

# STORMWATER MANAGEMENT AND FUNCTIONAL SERVICING REPORT IN SUPPORT OF SITE PLAN APPLICATION

## LARKIN+ LUPi RESIDENTIAL DEVELOPMENT

181 TORONTO STREET SOUTH  
UXBRIDGE ONTARIO



Prepared For:  
**LARKIN+ LUPi**

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File Number: 21026  
1<sup>st</sup> Submission: May 16th, 2021



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## 1.0 PROJECT INTRODUCTION

This Stormwater Management Report has been prepared on behalf of Larkin+ and Lupi in support of Site Plan Application for the proposed semidetached homes. The residential development is composed of 10 units.

## 2.0 BACKGROUND MATERIALS

This report is based on a review of the following drawings and reports located in **Appendix A**:

- *Toronto Street Plan and Profiles from 53 m E. of Elgin Park Dr. to 303 m E. of Elgin Park Dr. - Drawing U-06-R-315, prepared by Chishol, Fleming and Associates Consulting Engineers, dated May 17, 2007* **[Plan and Profile of Toronto Street South]**
- *Storm Drainage Area Plan – Drawing STDP -1, prepared by LGI Consulting Engineers Inc.* **[LGI Stormwater Drainage Area Plan]**
- *Topographic Mapping, prepared by Barcih Grenkie, dated March 2021 and updated May 2021* **[Topographic Mapping]**
- *Geotechnical Investigation 181 Toronto Street South Uxbridge, Ontario, prepared by Toronto Inspection, dated May 2021* **[Geotechnical Report]**
- *Hydrogeotechnical Investigation 181 Toronto Street South Uxbridge, Ontario, prepared by Toronto Inspection, dated April 2022* **[Hydrogeotechnical Report]**
- *Township of Uxbridge Design Criteria and Standard Detail Drawings - 2016*

## 3.0 EXISTING CONDITIONS AND EXISTING DRAINAGE

The site is currently a vacant open field that fronts onto a not well defined ditch located on Toronto Street South's ROW. Based on the Topographic Mapping, the site contains a ditch on the southern end that drains towards a DICB on the downstream end. Just upstream of this ditch is a culvert that drains towards a catch basin located on the western side of Toronto Street.





The existing site drainage splits three ways, southwest through a DICB (catchment 101), north to Toronto Street (catchment 102), and southeast through a DICB (Catchment 103). Catchments 101 and 103 are assumed to drain to the same storm sewer line indicated on the LGI Stormwater Drainage Plan and are indicated on **SWM-1 Pre-Development drainage plan**.

As seen on the LGI Stormwater Drainage Plan included in **Appendix A**, the existing stormwater flows all outlet to the same downstream creek.

## 4.0 Design Criteria

The site will be designed based on the following criteria:

- Quantity Control – Control post development flows to pre-development levels.
- Water Balance – Provide Post to Pre Water Balance
- Volume Control – Provide best efforts to meet 25 mm retention and at a minimum meet 5 mm stormwater retention
- Quality Control – Provide 80% TSS Removal
- Phosphorus Removal – As per Lake Simcoe Conservation Authority (LSRCA) provide a net 0 load increase in phosphorus to Lake Simcoe as per the Lake Simcoe Phosphorus Offsetting Policy

## 5.0 Quantity Control, Water Balance and Volume Control

Quantity control, water balance and volume control will be achieved through on-site storage and infiltration trenches.

### Quantity Control

Two separate chambers providing both storage and infiltration are located within the site. All rooftop flows (Area 202) up to the 100-year storm are directed to the infiltration trench in the backyard where they are infiltrated. To store and infiltrate the 100-year rooftop flows, 21 m<sup>3</sup> of storage is required and 25 m<sup>3</sup> is provided. Calculations are provided in **Appendix B**. All roof flows in excess of the 100-year event will overflow the roof drains at the splash pads and will flow to the proposed catchbasins.



The storage and infiltration chamber for Area 201 is located within the driveway entrance of the site will control the remainder of the site to a release rate of 7 L/s. This tank includes 48 m<sup>3</sup> of storage and 12 m<sup>3</sup> of infiltration. Storms more than the 100-year will flow overland through the site to Toronto Street. Area 301 represents the sites uncontrolled flows.

A summary of the predevelopment flow is compared to the post development conditions in **Table 1** below.

**Table 1 – 100 Year Quantity Control Summary**

Area I.D	Area (ha)	Storage Available (m <sup>3</sup> )	Storage Required (m <sup>3</sup> )	Design Release Rate (l/s)
Toronto Street Storm Sewer Outlet (Allowable Release Rate - 5 year = 10 L/s)				
201 (Roof)	0.07	25	21	NA
202 (Site)	0.18	48	46	7
301 (Uncontrolled)	0.02	NA	NA	3
Totals	0.27	73	67	10

Quantity control calculations are provided in **Appendix B**. A post development drainage plan is shown as **SWM-2**.

### Water Balance and Volume Control

The water balance results are shown below in **Table 2**. As seen below, the infiltration and runoff have been improved for the site via site grading and implementation of infiltration.

**Table 2 Water Balance Summary**

	ET	Infiltration m <sup>3</sup>	Runoff
Pre	1608	268	626
w/o Mitigation	793 -51%	107 -60%	1601 156%
w/ Mitigation	793 -51%	1428 433%	280 -55%



The volume control requirement for the site is 5mm retention with best efforts for 25mm. For this site and 0.18 ha of impermeable area, a total of 37 m<sup>3</sup> (25 m<sup>3</sup> + 12 m<sup>3</sup>) of infiltration is proposed. This equals to 20 mm of retention for the site. The infiltrated volume is well above the 5mm volume and therefore meets the requirement.

Based on the Geotechnical Report laboratory results, dated May 11 2021, the recommended infiltration rate is 34.3 mm/hr after applying a safety factor of 2.5. A hydrogeotechnical report was completed April 19, 2022 and outlines the water table elevations within the site. At the the roof infiltration trench (as per 21BH-4) the water table has elevation of 275.99 m. This provides 1.0 m clearance to the bottom of the system. At the location of the Stormtech chambers and infiltration, (as per 21BH-8) the water table has an elevation of 274.91 m. This provides 1.0 m of clearance to the bottom of this system at 276.0 m.

## 6.0 Quality Control

The site is composed of clean rooftops, and clean landscape areas. All rooftop flows will be infiltrated. The site also includes a minimum amount of paved areas with low traffic that may have in increase in TSS. To accommodate the potential increase in TSS from the paved areas quality control will be provided by a treatment train approach utilizing the proposed CB shields, the Stormtech Isolator Row Plus, and the proposed infiltration volume.

## 7.0 Phosphorus Removal

The existing and post development phosphorus loading is summarized in **Table 7-1** below. As seen below the site will be required to provide a phosphorus offset for the post development condition. The cost to be paid is **\$719.87**.



Table 7-1 Phosphorus Loading Summary

Phosphorus Loading Summary		
Existing Conditions	0.006	kg/year
Proposed Conditions with no BMP	0.039	kg/year
Proposed Conditions with BMP	0.007	kg/year
Post Development % Phosphorus Removal	81%	

Phosphorus calculations are provided in **Appendix B**.

## 8.0 Proposed Grading

Grading for the site will be implemented to follow the Township of Uxbridge minimum criteria for Lot Grading. Overland flow routes will be provided such that stormwater will be safely conveyed offsite and maintain existing conditions. Refer to drawing C-1, Grading Plan for details included in **Appendix E**.

## 9.0 Water Servicing

The site will be serviced by making a connection to the existing watermain within Toronto Street South. As per the Region of Durham standards, a water meter room will be installed within the site prior to distribution to individual units and for fire protection. Water demand calculations were completed per Region of Durham standards and a max day plus fire flow for the site is 4,037 L/min. Water demand calculations can be found in **Appendix C**. Hydrant pressure flow testing will be completed in the summer of 2022 to confirm the available flows in the existing system

## 10.0 Sanitary Servicing

Sanitary servicing for the site will be completed by installing a series of manholes within the property frontage. The sanitary system will connect to the municipal system at a single location, an existing manhole within Toronto Street South. The private sanitary system will be within a common element portion of the development. The sanitary sewer flow rate was calculated for the site as per Region of Durham standards. The flow rate for the proposed site is 0.56 L/s. Calculations can be found in **Appendix D**.



## 11.0 Erosion and Sediment Control Measures

The Erosion and Sediment Control Measures Provided generally follow the Erosion and Sediment Control Guidelines for Urban Construction (December 2006), Prepared by the Greater Golden Horeshoe Area Conservation Authorities. As illustrated in Drawing EC-01 the sediment control measures are summarized below:

1. Silt Fences are to be installed along the limit of the property prior to construction activities such as topsoil stripping and topsoil stockpiling;
2. Catch Basin and Area Drain Inlet Protection Filter are to be installed on all catch basins and area drains;
3. Mud Mat is to be installed at the construction entrance prior to the commencement of earthworks in order to reduce mud tracking onto municipal roads;

### Construction Sequencing

The following are the construction sequencing with respect to sediment control:

1. Installation of all silt fences along the limit of property, and sediment traps;
2. Installation of mud mat for construction access;
3. Topsoil stripping, stockpiling and excavate the site for the construction of the buildings;
4. Installation of site servicing and underground utilities;
5. Installation of CB and Area Drain sediment traps;
6. Construction of the buildings;
7. Restore or re-vegetate all disturbed area with temporary measures or with final landscaping and paving; and,
8. Remove sediment control measures when all disturbed areas are stabilized.



### **Inspection and Maintenance**

Inspection, maintenance, and record keeping for all sediment control measures are to be conducted on a regular basis in order to ensure they operate effectively.

The minimum inspection frequency during all construction stages is to be as follows:

- On a weekly basis;
- After every rainfall event;
- After significant snowmelt events; and,
- Daily during extended rain or snowmelt periods.

During inactive construction periods, when the site is left alone for 30 days or longer, a monthly inspection should be conducted.

All damaged sediment control measures should be repaired and/or replaced within 48 hours of the inspection.

### **Record Keeping Procedure**

Maintenance record keeping of all the Erosion and Sediment Control requirements will be conducted by Counterpoint Engineering's field representative, or his/her designee. The minimum inspection frequency during all construction stages is to be as follows:

- On a weekly basis;
- After every rainfall event;
- After significant snowmelt events; and,
- Daily during extended rain or snowmelt periods.

During inactive construction periods, when the Site is left alone for 30 days or longer, a monthly inspection should be conducted. All damaged erosion and sediment control measures should be repaired and / or replaced within 48 hours of the inspection.



## 12.0 CONCLUSIONS

Based on the assessment provided above, the residential development will meet the stormwater management criteria via the following methods:

- Quantity Control, Water Balance and Volume Control will be met with infiltration trench and stormwater storage.
- Quality Control will be met via inherently clean surfaces and stormwater infiltration.
- Phosphorus Removal will be met using infiltration areas on site

We trust the information provided in this report meets with your requirements. Should there be any questions or comments, please feel free to contact the undersigned.

Sincerely,

**Counterpoint Engineering**



Patrick Turner, P.Eng  
Partner

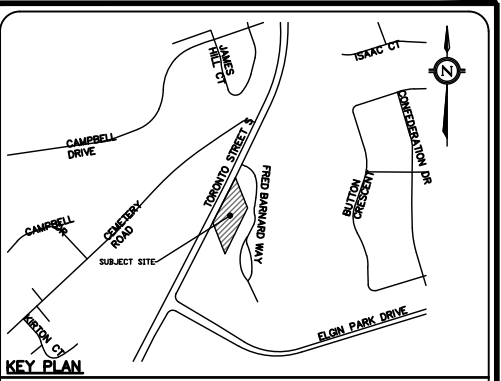
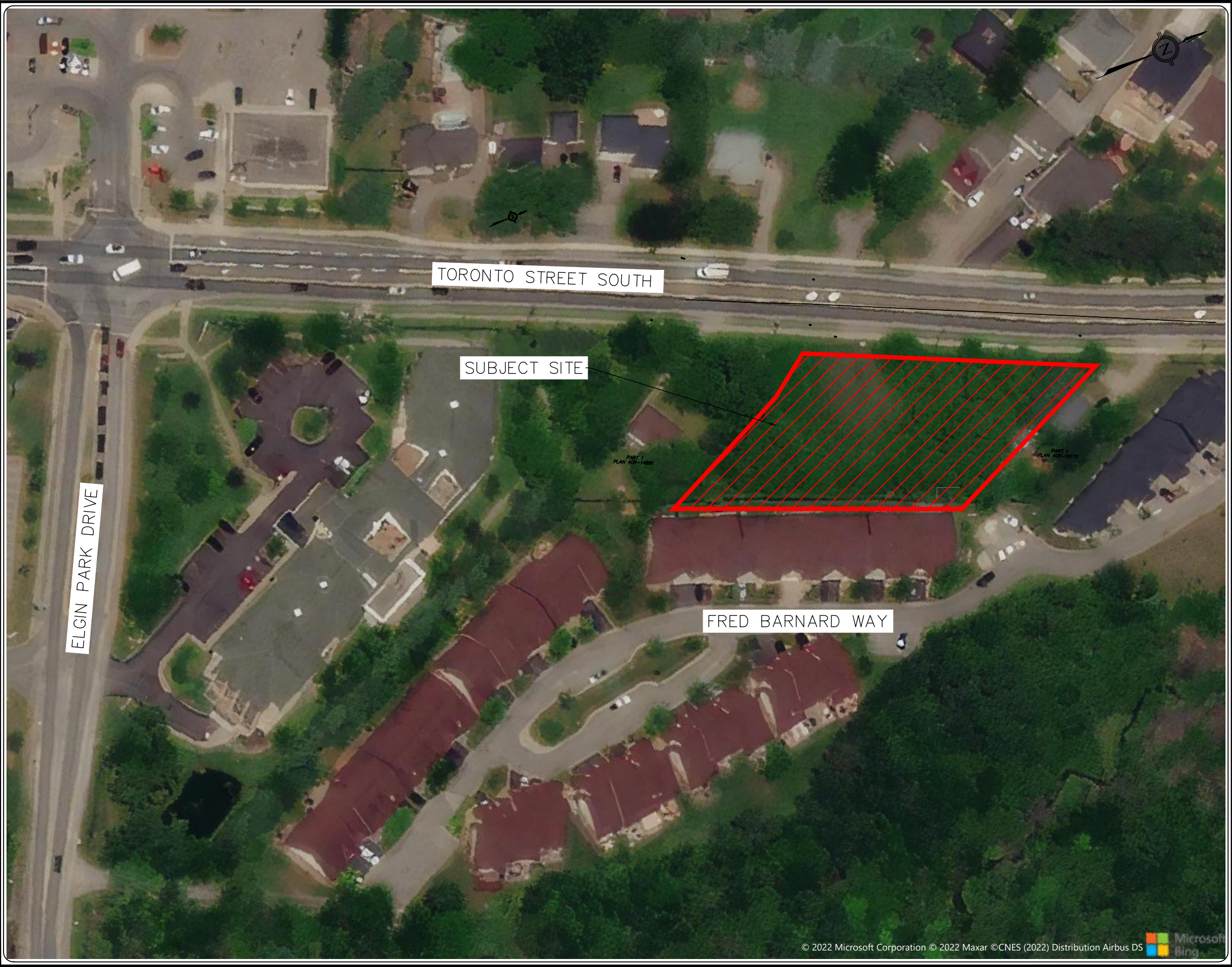
Scott Corley, E.I.T.



# **Appendix A**

## **Background Information**





LEGEND

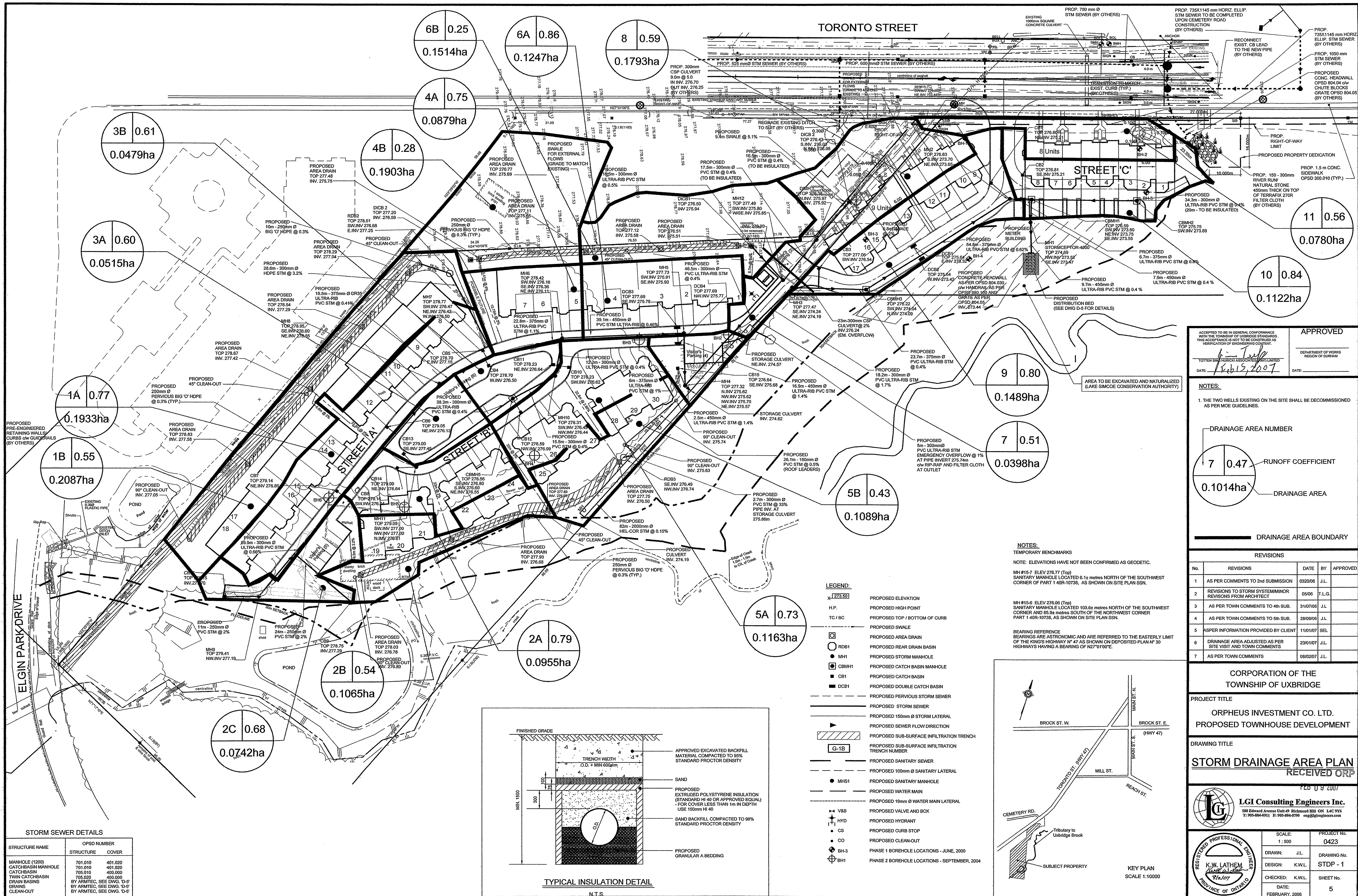
**counterpoint**  
ENGINEERING

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181 TORONTO STREET SOUTH MANSOUR  
ARABI/MAN HOLDINGS LTD  
UXBRIDGE, ONTARIO

SITE LOCATION PLAN	
DESIGNED BY: SC	DATE: MAY 2022
CHECKED BY: PT	PROJECT No. 21026
DRAWING BY: SC	
CHECKED BY: PT	FIGURE No. F-1
SCALE: 1:1000	





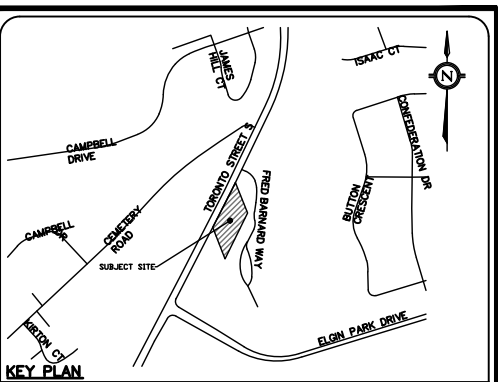
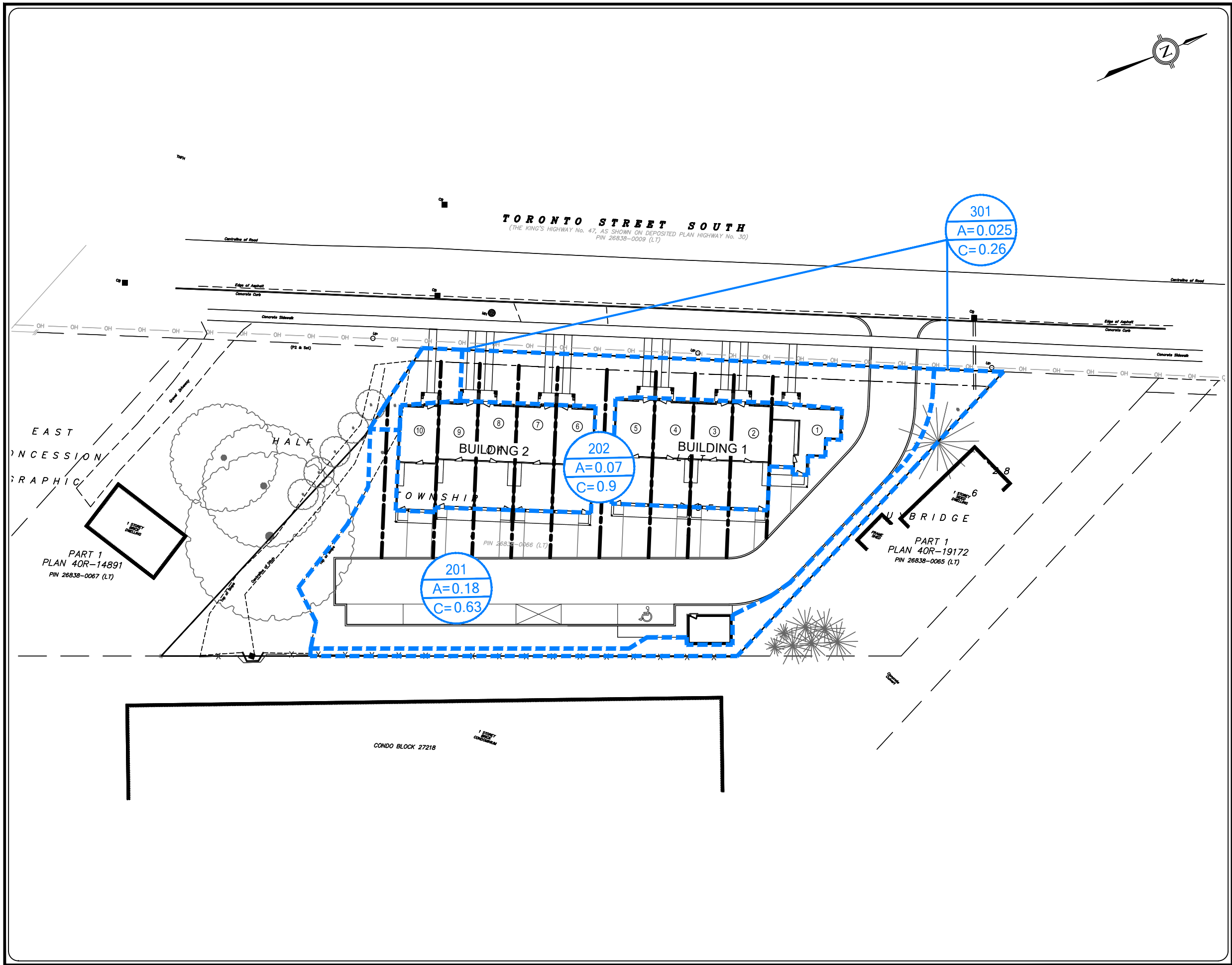


## **Appendix B**

# **Stormwater Management**







LEGEND	
	POST-DEVELOPMENT DRAINAGE AREA
<div><div>203</div><div>A=3.30</div><div>C=0.25</div></div>	AREA ID AREA (Ha) RUNOFF COEFFICIENT

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181 TORONTO STREET SOUTH MANSOUR  
ARABI/MAN HOLDINGS LTD  
UXBRIDGE, ONTARIO

POST-DEVELOPMENT STORM DRAINAGE PLAN

DESIGNED BY: SC	DATE: MAY 2022
CHECKED BY: PT	PROJECT No. 21026
DRAWING BY: SC	FIGURE No. SWM-2
CHECKED BY: PT	
SCALE: 1:500	



**SWM DESIGN CALCULATIONS**  
**5-Year Flow Rate Calculations - Pre Development Area 102**

**Project Name:** 181 Toronto Street  
**Municipality:** Uxbridge  
**Project No.:** 21026  
**Date:** 16-May-22

**Prepared by:** S.C

**Last Revised:** 16-May-22

**Rainfall Data**

Location:	Uxbridge	a	904
Event	5-year	b	5
		c	0.788

**Site Data**

Area (ha)	0.13
Runoff Coefficient	0.25
AC	0.03
Tc (min)	10
Rainfall Intensity (mm/hr)	107
Rational Flow Rate (l/s)	10

**The Rational Equation:**

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m<sup>3</sup>/s)  
C = the site specific runoff coefficient  
A = the drainage area (ha)  
i = rainfall intensity (mm/hr)



**SWM DESIGN CALCULATIONS**  
**5-Year Flow Rate Calculations - Post Development Area 201**

**Project Name:** 181 Toronto Street  
**Municipality:** Uxbridge  
**Project No.:** 21026  
**Date:** 16-May-22

**Prepared by:** S.C

**Last Revised:** 16-May-22

**Rainfall Data**

Location:	Uxbridge	a	904
Event	5-year	b	5
		c	0.788

**Site Data**

Area (ha)	0.18
Runoff Coefficient	0.63
AC	0.11
Tc (min)	10
Rainfall Intensity (mm/hr)	107
Rational Flow Rate (l/s)	34

**The Rational Equation:**

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m<sup>3</sup>/s)  
C = the site specific runoff coefficient  
A = the drainage area (ha)  
i = rainfall intensity (mm/hr)



**SWM DESIGN CALCULATIONS**  
**100-Year Flow Rate Calculations - Post Development Area 201**

**Project Name:** 181 Toronto Street  
**Municipality:** Uxbridge  
**Project No.:** 21026  
**Date:** 16-May-22

**Prepared by:** S.C

**Last Revised:** 16-May-22

**Rainfall Data**

Location:	Uxbridge	a	1799
Event	100-year	b	5
		c	0.81

**Site Data**

Area (ha)	0.18
Runoff Coefficient	0.63
AC	0.11
Tc (min)	10
Rainfall Intensity (mm/hr)	201
Rational Flow Rate (l/s)	63

**The Rational Equation:**

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m<sup>3</sup>/s)  
C = the site specific runoff coefficient  
A = the drainage area (ha)  
i = rainfall intensity (mm/hr)





**SWM DESIGN CALCULATIONS**  
**5-Year Flow Rate Calculations - Post Development External Area 301**

**Project Name:** 181 Toronto Street  
**Municipality:** Uxbridge  
**Project No.:** 21026  
**Date:** 16-May-22

**Prepared by:** S.C

**Last Revised:** 16-May-22

**Rainfall Data**

Location:	Uxbridge	a	904
Event	5-year	b	5
		c	0.788

**Site Data**

Area (ha)	0.02
Runoff Coefficient	0.26
AC	0.01
Tc (min)	10
Rainfall Intensity (mm/hr)	107
Rational Flow Rate (l/s)	2

**The Rational Equation:**

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m<sup>3</sup>/s)  
C = the site specific runoff coefficient  
A = the drainage area (ha)  
i = rainfall intensity (mm/hr)



## SWM DESIGN CALCULATIONS

### 100-Year Flow Rate Calculations - Post Development External Area 301

**Project Name:** 181 Toronto Street  
**Municipality:** Uxbridge  
**Project No.:** 21026  
**Date:** 16-May-22

**Prepared by:** S.C

**Last Revised:** 16-May-22

#### Rainfall Data

Location:	Uxbridge	a	1799
Event	100-year	b	5
		c	0.81

#### Site Data

Area (ha)	0.025
Runoff Coefficient	0.25
AC	0.01
Tc (min)	10
Rainfall Intensity (mm/hr)	201
Rational Flow Rate (l/s)	3

#### The Rational Equation:

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m<sup>3</sup>/s)  
 C = the site specific runoff coefficient  
 A = the drainage area (ha)  
 i = rainfall intensity (mm/hr)



## SWM DESIGN CALCULATIONS Required Storage Calculations - Area 201

**Project Name:** 181 Toronto Street

**Prepared by:** S.C

**Municipality:** Uxbridge

**Project No.:** 21026

**Last Revised:** 16-May-22

**Date:** 16-May-22

### Rainfall Data

Location:	Uxbridge	a	1799
Event	100-year	b	5
		c	0.81

### Site Data

Area (ha)	0.18
Runoff Coefficient	0.63
AC	0.11
Tc (min)	10
Time Increment (min)	5
Release Rate (l/s)	7.0
Storage Required (m <sup>3</sup> )	46

### The Rational Equation:

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m<sup>3</sup>/s)  
C = the site specific runoff coefficient  
A = the drainage area (ha)  
i = rainfall intensity (mm/hr)

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume
(min)	(mm/hr)	(m <sup>3</sup> /s)	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )
10	201	0.06	38	4	34
15	159	0.05	45	6	39
20	133	0.04	50	8	42
25	114	0.04	54	11	44
30	101	0.03	57	13	45
35	91	0.03	60	15	45
40	82	0.03	62	17	46
45	76	0.02	64	19	46
50	70	0.02	66	21	45
55	65	0.02	68	23	45
60	61	0.02	69	25	44
65	58	0.02	71	27	44
70	54	0.02	72	29	43
75	52	0.02	73	32	42
80	49	0.02	74	34	41
85	47	0.01	76	36	40
90	45	0.01	77	38	39
95	43	0.01	78	40	38
100	41	0.01	78	42	36
105	40	0.01	79	44	35
110	39	0.01	80	46	34
115	37	0.01	81	48	33
120	36	0.01	82	50	31

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**SWM DESIGN CALCULATIONS**  
**Required Storage Calculations - Area 202 Roof**

**Project Name:** 181 Toronto Street

**Prepared by:** S.C

**Municipality:** Uxbridge

**Project No.:** 21026

**Last Revised:** 16-May-22

**Date:** 16-May-22

**Rainfall Data**

Location:	Uxbridge	a	1799
Event	100-year	b	5
		c	0.81

**Site Data**

Area (ha)	0.073
Runoff Coefficient	0.9
AC	0.07
Tc (min)	10
Time Increment (min)	5
Release Rate (l/s)	7.0
Storage Required (m <sup>3</sup> )	21

**The Rational Equation:**

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m<sup>3</sup>/s)  
C = the site specific runoff coefficient  
A = the drainage area (ha)  
i = rainfall intensity (mm/hr)

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume
(min)	(mm/hr)	(m <sup>3</sup> /s)	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )
10	201	0.04	22	4	18
15	159	0.03	26	6	20
20	133	0.02	29	8	21
25	114	0.02	31	11	21
30	101	0.02	33	13	21
35	91	0.02	35	15	20
40	82	0.02	36	17	19
45	76	0.01	37	19	18
50	70	0.01	38	21	17
55	65	0.01	39	23	16
60	61	0.01	40	25	15
65	58	0.01	41	27	14
70	54	0.01	42	29	12
75	52	0.01	42	32	11
80	49	0.01	43	34	10
85	47	0.01	44	36	8
90	45	0.01	44	38	7
95	43	0.01	45	40	5
100	41	0.01	45	42	3
105	40	0.01	46	44	2
110	39	0.01	46	46	0
115	37	0.01	47	48	0
120	36	0.01	47	50	0

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**Counterpoint Engineering Inc.**

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# Counterpoint Engineering

181 Toronto Street South

Project Number: 21026

## Drawdown Time Calculation - Roof Drain Infiltration Gallery

### Infiltration

Dimensions:	Area=	30.0 m <sup>2</sup>
	Volume=	25.0 m <sup>3</sup>
	<b>Average Height=</b>	<b>0.8 m</b>

### Infiltration Gallery

25.0 m<sup>3</sup>

### Drawdown Time:

Infiltration rate (with safety factor applied): 34.4 mm/hr = 0.010 m/hr  
(Based on hydrogeological report results, infiltration rate ranges from 86mm/hr - 120mm/hr)  
Infiltration rate used = 86mm/hr / 2.5 safety factor = 34.4mm/hr

Drawdown Time = Depth/Infiltration Rate

Drawdown Time = 0.8m/0.0344m/hr = 24.2 hrs

**Drawdown time is less than 48 hours, therefore, MECP drawdown time is achieved.**

	Water Balance Calculations
	181 Toronto Street South 21026 Mar-22

Based on MOE Table 3.1

#### Site Data

Hydrologic Soil group: A  
Vegetation Cover: Urban Lawn

#### PRE-DEVELOPMENT WATER BALANCE

	Pervious Area	Impervious Area	Total
Area (ha)	0.30	0.00	0.30
Precipitation (mm)	834	834	
ET (mm)	536	83	
Surplus (mm)	298	751	
Infiltration (mm)	89	0	
Runoff (mm)	209	751	
ET (m <sup>3</sup> )	1608	0	1608
Infiltration (m <sup>3</sup> )	268	0	268
Runoff (m <sup>3</sup> )	626	0	626

#### POST-DEVELOPMENT WATER BALANCE (NO MITIGATION)

	Pervious Area	Impervious Area	Total
Area (ha)	0.12	0.18	0.30
Precipitation (mm)	834	834	
ET (mm)	536	83	
Surplus (mm)	298	751	
Infiltration (mm)	89	0	
Runoff (mm)	209	751	
ET (m <sup>3</sup> )	643	150	793
Infiltration (m <sup>3</sup> )	107	0	107
Runoff (m <sup>3</sup> )	250	1351	1601

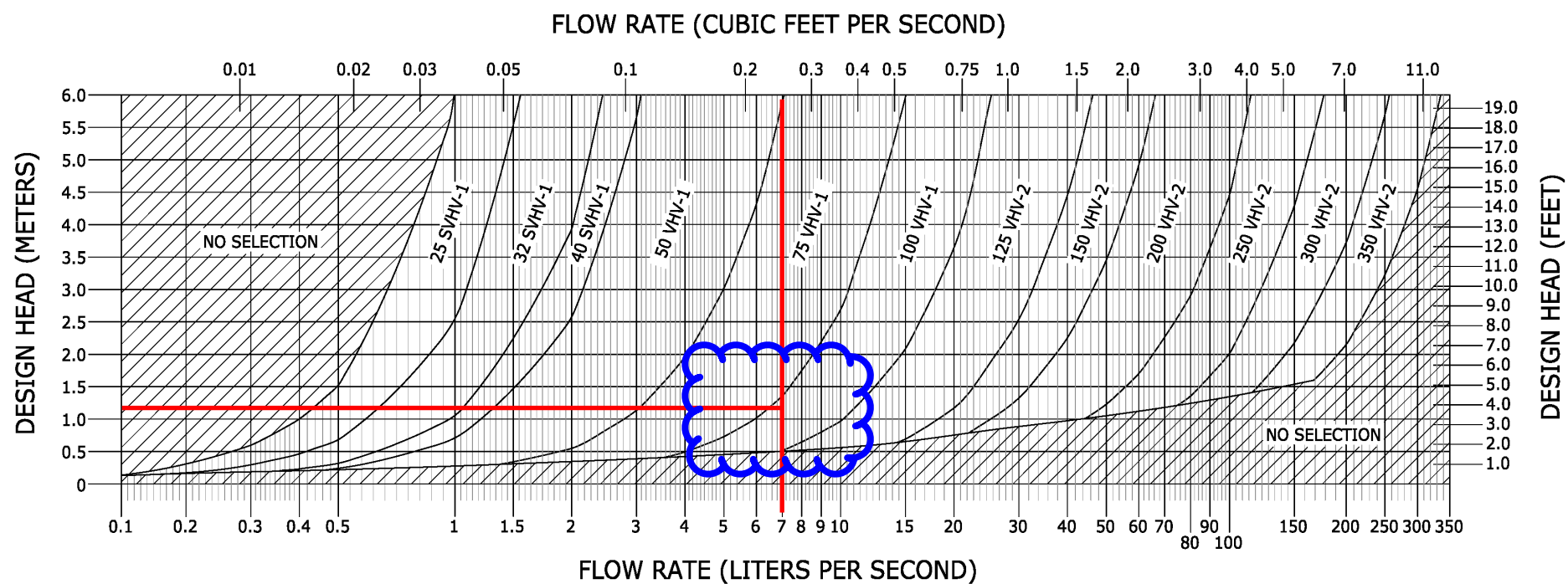
#### POST-DEVELOPMENT WATER BALANCE (WITH MITIGATION)

	Pervious Area	Impervious Area	Total
Area (ha)	0.12	0.18	0.30
Precipitation (mm)	834	834	
ET (mm)	536	83	
Surplus (mm)	298	751	
Infiltration (mm)	89	734	
Runoff (mm)	209	17	
ET (m <sup>3</sup> )	643	150	793
Infiltration (m <sup>3</sup> )	107	1321	1428
Runoff (m <sup>3</sup> )	250	30	280

#### SUMMARY

	ET	Infiltration m <sup>3</sup>	Runoff
Pre	1608	268	626
w/o Mitigation	793 -51%	107 -60%	1601 156%
w/ Mitigation	793 -51%	1428 433%	280 -55%

Figure 3 : HYDROVEX® VHV/SVHV Selection Chart



PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



# TORONTO STREET

## UXBRIDGE, ON

### DC-780 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH DC-780.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
  - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
  - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
  - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
  - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
  - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
  - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

### IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE DC-780 CHAMBER SYSTEM

- STORMTECH DC-780 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH DC-780 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
  - STONESHOOTER LOCATED OFF THE CHAMBER BED.
  - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
  - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm).
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

### NOTES FOR CONSTRUCTION EQUIPMENT

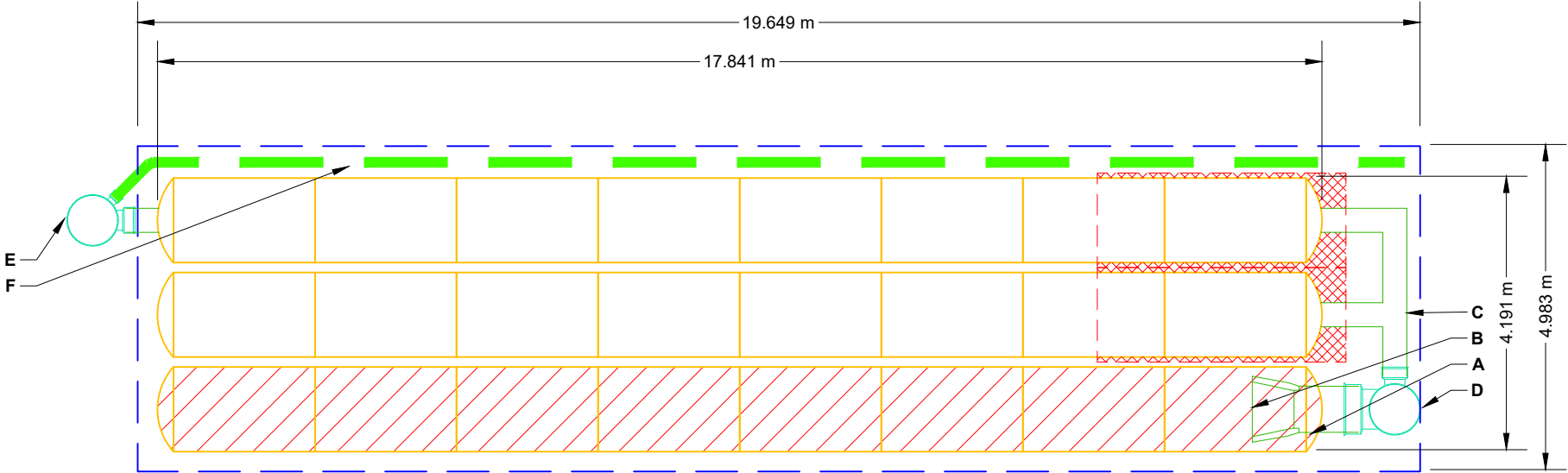
- STORMTECH DC-780 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- THE USE OF CONSTRUCTION EQUIPMENT OVER DC-780 CHAMBERS IS LIMITED:
  - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
  - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
  - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

**USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.**

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.



PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS		*INVERT ABOVE BASE OF CHAMBER				
				PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
24	STORMTECH DC-780 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	4.648					
6	STORMTECH DC-780 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.600					
152	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.448	PREFABRICATED EZ END CAP	A	600 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC740ECEZ / TYP OF ALL 600 mm	3 mm	
229	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.448	FLAMP	B	BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS		
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.448	MANIFOLD	C	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC74024RAMP		
63.6	INSTALLED SYSTEM VOLUME (m <sup>3</sup> ) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	1.143			300 mm x 300 mm TOP MANIFOLD, ADS N-12	318 mm	
		TOP OF DC-780 CHAMBER:	0.991	NYLOPLAST (INLET W/ ISO PLUS ROW)	D	750 mm DIAMETER (610 mm SUMP MIN)		130 L/s IN
		300 mm x 300 mm TOP MANIFOLD INVERT:	0.546	NYLOPLAST (OUTLET)	E	750 mm DIAMETER (DESIGN BY ENGINEER)		57 L/s OUT
		300 mm BOTTOM CONNECTION INVERT:	0.259	UNDERDRAIN	F	150 mm ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		
97.9	SYSTEM AREA (m <sup>2</sup> )	600 mm ISOLATOR ROW PLUS INVERT:	0.231					
49.3	SYSTEM PERIMETER (m)	BOTTOM OF DC-780 CHAMBER:	0.229					
		UNDERDRAIN INVERT:	0.000					
		BOTTOM OF STONE:	0.000					



ISOLATOR ROW PLUS  
(SEE DETAIL)



PLACE MINIMUM 3.810 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER  
BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR  
PROTECTION AT ALL CHAMBER INLET ROWS



BED LIMITS

#### NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

TORONTO STREET

UXBRIDGE, ON

DATE:

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StormTech®

Chamber System

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4640 TRUEMAN BLVD  
HILLIARD, OH 43026  
1-800-733-7473

SCALE = 1 : 100

SHEET

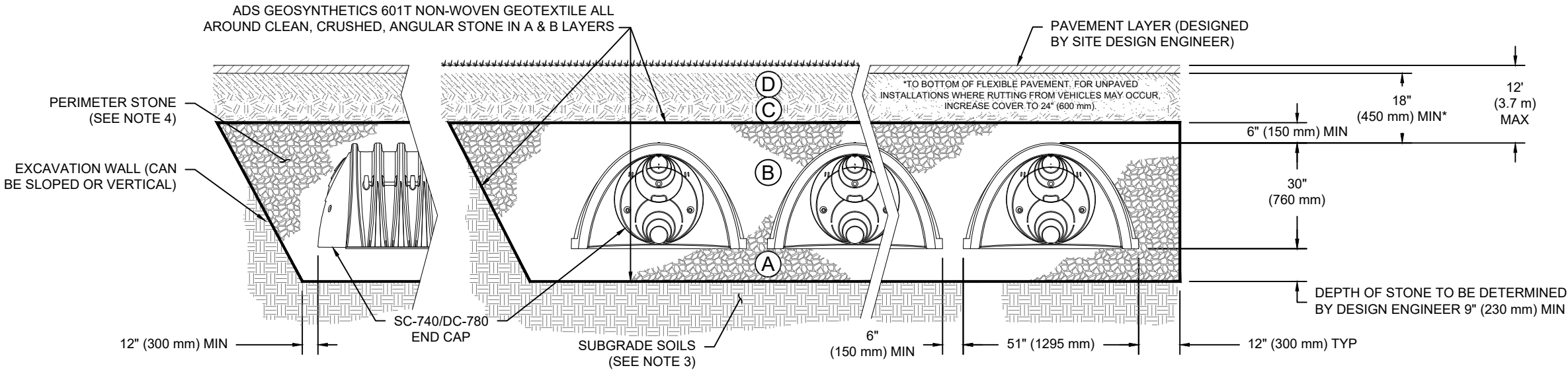
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ACCEPTABLE FILL MATERIALS: STORMTECH DC-780 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	<b>FINAL FILL:</b> FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	<b>INITIAL FILL:</b> FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE.  MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 <sup>1</sup> A-1, A-2-4, A-3  OR  AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	<b>EMBEDMENT STONE:</b> FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	<b>FOUNDATION STONE:</b> FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. <sup>2,3</sup>

- PLEASE NOTE:
- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
  - STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
  - WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
  - ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- DC-780 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
  - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
  - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
  - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

TORONTO STREET

UXBRIDGE, ON

DATE:

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PROJECT #:

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DESCRIPTION

CHK

DRW

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4640 TRUEMAN BLVD

HILLIARD, OH 43026

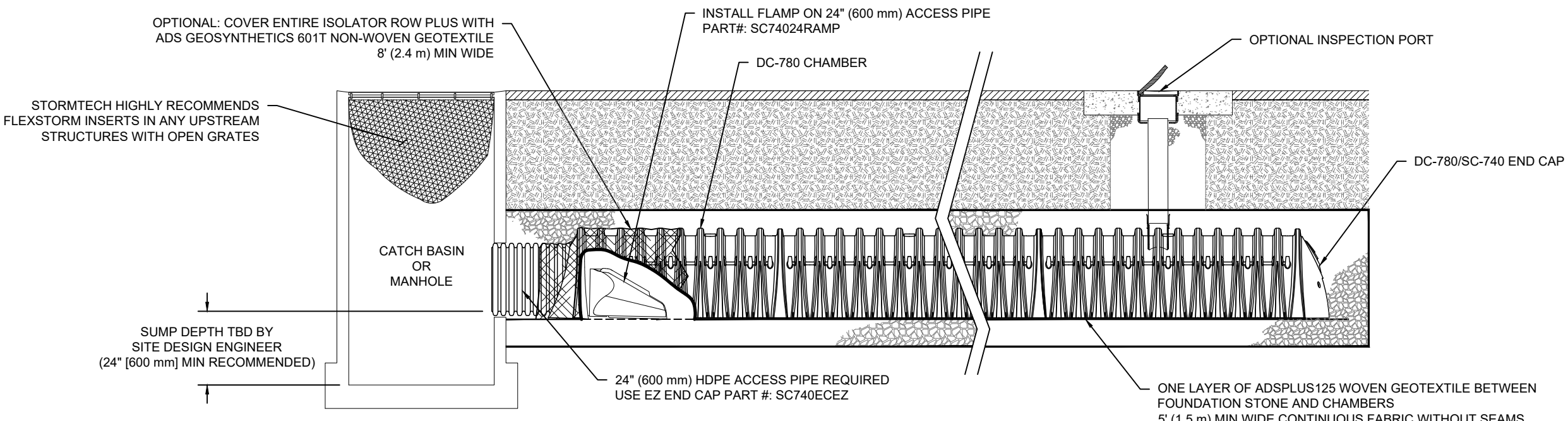
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**DC-780 ISOLATOR ROW PLUS DETAIL**  
NTS

**INSPECTION & MAINTENANCE**

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
    - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
    - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
    - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
    - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
    - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
  - B. ALL ISOLATOR PLUS ROWS
    - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
    - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
      - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
      - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
    - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
  - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
  - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

**NOTES**

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473	TORONTO STREET UXBRIDGE, ON	
	DATE:	DRAWN: SC
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StormTech® Chamber System		
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SHEET 4 OF 6		



# StormTech® Isolator® Row Plus

The StormTech Isolator Row Plus is an enhancement to our proven water quality treatment system. This updated system is both a NJCAT and ETV verified water quality treatment device that can be incorporated into any system layout.

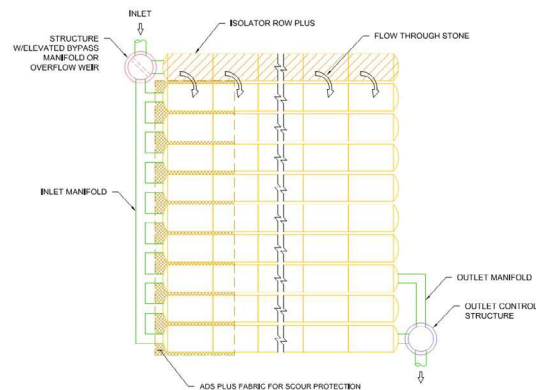
## Features

- Isolator Row Plus is now ETV verified. As a Manufactured Treatment Device it achieves over 81% TSS removal per the ISO 14034:2016 ETV standard and the Canadian Environmental Technology Verification Process.
- A patented Flamp™ (Flared End Ramp) provides a smooth transition from pipe invert to fabric bottom. The FLAMP is attached to the inlet pipe inside the chamber end cap and improves chamber function over time by distributing sediment and debris that would otherwise collect at the inlet. It also serves to improve the fluid and solid flow back into the inlet pipe during maintenance and cleaning.
- Proprietary ADS Plus fabric maintains durability and sediment removal while allowing for higher water quality flow rates. A single layer of ADS Plus fabric is placed between the angular base stone and the Isolator Row Plus chambers.

## Technology Descriptions

The Isolator Row Plus is designed to capture the “first flush” runoff and offers the versatility to be sized on a volume or a flow basis. Considered an LID (low impact development) technology, the Isolator Row Plus can be part of the treatment train design for water quality. An upstream manhole not only provides access to the Isolator Row Plus but includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. Stormwater is then either infiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

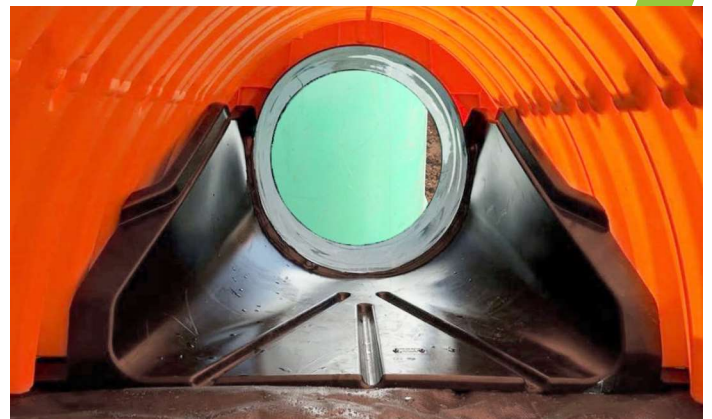
## Schematic of the StormTech Isolator Row PLUS System



## Summary of Verified Claims<sup>1</sup>

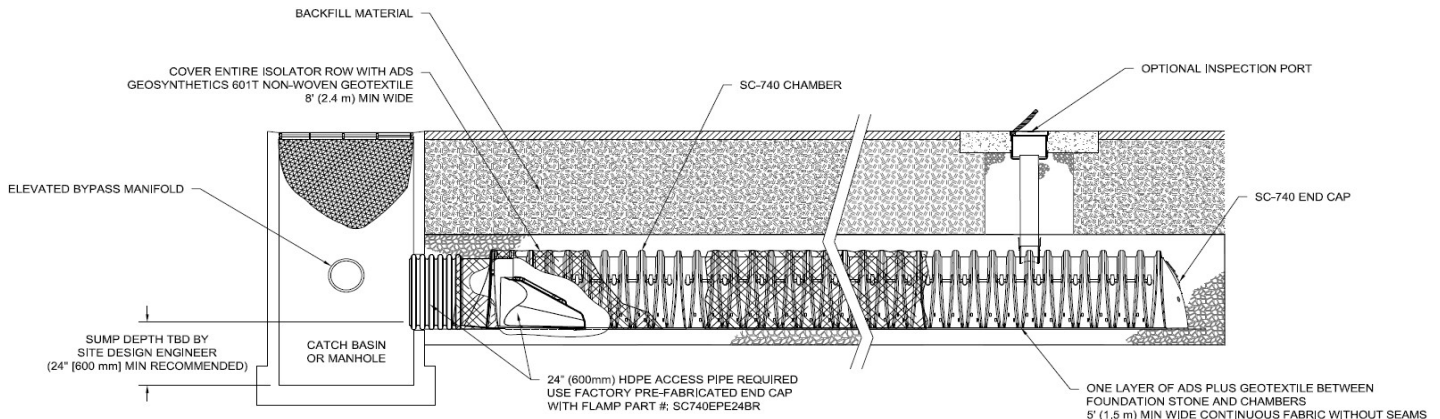
Maximum Treatment Flow Rate (MTFR) (L/s/m <sup>2</sup> )	2.8
Effective Filtration Treatment Area (m <sup>2</sup> )	5.06
Test Sediment Size (microns)	1-1000
Mean Particle Concentration (mg/L)	200
TSS Removal Efficiency	81%

<sup>1</sup> Verification of StormTech SC-740 Isolator Row PLUS test results in accordance with the ISO 14034:2016 ETV standard. The full Verification Statement for the StormTech SC-740 Isolator Row PLUS can be downloaded from the VerifiGlobal website



## StormTech Isolator Row Plus (not to scale)

Note: Non-woven fabric is only required over the chambers for the SC-310 and SC-740 chamber models.



## Maintenance

The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By “isolating” sediment to just one row of the StormTech system, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. Maintenance is accomplished with the JetVac process. The JetVac® process utilizes a high-pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediment. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency.

	Chamber Storage	Chamber Footprint	Treatment Rate
SC-160LP	0.42 m <sup>3</sup> (15.0 cf)	1.06 m <sup>2</sup> (11.45 sf)	3.11 L/s (0.11 cfs)
SC-310	0.88 m <sup>3</sup> (31.0 cf)	1.64 m <sup>2</sup> (17.7 sf)	4.53 L/s (0.16 cfs)
SC-740	2.12 m <sup>3</sup> (74.9 cf)	2.58 m <sup>2</sup> (27.8 sf)	7.36 L/s (0.26 cfs)
DC-780	2.22 m <sup>3</sup> (78.4 cf)	2.58 m <sup>2</sup> (27.8 sf)	7.36 L/s (0.26 cfs)
MC-3500	4.96 m <sup>3</sup> (175.0 cf)	3.99 m <sup>2</sup> (42.9 sf)	11.32 L/s (0.40 cfs)
MC-4500	4.60 m <sup>3</sup> (162.6 cf)	2.80 m <sup>2</sup> (30.1 sf)	7.93 L/s (0.28 cfs)

## Installation

Installation of the stormwater treatment unit(s) shall be preformed per manufacture’s installation instructions. Such instructions can be obtained by calling Advanced Drainage systems at 888-367-7473 or by logging on to [www.ads-pipe.com](http://www.ads-pipe.com) or [www.stormtech.com](http://www.stormtech.com).



ADS “Terms and Conditions of Sale” are available on the ADS website, [www.ads-pipe.com](http://www.ads-pipe.com).  
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[ads-pipcanada.ca](http://ads-pipcanada.ca)

519-699-0222

# Verification Statement



## StormTech Isolator® Row PLUS Registration number: (V-2020-10-01) Date of issue: (2020-October-27)

<b>Technology type</b>	Stormwater Filtration Device		
<b>Application</b>	Stormwater filtration technology to remove sediments, nutrients, heavy metals, and organic contaminants from stormwater runoff		
<b>Company</b>	StormTech, LLC.		
<b>Address</b>	520 Cromwell Avenue, Rocky Hill, CT 06067 USA	<b>Phone</b>	+1-888-892-2694
<b>Website</b>	www.stormtech.com		
<b>E-mail</b>	info@stormtech.com		

### Verified Performance Claims

The StormTech Isolator® Row PLUS technology was tested at the Mid-Atlantic Storm Water Research Center (MASWRC), under the supervision of Boggs Environmental Consultants, Inc. The performance test results for two overlapping StormTech Isolator® Row PLUS chambers (commercial unit model SC-740) were verified by Good Harbour Laboratories Inc. (GHL), following the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. Based on the laboratory testing conducted, the verified performance claims are as follows:

**Total Suspended Solids (TSS) Removal Efficiency** - The StormTech Isolator® Row PLUS achieved  $82\% \pm 1\%$  removal efficiency of suspended sediment concentration (SCC) at a 95% confidence level.

**Average Loading Rate** - Based on the reported flow rate data and the effective sedimentation and filtration treatment area of the test unit, the average loading rate of the test unit was  $4.15 \pm 0.03$  GPM/ft<sup>2</sup> at a 95% confidence level.

**Maximum Treatment Flow Rate (MTFR)** - Although the MTFR varies among the StormTech Isolator® Row PLUS model sizes and the number of chambers, the design surface loading rate remains the same (4.13 gpm/ ft<sup>2</sup> of treatment surface area). The test unit consisted of two overlapping StormTech SC-740 chambers with a nominal MTFR of 225 GPM (0.501 CFS) and an effective filtration treatment area (EFTA) of approximately 54.5 ft<sup>2</sup>.

**Detention Time and Volume** - The StormTech Isolator Row PLUS detention time and wet volume varies with model size. The unit tested had a wet volume of approximately 65.1 ft<sup>3</sup> and a detention time of 2.2 minutes.

**Maximum Sediment Storage Depth and Volume** - The sediment storage volume and depth vary according to the StormTech Isolator® Row PLUS model sizes and system configuration. For the two overlapping StormTech SC-740 chambers tested, the maximum sediment storage volume is 2.3 ft<sup>3</sup> at a sediment depth of 0.5 inches.

**Effective Sedimentation/Filtration Treatment Areas** - The Effective Sedimentation Area (ESA) and the Effective Filtration Treatment Area (EFTA) increase as the size of the system increases. For the two overlapping StormTech SC-740 chambers tested, the ESA and the ratio of ESA/EFTA were 54.5 ft<sup>2</sup> and 1.0, respectively.

**Sediment Mass Load Capacity** - The sediment mass load capacity varies according to the StormTech Isolator® Row PLUS model sizes and system configuration. For the two overlapping StormTech SC-740 chambers tested, the mass loading capture was 158.4 lbs ± 0.8 lbs (2.91 ± 0.01 lbs/ ft<sup>2</sup>) following a total sediment loading of 195.2 lbs.

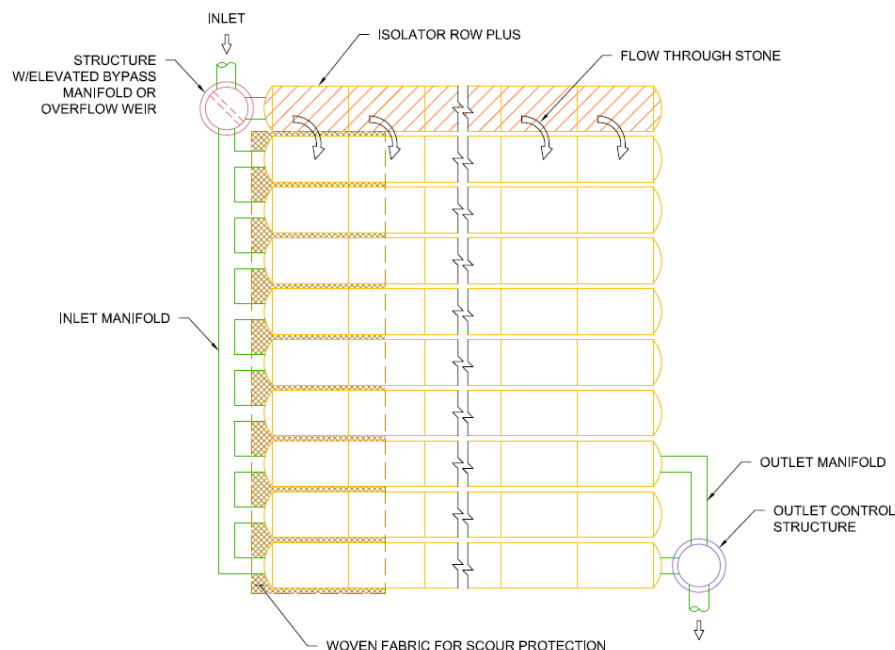
### Technology Application

The StormTech “Isolator® Row PLUS” is a stormwater treatment technology designed for use under parking lots, roadways and heavy earth loads while providing a superior and durable structural system. The technology comprises a row of chambers covered in a non-woven geotextile fabric with a single layer of proprietary woven fabric at the bottom that serves as a filter strip, providing surface area for infiltration and runoff reduction with enhanced suspended solids and pollutant removal. The following features make the Isolator® Row PLUS effective as a water quality solution:

- Enhanced infiltration Surface Area
- Runoff Volume Reduction
- Peak Flow Reduction
- Sediment/Pollutant Removal
- Internal Water Storage (IWS)
- Water Temperature Cooling (Thermal Buffer).

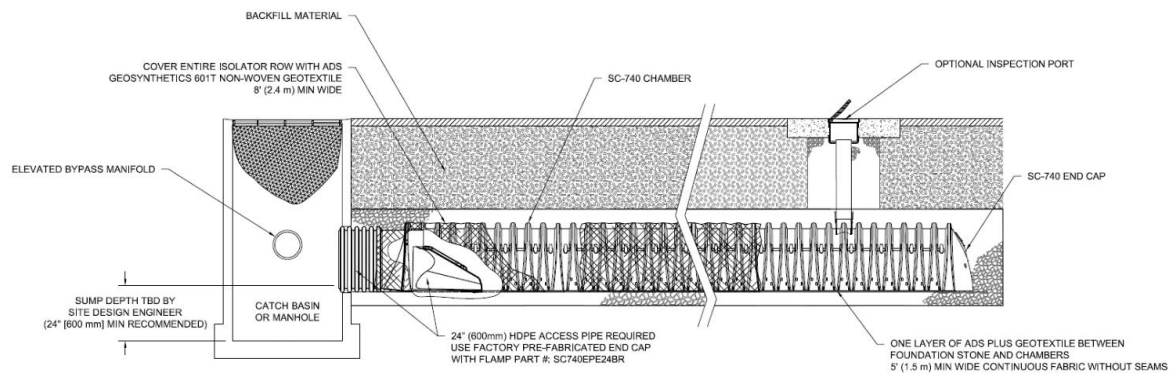
### Technology Description

The Isolator® Row PLUS (shown in Figures 1 and 2) is the first row of StormTech chambers that is surrounded with filter fabric and connected to a closely located manhole for easy access. The Isolator® Row PLUS provides for settling and filtration of sediment as stormwater rises in the chamber and ultimately passes through the filter fabric. The open-bottom chambers allow stormwater to flow out of the chambers, while sediment is captured in the Isolator® Row PLUS.



**Figure 1: Schematic of the StormTech Isolator® Row PLUS System**





**Figure 2: Isolator® Row PLUS Detail**

A single layer of proprietary Advanced Drainage Systems (ADS) PLUS fabric is placed between the angular base stone and the Isolator Row PLUS chamber. The geotextile provides the means for stormwater filtration and provides a durable surface for maintenance operations. A 6 oz. non-woven fabric is placed over the chambers.

The Isolator® Row PLUS is designed to capture the “first flush” and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole not only provides access to the Isolator® Row PLUS but includes a high low/concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator® Row PLUS bypass through a manifold to the other chambers. This is achieved with either a high-flow weir or an elevated manifold. This creates a differential between the Isolator® Row PLUS and the manifold, thus allowing for settlement time in the Isolator® Row PLUS. After Stormwater flows through the Isolator® Row PLUS and into the rest of the StormTech chamber system it is either infiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

StormTech developed and owns the Isolator® Row PLUS technology and has filed a number of patent applications relating to the Isolator® Row PLUS system.<sup>1</sup>

### **Description of Test Procedure for the StormTech Isolator® Row PLUS**

In January 2020, two overlapping StormTech SC-740 Isolator® Row PLUS commercial size chambers were installed at the Mid-Atlantic Storm Water Research Center (MASWRC, a subsidiary of BaySaver), in Mount Airy, Maryland, to evaluate the performance of the Isolator® Row PLUS system for Total Suspended Solid (TSS) removal (Figure 3) All testing and data collection procedures were supervised by Boggs Environmental Consultants, Inc. (BEC), who was hired by ADS for third party oversight, and were in accordance with the *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device (January 2013)*.

Prior to the start of testing, a Quality Assurance Project Plan (QAPP), revision dated January 09, 2020, was submitted and approved by the New Jersey Corporation for Advanced Technology (NJCAT), c/o Center for Environmental Systems, Stevens Institute of Technology, Castle Point on Hudson, Hoboken, NJ 07030.

<sup>1</sup> (U.S. Provisional Application No. 62/753,050, filed October 30, 2018; U.S. Non-Provisional Application No. 16/670,628, filed October 31, 2019; International Application No. PCT/US2019/059283, filed October 31, 2019; U.S. Application No. 16/938,482, filed July 24, 2020; U.S. Application No. 16/938,657, filed July 24, 2020; PCT International Application No. PCT/US2020/043543, filed July 24, 2020; PCT International Application No. PCT/US2020/043557, filed July 24, 2020.





**Figure 3: StormTech “Isolator® Row PLUS” Test Set-up at MASWRC**

### **Verification Results**

The verification process for the StormTech Isolator® Row PLUS technology was conducted by GHIL in accordance with the VerifiGlobal Verification Plan for the StormTech “Isolator® Row PLUS” Technology – 2020-09-09. The technology performance claims verified by GHIL are summarized at the front of this Verification Statement and in Table 6 on Page 8 under the heading “Verification Summary”.

Particle size distribution analysis was performed by ECS Mid-Atlantic, LLC of Frederick, MD in accordance with ASTM D422-63(2007). ECS is accredited by the American Association of State Highways and Transportation Officials (AASHTO).

ASTM D422-63(2007) is a sieve and hydrometer method where the larger particles, > 75 microns, are measured using a standard sieve stack while the smaller particles are measured based on their settling time using a hydrometer.

The PSD meets the requirements of NJDEP, which is generally accepted as representative of the type of particle sizes an OGS would be designed to treat. Actual PSD is site and rainfall event specific, so it was necessary to choose a standard PSD to make testing and comparison manageable.

Table 1 shows the NJDEP PSD specification. Table 2 and Figure 4 show the incoming material PSD as determined by ECS Mid-Atlantic and confirmed by the verifier.

**Table 1: NJDEP PSD Specification**

<b>Particle Size (µm)</b>	<b>NJDEP Minimum Specification</b>
1000	98
500	93
250	88
150	73
100	58
75	48
50	43
20	33
8	18
5	8
2	3
d <sub>50</sub>	< 75 µm

**Table 2 – Particle Size Distribution (PSD) of Test Sediment**

Mesh (mm)	US Sieve Size	Sample ID		
		PSD A	PSD B	PSD C
		Percent Finer		
9.525	0.375	100.0	100.0	100.0
4.750	#4	100.0	100.0	100.0
4.000	#5	100.0	100.0	100.0
2.360	#8	100.0	100.0	100.0
2.000	#10	100.0	100.0	100.0
1.180	#16	100.0	100.0	100.0
1.000	#18	100.0	100.0	100.0
0.500	#35	100.0	100.0	100.0
0.425	#40	93.3	93.0	93.6
0.250	#60	90.3	89.8	90.2
0.150	#100	79.3	78.1	78.1
0.125	#120	73.6	71.7	71.7
0.106	#140	68.4	65.2	64.8
0.090	#170	60.2	58.3	57.5
0.075	#200	52.0	50.9	50.3
0.053	#270	48.0	48.3	47.8
0.045	Hydrometer	46.6	46.7	46.7
0.032		42.8	42.9	41.0
0.021		37.1	37.2	35.3
0.0125		25.7	25.7	25.8
0.0090		20.1	20.1	19.2
0.0064		16.3	16.4	14.5
0.0032		8.8	8.7	7.8
0.0014		3.8	3.7	3.8

The suspended sediment concentration analysis was completed by Fredericktowne Labs Inc., Meyersville, MD. Fredericktown Labs is accredited by the Maryland Department of Environment as Maryland Certified Water Quality Laboratory. The analysis procedure was ASTM D3977-97, Suspended Sediment Concentration. The sampling procedure and submission of samples to the test lab were overseen by the independent observer, Boggs Environmental Consultants, Inc.

All test data and calculations were detailed in the report “NJCAT TECHNOLOGY VERIFICATION Isolator® Row PLUS StormTech, LLC”, July 2020, which was submitted to and verified by the New Jersey Corporation for Advanced Technology (NJCAT).

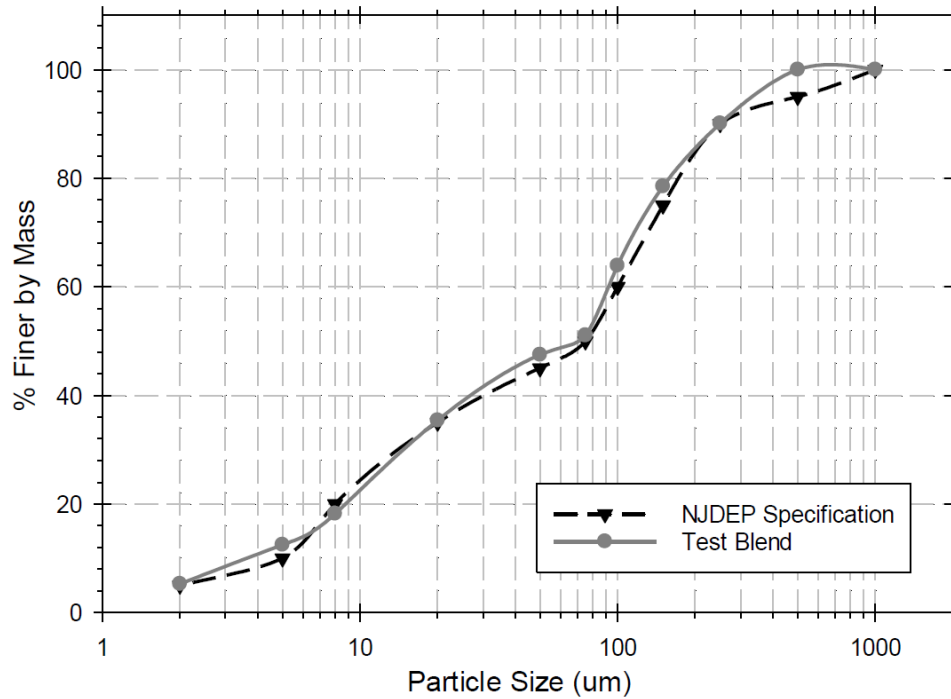


Figure 4– Particle Size Distribution (PSD)

The data in Table 3 (Flow Rate and Temperature) and Table 4 (Removal Efficiency) form the basis for the verified technology performance claim, specifically, flow rate, sediment captured and removal efficiency.

Table 3: Flow Rate and Temperature Summary

Run	Max Flow (gpm)	Min Flow (gpm)	Average Flow (gpm)	Flow COV	Flow Compliance (COV< 0.1)	Maximum Temperature (Fahrenheit)	NJDEP Temperature Compliance (< 80 F)
1	232.8	223.9	226.3	0.0078	Y	48.2	Y
2	228.9	218.6	220.8	0.0104	Y	51.5	Y
3	229.4	220.0	227.2	0.0094	Y	44.7	Y
4	230.2	218.7	223.2	0.0138	Y	40.5	Y
5	228.7	216.9	222.2	0.0103	Y	44.7	Y
6	227.6	217.0	224.2	0.0115	Y	46.7	Y
7	229.7	221.9	226.4	0.0092	Y	44.6	Y
8	230.3	222.2	226.8	0.0089	Y	43.5	Y
9	233.2	218.4	225.6	0.0136	Y	45.5	Y
10	232.2	219.7	228.4	0.0126	Y	44.7	Y
11	226.9	219.2	224.1	0.0088	Y	52.4	Y
12	232.2	222.1	226.9	0.0107	Y	48.5	Y
13	234.7	221.2	226.1	0.0109	Y	48.5	Y
14	231.9	223.4	228.7	0.0103	Y	45.6	Y
15	236.8	224.1	231.4	0.0131	Y	52.2	Y
16	232.5	221.3	229.0	0.0137	Y	47.8	Y

Table 4: Removal Efficiency Results

Run	Average Influent TSS (mg/L)	Influent Water Volume (gal)	Adjusted Average Effluent TSS (mg/L)	Effluent Water Volume (gal)	Adjusted Average Drain Down TSS (mg/L)	Drain Down Water Volume (gal)	Single Run Removal Efficiency (%)	Mass of Captured Sediment (g)	Cumulative Removal Efficiency (%)
1	203	7166	46	6881	34	285	77.8	4282	77.8
2	199	6993	32	6639	27	354	84.0	4415	80.8
3	207	7197	37	6793	27	403	82.6	4654	81.4
4	217	7068	33	6635	29	433	84.9	4923	82.3
5	215	7037	39	6593	29	444	82.2	4705	82.3
6	207	7097	40	6643	31	454	81.2	4504	82.1
7	198	7169	37	6693	30	476	81.6	4386	82.0
8	201	7184	37	6716	32	468	81.6	4473	82.0
9	205	7147	38	6675	30	472	81.8	4539	82.0
10	203	7235	38	6759	31	476	81.4	4523	81.9
11	208	7096	38	6624	30	472	81.8	4567	81.9
12	209	7185	41	6709	30	476	80.7	4584	81.8
13	198	7162	41	6680	32	482	79.7	4277	81.6
14	200	7242	43	6757	34	485	78.8	4318	81.4
15	196	7329	41	6842	32	487	79.5	4320	81.3
16	202	7254	44	6769	31	485	78.9	4384	81.2
<b>Avg.</b>	<b>204.2</b>	<b>7160</b>	<b>39</b>	<b>6713</b>	<b>31</b>	<b>447</b>	<b>81.2</b>	<b>4491</b>	<b>N/A</b>
<b>Cumulative Mass Removed (g)</b>							<b>71854</b>		
<b>Cumulative Mass Removed (lb)</b>							<b>158.4</b>		
<b>Total Mass Loaded (lb)</b>							<b>195.2</b>		
<b>Cumulative Removal Efficiency (%)</b>							<b>81.2</b>		

### Quality Assurance

Performance verification of the StormTech Isolator® Row PLUS technology was performed in accordance with the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. This included reviewing all data sheets and calculated values, as well as overall management of the test system, quality control and data integrity.

Additional information on quality control measures taken can be found in section 5 of the QAPP for StormTech Isolator Row New Jersey Department of Environmental Protection Testing, Rev. 1/9/2020.

Specific QA/QC measures reviewed by the verifier are summarized in Table 5 below.

Table 5. Validation of QA/QC Procedures

QC Parameter	Acceptance Criteria
Independence of observer	Confirmed in letter from Boggs Environmental Consultants, Inc. to NJCAT
Consistency of procedure	Daily logs confirm proper procedure
Existence of QAPP	Confirmed. "QAPP For StormTech Isolator Row New Jersey Department of Environmental Protection Testing", Rev. 1/9/2020)
Use of appropriate sample analysis method – ASTM D3799	Confirmed by method reference on lab reports from Fredericktowne Labs Inc.
Test method appropriate for the technology	Used industry stakeholder approved protocol: <i>New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids</i>

	<i>Removal by a Filtration Manufactured Treatment Device (January 2013)</i>
Test parameters stayed within required limits	Confirmed in report "NJCAT TECHNOLOGY VERIFICATION Isolator® Row PLUS StormTech, LLC", July 2020
Third party verified data	All testing was observed and reviewed by Boggs Environmental Consultants, Inc.

### Variance

Performance claims regarding structural load limitations were not verified as they are outside the scope of the performance testing that was conducted in accordance with the 'Quality Assurance Project Plan (QAPP) for StormTech Isolator Row, New Jersey Department of Environmental Protection Testing', revision dated January 09, 2020.

### Verification Summary

The StormTech "Isolator® Row PLUS" is a stormwater treatment technology designed for use under parking lots, roadways and heavy earth loads while providing a superior and durable structural system. The technology comprises a row of chambers wrapped in woven geotextile fabric with two layers at the bottom that serve as a filter strip, providing surface area for infiltration and runoff reduction with enhanced suspended solids and pollutant removal.

The StormTech Isolator® Row PLUS technology was tested at the Mid-Atlantic Storm Water Research Center (MASWRC), under the supervision of Boggs Environmental Consultants, Inc. The performance test results for two overlapping StormTech Isolator® Row PLUS chambers (commercial unit model SC-740) were verified by Good Harbour Laboratories Inc. (GHL), following the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. Table 6 summarizes the verification results in relation to the technology performance parameters that were identified in the Verification Plan to determine the efficacy of the StormTech Isolator® Row PLUS technology.

**Table 6 - Summary of Verification Results Against Performance Parameters**

Parameters	Verified Claims	Accuracy
Total Suspended Solids (TSS) Removal Efficiency	Based on the laboratory testing conducted, the StormTech Isolator® Row PLUS achieved an average 82% removal efficiency of SSC	± 1% (95% confidence level)
Average Loading Rate	Based on the laboratory testing parameters, the StormTech Isolator® Row PLUS maintained a loading rate of 4.15 GPM/sf	±0.03 GPM/sf (95% confidence level)
Maximum Treatment Flow Rate (MTFR)	Although the MTFR varies among the StormTech Isolator® Row PLUS model sizes and the number of chambers, the design surface loading rate remains the same (4.13 GPM/ft <sup>2</sup> of treatment surface area). The test unit consisted of two overlapping StormTech SC-740 chambers with a nominal MTFR of 225 GPM (0.501 CFS) and an effective filtration treatment area (EFTA) of approximately 54.5 ft <sup>2</sup> .	± 1.4 GPM (95% confidence level)
Detention Time and Volume	Detention time and wet volume varies with model size. The unit tested had a wet volume of approximately 65.1 ft <sup>3</sup> (based on	N/A

	physical measurement) and a detention time of 2.2 minutes.	
Maximum Sediment Storage Depth and Volume	The sediment storage volume and depth vary according to the StormTech Isolator® Row PLUS model sizes and system configuration. For the two overlapping StormTech SC-740 chambers tested, the maximum sediment storage volume is 2.3 ft <sup>3</sup> at a sediment depth of 0.5 inches.	N/A
Effective Sedimentation/ Filtration Treatment Area	The effective sedimentation and filtration treatment area increases as the size of the chamber increases. Under the tested conditions using 2 overlapping chambers, the treatment area was 54.5 ft <sup>2</sup>	The sedimentation /filtration area was determined from the actual physical dimensions of the test unit*
Sediment Mass Load Capacity	The sediment mass load capacity varies according to the StormTech Isolator® Row PLUS model sizes and system configuration. For the two overlapping StormTech SC-740 chambers tested, the mass loading capture was 158.4 lbs (2.91 lbs/ ft <sup>2</sup> ) following a total sediment loading of 195.2 lbs	± 0.8 lbs (±0.01 lbs/ft <sup>2</sup> ) (95% confidence level)

\*Note: These numbers are determined based on physical measurement or a dimensional drawing, which is standard practice. Highly accurate measurements are not practical.

In conclusion, the StormTech Isolator® Row PLUS is a viable technology that can be used to remove contaminants from stormwater runoff via filtration. This technology has proven effective at removing suspended sediment from stormwater through in-lab testing using an industry recognized laboratory protocol.

By extension of sediment removal, this technology should also remove particle bound nutrients, heavy metals, and a wide variety of organic contaminants. Performance is a function of pollutant properties, hydraulic retention time, filter media, pre-treatment, and flow rate, such that proper design of the system is critical to achieving the desired results.

### **What is ISO 14034?**

The purpose of environmental technology verification is to provide a credible and impartial account of the performance of environmental technologies. Environmental technology verification is based on a number of principles to ensure that verifications are performed and reported accurately, clearly, unambiguously and objectively. The International Organization for Standardization (ISO) standard for environmental technology verification (ETV) is ISO 14034, which was published in November 2016.



### Benefits of ETV

ETV contributes to protection and conservation of the environment by promoting and facilitating market uptake of innovative environmental technologies, especially those that perform better than relevant alternatives. ETV is particularly applicable to those environmental technologies whose innovative features or performance cannot be fully assessed using existing standards. Through the provision of objective evidence, ETV provides an independent and impartial confirmation of the performance of an environmental technology based on reliable test data. ETV aims to strengthen the credibility of new, innovative technologies by supporting informed decision-making among interested parties.

For more information on the StormTech "Isolator® Row PLUS" technology, contact:	For more information on VerifiGlobal, contact:
StormTech, LLC. 520 Cromwell Avenue, Rocky Hill, CT 06067 USA t: +1-888-892-2694 e: info@stormtech.com w: www.stormtech.com	VerifiGlobal c/o ETA-Danmark A/S Göteborg Plads 1, DK-2150 Nordhaven t +45 7224 5900 e: info@verifiglobal.com w: www.verifiglobal.com
<p>Signed for StormTech:</p> <p style="text-align: center;"><i>Original signed by:</i>    Greg Spires, P.E.  General Manager</p>	<p>Signed for VerifiGlobal:</p> <p style="text-align: center;"><i>Original signed by:</i>    Thomas Bruun, Managing Director</p> <p style="text-align: center;"><i>Original signed by:</i>    John Neate, Managing Director</p>

**NOTICE:** Verifications are based on an evaluation of technology performance under specific, predetermined operational conditions and parameters and the appropriate quality assurance procedures. VerifiGlobal and the Verification Expert, Good Harbour Laboratories, make no expressed or implied warranties as to the performance of the technology and do not certify that a technology will always operate as verified. The end user is solely responsible for complying with any and all applicable regulatory requirements. Mention of commercial product names does not imply endorsement.

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	Phosphorus Removal Calculations						
	181 Toronto Street South						
	21026 Mar-22						

Land Use		Area	P Coef (kg/ha/yr)	P Load (kg/yr)	Existing Phosphorus Loading Calculation		BMP P (kg/yr)	Notes
Sod Farm/Golf Course		0.30	0.02	0.006	BMP	Efficiency (%)	0.006	
		0.30			None	0	0.006	
Land Use		Area	P Coef (kg/ha/yr)	P Load (kg/yr)	Proposed Phosphorus Loading Calculation with BMP		BMP P (kg/yr)	Notes
Low Intensity Development		0.02	0.13	0.003	BMP	Efficiency (%)	0.003	Uncontrolled Landscaped Area
		0.28	0.13	0.036	Sodded Area	0%	0.005	Area to Perforated pipe Infiltration Trench
Low Intensity Development					Perforated pipe Infiltration / Exfiltration System	87%		
		0.30					0.007	
Land Use		Area	P Coef (kg/ha/yr)	P Load (kg/yr)	Proposed Phosphorus Loading Calculation without BMP		BMP P (kg/yr)	Notes
Low Intensity Development		0.30	0.13	0.039	BMP	Efficiency (%)	0.039	
		0.30			None	0%	0.039	Total Phosphorus Load without BMP
							0.032	Total Phosphorus Removed with BMP
							81%	Phosphorus removal

Phosphorus Loading Summary		
Existing Conditions	0.006	kg/year
Proposed Conditions with no BMP	0.039	kg/year
Proposed Conditions with BMP	0.007	kg/year
Post Development % Phosphorus Removal	81%	

# Recharge Compensation Form

Application Details	
Site Name (Developer):	181 Toronto Street
Site Location:	Uxbrige Ontario
Phosphorous Balance	
Kg/year	0.007
Compensation Costs	
Offsetting Value	2.5
Compensation Cost (P load *2.5*\$35,770)	\$625.98
Administration Fee (15%)	\$93.90
Total	\$719.87



## **Appendix C**

### **Water Demand Calculation**

# Counterpoint Engineering Inc.

## REQUIRED FIRE FLOW WORKSHEET - Lot 1 Fire Underwriters Survey

Project : 181 Toronto Street South  
Project No: 21026  
Client: LARKIN+ LUPi  
Location: Uxbridge, Ontario

Guide for Determination of Required Flow Copyright I.S.O

$$F = 220C\sqrt{A}$$

where

F = the required fire flow in litres per minute.  
C = coefficient related to the type of construction.  
= 1.5 for wood frame construction (structure essentially all combustible).  
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).  
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).  
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).  
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Type of Construction	Class Factor
WF Wood Frame	1.5
OC Ordinary Construction	1.0
NC Non-Combustible	0.8
FC Fire-Resistive	0.6

Area Notes for Fire Resistive Buildings (from FUS manual, 1999):

If Vertical Openings are inadequately protected (less than 1-hour fire rating): Area is the total of the two largest adjoining floors (above ground level) plus 50% of the area of each of the next 8 adjoining floors above that.

Contents	% Reduction
NC Non-Combustible	25
LC Limited Combustible	15
C Combustible	0
FB Free Burning	15
RB Rapid Burning	25

If Vertical Openings are adequately protected (at least 1-hour fire rating): Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining floors above that.

### 1) Fire Flow

Type of Construction:

C=

A\*=

F=

OC
1
222 m <sup>2</sup>
3,278 L/min

Note: Exterior walls are proposed brick and/or stone with wood frame. Assumes windows are adequately protected. Assume two-storeys.

### 2) Occupancy Reduction/Surcharge

Contents Factor:

Reduction/Surcharge of

F=

C	
0%	= 0 L/min
3278 L/min + 0 L/min	= 3,278 L/min

### 3) System Type Reduction

NFPA 13 Sprinkler:

Standard Water Supply:

Fully Supervised:

Total

Reduction of

F=

NO	0%
NO	0%
NO	0%
Total	0%
0% L/min	= 0 L/min
3278 L/min - 0 L/min	= 3,278 L/min

### 4) Separation Charge

Building Face

North

East

South

West

Total

Dist(m)	Charge
46	0%
2.5	25%
46	0%
46	0%
Total	25%

\*Fire wall assumed between units

of 3,278 L/min = 819 L/min

(max exposure charge can be 75%)

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

F= 3278 L/min + 819 L/min = 4,097 L/min (2,000 L/min < F < 45,000 L/min)

F=	4,000 L/min	(round to the nearest 1,000 L/min)
F=	67 L/s	Note: Minimum recommended fire flow for contiguous buildings is 8,000 L/min
F=	1,057 gpm	



## **Appendix D**

### **Sanitary Demand Calculation**



[illegible]

**NOTES:**

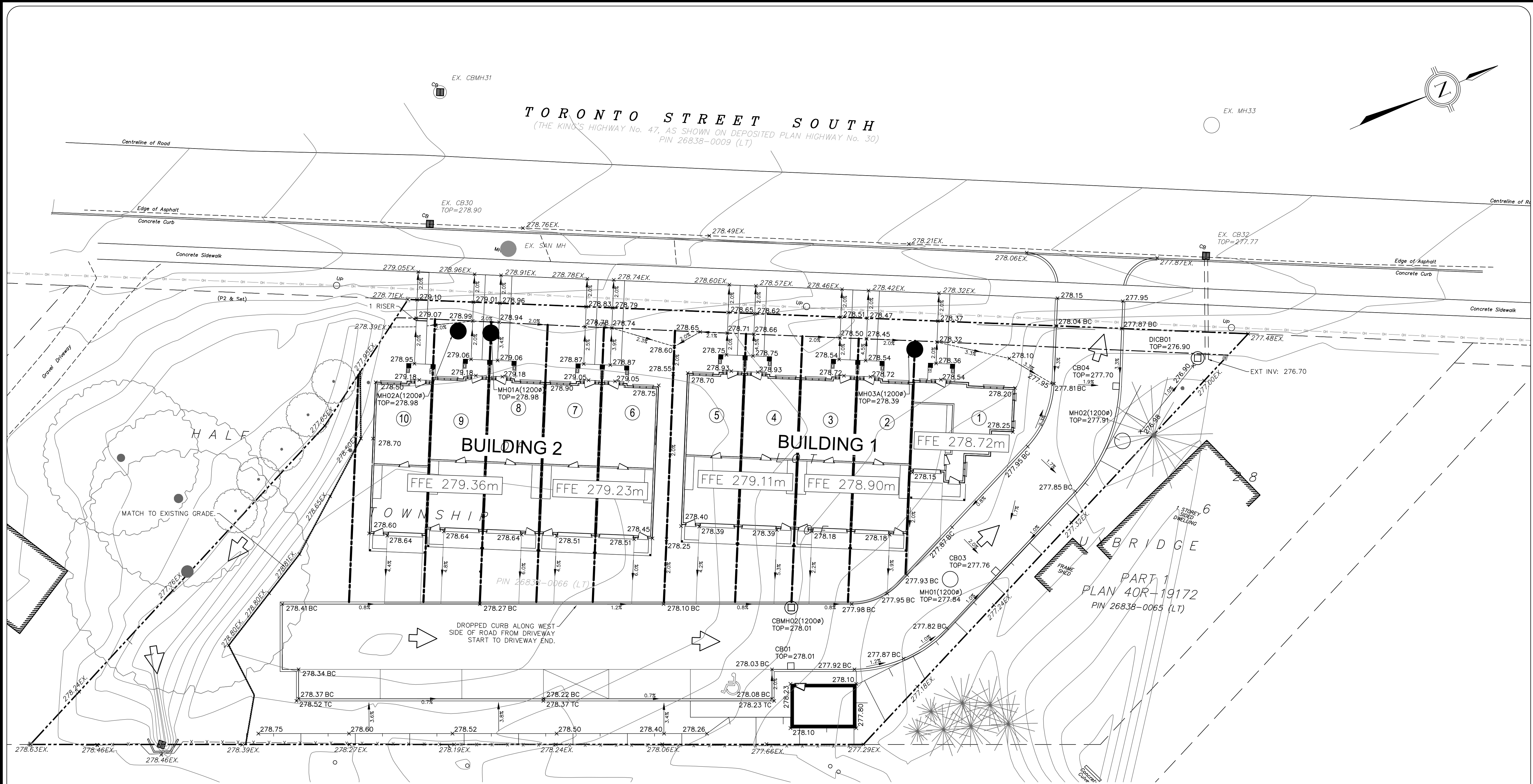
INFILTRATION	0.26L/s - 22.5 m3/ha/day 0.52 L/s - 45.0 m3/ha/day
INDUSTRIAL	1.04L/s - 90.0 m3/ha/day
FLOW RATES	2.08L/s - 180 m3/ha/day



## **Appendix E**

### **Engineering Drawings**





CONSTRUCTION NOTES

GENERAL NOTES

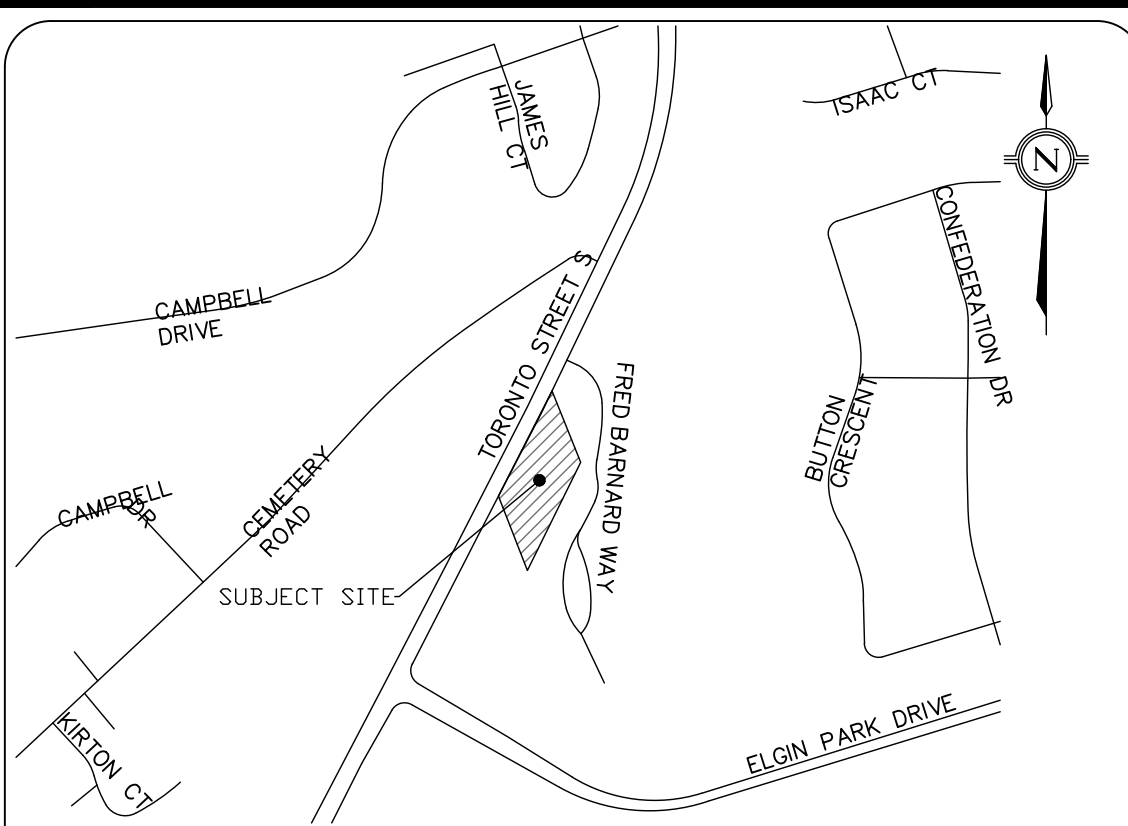
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2. THE INFORMATION SHOWN FOR EXISTING UTILITIES WAS PROVIDED BY OTHERS. THE INFORMATION IS SHOWN FOR GENERAL INFORMATION ONLY AND THE ACCURACY OR COMPLETENESS OF THE PROVIDED INFORMATION HAS NOT BEEN CONFIRMED BY COUNTERPOINT ENGINEERING INC. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES DURING CONSTRUCTION. ALL EXISTING UTILITIES MUST BE LOCATED AND VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORK. ANY VARIANCE IS TO BE IMMEDIATELY REPORTED TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTOR TO CONFIRM UTILITY LOCATIONS AND NOTIFY THE ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT THE CONTRACTOR'S EXPENSE.
3. THIS PLAN SHOULD BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS PLANS. ANY DISCREPANCIES SHALL BE CLARIFIED PRIOR TO CONSTRUCTION. INFORMATION RELATED TO DIMENSIONS FOR PRIVATE ROADS, PARKING, CURBING, BUILDING LOCATION AND SETBACKS SHALL BE TAKEN FROM THE SITE PLAN PREPARED BY THE SITE ARCHITECT.
4. INSPECTIONS: ALL WORK IN THE MUNICIPAL RIGHT OF WAY AND EASEMENTS IS TO BE INSPECTED BY THE TOWNSHIP PRIOR TO BACKFILLING. ALL WORK RELATING TO WATERMAINS AND SEWERS TO BE INSPECTED BY THE CITY AS PER THE SITE PLAN AGREEMENT.
5. ALL DISTURBED GRASSED AREAS TO BE RESTORED WITH MINIMUM 150mm TOPSOIL AND No. 1 NURSERY SOD.
6. A MINIMUM HORIZONTAL CLEARANCE OF 1.0m SHALL BE MAINTAINED BETWEEN ALL ABOVE GROUND SERVICES AND UTILITIES.
7. THE CONTRACTOR SHALL NOTIFY THE TOWNSHIP A MINIMUM OF 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION, UNLESS OTHERWISE NOTED HEREON OR PURSUANT TO CONDITIONS OF PERMIT APPROVALS. WHERE APPLICABLE, THE CONTRACTOR SHALL OBTAIN CITY ROAD OCCUPANCY PERMIT A MINIMUM OF 48 HOURS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
8. ALL DIMENSIONS AND ELEVATIONS TO BE VERIFIED PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES FOUND PRIOR TO OR DURING CONSTRUCTION SHALL BE CLARIFIED WITH THE ENGINEER.
9. ALL TRENCHING SHALL BE IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT. TRENCH SIDES SHALL BE FLATTENED IN ACCORDANCE WITH DIRECTIONS FROM THE GEOTECHNICAL ENGINEER. CONSTRUCTION OF SHORING, BRACING AND PROTECTION SCHEMES SHALL CONFORM TO OPCS 538 & 539.
10. ALL TRAFFIC CONTROL AND SIGNAGE SHALL BE IN ACCORDANCE WITH MTO'S "ONTARIO TRAFFIC MANUAL".

GRADING NOTES

1. ALL DISTURBED GRASSED AREAS OUTSIDE OF PROPERTY LIMITS SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER, WITH SOD ON MINIMUM 100mm TOPSOIL. ALL TREE AND SHRUB RELOCATION SUBJECT TO APPROVAL BY THE LANDSCAPE ARCHITECT.
2. ALL UNSUITABLE SOIL OR SURPLUS MATERIAL OBTAINED FROM EXCAVATIONS TO BE DISPOSED OF OFF-SITE TO AN APPROVED DISPOSAL FACILITY THAT MEETS ALL ENVIRONMENTAL REGULATIONS AND GUIDELINES.
3. EXCEPT WHERE INDICATED, ALL DIFFERENCES IN GRADE BETWEEN THIS SITE AND ADJOINING LANDS ARE TO BE TAKEN UP ON OWNER'S LAND WITH A MAXIMUM SLOPE OF ONE (1) VERTICAL AND THREE (3) HORIZONTAL, SODDED AND/OR PAVED.
4. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING VEGETATION AND TREE PRESERVATION HOARDINGS IN AN APPROVED AND FUNCTIONING CONDITION AS REQUIRED.

CONFORMANCE REQUIREMENTS

1. THE FOLLOWING ITEMS ARE TO BE PROVIDED TO COUNTERPOINT NO LESS THAN 10 WORKING DAYS PRIOR TO THE REQUEST FOR A LETTER OF GENERAL CONFORMANCE/FINAL CERTIFICATION. THE DOCUMENTS MUST INDICATE THAT THE SITE HAS BEEN CONSTRUCTED IN GENERAL CONFORMANCE WITH THE APPROVED DESIGN:
  - AS-CONSTRUCTED TOPOGRAPHIC/UNDERGROUND SURVEY COMPLETED BY A REGISTERED LAND SURVEYOR AS PER THE SPECIFICATIONS OUTLINED WITHIN THE CONTRACT DOCUMENT;
  - GEOTECHNICAL ENGINEER CERTIFICATION LETTER, WHICH INCLUDES SUB-GRADE COMPACTION RESULTS, BEDDING AND BACKFILL COMPACTION AND MATERIAL ACCEPTANCE, GRANULAR, ASPHALT, SITE CONCRETE MATERIAL ACCEPTANCE AND COMPACTION RESULTS;
  - CCTV INSPECTION OF FLUSHED STORM AND SANITARY PIPES AND STRUCTURES;
  - AIR/MANDEL TEST RESULTS FOR SANITARY SEWER (IF REQUIRED);
  - WATERMAIN PRESSURE, CHLORINATION AND BACTERIAL TEST RESULTS AND MUNICIPAL APPROVAL IF AVAILABLE.
2. SHOULD THE SUBMITTED MATERIALS INDICATE NON-CONFORMANCE OR DEFICIENCIES, THEY MUST BE ADDRESSED TO COUNTERPOINT'S SATISFACTION WITH AN UPDATED SUBMITTAL PRIOR TO ISSUANCE OF A LETTER OF GENERAL CONFORMANCE/FINAL CERTIFICATION.
3. COUNTERPOINT MUST ALSO COMPLETE ALL NECESSARY SITE INSPECTIONS AS OUTLINED IN THE APPROVED SERVICE PROGRAM, WITH ALL DEFICIENCIES ADDRESSED TO COUNTERPOINT'S SATISFACTION.



KEY PLAN

LEGEND

- EXISTING HYDRANT
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED STORM SEWER AND MH
- PROPOSED SANITARY SEWER AND MH
- PROPOSED HYDRANT AND VALVE
- PROPOSED VALVE AND BOX
- EXISTING ELEVATION
- EXISTING CONTOUR
- PROPOSED ELEVATION
- OVERLAND FLOW ROUTE
- PROPOSED WATERMAIN
- PROPERTY LINE
- PROPOSED SWALE

LEGAL & TOPOGRAPHY

PROVIDED BY: BARICH GRENKIE  
297 HWY No. 8 (UNIT 101)  
STONE CREEK, ON, L8G 1E5  
PHONE: (905) 662-6767

BENCHMARK AND ELEVATION

ELEVATIONS SHOWN ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928: 1978) AND ARE DERIVED FROM THE TOWNSHIP OF UXBRIDGE BENCHMARK No. 0011931U5175, HAVING AN ELEVATION OF 272.439 METERS.  
BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17 (81°00' WEST LONGITUDE) NAD83 (CSRS) (2010.0).  
ORP 1 - NORTHING (4884511.823), EASTING (649875.665).


1.	ISSUED FOR 1ST SUBMISSION	2022/05/16	P.T
No.	REVISIONS/ISSUED	DATE	BY CITY

**counterpoint**   
ENGINEERING  
COUNTERPOINT ENGINEERING INC.  
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405




ENGINEER'S STAMP

APPLICANT:  
**MANSOUR ARAB/MAN HOLDINGS LTD**  
174 DINNICK CRESCENT  
TORONTO, ONTARIO  
M4N 1M3

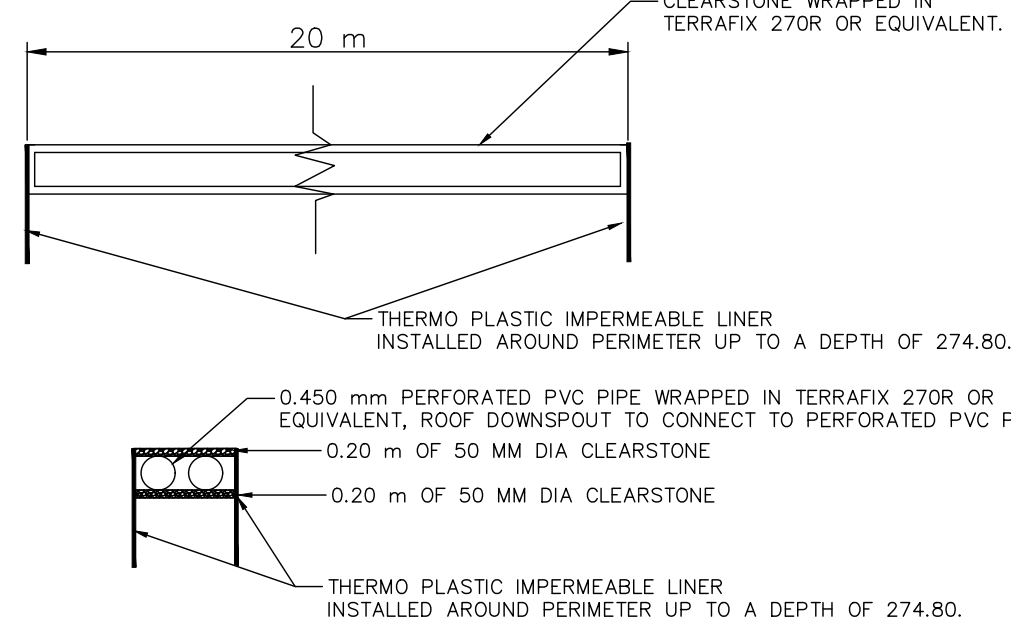
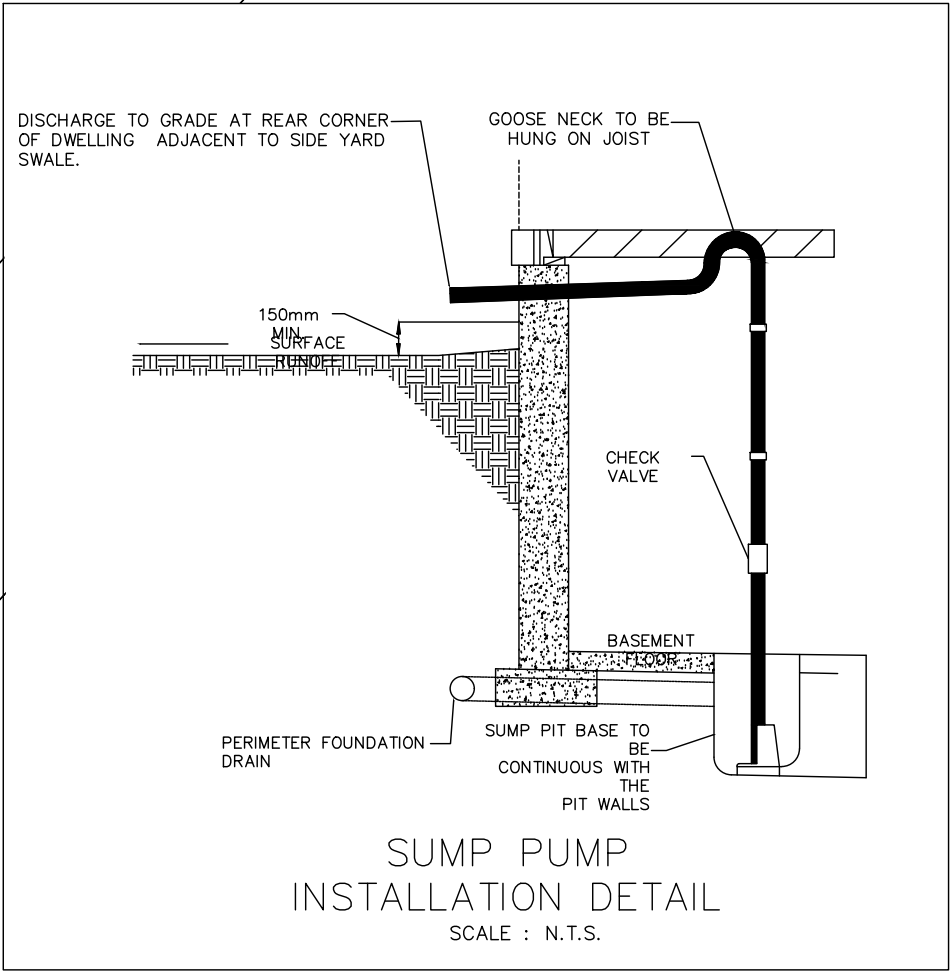
SITE LOCATION:  
**181 TORONTO STREET SOUTH**  
UXBRIDGE, ONTARIO

SITE PLAN FILE No.:

GRADING PLAN

DESIGNED BY:	CHECKED BY:	DATE: APRIL 2021
DRAWING BY:	CHECKED BY:	PROJECT NO. <b>21026</b>
SWM BY:	CHECKED BY:	DRAWING NO. <b>C-1</b>
SCALE: 1:200m 		





### INFILTRATION GALLERY DETAIL (N.T.S.)

## CONSTRUCTION NOTES

## GENERAL NOTES

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4. INSPECTIONS: ALL WORK IN THE MUNICIPAL RIGHT OF WAY AND EASEMENTS IS TO BE INSPECTED BY THE TOWNSHIP PRIOR TO BACKFILLING. ALL WORK RELATING TO WATERMAINS AND SEWERS TO BE INSPECTED BY THE CITY AS PER THE SITE PLAN AGREEMENT.
5. ALL DISTURBED GRASSLAND AREAS TO BE RESTORED WITH MINIMUM 150mm TOPSOIL AND No. 1 NURSERY SOD.
6. A MINIMUM HORIZONTAL CLEARANCE OF 1.0m shall BE MAINTAINED BETWEEN ALL ABOVE GROUND SERVICES AND UTILITIES.
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10. ALL TRAFFIC CONTROL AND SIGNAGE SHALL BE IN ACCORDANCE WITH MTO'S "ONTARIO TRAFFIC MANUAL".

## STORM AND SANITARY SEWER

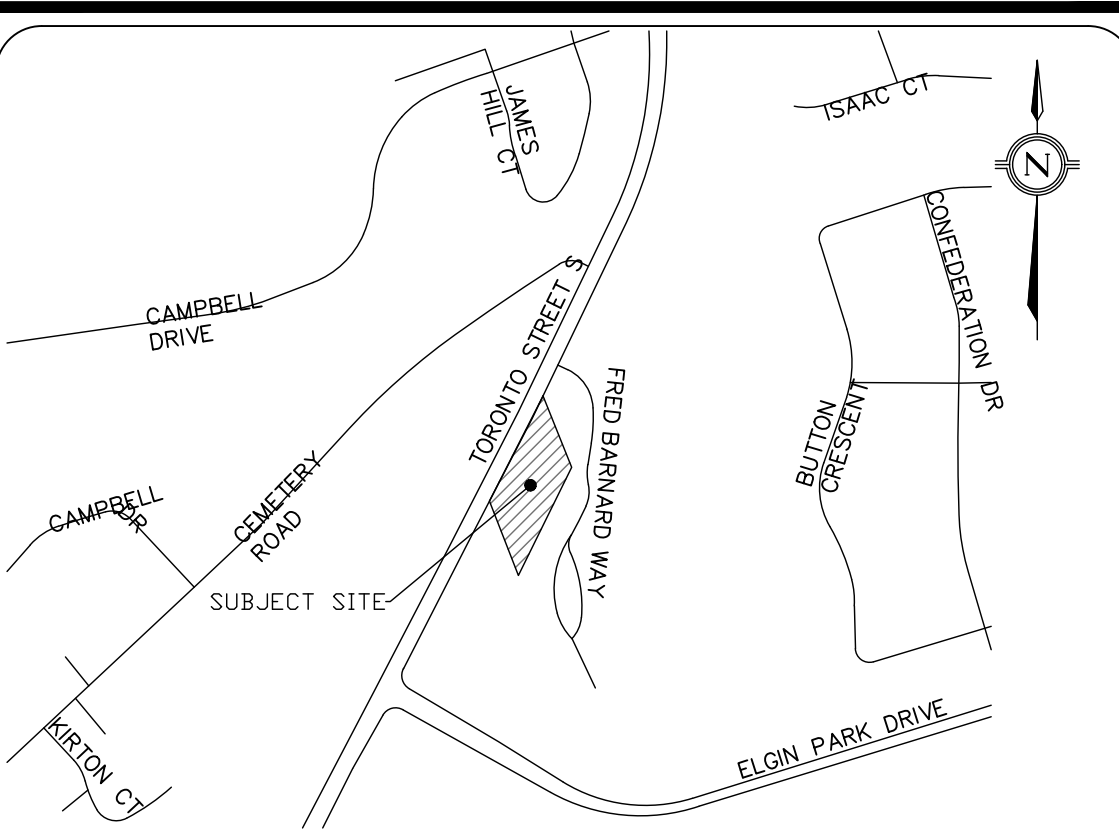
1. FOR CONSTRUCTION DETAILS NOT SHOWN ON PLANS, REFERENCE SHALL BE MADE TO REGION OF DURHAM STANDARDS AND SPECIFICATIONS, AND ONTARIO PROVINCIAL STANDARDS DRAWINGS AND SPECIFICATIONS.
2. ALL STORM MANHOLES SHALL BE AS PER OPSD 701.010 TO 701.014 (SIZE AS SHOWN) WITH FRAME COVER AS PER OPSD 401.010. CATCHBASIN MANHOLES TO HAVE FRAME AND GRATE AS PER OPSD 400.020 UNLESS OTHERWISE SPECIFIED. SAFETY PLATFORMS TO BE INSTALLED IN ALL MANHOLES WHERE DEPTHS EXCEED 5.0m. THE MAXIMUM SPACING BETWEEN SAFETY GRATING SHALL NOT EXCEED 4.5m.
3. ALL STORM SEWERS UP TO 450mm DIA., INCLUDING CATCHBASIN LEADS, SHALL BE PVC SDR-35 SEWER PIPE AND SHALL BE IN COMPLIANCE WITH OPSD 1841, CSA B182.2, CSA B182.3, SEALING GASKETS MUST MEET THE REQUIREMENTS OF OPSD D3034 OR ASTM F1760, CSA B182.2 OR CSA B182.7. IN ADDITION, THE PIPE JOINTS MUST BE ABLE TO WITHSTAND A MINIMUM HYDROSTATIC PRESSURE OF 345 kPa WITHOUT LEAKAGE. INJECTION-MOLDED GASKETED PVC FITTING SHALL MEET THE REQUIREMENTS OF OPSD D3034 OR ASTM F3034, 1760, ASTM F1336 AND CSA B182.1 OR CSA B182.1 OR CSA B182.2. FABRICATED FITTINGS MUST CONFORM TO ASTM F1336 AND CSA B182.2.
4. ALL STORM SEWERS 525mm OR LARGER SHALL BE REINFORCED CONCRETE COMPLYING WITH C.S.A. SPECIFICATION A257.2. STANDARD MINIMUM CLASS OF CONCRETE SEWER SHALL BE AS PER OPSD 807.010 AND 807.030. RIGID PIPE REQUIRES CONCRETE ENCASEMENT FOR THE FIRST PIPE LENGTH ADJOINING TO JOINT PERTURBANCES. WHERE CONCRETE PIPE SMALLER THAN 525mm IS SPECIFIED CLASS SHALL BE 100-D.
5. PVC STORM SEWER BEDDING SHALL BE CLASS "B" BEDDING AS PER REGIONAL MUNICIPALITY OF DURHAM STANDARD 200-010. CONCRETE STORM SEWER BEDDING SHALL BE OPSD GRANULAR "A" AS PER OPSD 802.030 CLASS "B". ALL BEDDING AND COVER MATERIAL ARE TO BE COMPACTED TO MINIMUM 98% SPMDD WITH A MINIMUM 300mm SAND COVER OVER THE PIPE. WITHIN 0.5m OF SUBGRADE ELEVATION, BACKFILL TO BE COMPACTED TO 98% SPMDD.
6. SINGLE AND DOUBLE CATCH BASINS TO BE PRECAST AS PER OPSD 705.010 AND OPSD 705.020, WITH FRAME AND GRATE AS PER OPSD 400.020.
7. CATCHBASIN LEADS TO HAVE MIN. COVER OF 1.5m BELOW FINISHED GRADE UNLESS OTHERWISE SPECIFIED.
8. ALL SANITARY MANHOLES SHALL BE 1200mmx6m AS PER OPSD 701.010 AND WATERTIGHT FRAME AND COVER AS PER OPSD 401.050.
9. ALL SANITARY SEWERS SHALL BE PVC SDR 38 SEWER PIPE FOR 150mm DIA., & PVC SDR 35 SEWER PIPE FOR 200mm DIA, AND SHALL BE IN COMPLIANCE WITH ASTM D3034 OR ASTM F1760 AND THIRD PARTY CERTIFIED TO CSA B182.2 OR CSA B182.7. SEALING GASKETS MUST MEET THE REQUIREMENTS OF OPSD D3034 OR ASTM F1760, OR CSA B182.2. IN ADDITION, THE PIPE JOINTS MUST BE ABLE TO WITHSTAND A MINIMUM HYDROSTATIC PRESSURE OF 345 kPa WITHOUT LEAKAGE. INJECTION-MOLDED GASKETED PVC FITTING SHALL MEET THE REQUIREMENTS OF OPSD D3034 OR ASTM F3034, 1760, ASTM F1336 AND CSA B182.1 OR CSA B182.1 OR CSA B182.2. FABRICATED FITTINGS MUST CONFORM TO ASTM F1336 AND CSA B182.2.
10. BEDDING FOR SANITARY SEWERS SHALL BE 19mm CRUSHER RUN LIMESTONE COMPACTED TO 98% PROCTOR DENSITY FROM 100mm BELOW INVERT TO OVERT, WITH 300mm SAND COVER ABOVE. COMPACTED TO 98% PROCTOR DENSITY AS PER REGION STANDARD S-200.010 (CLASS "B"). WITHIN 0.5m OF SUBGRADE ELEVATION, BACKFILL TO BE COMPACTED TO 100% SPMDD.
11. ALL MANHOLE AND CATCH-BASIN EXCAVATIONS TO BE BACKFILLED WITH OPSD 1010 GRANULAR "B"-TYPE 2 COMPACTED TO 98% SPMDD. WITHIN 0.5m OF SUBGRADE ELEVATION, BACKFILL TO BE COMPACTED TO 100% SPMDD.
12. MANHOLES SHALL BE BENCHMARKED ACCORDING TO OPSD 701.021. STORM MANHOLES SHALL BE BENCHMARKED TO SPOT ELEVATION. SANITARY MANHOLES SHALL BE BENCHMARKED TO SPOT ELEVATION. ALL MANHOLES SHALL BE PROVIDED WITH A MIN. 0.3m Sump. SANITARY MANHOLES SHALL BE BENCHMARKED TO OVERT.

## WATER SERVICING NOTES











1. WATERMAINS AND APPURTENANCES SHALL BE AS PER REGION OF DURHAM STANDARDS AND SPECIFICATIONS.
2. WATERMAINS SHALL BE POLYVINYL CHLORIDE (PVC) CLASS 150, DR 18 CONFORMING TO AWWA C-900.
3. ALL PIPE FITTINGS SHALL BE CAST IRON, CEMENT LINED MECHANICAL JOINT, SHORT BODY CONFORMING TO AWWA C10 IRON FITTINGS OR AWWA C135 FOR DUCTILE IRON FITTINGS. FITTINGS SHALL BE SUPPLIED WITH MECHANICAL JOINT TYPE ENDS AWWA C111.
4. WATERMAIN BEDDING SHALL BE 19mm CRUSHER RUN LIMESTONE COMPACTED TO 98% PROCTOR DENSITY FROM 100mm BELOW INVERT TO OVERT, WITH 300mm SAND COVER ABOVE COMPACTED TO 98% PROCTOR DENSITY AS PER REGION STANDARD S-200.010 (CLASS "P"). WITHIN 0.5m OF SUBGRADE ELEVATION, BACKFILL TO BE COMPACTED TO 100% SPMOD.
5. ALL BENDS, TEES, JOINTS, ETC., ARE TO BE RESTRAINED WITH THRUST BLOCKS AS PER OPSD 1103.010 & OPSD 1103.020.
6. TRACER WIRE SHALL BE INSTALLED ON ALL PVC WATERMAIN AS PER REGION STANDARD DRAWING S-201.030. TRER WIRE SHALL BE NO 12 GAUGE (CANADIAN WIRE STRANDED T.W.V. 75C 600 OR APPROVED EQUIVALENT)
7. ANODES FOR METAL FITTING TO BE 5.4 Kg Zinc AS PER REGION SPECIFICATIONS. CATHODIC PROTECTION FOR WATERMAINS TO BE PER REGION STANDARD DRAWING S-201.030. CATHODIC PROTECTION SHALL BE PROVIDED ON ALL BURIED METAL PIPES AND FITTINGS.
8. WATERMAINS AND/OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.8m FROM PROPOSED GRADES WITH A MINIMUM HORIZONTAL SPACING OF 2.5m HORIZ FROM STORM AND SANITARY SEWERS AND 1.0m HORIZ FROM GAS MAINS AND OTHER WIRE CONDUITS. IN PRE-GRADE OF DEVELOPED AREAS COVER SHALL BE FROM PRE-GRADE EXISTING ELEVATIONS.

## CONFORMANCE REQUIREMENTS

1. THE FOLLOWING ITEMS ARE TO BE PROVIDED TO COUNTERPOINT NO LESS THAN 10 WORKING DAYS PRIOR TO THE REQUEST FOR A LETTER OF GENERAL CONFORMANCE/FINAL CERTIFICATION. THE DOCUMENTS MUST INDICATE THAT THE SITE HAS BEEN CONSTRUCTED IN GENERAL CONFORMANCE WITH THE APPROVED DESIGN;
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### LEGEND

- |   |                                |
|---|--------------------------------|
|  | EXISTING HYDRANT               |
|  | EXISTING STORM SEWER           |
|  | EXISTING SANITARY SEWER        |
|  | EXISTING WATERMAIN             |
|  | PROPOSED STORM SEWER AND MH    |
|  | PROPOSED SANITARY SEWER AND MH |
|  | PROPOSED HYDRANT AND VALVE     |
|  | PROPOSED VALVE AND BOX         |
|  | PROPOSED WATERMAIN             |
|  | PROPERTY LINE                  |

## LEGAL & TOPOGRAPHY

PROVIDED BY: BARICH GRENKIE  
297 HWY No. 8 (UNIT 101)  
STONE CREEK, ON, L8G 1E5  
PHONE: (905) 662-6767

### BENCHMARK AND ELEVATION

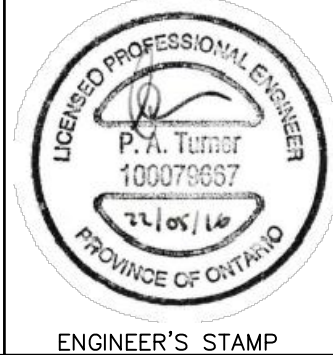
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BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE BY REAL TIME NETWORK (RTN) OBSERVATIONS. UTM ZONE 17 (81°00' WEST LONGITUDE) NAD83 (CSRS) (2010.0). CORP 1 - NORTHING (4884511.823), EASTING (649875.665).


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No.	REVISIONS/ISSUED	DATE	BY	CITY

**counterpoint**  
ENGINEERING

**COUNTERPOINT ENGINEERING INC.**  
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405



APPLICANT: MANSOUR ARAB/MAN HOLDINGS LTD  
174 DINNICK CRESCENT  
TORONTO, ONTARIO  
M4N 1M3

SITE LOCATION:  
181 TORONTO STREET SOUTH  
UXBRIDGE, ONTARIO

SITE PLAN FILE No.:

## SERVICING PLAN

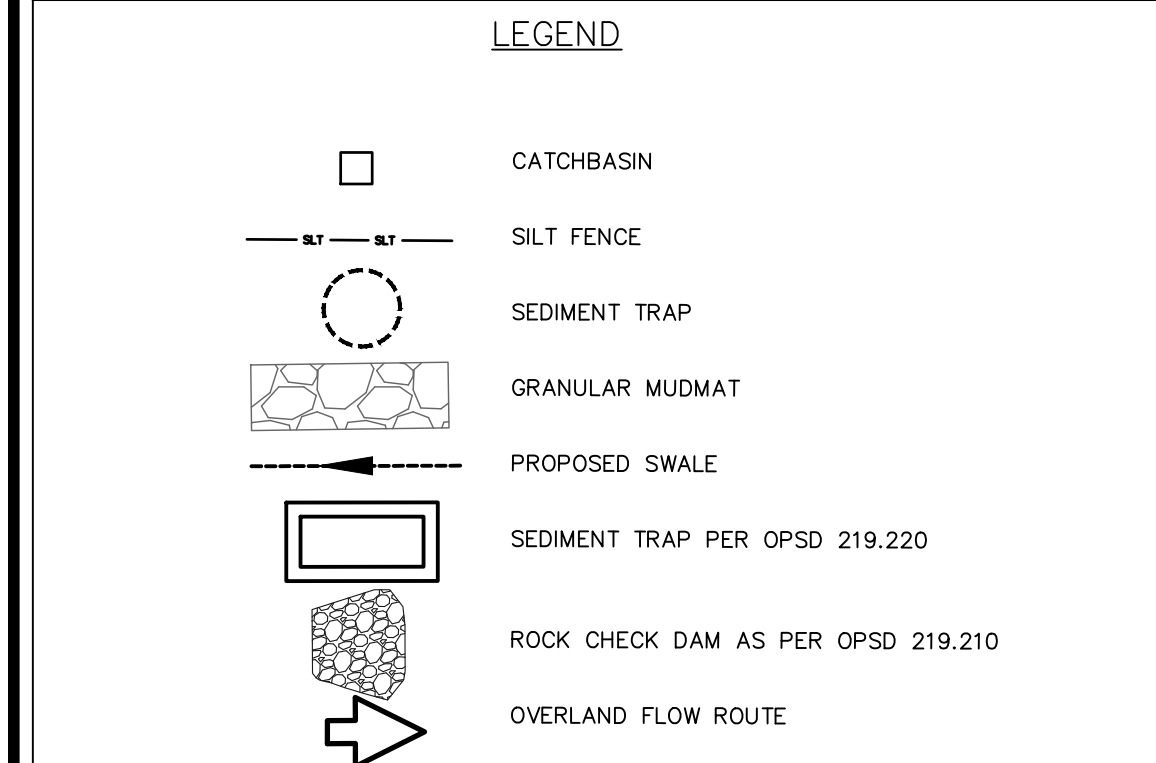
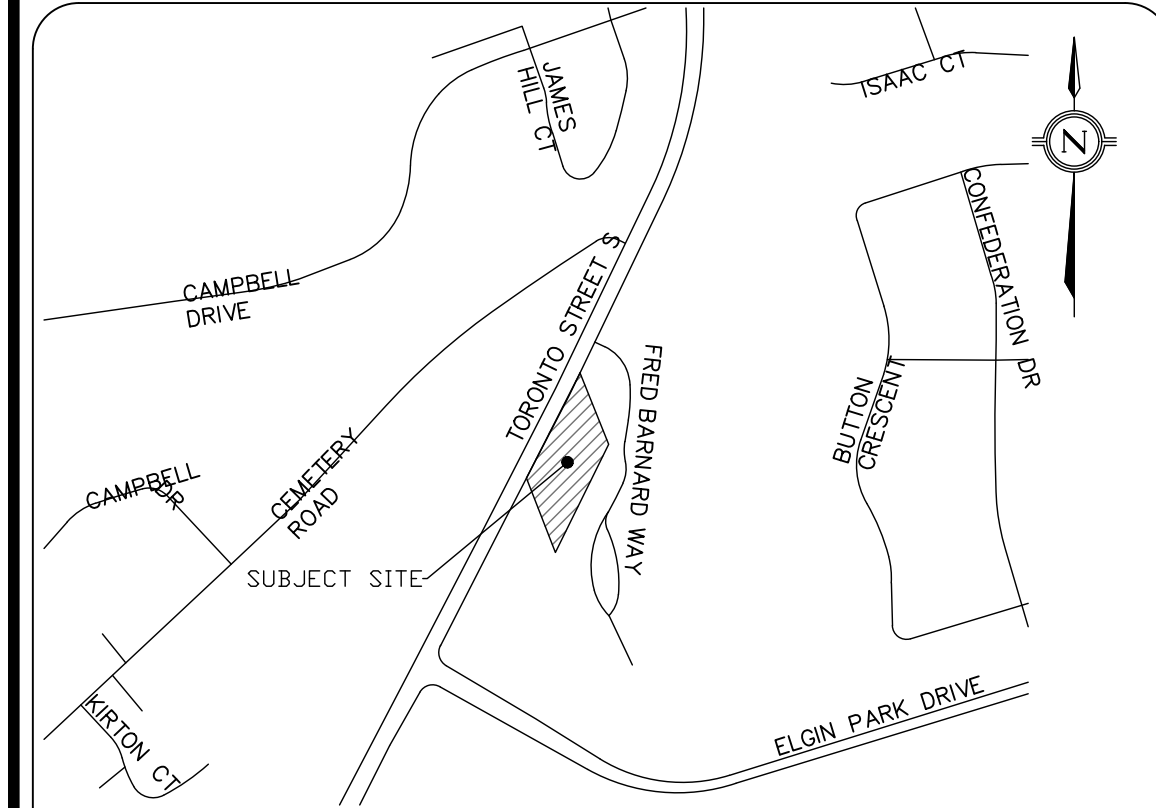
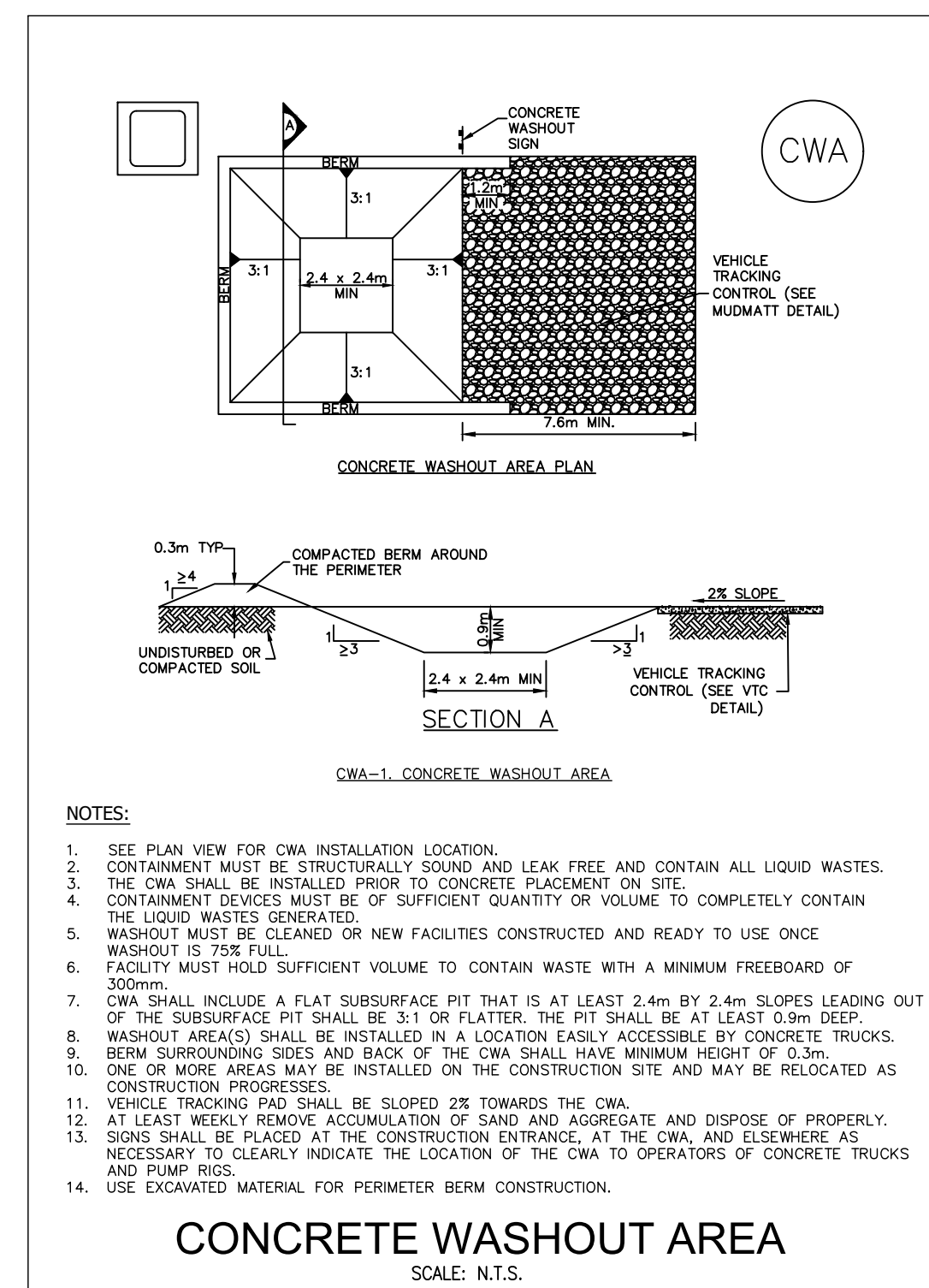
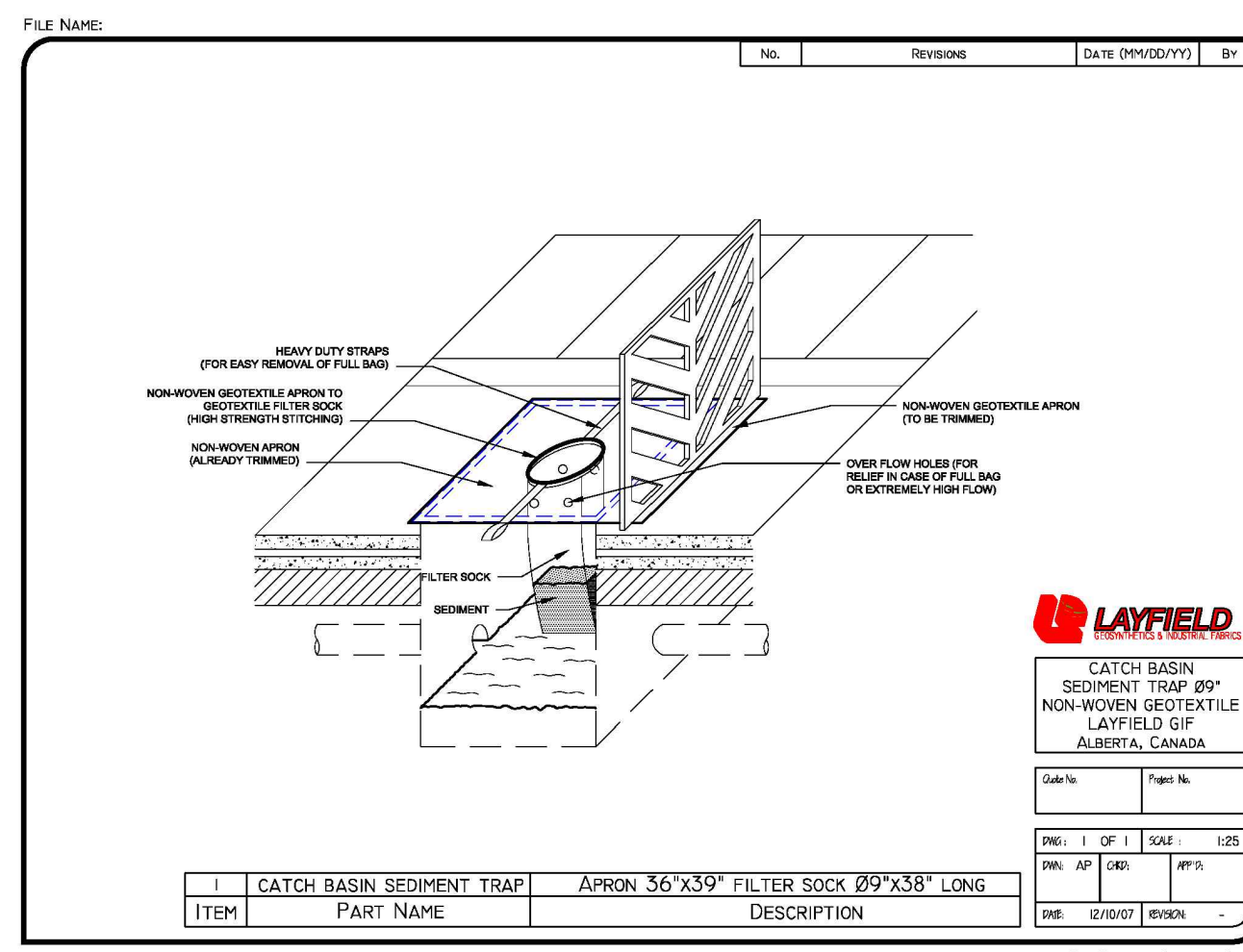
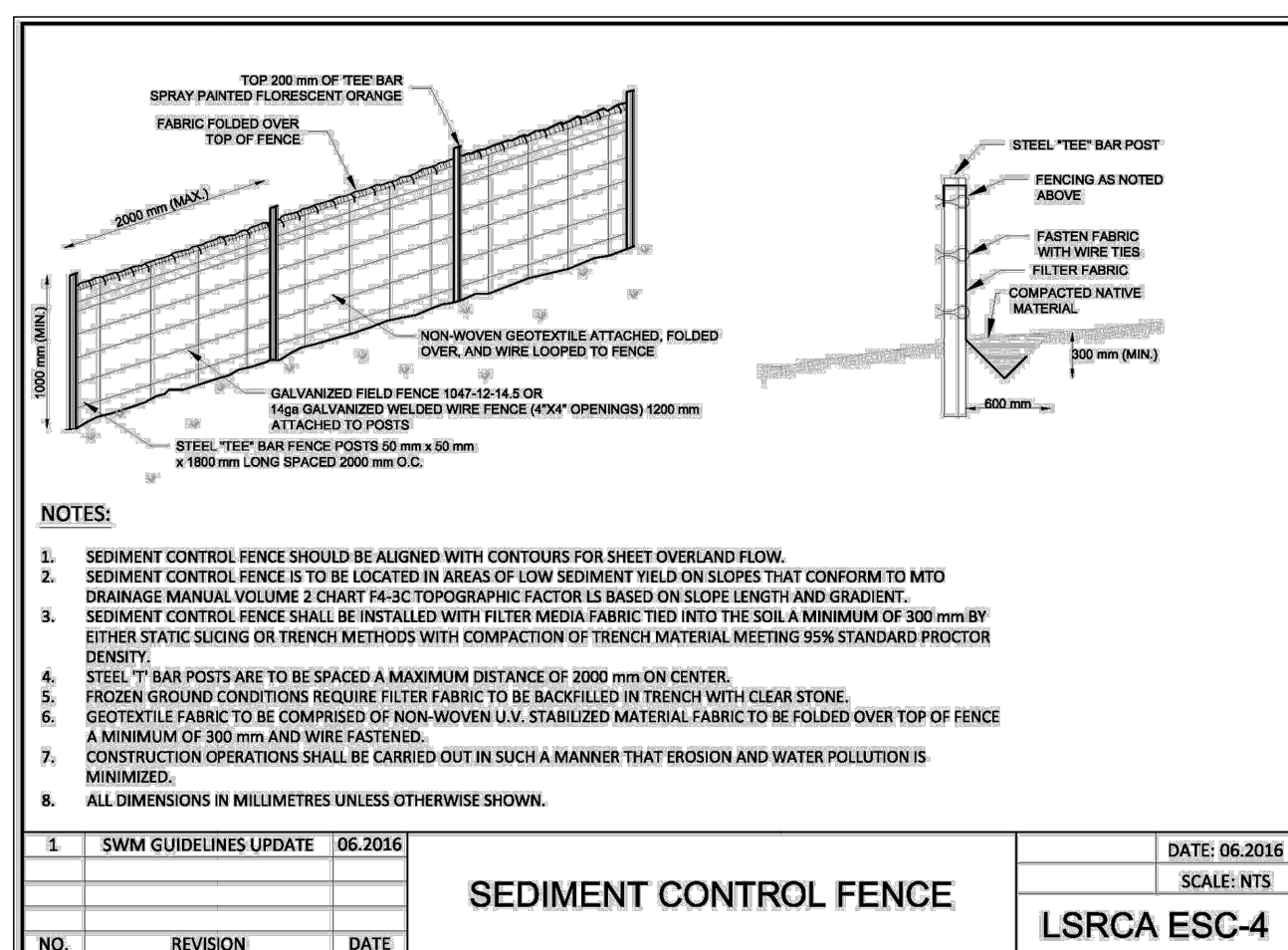
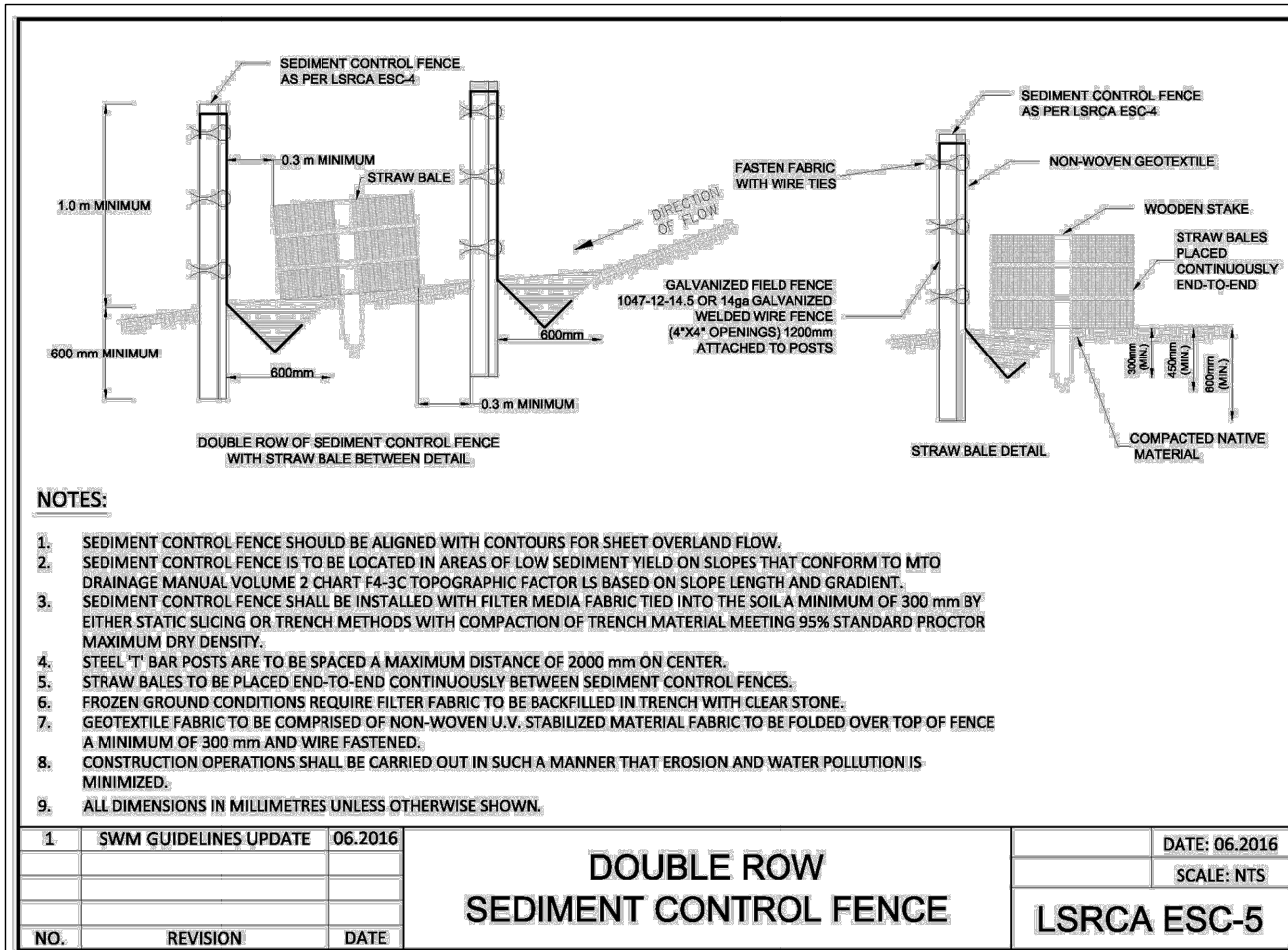
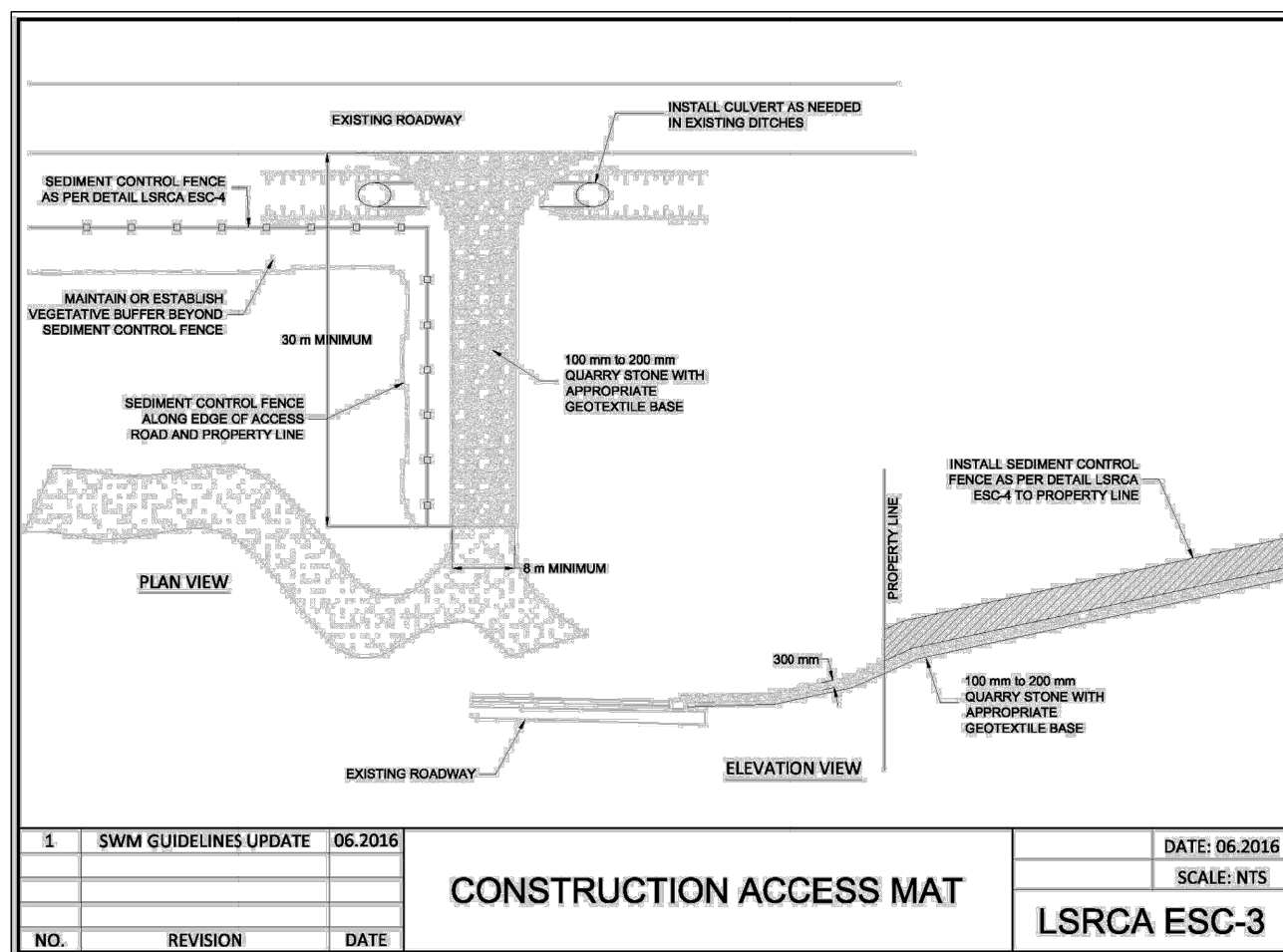
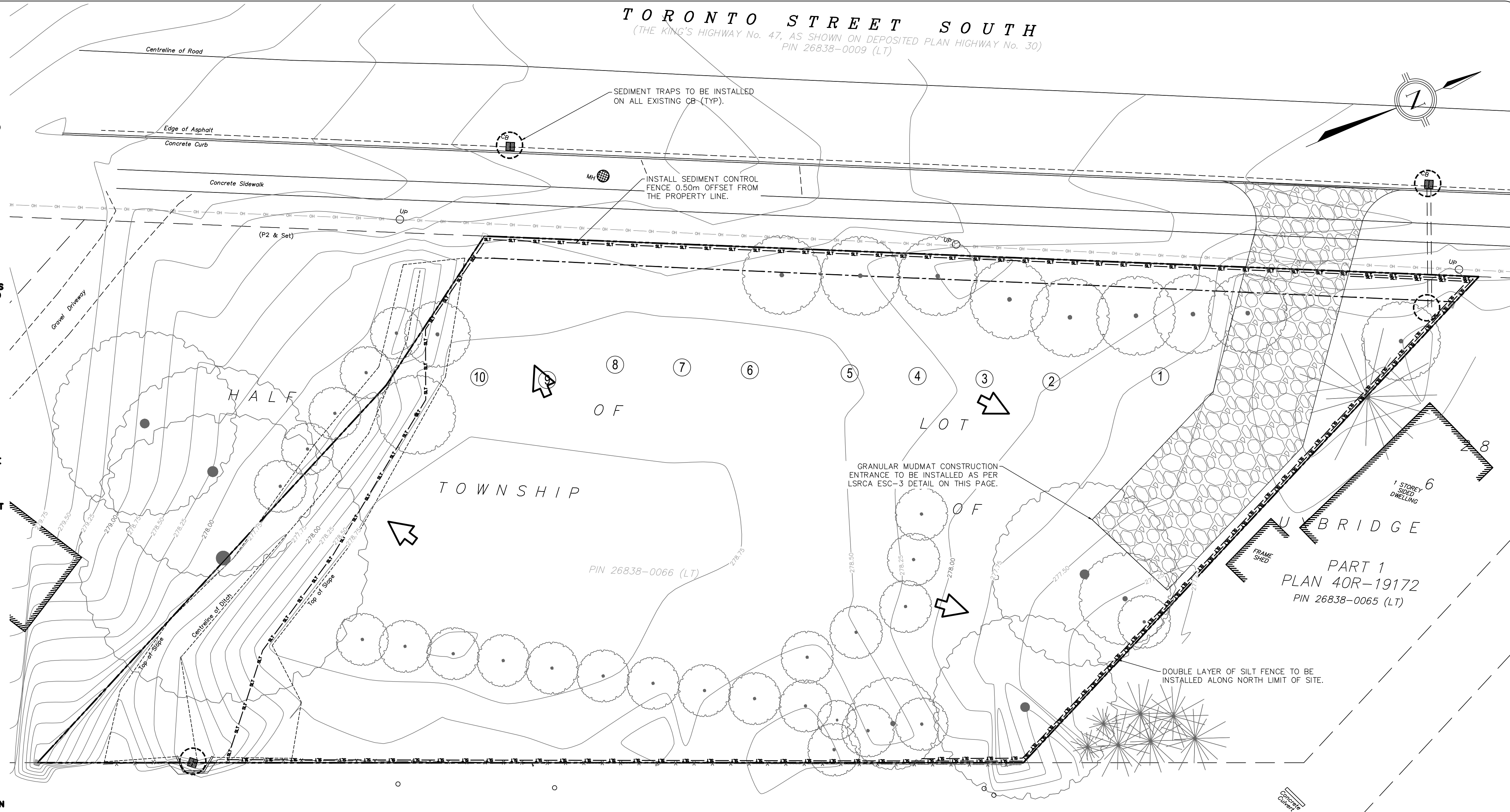
DESIGNED BY:	CHECKED BY:	DATE: APRIL 2021
DRAWING BY:	CHECKED BY:	PROJECT NO. 21026
SWM BY:	CHECKED BY:	
SCALE: 1:200m		DRAWING NO. C-2

REGION FILE No.:



# EROSION AND SEDIMENT CONTROL

- SILT CONTROL FENCE SHALL BE INSTALLED AROUND THE PERIMETER OFFSET 0.60M INSIDE THE PROPERTY OF THE SITE AND MAINTAINED UNTIL THE COMPLETION OF THE LANDSCAPING.
- DURING GRADING OPERATIONS, ALL STORM RUNOFF SHALL BE CONTROLLED WITH TEMPORARY SWALES TO PREVENT SURFACE RUNOFF FROM LEAVING THE SITE UNTREATED.
- MUD MAT FOR CONSTRUCTION ACCESS IS TO BE INSTALLED AT ALL SITE ENTRANCES PRIOR TO THE STRIPPING OF TOPSOIL AND IS TO BE MAINTAINED UNTIL ROADS/DRIVEWAYS HAVE BEEN CONSTRUCTED TO BASE COURSE ASPHALT. MUD MAT TO BE A MINIMUM 30M LONG AND 8M WIDE AND SHALL CONSIST OF 100MM CLEAR STONE AND 450MM DEEP.
- VEHICLE REFUELLING AND SOIL STOCKPILING SHALL BE UNDERTAKEN AWAY FROM ANY VALLEY/WATERCOURSE OR EXISTING CATCHBASINS.
- ADDITIONAL EROSION AND SEDIMENT CONTROL MATERIALS (i.e. SILT FENCE, STRAW BALES, CLEAR STONE, ETC.) ARE TO BE KEPT ON SITE FOR EMERGENCIES AND REPAIRS.
- EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE CONTINUOUSLY EVALUATED AND REPLACED/MAINTAINED AS REQUIRED TO ENSURE THEIR EFFECTIVENESS.
- ALL CATCHBASINS ARE TO BE PROTECTED WITH SEDIMENT TRAPS AS PER DETAIL ON ESC2 IMMEDIATELY AFTER INSTALLATION AND ARE TO BE MAINTAINED UNTIL ALL CONSTRUCTION IS COMPLETE.
- ALL TOPSOIL STOCKPILES INTENDED TO REMAIN IN PLACE FOR MORE THAN 30 DAYS ARE TO BE SEEDED TO PREVENT WIND EROSION.
- THE CONTRACTOR MUST UNDERTAKE MEASURES TO CONTROL DUST DURING CONSTRUCTION, AND DURING SOIL REMEDIATION/EXCAVATION ACTIVITIES, AND SHOULD INCLUDE THE FOLLOWING AS APPLICABLE:
  - THE WEEKLY, OR MORE FREQUENTLY IF REQUIRED, WETTING OF ALL SOFT AND HARD SURFACES AND ANY EXCAVATION FACE ON THE SITE, WITH THE ADDITION OF CALCIUM CHLORIDE OR OTHER RECOGNIZED MATERIALS AS A DUST SUPPRESSANT, IF REQUIRED;
  - THE WEEKLY CLEANING OF THE ROAD PAVEMENT AND SIDEWALKS FOR THE ENTIRE FRONTAGE(S) OF THE PROPERTY TO A DISTANCE OF TWENTY-FIVE METRES FROM THE PROPERTY LINES.
- SINCE THE LOCATION AND TYPE OF EROSION AND SEDIMENT CONTROL MEASURES WILL BE MODIFIED AS THE CONSTRUCTION OF THE SITE PROCEEDS, EROSION AND SEDIMENT CONTROL, BEST MANAGEMENT PRACTICES ARE DYNAMIC AND ADJUSTMENTS TO THE LOCATION AND TYPE OF ESC MEASURES WILL BE REQUIRED TO REDUCE THE AMOUNT OF SEDIMENT LEAVING THE SITE AND ONTO ADJACENT AREAS.
- BEFORE PROCEEDING WITH ANY AREA GRADING THE FOLLOWING MUST BE CONSTRUCTED:
  - MUD MAT WHERE INDICATED,
  - TEMPORARY SWALES,
  - SILT FENCE WHERE INDICATED,
  - TREE PRESERVATION, INSPECTION IS REQUIRED
  - TEMPORARY POND, IF REQUIRED,
  - SILT TRAPS.
- ACCUMULATED SILT TO BE REMOVED OFF SITE PRIOR TO REMOVAL OF ESC MEASURES.
- THE SILT FENCE MUST BE INSPECTED BI-WEEKLY AND IMMEDIATELY AFTER RAINFALL EVENTS FOR RIPS OR TEARS, BROKEN STAKES, BLOW OUTS (STRUCTURAL FAILURE) AND ACCUMULATION OF SEDIMENT. THE SILT FENCE MUST BE FIXED AND/OR REPLACED IMMEDIATELY WHEN DAMAGED. SEDIMENT MUST BE REMOVED FROM SILT FENCE WHEN ACCUMULATION REACHES 50% OF THE HEIGHT OF THE FENCE.
- THE OWNER WILL SEED, MULCH AND MAINTAIN THE ENTIRE SITE IF A BUILDING PERMIT IS NOT ISSUED WITHIN 365 DAYS OF THE SEDIMENT AND EROSION CONTROL PERMIT BEING USED.
- UPON COMPLETION OF LANDSCAPING ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED.
- NO CONSTRUCTION ACTIVITY OR MACHINERY SHALL BE BEYOND THE SILT FENCE.
- ALL TOPSOIL STOCKPILES SHALL BE SURROUNDED WITH A SEDIMENT CONTROL FENCE.
- ANY AREAS THAT ARE INACTIVE FOR MORE THAN 30 DAYS SHALL BE SEEDED AND/OR STABILIZED.



**LEGAL & TOPOGRAPHY**  
 PROVIDED BY: BARICH GRENKIE  
 257 HWY No. 8 (UNIT 101)  
 STONEY CREEK, ON, L8G 1E5  
 PHONE: (905) 662-6767

**BENCHMARK AND ELEVATION**  
 ELEVATIONS SHOWN ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928: 1978) AND ARE DERIVED FROM THE TOWNSHIP OF UXBRIDGE BENCHMARK No. 001193105175, HAVING AN ELEVATION OF 272.439 METERS.  
 BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17 (81°00' WEST LONGITUDE) NAD83 (CSRS) (2010.0).  
 ORP 1 - NORTHING (4884511.823), EASTING (649875.665).

1.	ISSUED FOR 1ST SUBMISSION	2022/05/16	P.T
No.	REVISIONS/ISSUED	DATE	BY CITY

**COUNTERPOINT ENGINEERING INC.**  
 8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

ENGINEER'S STAMP

APPLICANT:  
**MANSOUR ARAB/MAN HOLDINGS LTD**  
 174 DINNIQ CRESCENT  
 TORONTO, ONTARIO  
 M4N 1M3

SITE LOCATION:  
**181 TORONTO STREET SOUTH**  
**UXBRIDGE, ONTARIO**

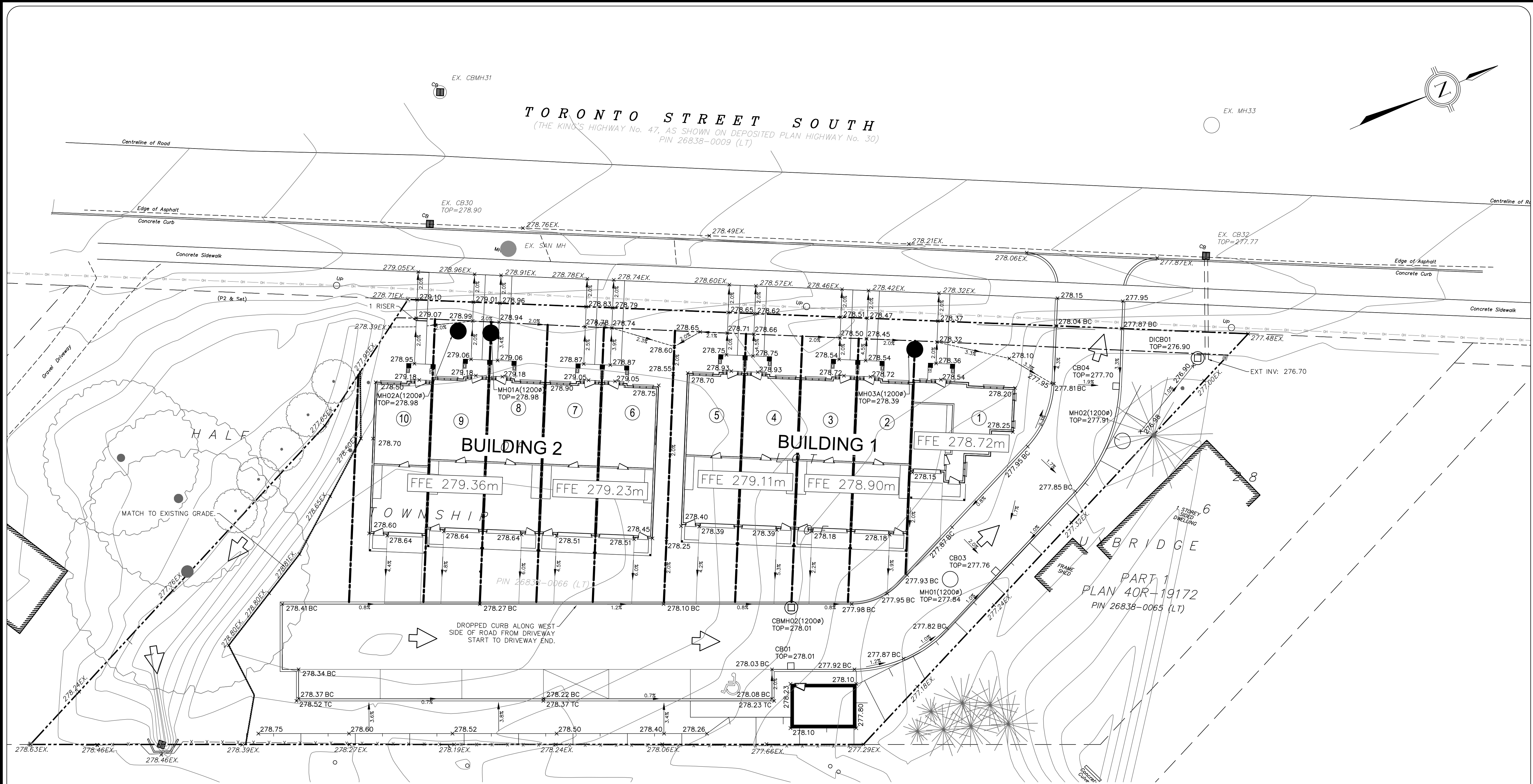
SITE PLAN FILE No.:

**EROSION AND SEDIMENT CONTROL PLAN**

DESIGNED BY:	CHECKED BY:	DATE: APRIL 2021
DRAWING BY:	CHECKED BY:	PROJECT NO. <b>21026</b>
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REGION FILE No.:





CONSTRUCTION NOTES

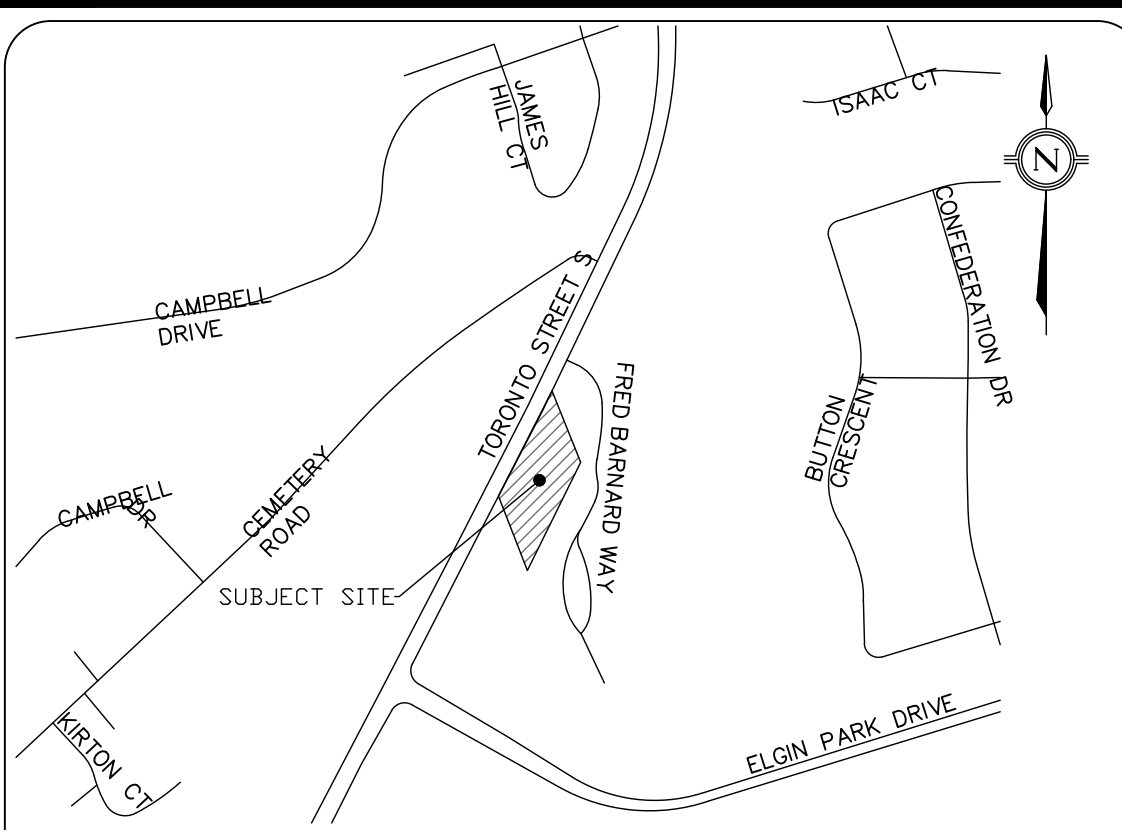
- GENERAL NOTES**
- THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES WITH ALL OTHER CONTRACTORS AND PREVENT CONSTRUCTION CONFLICTS.
  - THE INFORMATION SHOWN FOR EXISTING UTILITIES WAS PROVIDED BY OTHERS. THE INFORMATION IS SHOWN FOR GENERAL INFORMATION ONLY AND THE ACCURACY OR COMPLETENESS OF THE PROVIDED INFORMATION HAS NOT BEEN CONFIRMED BY COUNTERPOINT ENGINEERING INC. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES DURING CONSTRUCTION. ALL EXISTING UTILITIES MUST BE LOCATED AND VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORK. ANY VARIANCE IS TO BE IMMEDIATELY REPORTED TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTOR TO CONFIRM UTILITY LOCATIONS AND NOTIFY THE ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT THE CONTRACTOR'S EXPENSE.
  - THIS PLAN SHOULD BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS PLANS. ANY DISCREPANCIES SHALL BE CLARIFIED PRIOR TO CONSTRUCTION. INFORMATION RELATED TO DIMENSIONS FOR PRIVATE ROADS, PARKING, CURBING, BUILDING LOCATION AND SETBACKS SHALL BE TAKEN FROM THE SITE PLAN PREPARED BY THE SITE ARCHITECT.
  - INSPECTIONS: ALL WORK IN THE MUNICIPAL RIGHT OF WAY AND EASEMENTS IS TO BE INSPECTED BY THE TOWNSHIP PRIOR TO BACKFILLING. ALL WORK RELATING TO WATERMAINS AND SEWERS TO BE INSPECTED BY THE CITY AS PER THE SITE PLAN AGREEMENT.
  - ALL DISTURBED GRASSED AREAS TO BE RESTORED WITH MINIMUM 150mm TOPSOIL AND No. 1 NURSERY SOD.
  - A MINIMUM HORIZONTAL CLEARANCE OF 1.0m SHALL BE MAINTAINED BETWEEN ALL ABOVE GROUND SERVICES AND UTILITIES.
  - THE CONTRACTOR SHALL NOTIFY THE TOWNSHIP A MINIMUM OF 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION, UNLESS OTHERWISE NOTED HEREON OR PURSUANT TO CONDITIONS OF PERMIT APPROVALS. WHERE APPLICABLE, THE CONTRACTOR SHALL OBTAIN CITY ROAD OCCUPANCY PERMIT A MINIMUM OF 48 HOURS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
  - ALL DIMENSIONS AND ELEVATIONS TO BE VERIFIED PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES FOUND PRIOR TO OR DURING CONSTRUCTION SHALL BE CLARIFIED WITH THE ENGINEER.
  - ALL TRENCHING SHALL BE IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT. TRENCH SIDES SHALL BE FLATTENED IN ACCORDANCE WITH DIRECTIONS FROM THE GEOTECHNICAL ENGINEER. CONSTRUCTION OF SHORING, BRACINGS AND PROTECTION SCHEMES SHALL CONFORM TO OPCS 538 & 539.
  - ALL TRAFFIC CONTROL AND SIGNAGE SHALL BE IN ACCORDANCE WITH MTO'S "ONTARIO TRAFFIC MANUAL".

GRADING NOTES

- ALL DISTURBED GRASSED AREAS OUTSIDE OF PROPERTY LIMITS SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER, WITH SOD ON MINIMUM 100mm TOPSOIL. ALL TREE AND SHRUB RELOCATION SUBJECT TO APPROVAL BY THE LANDSCAPE ARCHITECT.
- ALL UNSUITABLE SOIL OR SURPLUS MATERIAL OBTAINED FROM EXCAVATIONS TO BE DISPOSED OF OFF-SITE TO AN APPROVED DISPOSAL FACILITY THAT MEETS ALL ENVIRONMENTAL REGULATIONS AND GUIDELINES.
- EXCEPT WHERE INDICATED, ALL DIFFERENCES IN GRADE BETWEEN THIS SITE AND ADJOINING LANDS ARE TO BE TAKEN UP ON OWNER'S LAND WITH A MAXIMUM SLOPE OF ONE (1) VERTICAL AND THREE (3) HORIZONTAL, SODDED AND/OR PAVED.
- THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING VEGETATION AND TREE PRESERVATION HOARDINGS IN AN APPROVED AND FUNCTIONING CONDITION AS REQUIRED.

CONFORMANCE REQUIREMENTS

- THE FOLLOWING ITEMS ARE TO BE PROVIDED TO COUNTERPOINT NO LESS THAN 10 WORKING DAYS PRIOR TO THE REQUEST FOR A LETTER OF GENERAL CONFORMANCE/FINAL CERTIFICATION. THE DOCUMENTS MUST INDICATE THAT THE SITE HAS BEEN CONSTRUCTED IN GENERAL CONFORMANCE WITH THE APPROVED DESIGN:
  - AS-CONSTRUCTED TOPOGRAPHIC/UNDERGROUND SURVEY COMPLETED BY A REGISTERED LAND SURVEYOR AS PER THE SPECIFICATIONS OUTLINED WITHIN THE CONTRACT DOCUMENT;
  - GEOTECHNICAL ENGINEER CERTIFICATION LETTER, WHICH INCLUDES SUB-GRADE COMPACTION RESULTS, BEDDING AND BACKFILL COMPACTION AND MATERIAL ACCEPTANCE, GRANULAR, ASPHALT, SITE CONCRETE MATERIAL ACCEPTANCE AND COMPACTION RESULTS;
  - CCTV INSPECTION OF FLUSHED STORM AND SANITARY PIPES AND STRUCTURES;
  - AIR/MANDEL TEST RESULTS FOR SANITARY SEWER (IF REQUIRED);
  - WATERMAIN PRESSURE, CHLORINATION AND BACTERIAL TEST RESULTS AND MUNICIPAL APPROVAL IF AVAILABLE.
- SHOULD THE SUBMITTED MATERIALS INDICATE NON-CONFORMANCE OR DEFICIENCIES, THEY MUST BE ADDRESSED TO COUNTERPOINT'S SATISFACTION WITH AN UPDATED SUBMITTAL PRIOR TO ISSUANCE OF A LETTER OF GENERAL CONFORMANCE/FINAL CERTIFICATION.
- COUNTERPOINT MUST ALSO COMPLETE ALL NECESSARY SITE INSPECTIONS AS OUTLINED IN THE APPROVED SERVICE PROGRAM, WITH ALL DEFICIENCIES ADDRESSED TO COUNTERPOINT'S SATISFACTION.



LEGEND

- EXISTING HYDRANT
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED STORM SEWER AND MH
- PROPOSED SANITARY SEWER AND MH
- PROPOSED HYDRANT AND VALVE
- PROPOSED VALVE AND BOX
- EXISTING ELEVATION
- EXISTING CONTOUR
- PROPOSED ELEVATION
- OVERLAND FLOW ROUTE
- PROPOSED WATERMAIN
- PROPERTY LINE
- PROPOSED SWALE

LEGAL & TOPOGRAPHY

PROVIDED BY: BARICH GRENKIE  
297 HWY No. 8 (UNIT 101)  
STONE CREEK, ON, L8G 1E5  
PHONE: (905) 662-6767

BENCHMARK AND ELEVATION

ELEVATIONS SHOWN ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928: 1978) AND ARE DERIVED FROM THE TOWNSHIP OF UXBRIDGE BENCHMARK No. 0011931U5175, HAVING AN ELEVATION OF 272.439 METERS.  
BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17 (81°00' WEST LONGITUDE) NAD83 (CSRS) (2010.0).  
ORP 1 - NORTHING (4884511.823), EASTING (649875.665).


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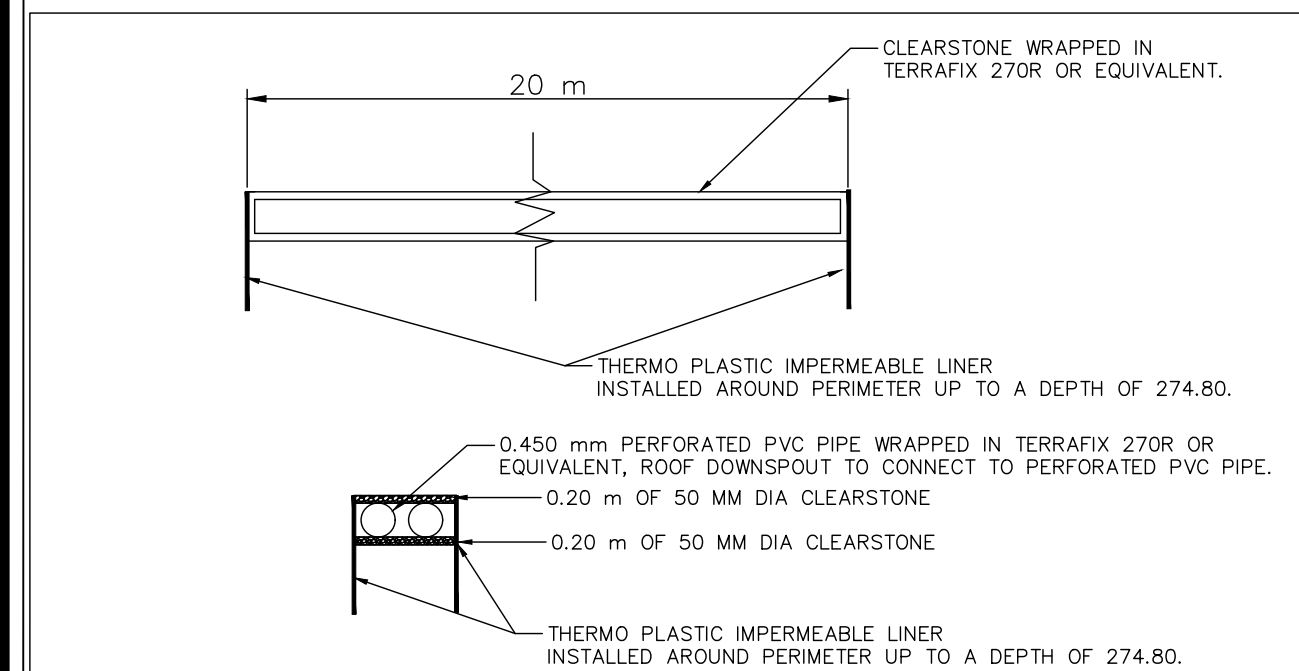
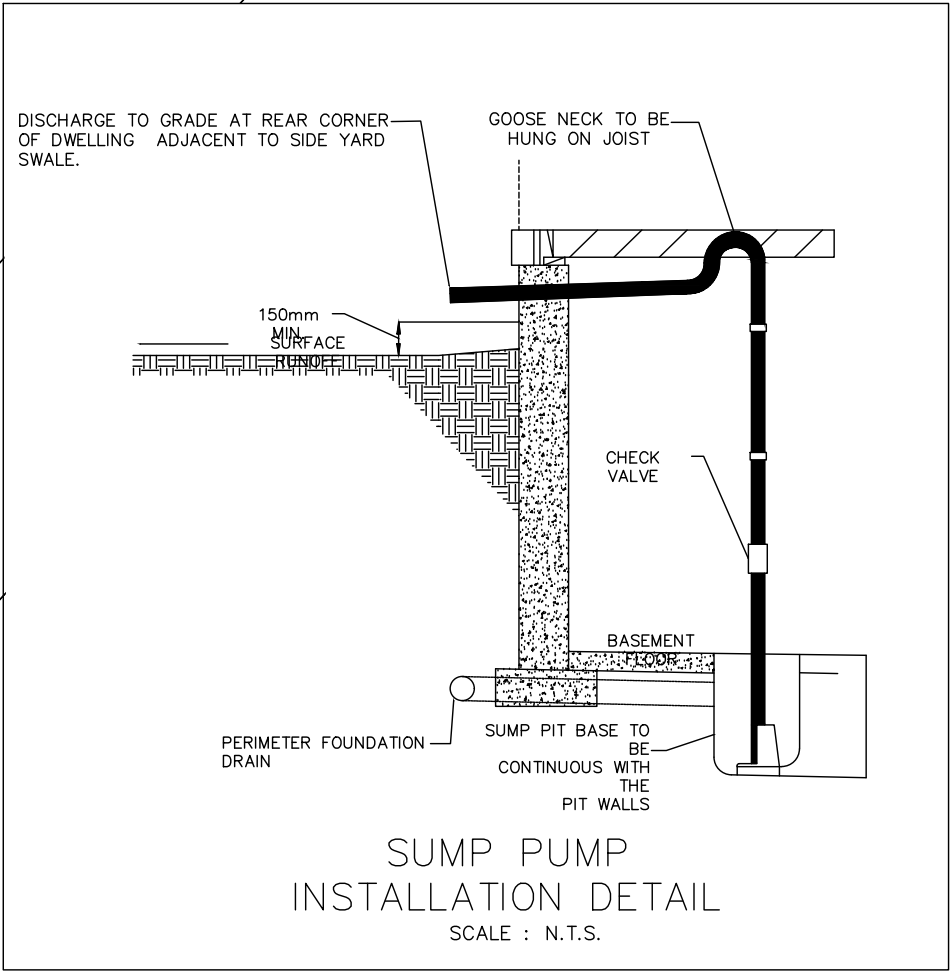
APPLICANT:  
**MANSOUR ARAB/MAN HOLDINGS LTD**  
174 DINNICK CRESCENT  
TORONTO, ONTARIO  
M4N 1M3


SITE LOCATION:  
**181 TORONTO STREET SOUTH**  
UXBRIDGE, ONTARIO

SITE PLAN FILE No.:

GRADING PLAN		
DESIGNED BY:	CHECKED BY:	DATE: APRIL 2021
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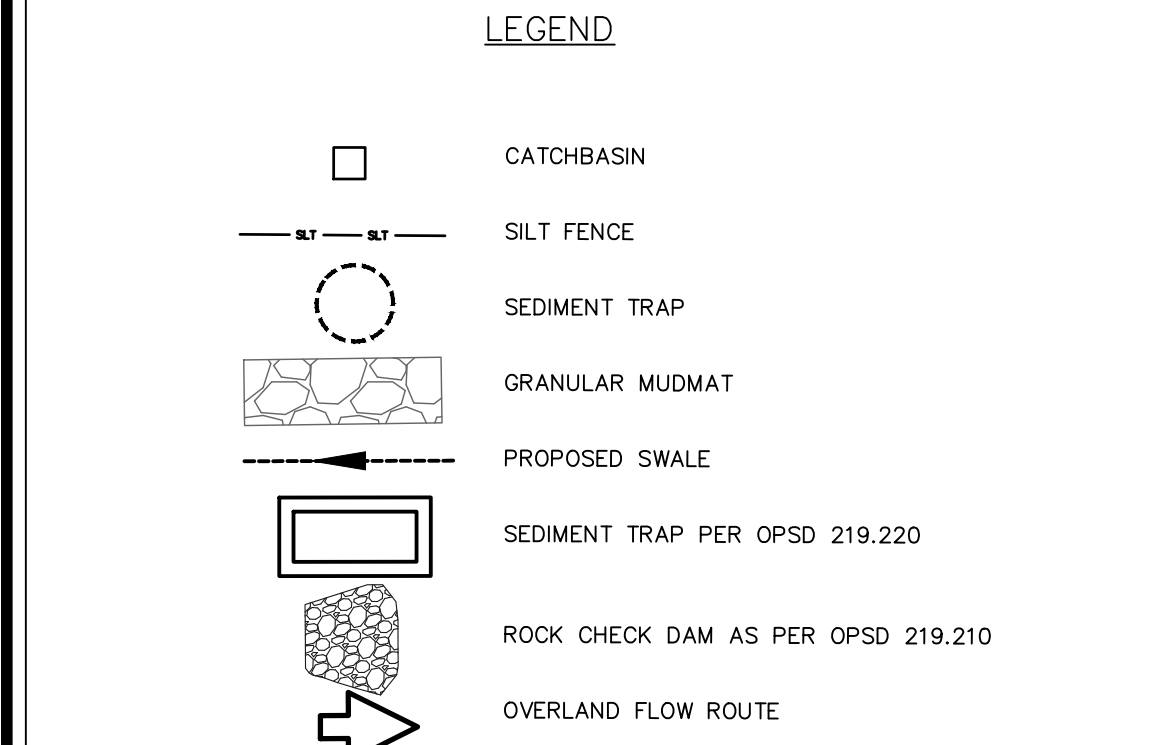
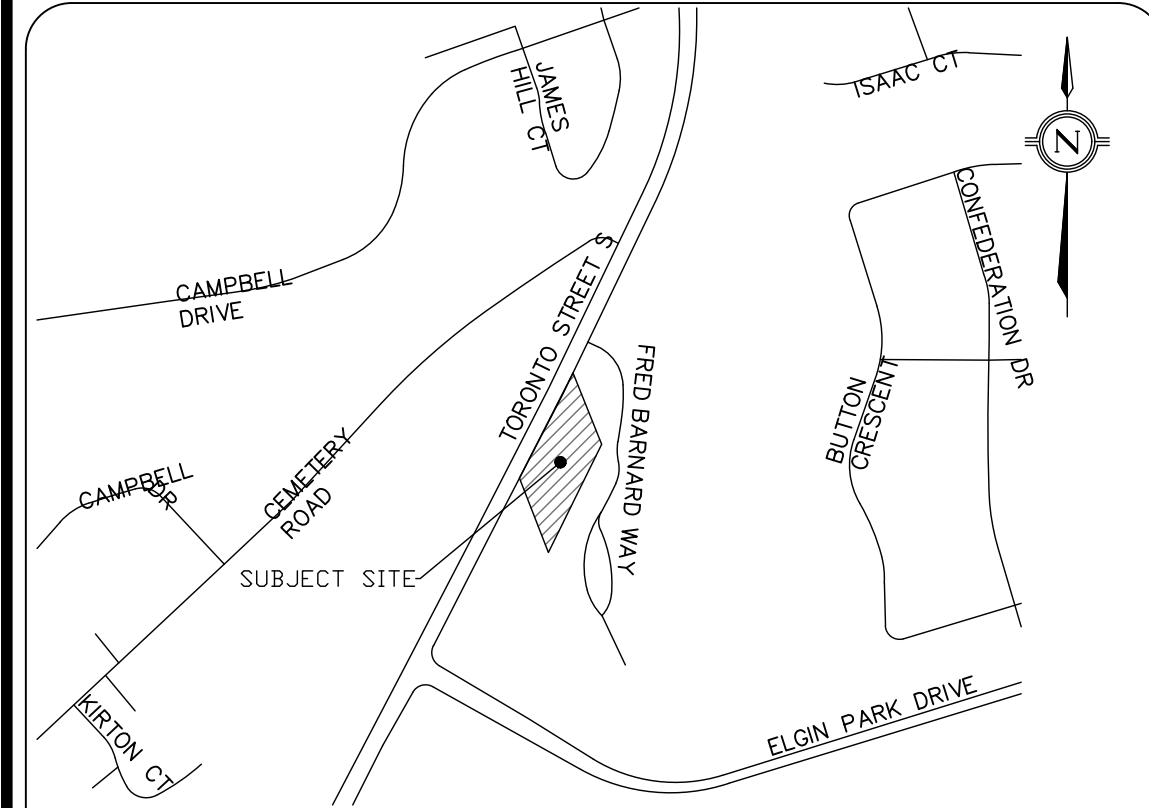
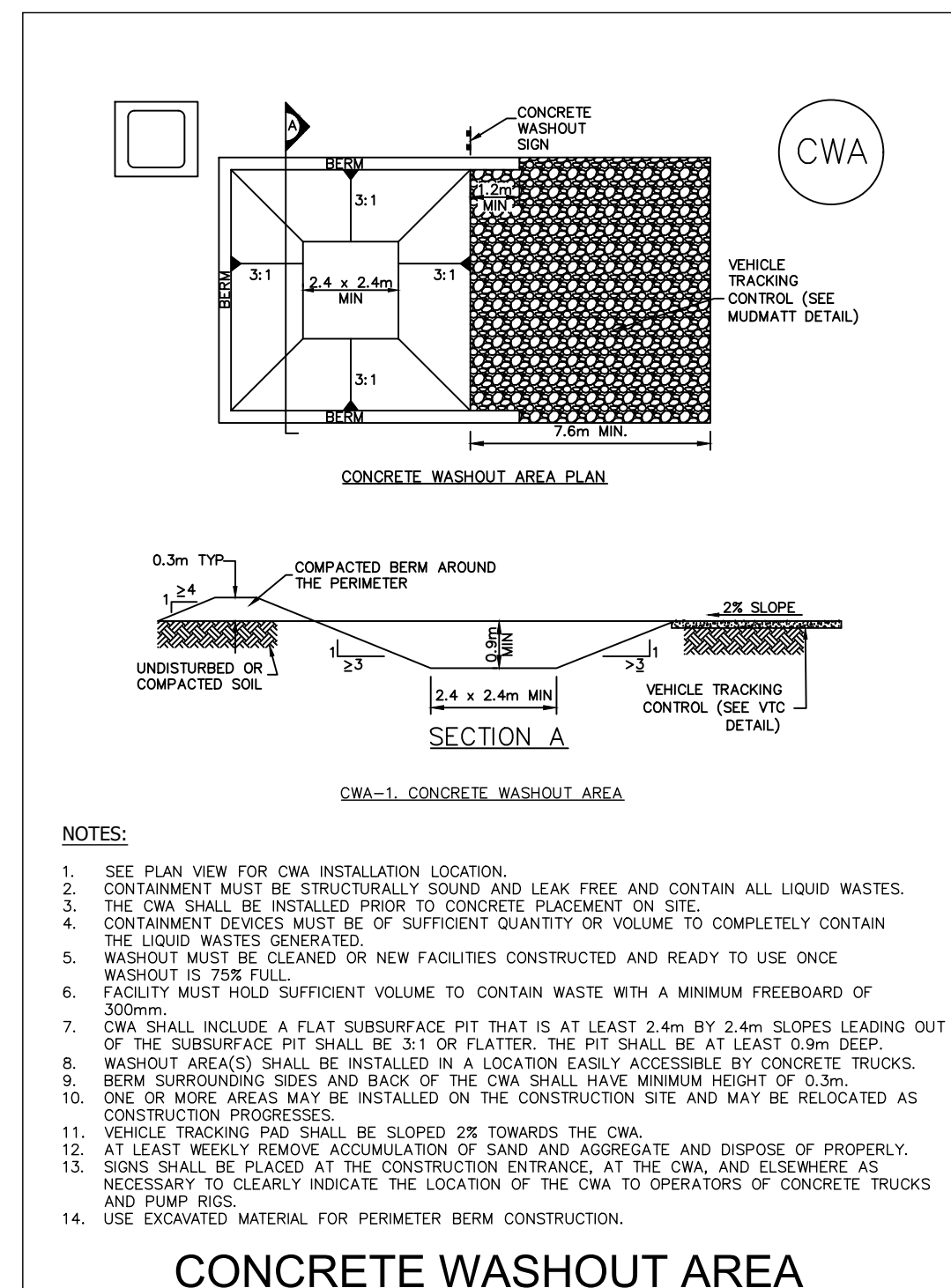
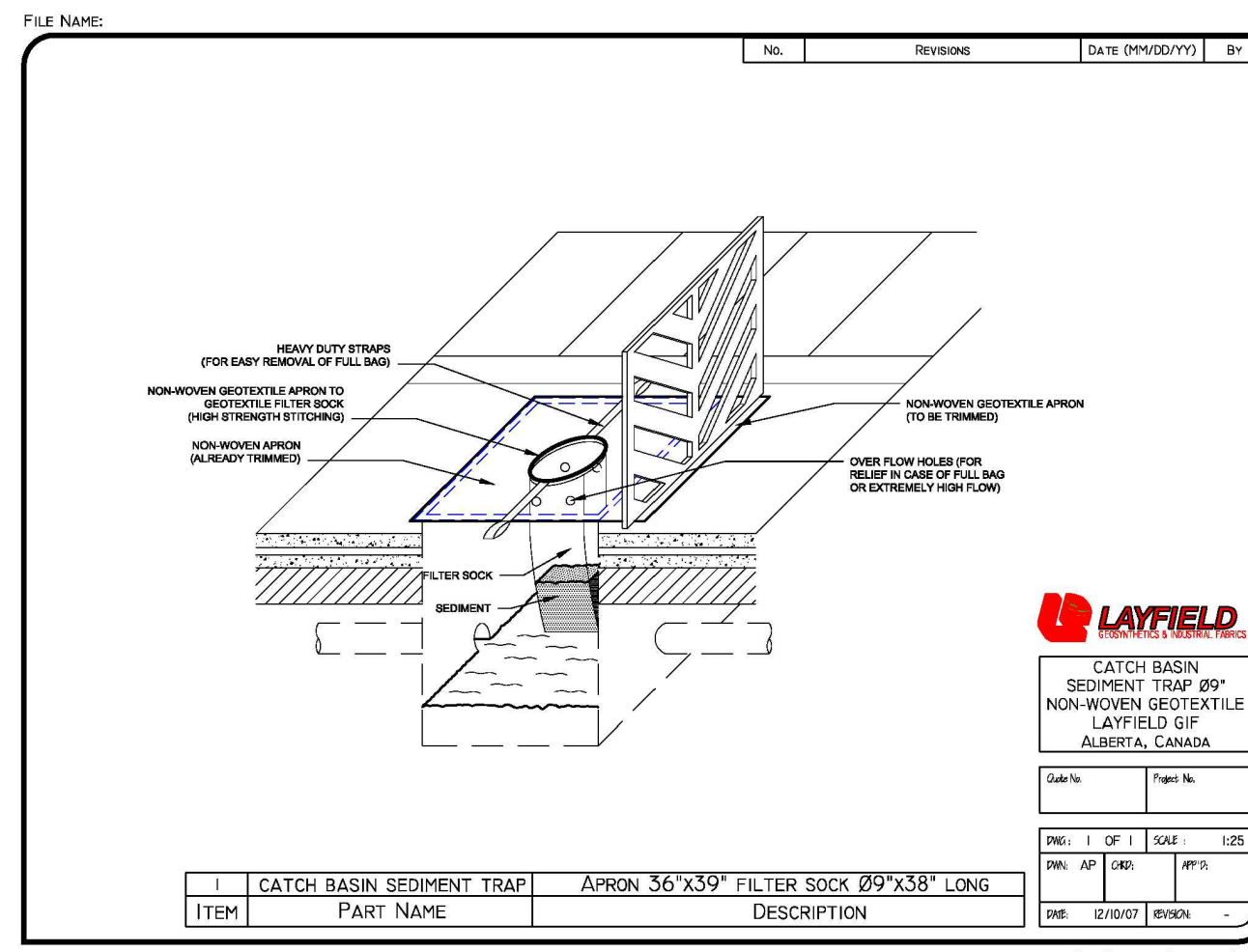
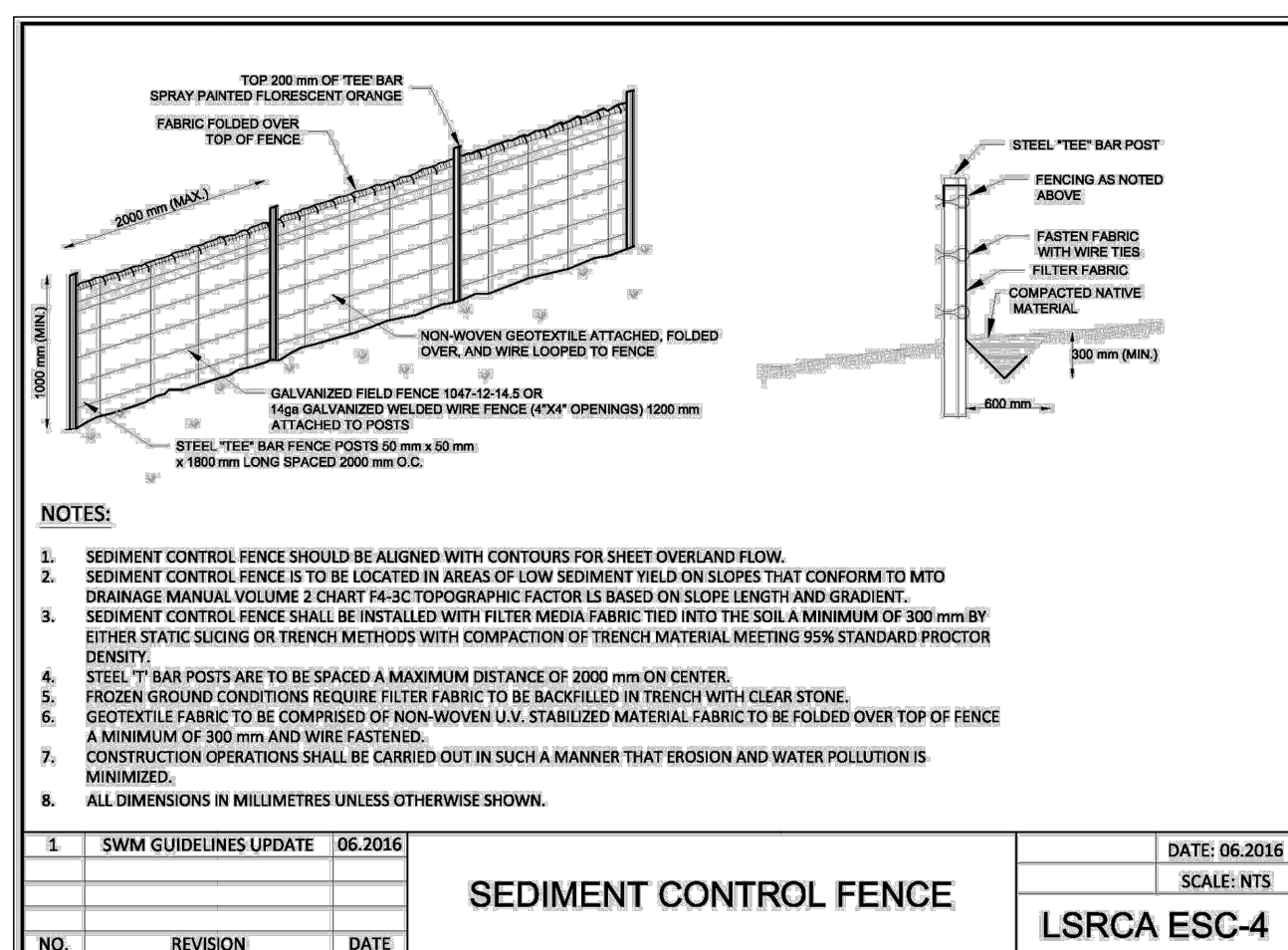
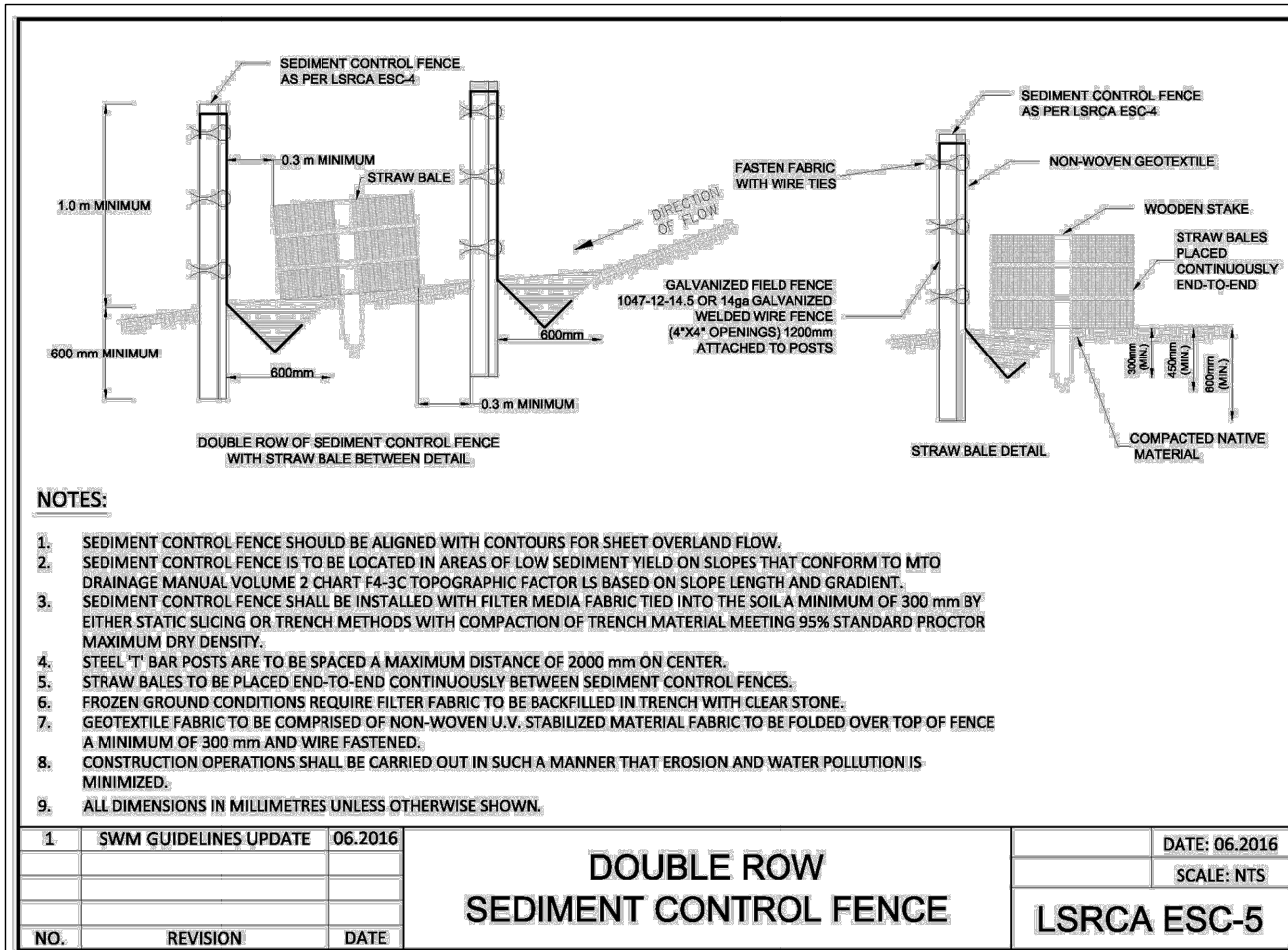
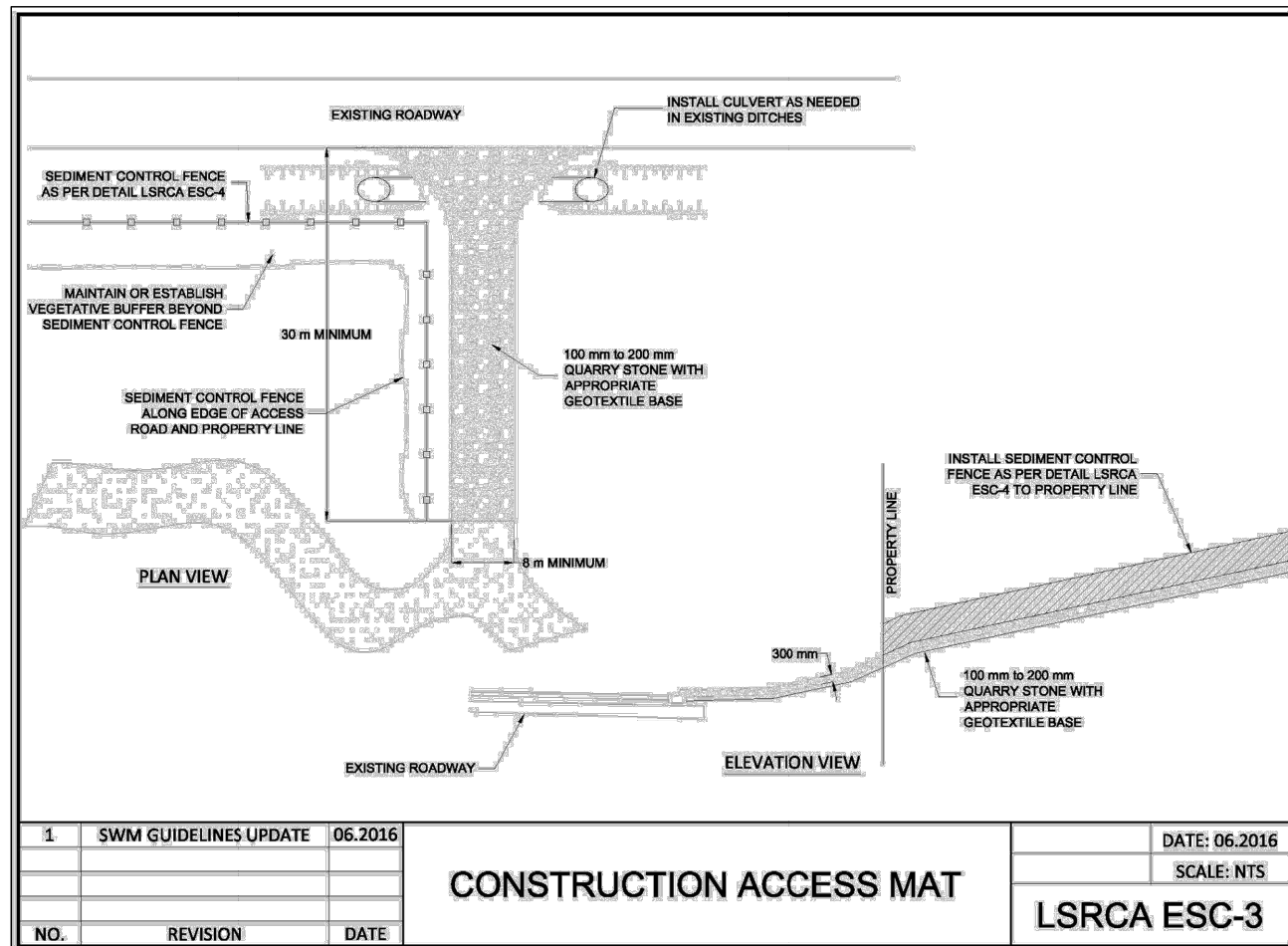
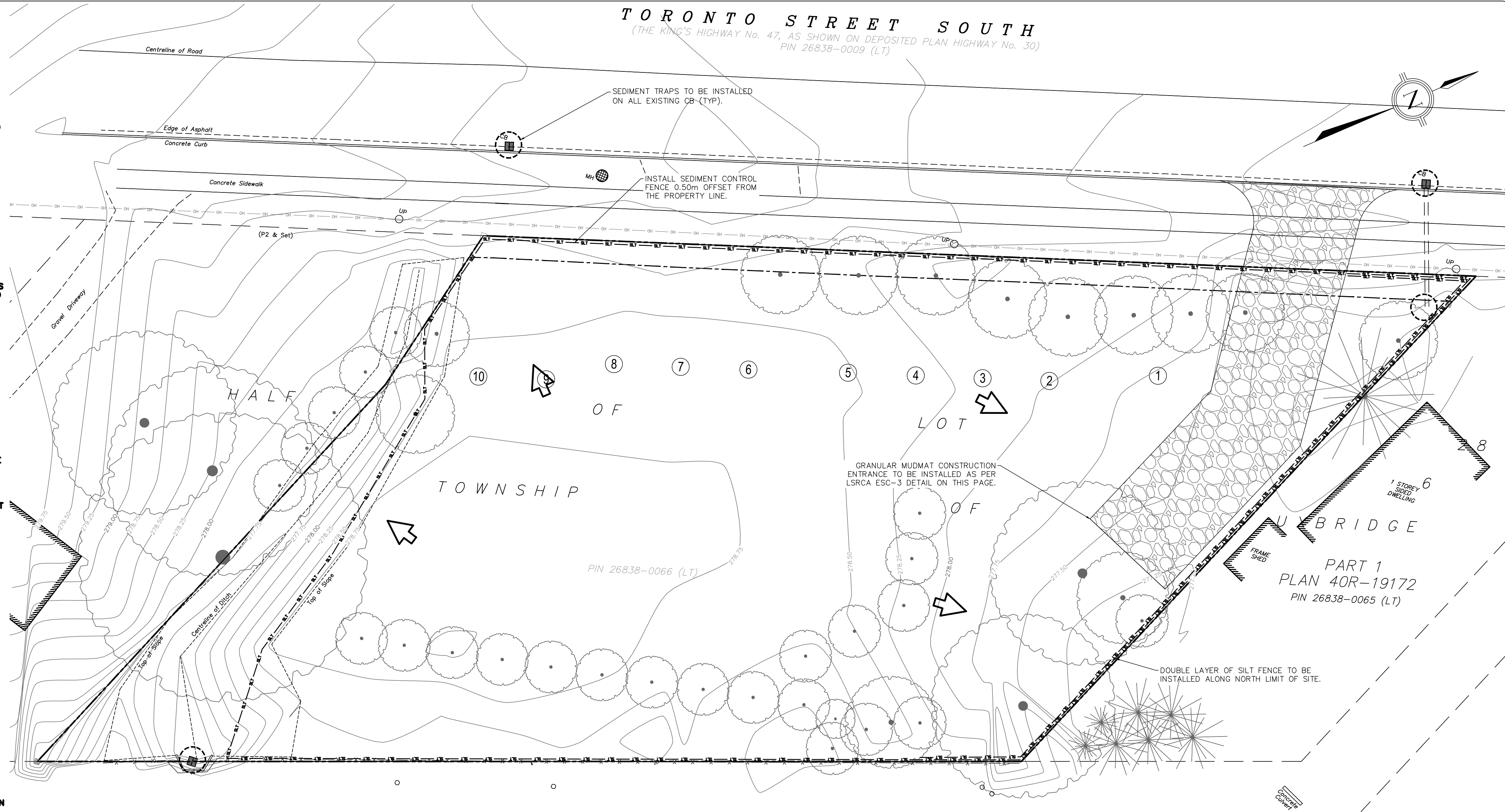
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SCALE: 1:200m 		DRAWING NO. C-2

REGION FILE No.:



# EROSION AND SEDIMENT CONTROL

- SILT CONTROL FENCE SHALL BE INSTALLED AROUND THE PERIMETER OFFSET 0.60M INSIDE THE PROPERTY OF THE SITE AND MAINTAINED UNTIL THE COMPLETION OF THE LANDSCAPING.
- DURING GRADING OPERATIONS, ALL STORM RUNOFF SHALL BE CONTROLLED WITH TEMPORARY SWALES TO PREVENT SURFACE RUNOFF FROM LEAVING THE SITE UNTREATED.
- MUD MAT FOR CONSTRUCTION ACCESS IS TO BE INSTALLED AT ALL SITE ENTRANCES PRIOR TO THE STRIPPING OF TOPSOIL AND IS TO BE MAINTAINED UNTIL ROADS/DRIVEWAYS HAVE BEEN CONSTRUCTED TO BASE COURSE ASPHALT. MUD MAT TO BE A MINIMUM 30M LONG AND 8M WIDE AND SHALL CONSIST OF 100MM CLEAR STONE AND 450MM DEEP.
- VEHICLE REFUELLING AND SOIL STOCKPILING SHALL BE UNDERTAKEN AWAY FROM ANY VALLEY/WATERCOURSE OR EXISTING CATCHBASINS.
- ADDITIONAL EROSION AND SEDIMENT CONTROL MATERIALS (i.e. SILT FENCE, STRAW BALES, CLEAR STONE, ETC.) ARE TO BE KEPT ON SITE FOR EMERGENCIES AND REPAIRS.
- EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE CONTINUOUSLY EVALUATED AND REPLACED/MAINTAINED AS REQUIRED TO ENSURE THEIR EFFECTIVENESS.
- ALL CATCHBASINS ARE TO BE PROTECTED WITH SEDIMENT TRAPS AS PER DETAIL ON ESC2 IMMEDIATELY AFTER INSTALLATION AND ARE TO BE MAINTAINED UNTIL ALL CONSTRUCTION IS COMPLETE.
- ALL TOPSOIL STOCKPILES INTENDED TO REMAIN IN PLACE FOR MORE THAN 30 DAYS ARE TO BE SEED TO PREVENT WIND EROSION.
- THE CONTRACTOR MUST UNDERTAKE MEASURES TO CONTROL DUST DURING CONSTRUCTION, AND DURING SOIL REMEDIATION/EXCAVATION ACTIVITIES, AND SHOULD INCLUDE THE FOLLOWING AS APPLICABLE:
  - THE WEEKLY, OR MORE FREQUENTLY IF REQUIRED, WETTING OF ALL SOFT AND HARD SURFACES AND ANY EXCAVATION FACE ON THE SITE, WITH THE ADDITION OF CALCIUM CHLORIDE OR OTHER RECOGNIZED MATERIALS AS A DUST SUPPRESSANT, IF REQUIRED;
  - THE WEEKLY CLEANING OF THE ROAD PAVEMENT AND SIDEWALKS FOR THE ENTIRE FRONTAGE(S) OF THE PROPERTY TO A DISTANCE OF TWENTY-FIVE METRES FROM THE PROPERTY LINES.
- SINCE THE LOCATION AND TYPE OF EROSION AND SEDIMENT CONTROL MEASURES WILL BE MODIFIED AS THE CONSTRUCTION OF THE SITE PROCEEDS, EROSION AND SEDIMENT CONTROL, BEST MANAGEMENT PRACTICES ARE DYNAMIC AND ADJUSTMENTS TO THE LOCATION AND TYPE OF ESC MEASURES WILL BE REQUIRED TO REDUCE THE AMOUNT OF SEDIMENT LEAVING THE SITE AND ONTO ADJACENT AREAS.
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  - SILT FENCE WHERE INDICATED,
  - TREE PRESERVATION, INSPECTION IS REQUIRED
  - TEMPORARY POND, IF REQUIRED,
  - SILT TRAPS.
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- THE SILT FENCE MUST BE INSPECTED BI-WEEKLY AND IMMEDIATELY AFTER RAINFALL EVENTS FOR RIPS OR TEARS, BROKEN STAKES, BLOW OUTS (STRUCTURAL FAILURE) AND ACCUMULATION OF SEDIMENT. THE SILT FENCE MUST BE FIXED AND/OR REPLACED IMMEDIATELY WHEN DAMAGED. SEDIMENT MUST BE REMOVED FROM SILT FENCE WHEN ACCUMULATION REACHES 50% OF THE HEIGHT OF THE FENCE.
- THE OWNER WILL SEED, MULCH AND MAINTAIN THE ENTIRE SITE IF A BUILDING PERMIT IS NOT ISSUED WITHIN 365 DAYS OF THE SEDIMENT AND EROSION CONTROL PERMIT BEING USED.
- UPON COMPLETION OF LANDSCAPING ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED.
- NO CONSTRUCTION ACTIVITY OR MACHINERY SHALL BE BEYOND THE SILT FENCE.
- ALL TOPSOIL STOCKPILES SHALL BE SURROUNDED WITH A SEDIMENT CONTROL FENCE.
- ANY AREAS THAT ARE INACTIVE FOR MORE THAN 30 DAYS SHALL BE SEED AND/OR STABILIZED.



**LEGAL & TOPOGRAPHY**  
 PROVIDED BY: BARICH GRENNIE  
 257 HWY No. 8 (UNIT 101)  
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**EROSION AND SEDIMENT CONTROL PLAN**

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