AND SHOULD BE COMPLETED BASED ON DIRECTION FROM THE SITE ENGINEER. ADDITIONAL MEASURES MAY BE REQUIRED AS DIRECTED BY AN ENGINEER THROUGHOUT THE CONSTRUCTION PROCESS.
9. THE CONSTRUCTION ENTRANCE MAT IS TO BE INSTALLED AS THE FIRST STEP IN THE SITE ALTERATION PROCESS.
10. SEDIMENT CONTROL FENCE IS TO BE INSTALLED DOWN-SLOPE OF ALL DISTURBED AREAS. A DOUBLE ROW OF SEDIMENT CONTROL FENCE IS TO BE INSTALLED SURROUNDING ALL NATURAL HERITAGE FEATURES AND AS DIRECTED BY THE SITE ENGINEER. SEDIMENT CONTROL FENCE IS TO BE AS PER THE STANDARDS ON THIS DRAWING AT A MINIMUM.
11. FILTERREX SILT/STONE OR APPROVED EQUIVALENT TO BE INSTALLED DOWNSTREAM FROM OUTLET AND WITHIN DITCHES TO A MINIMUM HEIGHT OF 300mm.
12. AN APPROVED SILT/STONE MANAGEMENT PLAN IS TO BE KEPT ON SITE.
13. SPILL CLEANUP EQUIPMENT SUCH AS ABSORBENT MEDIA IS TO BE MAINTAINED ON SITE FOR IMMEDIATE USE IN THE EVENT OF A SPILL.
14. SPILLS ARE TO BE REPORTED IMMEDIATELY TO THE MCP SPILLS ACTION CENTRE AT 1-800-268-6860.
15. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE CLEAN-UP AND RESTORATION, INCLUDING ALL COST, DUE TO THE RELEASE OF SEDIMENT FROM THE SITE.
16. LOW IMPACT DEVELOPMENT (LID) MEASURES ARE NOT TO BE USED AS SEDIMENT CONTROL DEVICES.
17. ADDITIONAL SEDIMENT CONTROL DEVICES MAY BE REQUIRED NECESSARY AND AS SITE CONDITIONS CHANGE AND SHALL BE INSTALLED AS DIRECTED BY THE SITE ENGINEER, CONTRACT ADMINISTRATOR OR LOCAL MUNICIPALITY.

### SEDIMENT BASIN DECOMMISSIONING

1. PROVIDE SPLASH PAD AT BOTTOM OF VEGETATED AREA FOR PUMP DISCHARGE LOCATION.
2. CREATE STABLE INTAKE (TO AVOID PUMPING SEDIMENT). LOCATE INTAKE AS FAR FROM ACCUMULATED SEDIMENT AS POSSIBLE AND USE PERFORATED STANDPIPE TO HOUSE THE PUMP INTAKE. SURROUND PERFORATED STANDPIPE WITH FILTER FABRIC AND CLEAR STONE. PUMP INTAKE SHOULD BE FITTED WITH FILTER.
3. PUMP SLOWLY TO ENSURE THAT NO SEDIMENT IS ESCAPING TO THE WATERCOURSE.
4. MONITOR INTAKE REGULARLY TO ENSURE THAT PUMP IS PULLING WATER AND NOT SEDIMENT.
5. IF SEDIMENT IS OBSERVED TO BE REACHING THE WATERCOURSE, SHUT DOWN PIPES IMMEDIATELY AND CALL DESIGN ENGINEER.
6. CONTINUE TO PUMP UNTIL POND LEVELS ARE SUFFICIENTLY LOW TO ALLOW FOR SEDIMENT REMOVAL.
7. ONCE SEDIMENT HAS BEEN EXPOSED AND ALLOWED TO BEGIN DRYING, IT NEEDS TO BE TESTED TO DETERMINE DISPOSAL OPTIONS.
8. A QUALIFIED PERSON(S) (QP) WILL NEED TO SAMPLE THE SEDIMENT AND SUBMIT IT TO A ACCREDITED LAB FOR CHEMICAL ANALYSIS WHILE MAINTAINING THE CHAIN OF CUSTODY.
9. ONCE THE SEDIMENT HAS BEEN CHARACTERIZED, SEDIMENT REMOVAL MAY BEGIN.
10. SEDIMENT MAY BE REMOVED USING AN EXCAVATOR OR A HEAVY DUTY VACUUM TRUCK. REMOVAL SHOULD CONTINUE UNTIL NATIVE MATERIAL IS ENCOUNTERED AND CONFIRMED BY A GEOTECHNICAL CONSULTANT.

## SWALE TYPE A

SLOPE = 0.30%  
BOTTOM WIDTH = 1.0m  
3:1 SIDE SLOPES TO MATCH EXISTING GROUND (MIN. HEIGHT = 0.57m)  
CHECK DAMS (SILT/STONE) WITH MIN HEIGHT OF 0.20m TO BE PLACED EVERY 65m

## SWALE TYPE B

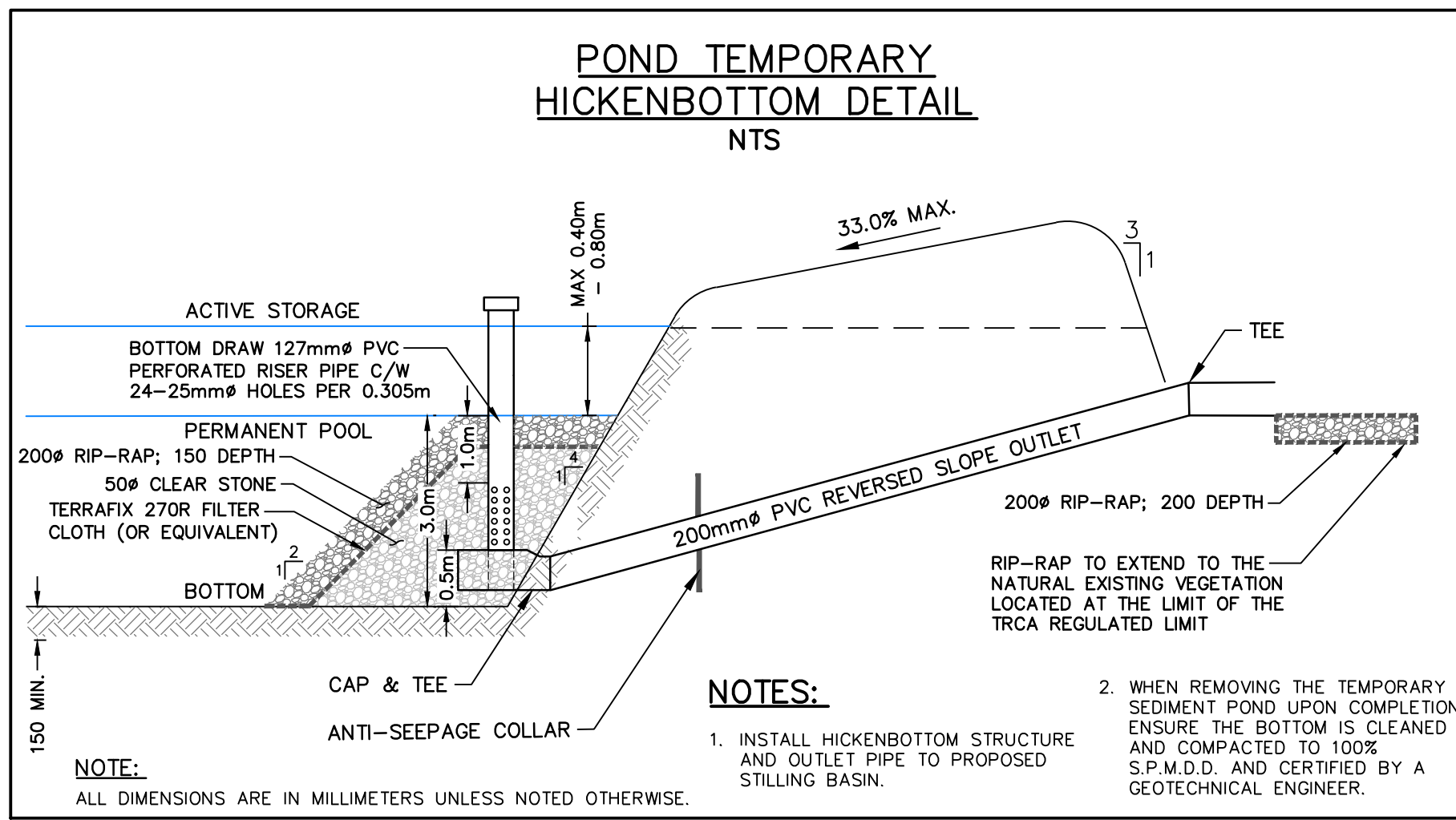
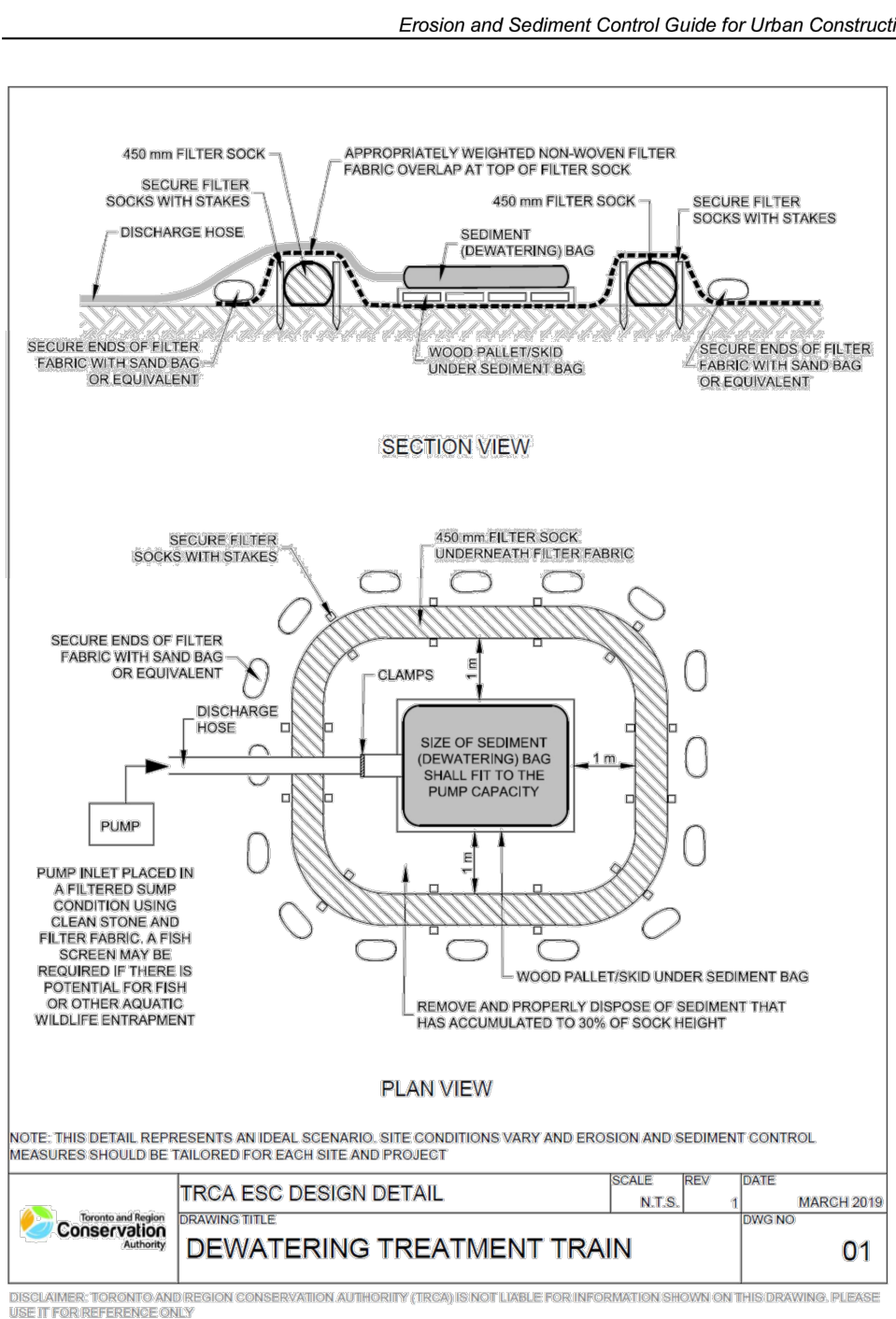
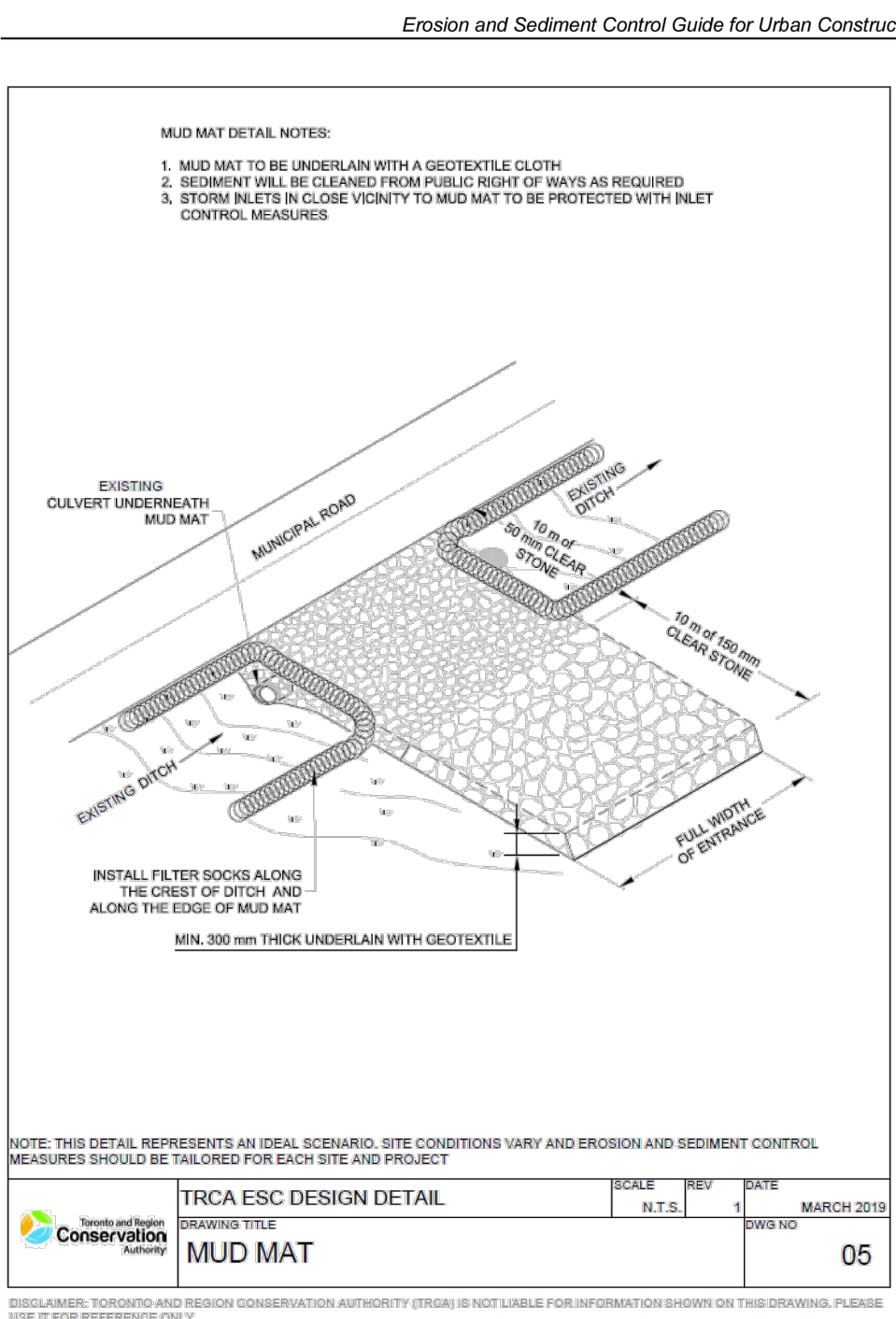
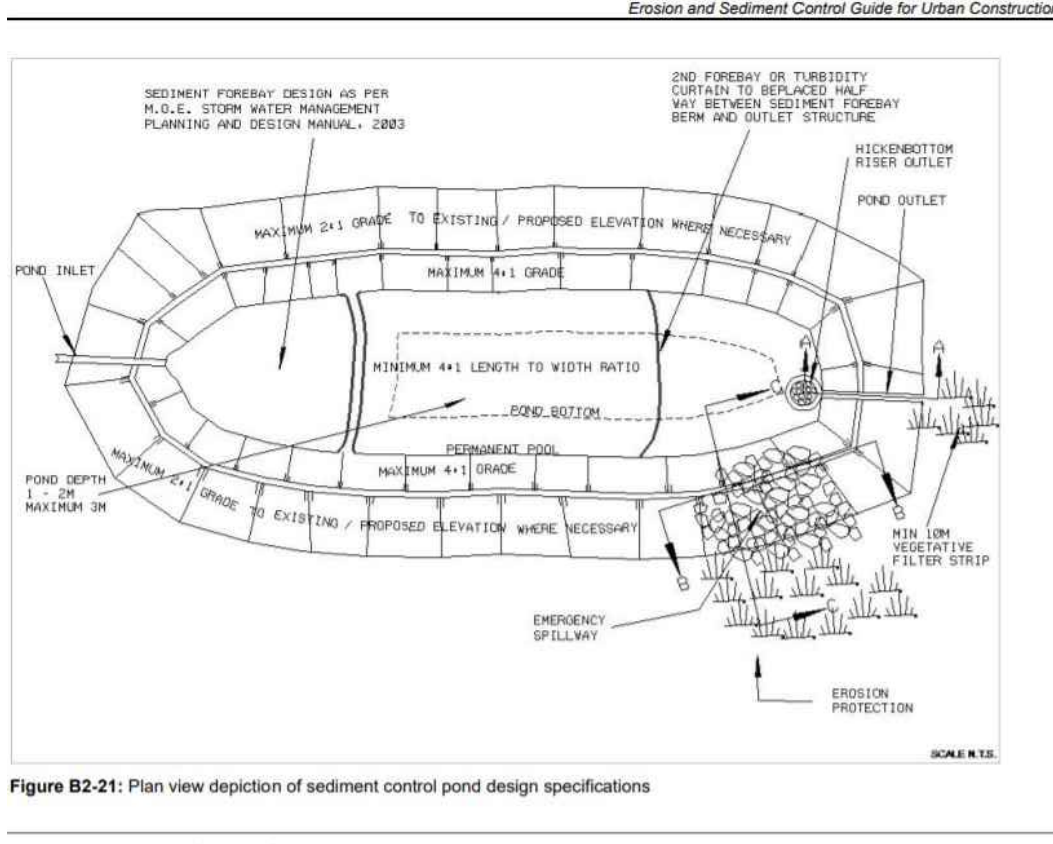
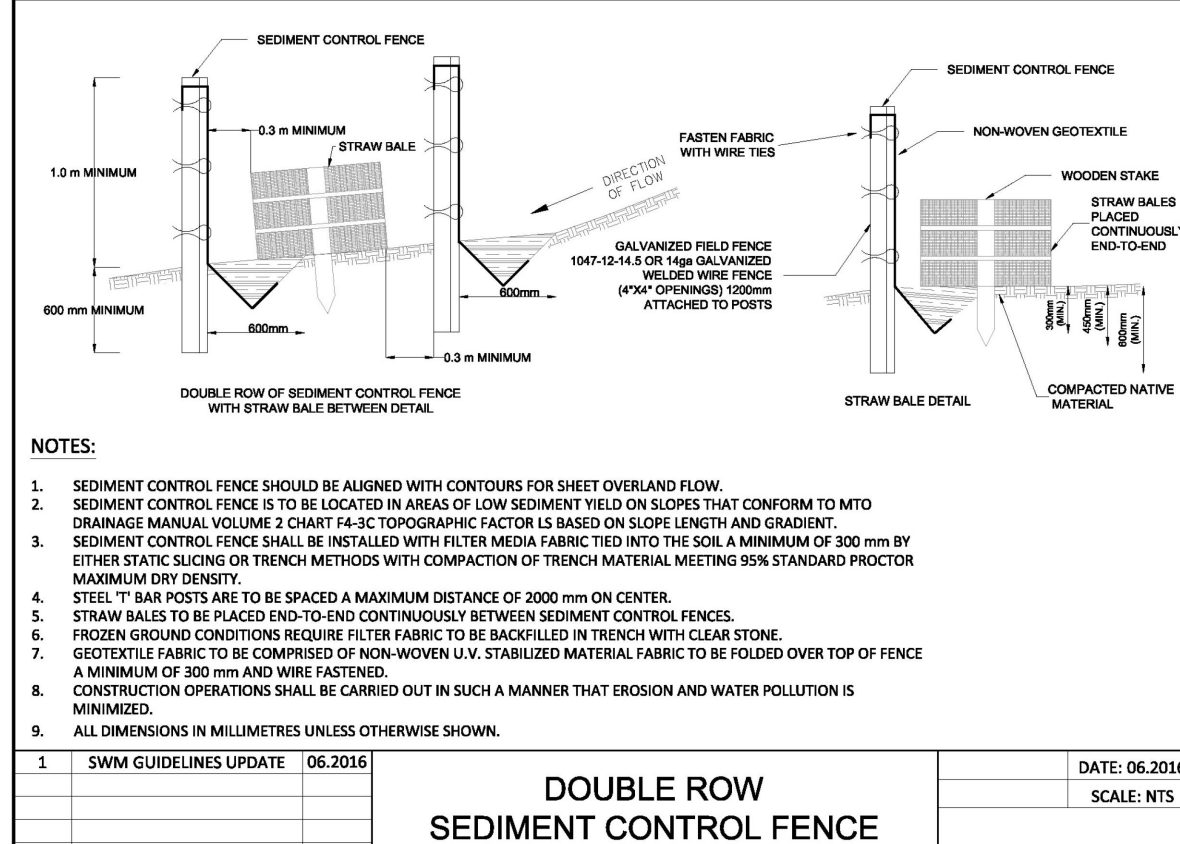
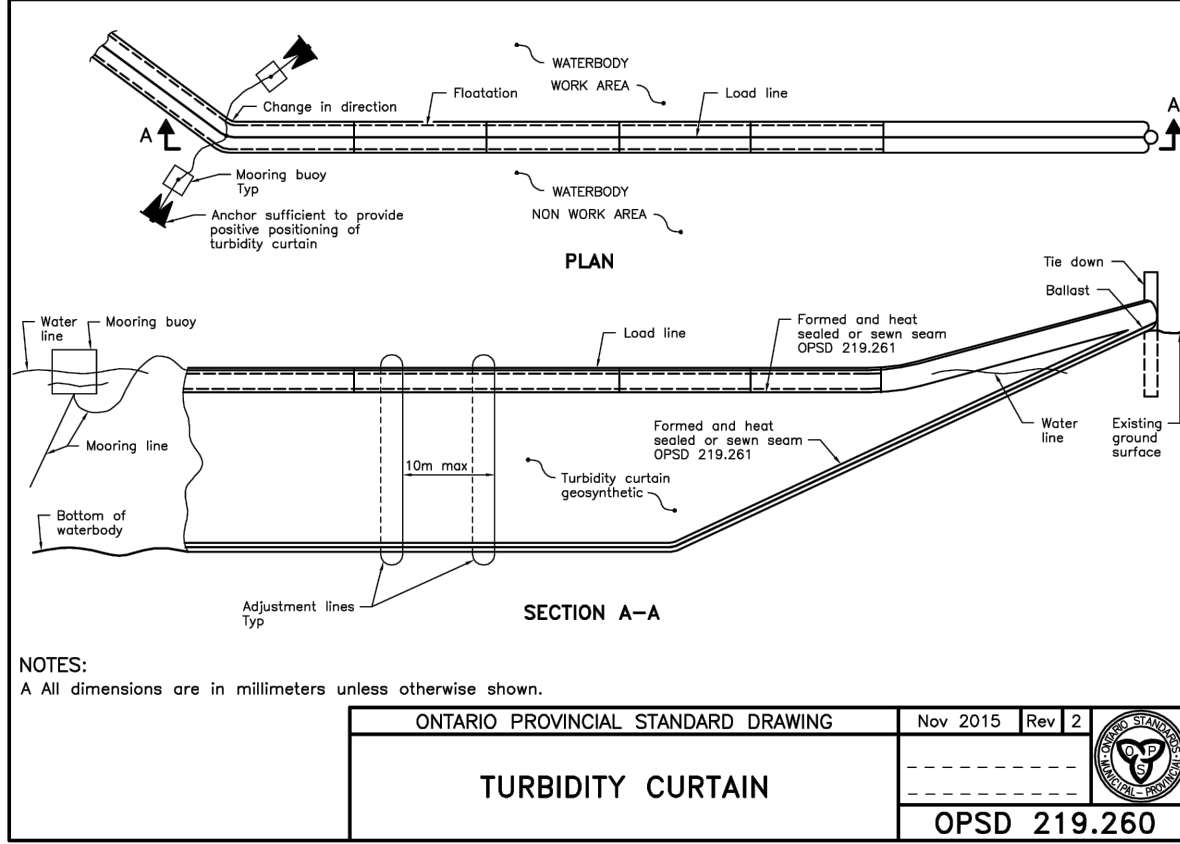
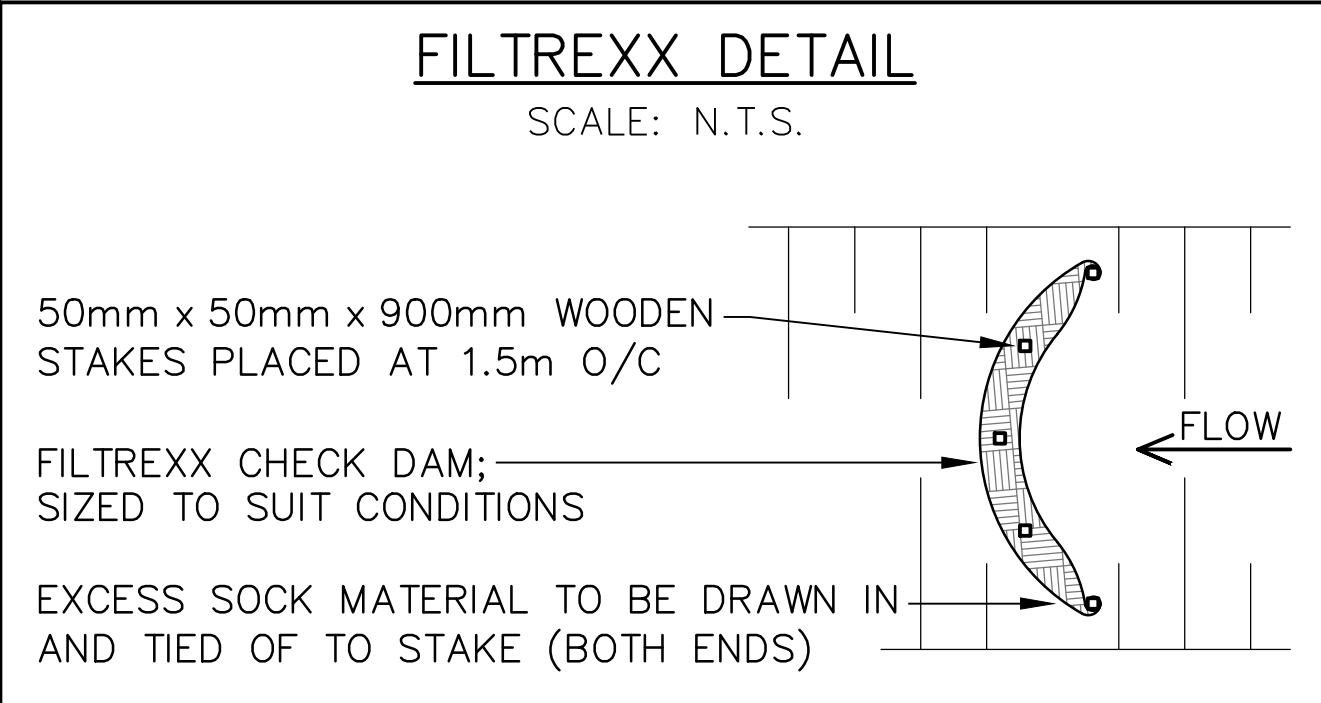
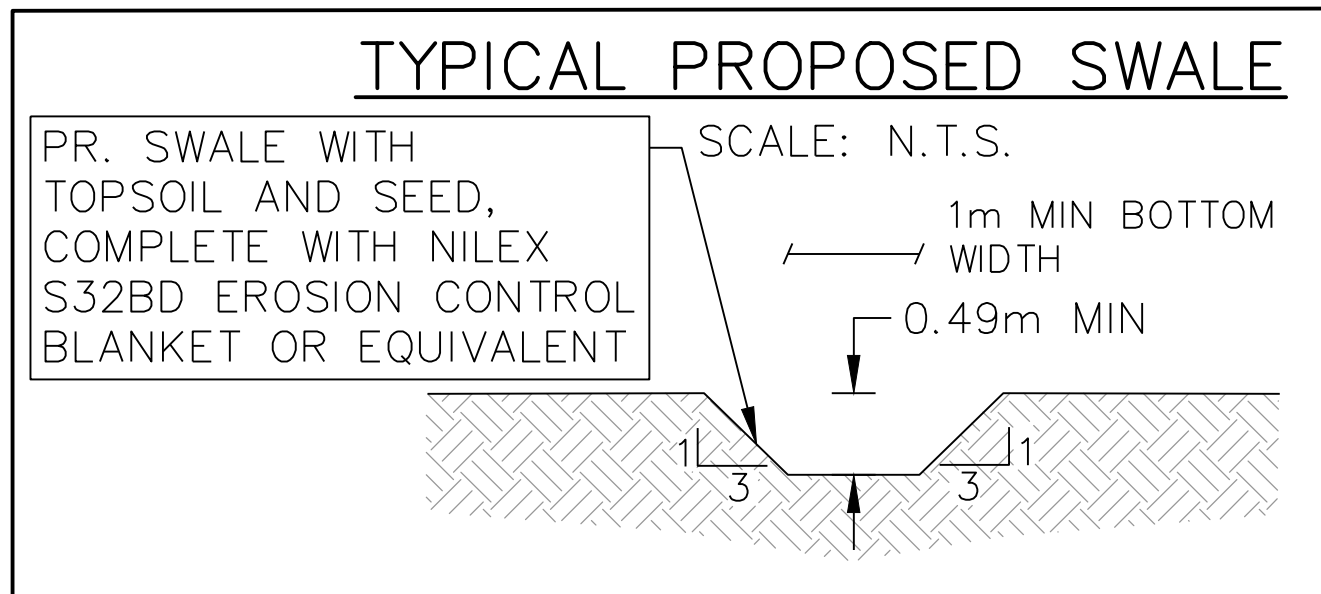
SLOPE = 0.70%  
BOTTOM WIDTH = 1.0m  
3:1 SIDE SLOPES TO MATCH EXISTING GROUND (MIN. HEIGHT = 0.49m)  
CHECK DAMS (SILT/STONE) WITH MIN HEIGHT OF 0.20m TO BE PLACED EVERY 28m

## SWALE TYPE C

SLOPE = 1.10%  
BOTTOM WIDTH = 1.0m  
3:1 SIDE SLOPES TO MATCH EXISTING GROUND (MIN. HEIGHT = 0.53m)  
CHECK DAMS (SILT/STONE) WITH MIN HEIGHT OF 0.30m TO BE PLACED EVERY 27m

## SWALE TYPE D

SLOPE = 1.50%  
BOTTOM WIDTH = 1.0m  
3:1 SIDE SLOPES TO MATCH EXISTING GROUND (MIN. HEIGHT = 0.51m)  
CHECK DAMS (SILT/STONE) WITH MIN HEIGHT OF 0.30m TO BE PLACED EVERY 20m



Species	Description	Application rate and Additional Instructions
Annual Ryegrass - Lolium multiflorum	Annual species, suitable for a wide range of site and soil types. Grass is suitable for a wide range of sites, including both moist and dry sites. Some production. Data can be moved in October before they set seed to reduce the effects are anticipated to only last a few weeks after death. Seed March to October.	Control may be required for spring/summer plantings (e.g. mowing, etc.) to prevent cover crop from seeding native seed and to deter seed production. Data can be moved in October before they set seed to reduce the effects are anticipated to only last a few weeks after death. Seed March to October.

Table 1 - Recommended species to be used as nurse or under cover crops

L-Rank	Scientific Name	Common Name	%
L1	Poa annua	Annual ryegrass	15.0%
L2	Stachytarpheta	Indian grass	15.0%
L3	Andropogon gerardii	Big bluestem	15.0%
L4	Elymus canadensis	Canada wild rice	11.0%
L5	Elymus canadensis	Canada wild rice	11.0%
L6	Elymus canadensis	Canada wild rice	11.0%
L7	Elymus canadensis	Canada wild rice	11.0%
L8	Elymus canadensis	Canada wild rice	11.0%
L9	Elymus canadensis	Canada wild rice	11.0%
L10	Elymus canadensis	Canada wild rice	11.0%
L11	Elymus canadensis	Canada wild rice	11.0%
L12	Elymus canadensis	Canada wild rice	11.0%
L13	Elymus canadensis	Canada wild rice	11.0%
L14	Elymus canadensis	Canada wild rice	11.0%
L15	Elymus canadensis	Canada wild rice	11.0%
L16	Elymus canadensis	Canada wild rice	11.0%
L17	Elymus canadensis	Canada wild rice	11.0%
L18	Elymus canadensis	Canada wild rice	11.0%
L19	Elymus canadensis	Canada wild rice	11.0%
L20	Elymus canadensis	Canada wild rice	11.0%
L21	Elymus canadensis	Canada wild rice	11.0%
L22	Elymus canadensis	Canada wild rice	11.0%
L23	Elymus canadensis	Canada wild rice	11.0%
L24	Elymus canadensis	Canada wild rice	11.0%
L25	Elymus canadensis	Canada wild rice	11.0%
L26	Elymus canadensis	Canada wild rice	11.0%
L27	Elymus canadensis	Canada wild rice	11.0%
L28	Elymus canadensis	Canada wild rice	11.0%
L29	Elymus canadensis	Canada wild rice	11.0%
L30	Elymus canadensis	Canada wild rice	11.0%
L31	Elymus canadensis	Canada wild rice	11.0%
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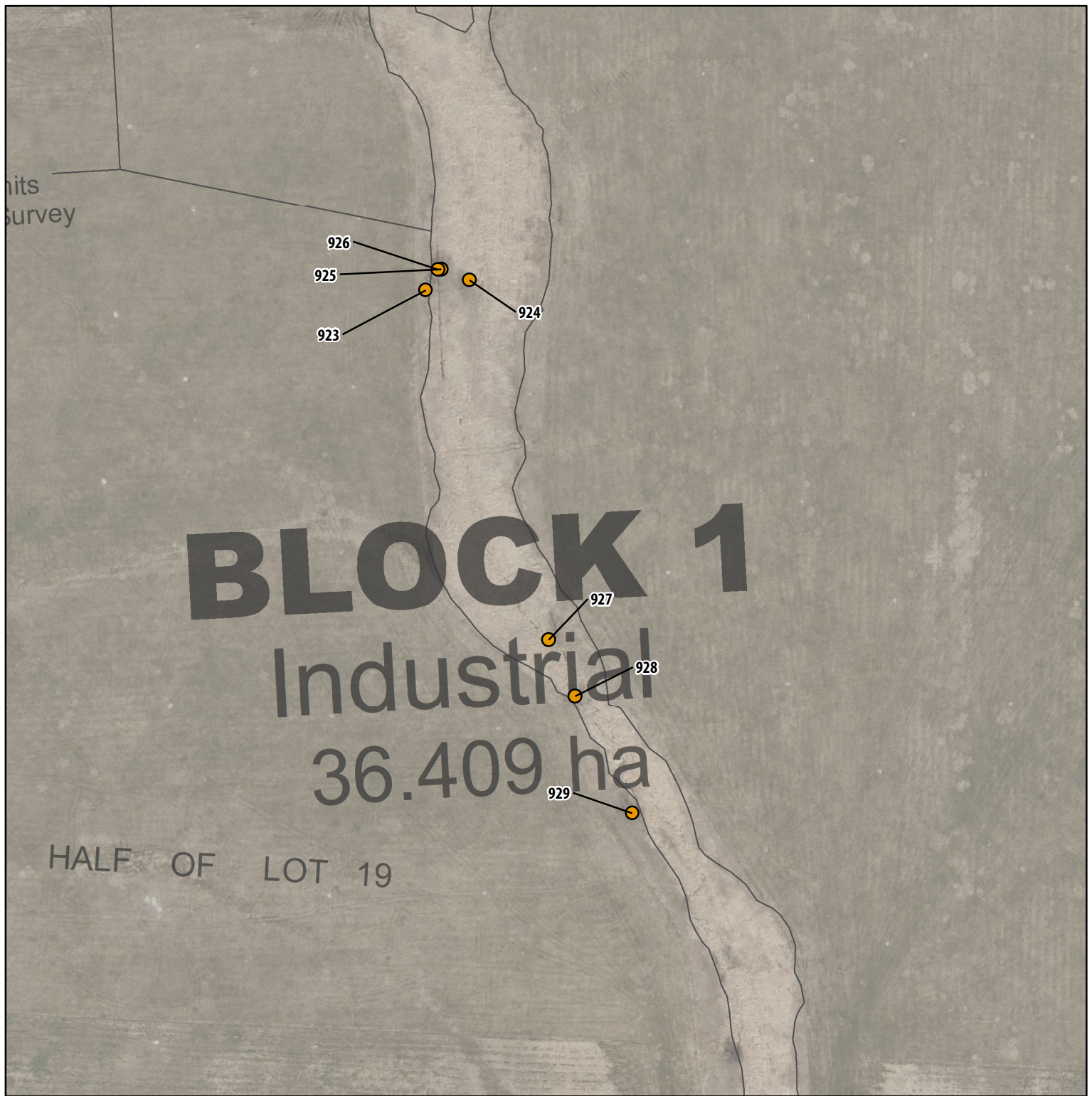
HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 1						
	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	245.00	2070	0.30	589	-	-
ACTIVE STORAGE	244.70	1865	0.80	1224	1274	-
PERMANENT POOL	243.90	1347	3.00	1811	1830	-
BOTTOM	243.00	160	-	-	-	-
FOREBAY	243.50	150	1.00	-	68	-
EMERGENCY WEIR	-	-	0.30	-	-	9.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 6						
	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	231.50	1219	0.30	365	397	-
ACTIVE STORAGE	231.20	1239	0.65	645	691	-
PERMANENT POOL	230.55	900	3.00	956	972	-
BOTTOM	229.55	36	-	-	-	-
FOREBAY	232.55	100	1.00	-	36	-
EMERGENCY WEIR	-	-	0.30	-	-	5.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 11						
	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	240.30	961	0.30	286	-	-
ACTIVE STORAGE	240.00	818	0.40	290	292	-
PERMANENT POOL	239.60	645	3.00	429	539	-
BOTTOM	238.00	2	-	-	-	-
FOREBAY	239.60	72	1.00	-	20	-
EMERGENCY WEIR	-	-	0.30	-	-	2.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 16						
	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	246.00	1722	0.30	487	-	-
ACTIVE STORAGE	245.70	1529	0.70	894	922	-
PERMANENT POOL	245.00	1122	3.00	1323	1387	-
BOTTOM	242.00	77	-	-	-	-
FOREBAY	245.00	125	1.00	-	51	-
EMERGENCY WEIR	-	-	0.30	-	-	6.00

HICKENBOTTOM AND SEDIMENT BASIN DETAIL - POND 2						
	ELEVATION (m)	AREA (m²)	DEPTH (m)	STORAGE REQUIRED (m³)	STORAGE PROVIDED (m³)	LENGTH (m)
TOP OF BERM	242.20	1892	0.30	557	-	-
ACTIVE STORAGE	241.90	1689	0.80	1033	1149	-
PERMANENT POOL	241.10	1204	3.00	1528	1546	-
BOTTOM	238.10	114	-	-	-	-
FOREBAY	241.10	134	1.00	-	57	-
EMERGENCY WEIR	-	-	0.30	-	-	7.00



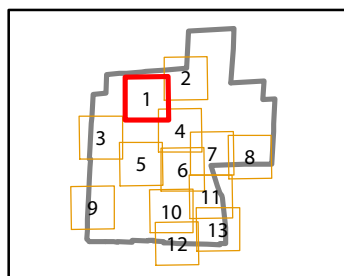
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#### Legend

1 Subject Lands (approximate)

#### Tree Inventory

● Removal



Arborist Report and Tree Preservation Plan  
 Tullamore Industrial LP

Figure 2.1  
 Proposed Development

0 25 m  
 1:1,700



GEI



Savanta Division

Project 2100975



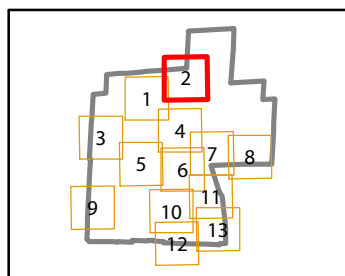
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### Legend

Subject Lands (approximate)

### Tree Inventory

● Removal



Arborist Report and Tree Preservation Plan  
 Tullamore Industrial LP

Figure 2.2  
 Proposed Development

0 25 m  
 1:1,700

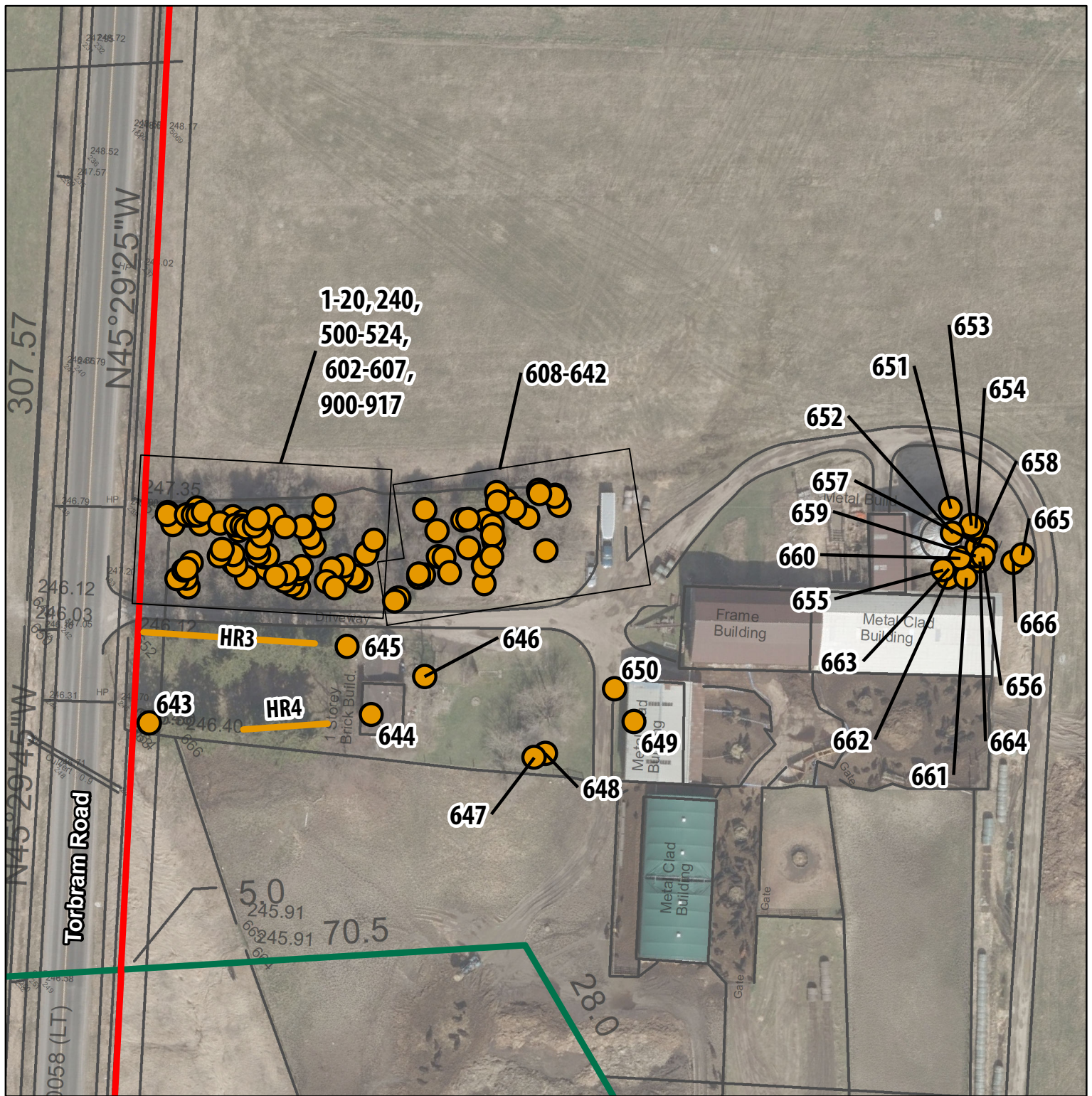


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Savanta Division

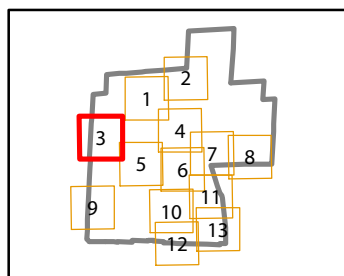
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#### Legend

- Subject Lands (approximate)
- Greenbelt Planning Area
- Tree Inventory**
- Removal
- Hedgerow Inventory**
- Removal

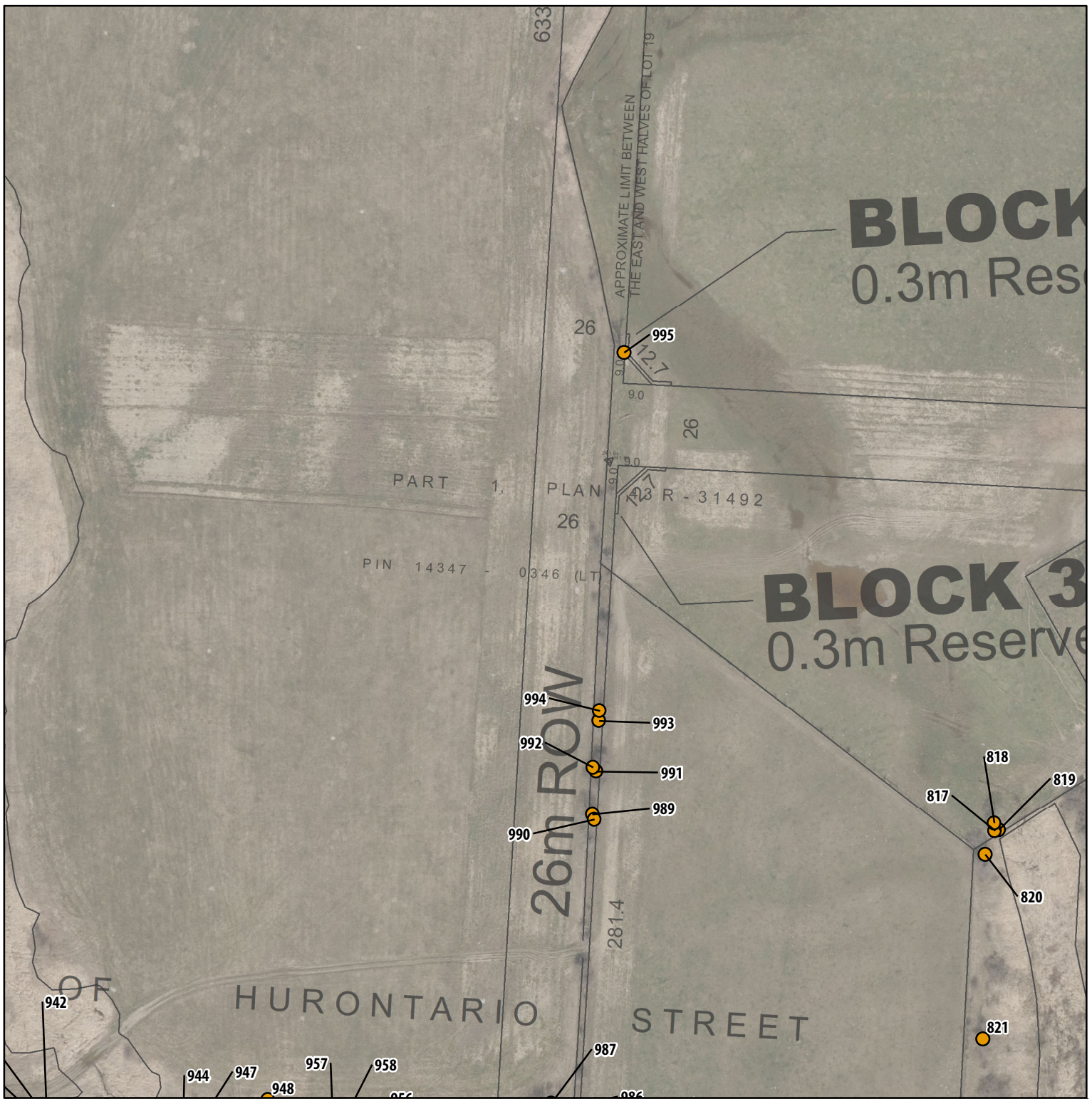


Arborist Report and Tree Preservation Plan  
 Tullamore Industrial LP

Figure 2.3  
 Proposed Development

0 25 m  
 1:1,000





Project 2100975

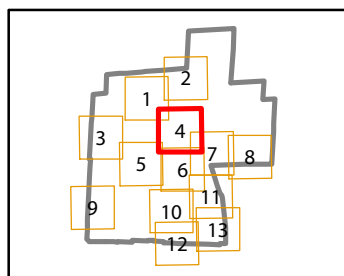
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#### Legend

Subject Lands (approximate)

#### Tree Inventory

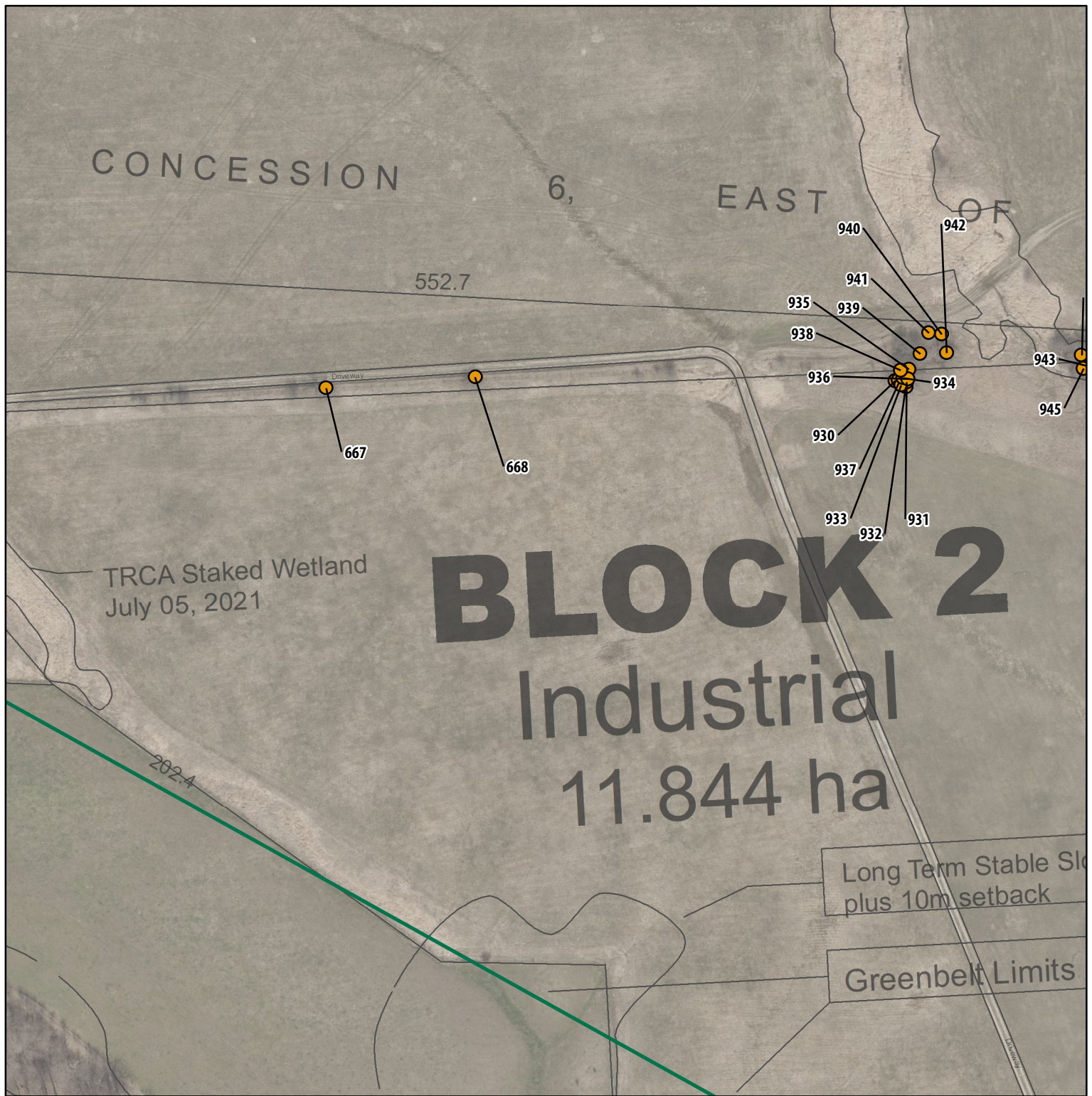
● Removal



Arborist Report and Tree Preservation Plan  
 Tullamore Industrial LP

Figure 2.4  
 Proposed Development

0 25 m  
 1:1,700

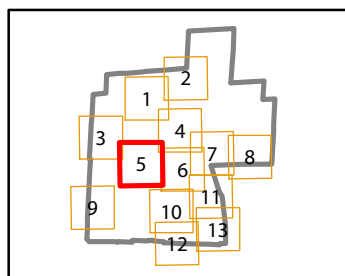


#### NOTES:

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#### Legend

- Subject Lands (approximate)
  - Greenbelt Planning Area
- Tree Inventory**
- Removal



Arborist Report and Tree Preservation Plan  
Tullamore Industrial LP

Figure 2.5  
Proposed Development

0 25 m  
1:1,700

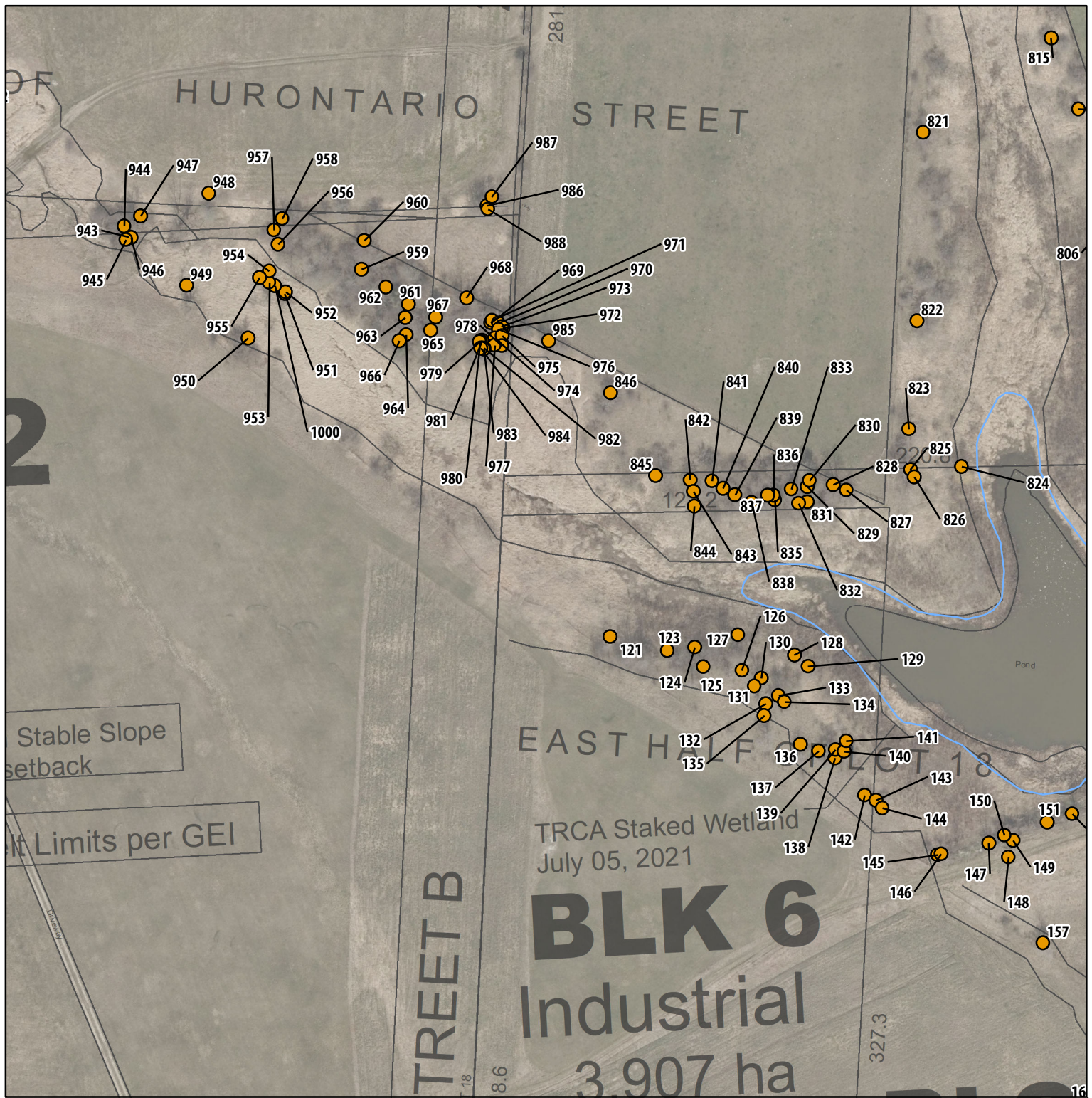


GEI



Consultants

Savanta Division



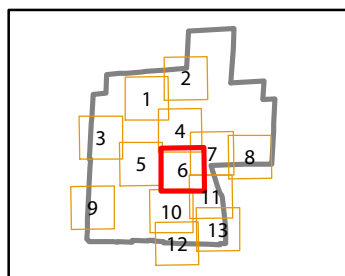
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#### Legend

- Subject Lands (approximate)
- Waterbody (LIO)

#### Tree Inventory

- Removal



Arborist Report and Tree Preservation Plan  
 Tullamore Industrial LP

Figure 2.6  
 Proposed Development

0 25 m  
 1:1,700





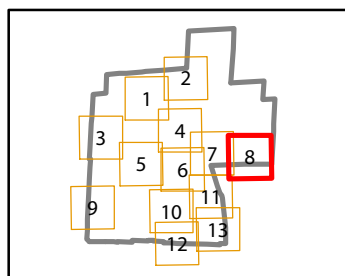
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#### Legend

Subject Lands (approximate)

#### Tree Inventory

● Removal

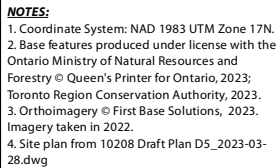


Arborist Report and Tree Preservation Plan  
 Tullamore Industrial LP

Figure 2.8  
 Proposed Development

0 25 m  
 1:1,700





 Subject Lands (approximate)  
 Greenbelt Planning Area  
 Watercourse (TRCA)  
 Waterbody (LIO)

 Removal

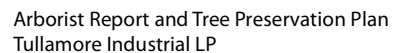
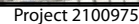


Figure 2.10  
Proposed Development

0 25 m  
1:1,700





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 Subject Lands (approximate)  
 Watercourse (TRCA)  
 Waterbody (LIO)

**Tree Inventory**  
 Removal

**Hedgerow Inventory**  
 Removal

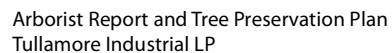
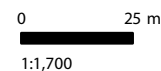
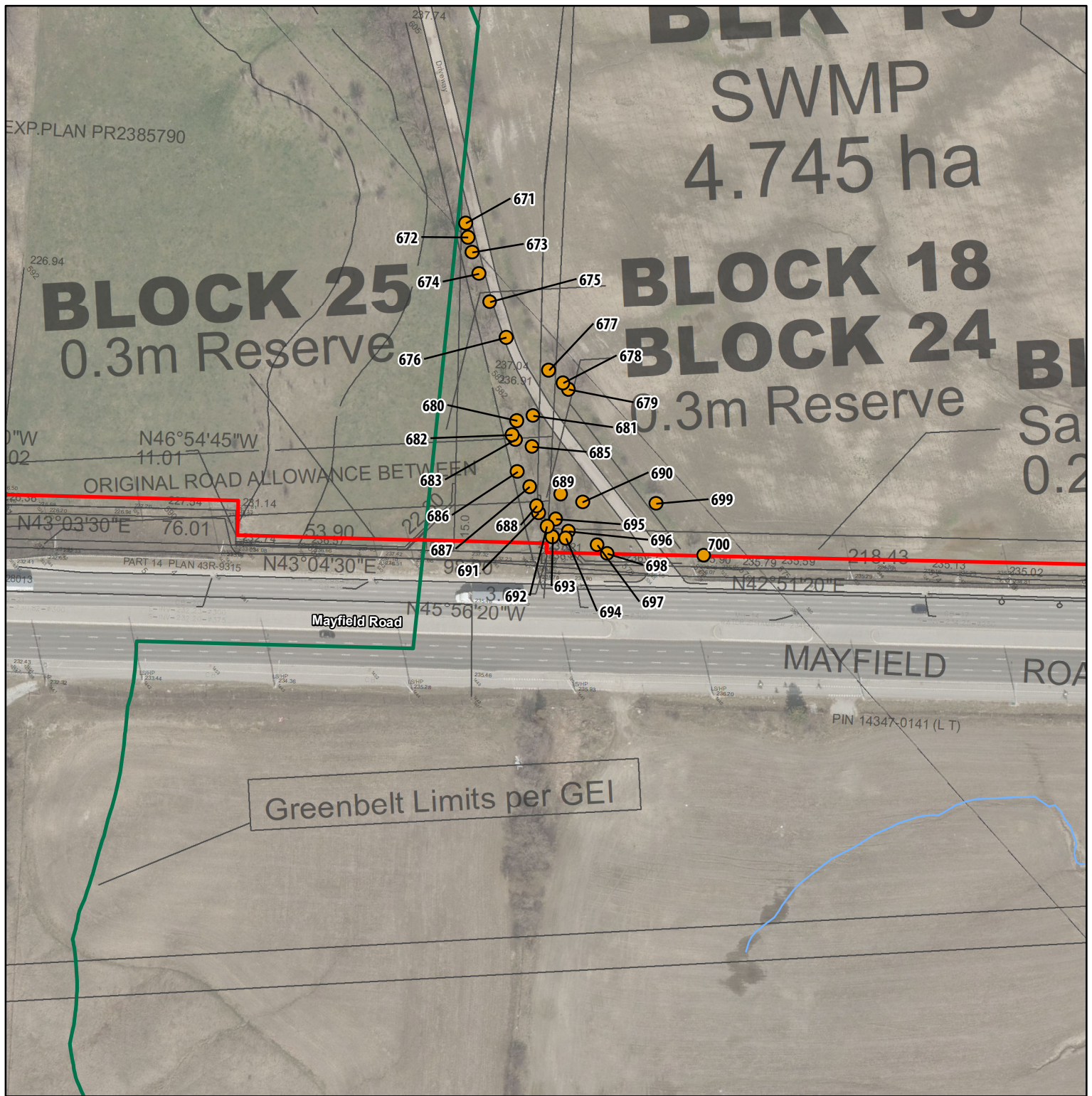


Figure 2.11  
Proposed Development





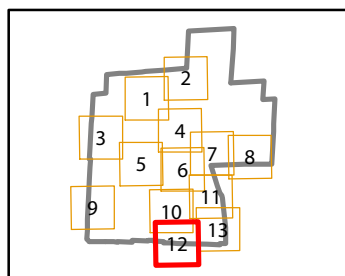
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 Imagery taken in 2022.  
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#### Legend

- Subject Lands (approximate)
- Greenbelt Planning Area
- Watercourse (TRCA)

#### Tree Inventory

- Removal



Arborist Report and Tree Preservation Plan  
 Tullamore Industrial LP

Figure 2.12  
 Proposed Development

0 25 m  
 1:1,700

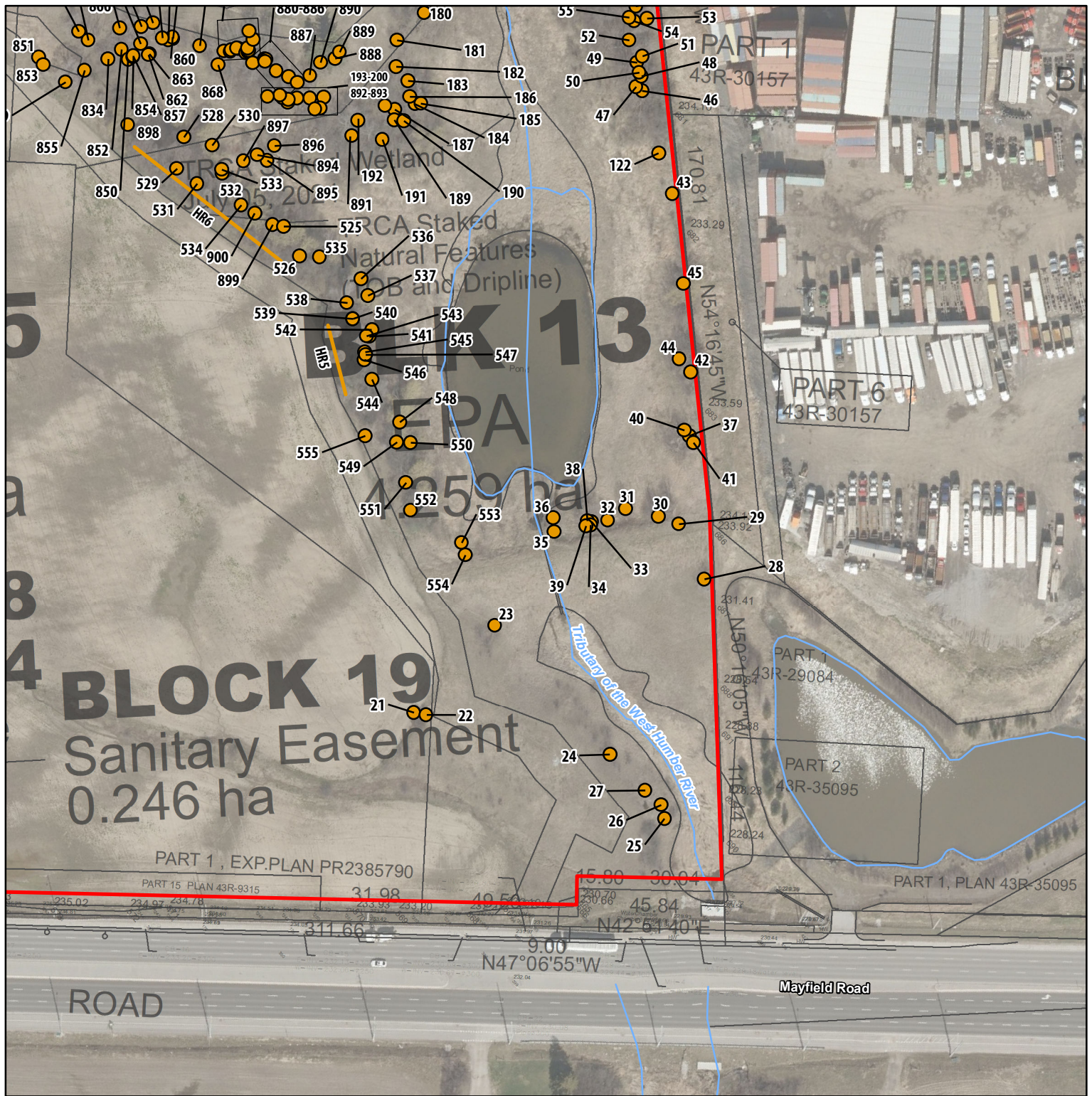


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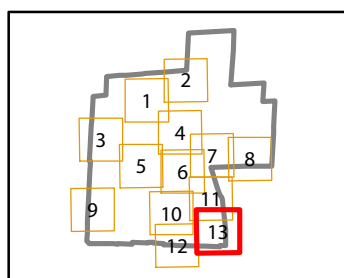
Project 2100975



**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, 2023;  
 Toronto Region Conservation Authority, 2023.  
 3. Orthoimagery © First Base Solutions, 2023.  
 Imagery taken in 2022.  
 4. Site plan from 10208 Draft Plan D5\_2023-03-28.dwg

### Legend

- Subject Lands (approximate)
- Watercourse (TRCA)
- Waterbody (LIO)
- Tree Inventory**
- Removal
- Hedgerow Inventory**
- Removal



Arborist Report and Tree Preservation Plan  
 Tullamore Industrial LP

Figure 2.13  
 Proposed Development

0 25 m  
 1:1,700



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