a.m. candaras associates inc.
consulting engineers

STORMWATER MANAGEMENT REPORT
FOR
PROPOSED 1 STOREY INDUSTRIAL BUILDING
12155 COLERAIN DRIVE
TOWN OF CALEDON: BOLTON
SPA 24-0087

June 12, 2025

a.m. candaras associates inc.
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Project No. 2417

1.0 INTRODUCTION

The site is located at 12155 Coleraine Drive, north of Mayfield Road and south of Parr Boulevard see Figure 1. The site will be developed with a single industrial building. Stormwater management will consist of roof top controls and roof ponding, plus ponding in the paved areas. The site outlets to the to the future Rainbow Creek in compliance with the Master Environmental Servicing Plan Update for the Simpson Road extension by GEI Consultants. In the interim condition prior to the Rainbow Creek being constructed the stormwater discharge from the site will be pumped to the surface from MH1 at the allowable discharge rate.

2.0 DESIGN CRITERIA

(a) The allowable stormwater discharge for all storms up to the 100-year storm to be limited to the 2-year storm TRCA rates as outlined in the MESP.

(b) The 2 to 100-year storm events must be contained on site and released at the allowable discharge rate as defined above.

(c) On site detention must be provided for the 100-year storm. Storm events based on the 100yr, 24-hour Chicago storm at 10min distribution. (See Appendix)

(d) Stormwater quality controls to provide Enhanced protection (80% TSS removal).

(e) Provide onsite retention through the means of infiltration, evapotranspiration and/or irrigation/reuse for the first 5mm of all storm events.

3.0 SITE DESCRIPTION

Roof:	=	2,514.43 m^2
Paved	=	20,231.31 m^2
Landscaped	=	2,054.26 m^2
Total	=	24,800.00 m^2

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SCALE:	N.T.S.
DATE:	JUNE 2058
JOB No.:	2417

12155 COLERAINE DRIVE
TOWN OF CALEDON, ONTARIO

FIGURE 1
SITE LOCATION PLAN

4.0 ROOF TOP CONTROLS

The roof area will be equipped with Zurn Z-105-5-ERC control flow roof drains as follows:

Area	No. of Notches	Notch Area	Flow (1) Per Notch	Total Flow
2,514.43	6	419.1	93 l/m	9.3 l/s
			Q_R =	9.3 l/s

(1) Based on manufacturer's design tables at a 102 mm depth.

The resulting total roof top volume ponding is:

138.6 m^3

, as indicated in Table 1. The available roof top storage is 167.6 m^3, based on a maximum ponding depth of 100 mm, as indicated in the attached calculations.

5.0 UNCONTROLLED RUNOFF

The site is designed to be self contained. A small portion of landscaped at the emergency overflow location will discharge uncontrolled. The following post development areas will discharge uncontrolled:

Landscaped area = 19.2 m^2

The 100 year storm uncontrolled runoff is:

$$Q_U = \frac{(19.2)\ (0.31)\ (196.5)\ (2.778)}{10000}$$

$$= 0.3 \text{ l/s}$$

$$I_{100year} = \frac{4688}{(Tc+17)^{0.9624}}$$

T_c = 10 minutes

$I_{100year}$ = 196.5 mm/hr

6.0 DETENTION VOLUME CALCULATIONS

The allowable site runoff is to be limited to the 2-year TRCA rates for Catchment ID C3.1 as outlined in the Master Environmental Servicing Plan Update by GEI Consultants in Table 5.7 (See Appendix for excepts from the MESP):

Allowable Site Runoff:

Q_S = 24.0 l/s

Roof Flow:

Q_R = 9.3 l/s

Uncontrolled Flow:

Q_U = 0.3 l/s

Allowable discharge from the paved and landscaped areas:

$Q_{PL} = Q_S - (Q_R + Q_U)$

Q_{PL} = 24.0 l/s - (9.3 l/s + 0.3 l/s)

= 14.4 l/s

Storage required = 1,579.4 m^3

Note: see Table 2 for volume calculations.

7.0 AVAILABLE DETENTION VOLUME

Based on a high-water level of 233.85 the available surface detention is:

DCBMH#4,5,6,7,9 & CB 1 & DCB 2,3	=	1,667.5 m^3
CB#5	=	86.1 m^3
CB#6	=	9.6 m^3
CB#7	=	45.4 m^3
CB#8	=	70.0 m^3
		1,878.6m^3

Note: Surface storage calculations on DWG G-1

8.0 OUTLET CONTROLS

The total site discharge is to be limited to:

$Q = Q_S - Q_U$

$Q = 24.0\ l/s - 0.3\ l/s$

$= \mathbf{23.7\ l/s}$

Sizing of the orifice is as follows:

$$Q = CA\sqrt{2gh}$$

where:

h = HWL - Inv of orifice

h = 233.85 m – 230.25 m

h = 3.6 m

$$A = \frac{Q}{C\sqrt{2gh}}$$

$$A = \frac{0.0237}{.82\sqrt{2X9.81X3.60}}$$

$A = 0.0034\ m^2$

$$d = \sqrt{\frac{4X0.0034m^2}{\pi}}$$

d = 0.066 m

Therefore, as the minimum orifice size is 75mm per Town of Caledon standards, use a 300mm orifice tube to accommodate a Hydro-Brake flow control device sized to discharge 23.7l/s on the downstream face of Manhole #3 as shown on DWG G-1. See Appendix for Hydro-Brake flow rates and technical specifications.

9.0 STORMWATER QUALITY CONTROLS

Quality controls for the proposed development are provided by an oil grit separator providing enhanced protection level 1 (80% TSS Removal) based on a total site area of 2.48 ha with a total imperviousness of 92%. The Stormceptor EFO8 will be located downstream of the orifice control. See the Appendix for Stormceptor EF Sizing Report.

10.0 WATER BALANCE / VOLUME CONTROL

The MESP requires that the 5mm storm be retained onsite. The resulting volume for the developed area is:

$$\left(\frac{5mm}{1000}\right) \text{ x } 24{,}800.00 \text{ m}^2$$

$$= 124.0 \text{ m}^3$$

Therefore, a 23.0m long by 20.0m wide by 0.7m deep infiltration trench will be provided to achieve a total trench storage volume of 128.8m^3. All impervious area discharge will be collected, treated and infiltrated for the first 5mm of rainfall. Please see the infiltration trench detail on the S-1 for sizing calculations. This adequately meets the required volume required for the water balance. The borehole log from the Geotechnical Investigation prepared by DS Consultants LTD, dated: April 17, 2025 the soils are silty clay till which has and estimated percolation rate of 12mm/hr which is conducive to infiltration. Geotechnical in situ testing for permeability of the soils would provide a more accurate infiltration rate of the existing soils.

<u>Infiltration & Goss Trap Maintenance Schedule</u>

Semi-annual inspection

- Check observation (MH12) manhole following 3 days of dry weather. Failure to percolate within this time period indicates clogging.
- Check goss trap for obstructions
- Observe sediment accumulation within perforate pipes
- Power flush perforated pipes and flush in direction of observation manhole. Vacuum any accumulated sediment from observation manhole (MH12).

12.0 SANITARY SERVICE CONNECTION

A existing 150mm sanitary service connection and doghouse manhole are provided at the east limit of the site along Coleraine Drive. The 150mm service connection at 2.36% has a capacity of 23.40l/s. The Region of Peel Connection Single Use Demand Table has been completed and is provided in the Appendix. The wastewater flows are summarized as follows:

Total Population = 70 ppha x 2.48ha = 174 people

Domestic Sewage Flow = 174people x 270l/cap/day

= 46,980l/day = 0.54 l/s

Peaking Factor = $PF = 1 + \left(\frac{14}{4+\left(\frac{174}{1000}\right)^{\frac{1}{2}}} \right) = 4.17$

Peak Domestic Sanitary flow = 0.54 l/s x 4.17 = 2.25 l/s

Infiltration = 2.48 ha x 0.26l/s/ha = 0.64 l/s

Total wastewater flow = 2.25 l/s + 0.64 l/s = 2.89 l/s

Therefore, the existing 150mm sanitary sewer at 2.36% will provide 23.40 l/s of capacity which is greater than the calculated sanitary demand of 2.89 l/s.

14.0 WATER SERVICING

An existing 200mm Watermain connection is provided at the property line and is proposed to be split into a 200mm fireline and 100mm domestic at the property line per Region of Peel Standard 1-8-6 and will be extended to the building to provide the water service connections. Refer to drawing S-1 for details.

The anticipated water demand has been calculated below, based on the Region of Peel design criteria for an industrial development.

Consumption	=	250l/employee/day
Max Day Factor	=	1.4
Peak Hour Factor	=	3.0
Equivalent Population	=	174 people
1 liter per second (l/s)	=	15.85USgpm

Water Demands

a) Average Daily Demand

= 250l/employees/day · 174employees

= 43,500l/day

= 0.50l/s (7.93USgpm)

b) Maximum Daily Demand

= 250l/employees/day · 174employees · 1.4 (Max day factor)

= 60,900 l/day

= 0.70l/s (11.09USgpm)

c) Peak Hour Demand

= 250l/employees/day

= 250l/employees/day · 174employees · 3.0 (Peak Hour factor)

= 130,500l/day

= 1.51l/s (23.93USgpm)

d) Fire Flow Calculation (Based on Fire Underwriters Survey 1999):

1. An estimate of the fire flow required for a given area is determined by the formula:

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

Where,

F = the required fire flow in litres per minute (l/m)

C = Construction type coefficient= 0.8 (non-combustible construction)

A = Total area (based on construction type and protected openings)

$F = 220(0.8)\sqrt{2{,}054.26 m^2}$

$F = 7{,}977 l/m$

Therefore, use: $F = 8{,}000\ l/m$

2. Occupancy Reduction

N/A

$F_2 = 8{,}000 l/m$

3. Sprinkler Reduction

30% Reduction for NFPA 13 System

4. Separation Charge

East Side (> 30m)	= 0%
West Side (> 30m)	= 0%
North Side (> 30m)	= 0%
South Side (> 30m)	= 0%
Total Separation Charge	= 0%

5. Final Fire Flow

Ffinal = F2 – (F2 × 30%) + (F2 × 0%)

Ffinal = 8,000l/m – (8,000l/min x 0.30) + (8,000l/min x 0.0)

Ffinal = 5,600l/m

Therefore, use: Ffinal = 6,000l/min

Ffinal = 1,585.03USgpm

6. Total Water Demand

The water supply system will be designed to convey the fire flow plus maximum day demand.

The flow results from the fire flow plus max day, as calculated below:

Max day + Fire Flow = 11.09USgpm + 1,585.03USgpm

= 1,598.05USgpm (100.7l/s)

A hydrant flow test has been commissioned; the results are not available at this time.

16.0 STORMWATER SUMMARY TABLE

DESCRIPTION	VALUE	UNIT
Allowable Site Release Rate (2yr TRCA)	**24.0**	l/s
Uncontrolled Release Rate	0.3	l/s
Roof Release Rate	9.3	l/s
Paved & Landscape Release Rate	14.4	l/s
Required Site Storage	1,657.4	m^3
Provided Site Storage	1,878.6	m^3
Required Roof Storage	138.6	m^3
Provided Roof Storage	167.6	m^3
Orifice	HydroBrake Flow Control Device	SHE-0176-2370-3600-2370
Water Balance Volume Required	124.0	m^3
Water Balance Volume Provided	128.8	m^3
OGS	Stormceptor EFO8	80% TSS REMOVAL. 90% ANNUAL RUNOFF TREATED

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Table 1: 100 YR Storm Runoff Computations for Roof Area

Time Period (min)	Intensity (mm/hr)	Runoff (l/s)	Storage (m^3)
400-410	2.9	1.9	-
410-420	3.7	2.5	-
420-430	4.9	3.3	-
430-440	7.0	4.6	-
440-450	11.0	7.3	-
450-460	21.1	14.0	2.8
460-470	62.2	41.3	19.2
470-480	196.5	130.4	72.7
480-490	83.1	55.1	27.5
490-500	41.2	27.3	10.8
500-510	25.1	16.7	4.4
510-520	17.1	11.3	1.2
520-530	12.5	8.3	-
530-540	9.6	6.4	-
540-550	7.7	5.1	-
550-560	6.3	4.2	-
560-570	5.3	3.5	-
570-580	4.5	3.0	-
580-590	3.9	2.6	-
590-600	3.4	2.3	-
			138.6

Roof Area = 2,514.43 m^2 @ C = 0.95

CAN = $\frac{(2{,}514.43m^2)(.95)(2.778)}{10{,}000}$

= 0.6636

Roof Outflow = 9.3 l/s

Storage (m^3) = $\frac{\text{(Runoff - Roof Outflow) x 10 min x 60 sec}}{1000}$

Table 2: 100 YR Storm Runoff Computations for Paved and Landscaped Areas

Time Period (min)	Intensity (mm/hr.)	Runoff (l/s)	Storage (m^3)
390-400	2.4	13.2	-
400-410	2.9	16.0	1.0
410-420	3.7	20.4	3.6
420-430	4.9	27.0	7.6
430-440	7.0	38.6	14.5
440-450	11.0	60.7	27.8
450-460	21.1	116.4	61.2
460-470	62.2	343.1	197.2
470-480	196.5	1083.9	641.5
480-490	83.1	458.4	266.3
490-500	41.2	227.3	127.7
500-510	25.1	138.5	74.4
510-520	17.1	94.3	48.0
520-530	12.5	69.0	32.7
530-540	9.6	53.0	23.1
540-550	7.7	42.5	16.9
550-560	6.3	34.8	12.2
560-570	5.3	29.2	8.9
570-580	4.5	24.8	6.3
580-590	3.9	21.5	4.3
590-600	3.4	18.8	2.6
600-610	3.0	16.5	1.3
610-620	2.7	14.9	0.3
620-630	2.5	13.8	-
			1579.4

Paved: 20,231.31 m^2 @ C = 0.95

Net Landscaped: 2,035.06 m^2 @ C = 0.31

$$\text{CAN:} = \frac{[(20{,}231.31 \times 0.95)+(2{,}035.06 \times 0.31)] \times 2.778}{10{,}000}$$

$$= 5.5145$$

$$\text{Storage } (m^3): = \frac{\text{(Runoff - Roof Outflow) x 10 min x 60 sec}}{1000}$$

Outflow: = 14.4 l/s

ROOF PONDING DETAILS

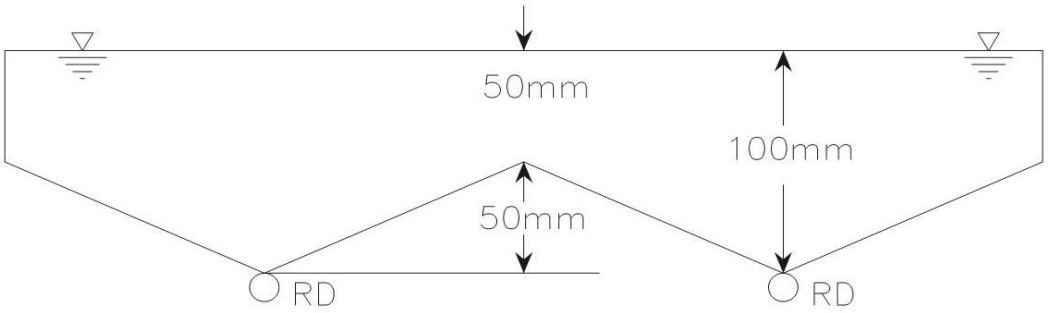
Criteria:

Roof Area = 2,514.43 m^2

Total No. of Drains = 6

100 mm Ponding Depth

50 mm Rise between Drains



Average Area per Drain: $= \frac{2{,}514.43\ m^2}{6}$

$= 419.1\ m^2$

Available Ponding Volume Per Drain: $= \frac{419.1\ m^2 \times 0.050\ m}{3} + (419.1\ m^2 \times 0.050\ m)$

$= 27.9\ m^3/\text{Drain}$

Total Volume = $27.9\ m^3 \times 6$

$= 167.6\ m^3$

Required Volume = $138.6\ m^3$

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ROOF DRAIN MANUFACTURERS DESIGN TABLE

LOCATION	SQUARE METRE (SQUARE FOOT) NOTCH AREA RATING	ROOF LOAD FACTOR KGS (LBS.)	TOTAL ROOF SLOPE											
			DEAD-LEVEL			51mm (2") RISE			102mm (4") RISE			152mm (6") RISE		
			L.P.M. (G.P.M.) Discharge	Draindown Time Hrs.	mm (In.) Water Depth	L.P.M. (G.P.M.) Discharge	Draindown Time Hrs.	mm (In.) Water Depth	L.P.M. (G.P.M.) Discharge	Draindown Time Hrs.	mm (In.) Water Depth	L.P.M. (G.P.M.) Discharge	Draindown Time Hrs.	mm (In.) Water Depth
St. Thomas, Ontario	232 (2,500)	5.7 (12.5)	54.5 (12)	8	61 (2.4)	68 (15)	7	76 (3.0)	86.5 (19)	5	96.5 (3.8)	104.5 (23)	4	117 (4.6)
	465 (5,000)	6.6 (14.6)	63.5 (14)	19	71 (2.8)	77.5 (17)	16	86.5 (3.4)	97.5 (21.5)	11	109 (4.3)	118 (26)	9	132 (5.2)
	697 (7,500)	7.1 (15.6)	68 (15)	29	76 (3.0)	82 (18)	26	91.5 (3.6)	102.5 (22.5)	18	114.5 (4.5)	125 (27.5)	15	139.5 (5.5)
	929 (10,000)	7.5 (16.6)	72.5 (16)	40	81.5 (3.2)	86.5 (19)	34	96.5 (3.8)	107 (23.5)	24	119.5 (4.7)	132 (29)	20	147.5 (5.8)
Timmins, Ontario	232 (2,500)	4.3 (9.4)	41 (9)	7	45.5 (1.8)	57 (12.5)	6	63.5 (2.5)	72.5 (16)	4	81.5 (3.2)	86.5 (19)	3.3	96.5 (3.8)
	465 (5,000)	5.7 (12.5)	54.5 (12)	16	61 (2.4)	63.5 (14)	14	71 (2.8)	82 (18)	9	91.5 (3.6)	97.5 (21.5)	7.5	109 (4.3)
	697 (7,500)	6.4 (14)	61.5 (13.5)	27	68.5 (2.7)	70.5 (15.5)	22	78.5 (3.1)	86.5 (19)	15	96.5 (3.8)	104.5 (23)	12	117 (4.6)
	929 (10,000)	6.6 (14.6)	63.5 (14)	36	71 (2.8)	72.5 (16)	30	81.5 (3.2)	91 (20)	21	101.5 (4.0)	109 (24)	17	122 (4.8)
Toronto, Ontario	232 (2,500)	5.7 (12.5)	54.5 (12)	8	61 (2.4)	66 (14.5)	7	73.5 (2.9)	82 (18)	4.5	91.5 (3.6)	97.5 (21.5)	3.5	109 (4.3)
	465 (5,000)	6.8 (15.1)	66 (14.5)	19	73.5 (2.9)	77.5 (17)	16	86.5 (3.4)	93 (20.5)	11	104 (4.1)	111.5 (24.5)	9	124.5 (4.9)
	697 (7,500)	8.0 (17.7)	77.5 (17)	30	86.5 (3.4)	84 (18.5)	26	94 (3.7)	100 (22)	18	112 (4.4)	120.5 (26.5)	14	134.5 (5.3)
	929 (10,000)	8.7 (19.2)	82 (18)	42	91.5 (3.6)	86.5 (19)	34	96.5 (3.8)	104.5 (23)	24	117 (4.6)	127.5 (28)	20	142 (5.6)
Windsor, Ontario	232 (2,500)	6.1 (13.5)	59 (13)	8.5	66 (2.6)	70.5 (15.5)	7.5	78.5 (3.1)	84 (18.5)	4.5	94 (3.7)	107 (23.5)	4	119.5 (4.7)
	465 (5,000)	7.1 (15.6)	68 (15)	20	76 (3.0)	79.5 (17.5)	16	89 (3.5)	97.5 (21.5)	11	109 (4.3)	118 (26)	9	132 (5.2)
	697 (7,500)	8.0 (17.7)	77.5 (17)	30	86.5 (3.4)	86.5 (19)	26	96.5 (3.8)	107 (23.5)	18	119.5 (4.7)	125 (27.5)	15	139.5 (5.5)
	929 (10,000)	8.7 (19.2)	82 (18)	42	91.5 (3.6)	91 (20)	36	101.5 (4.0)	113.5 (25)	26	127 (5.0)	129.5 (28.5)	20	145 (5.7)
Charlottetown, P.E.I.	232 (2,500)	4.9 (10.9)	47.5 (10.5)	7.5	53.5 (2.1)	57 (12.5)	6	63.5 (2.5)	68 (15)	3.8	76 (3.0)	79.5 (17.5)	3	89 (3.5)
	465 (5,000)	6.6 (14.6)	63.5 (14)	19	71 (2.8)	75 (16.5)	15.5	84 (3.3)	88.5 (19.5)	10	99 (3.9)	100 (22)	7.5	112 (4.4)
	697 (7,500)	7.8 (17.2)	75 (16.5)	31	84 (3.3)	86.5 (19)	26	96.5 (3.8)	102.5 (22.5)	18	114.5 (4.5)	113.5 (25)	13	127 (5.0)
	929 (10,000)	8.7 (19.2)	84 (18.5)	42	94 (3.7)	97.5 (21.5)	37	106.5 (4.2)	111.5 (24.5)	26	124.5 (4.9)	125 (27.5)	20	139.5 (5.5)
Montreal, Quebec	232 (2,500)	5.2 (11.4)	50 (11)	7.5	56 (2.2)	61.5 (13.5)	7	68.5 (2.7)	79.5 (17.5)	4.5	89 (3.5)	97.5 (21.5)	3.5	109 (4.3)
	465 (5,000)	5.9 (13)	57 (12.5)	17	63.5 (2.5)	70.5 (15.5)	15	78.5 (3.1)	88.5 (19.5)	10	99 (3.9)	109 (24)	8	122 (4.8)
	697 (7,500)	6.1 (13.5)	59 (13)	27	66 (2.6)	72.5 (16)	23	81.5 (3.2)	93 (20.5)	16	104 (4.1)	113.5 (25)	13	127 (5.0)
	929 (10,000)	6.4 (14)	61.5 (13.5)	36	68.5 (2.7)	77.5 (17)	31	86.5 (3.4)	95.5 (21)	22	106.5 (4.2)	120.5 (26.5)	19	134.5 (5.3)
Quebec City, Quebec	232 (2,500)	5.4 (12)	52.5 (11.5)	8	58.5 (2.3)	63.5 (14)	7	71 (2.8)	79.5 (17.5)	4.5	89 (3.5)	97.5 (21.5)	3.5	109 (4.3)
	465 (5,000)	6.4 (14)	61.5 (13.5)	18	68.5 (2.7)	70.5 (15.5)	15	78.5 (3.1)	84 (18.5)	10	94 (3.7)	104.5 (23)	8	117 (4.6)
	697 (7,500)	6.6 (14.6)	63.5 (14)	28	71 (2.8)	72.5 (16)	23	81.5 (3.2)	86.5 (19)	15	96.5 (3.8)	107 (23.5)	12	119.5 (4.7)
	929 (10,000)	7.1 (15.6)	68 (15)	37	76 (3.0)	77.5 (17)	31	86.5 (3.4)	88.5 (19.5)	20	99 (3.9)	109 (24)	17	122 (4.8)
Regina, Saskatchewan	232 (2,500)	4.5 (9.9)	43 (9.5)	7	48.5 (1.9)	54.5 (12)	6	61 (2.4)	72.5 (16)	4	81.5 (3.2)	79.5 (17.5)	3	89 (3.5)
	465 (5,000)	6.4 (14)	61.5 (13.5)	18	68.5 (2.7)	68 (15)	14	76 (3.0)	86.5 (19)	10	96.5 (3.8)	97.5 (21.5)	7.5	109 (4.3)
	697 (7,500)	7.3 (16.1)	70.5 (15.5)	29	78.5 (3.1)	77.5 (17)	24	86.5 (3.4)	100 (22)	17	112 (4.4)	109 (24)	12	122 (4.8)
	929 (10,000)	8.3 (18.2)	79.5 (17.5)	40	89 (3.5)	82 (18)	32	91.5 (3.6)	104.5 (23)	24	117 (4.6)	118 (26)	18	132 (5.2)
Saskatoon, Saskatchewan	232 (2,500)	4.0 (8.8)	38.5 (8.5)	6	43 (1.7)	57 (12.5)	6	63.5 (2.5)	66 (14.5)	3.8	73.5 (2.9)	77.5 (17)	2.8	86.5 (3.4)
	465 (5,000)	5.7 (12.5)	54.5 (12)	16	61 (2.4)	68 (15)	14.5	76 (3.0)	82 (18)	9	91.5 (3.6)	95.5 (21)	7	106.5 (4.2)
	697 (7,500)	6.6 (14.6)	63.5 (14)	28	71 (2.8)	75 (16.5)	24	84 (3.3)	91 (20)	16	101.5 (4.0)	104.5 (23)	12	117 (4.6)
	929 (10,000)	7.1 (15.6)	68 (15)	38	76 (3.0)	82 (18)	32	91.5 (3.6)	97.5 (21.5)	22	109 (4.3)	113.5 (25)	18	127 (5.0)

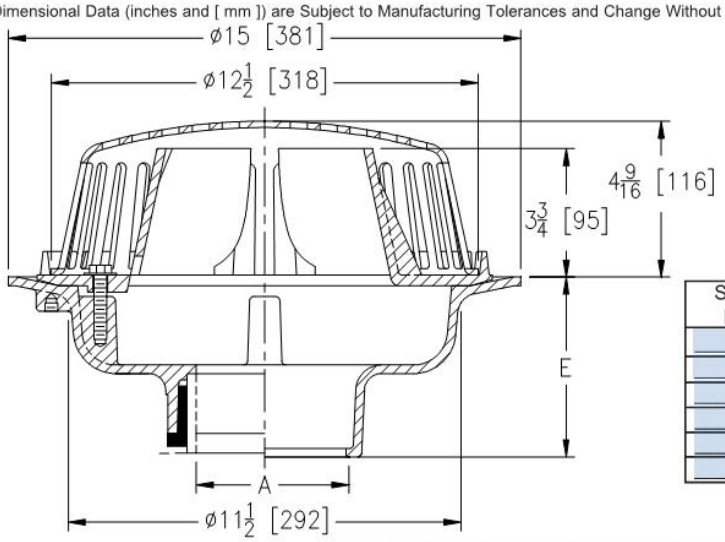
Z105

CONTROL-FLO ROOF DRAIN
W/ PARABOLIC WEIR

SPECIFICATION SHEET

TAG _____

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



Specify Number of Notches in Weir	
___ -N1	One Notch
___ -N2	Two Notches
___ -N3	Three Notches
___ -N4	Four Notches
___ -N5	Five Notches
___ -N6	Six Notches

A- Pipe Size In.[mm]	Approx. Wt. Lbs. [kg]	Dome Open Area Sq. In. [cm^2]
2,3,4 [51,76,102]	34 [15]	103 [665]

ENGINEERING SPECIFICATION: ZURN Z105
15" [381mm] Diameter Control-Flo roof drain for dead-level roof construction, Dura-Coated cast iron body, Control-Flo weir shall be linear functioning with integral membrane flashing clamp/gravel guard and Poly-Dome. All data shall be verified proportional to flow rates. Each notch will allow 10 GPM [LPM] of flow per 1" [25mm] of rain water build up above the drain.

OPTIONS (Check/specify appropriate options)

PIPE SIZE
3, 4 [76, 102]
2 , 3, 4 [51, 76, 102]
2 , 3, 4 [51, 76, 102]

(Specify size/type) **OUTLET**
_____ IC Inside Caulk
_____ NH No-Hub
_____ NL Neo-Loc

E BODY HT. DIM.
5-1/4 [133]
5-1/4 [133]
4-9/16 [116]

PREFIXES
____ Z D.C.C.I. Body with Poly-Dome*
____ ZA D.C.C.I. Body with Aluminum Dome
____ ZC D.C.C.I. Body with Cast Iron Dome

SUFFIXES
____ -C Underdeck Clamp
____ -DP Top-Set® Deck Plate (Replaces both -C & -R)
____ -E Static Extension 1 [25] thru 4 [102] (Specify Ht.)
____ -EA Adjustable Extension Assembly 2-1/8 [54] thru 3-1/2 [89]
____ -G Galvanized Cast Iron
____ -R Roof Sump Receiver
____ -TC Neo-Loc Test Cap Gasket (2,3,4 [51,76,102] NL Bottom Outlet Only)
____ -VP Vandal Proof Secured Top
____ -10 6 [152] High Parabolic Weir for Sloped Roof (ZC or ZA)

* Regularly furnished unless otherwise specified.

Zurn Industries, LLC | **Specification Drainage Operation**
1801 Pittsburgh Avenue, Erie, PA U.S.A. 16502 · Ph. 855-663-9876, Fax 814-454-7929
In Canada | **Zurn Industries Limited**
3544 Nashua Drive, Mississauga, Ontario L4V 1L2 · Ph. 905-405-8272, Fax 905-405-1292
www.zurn.com

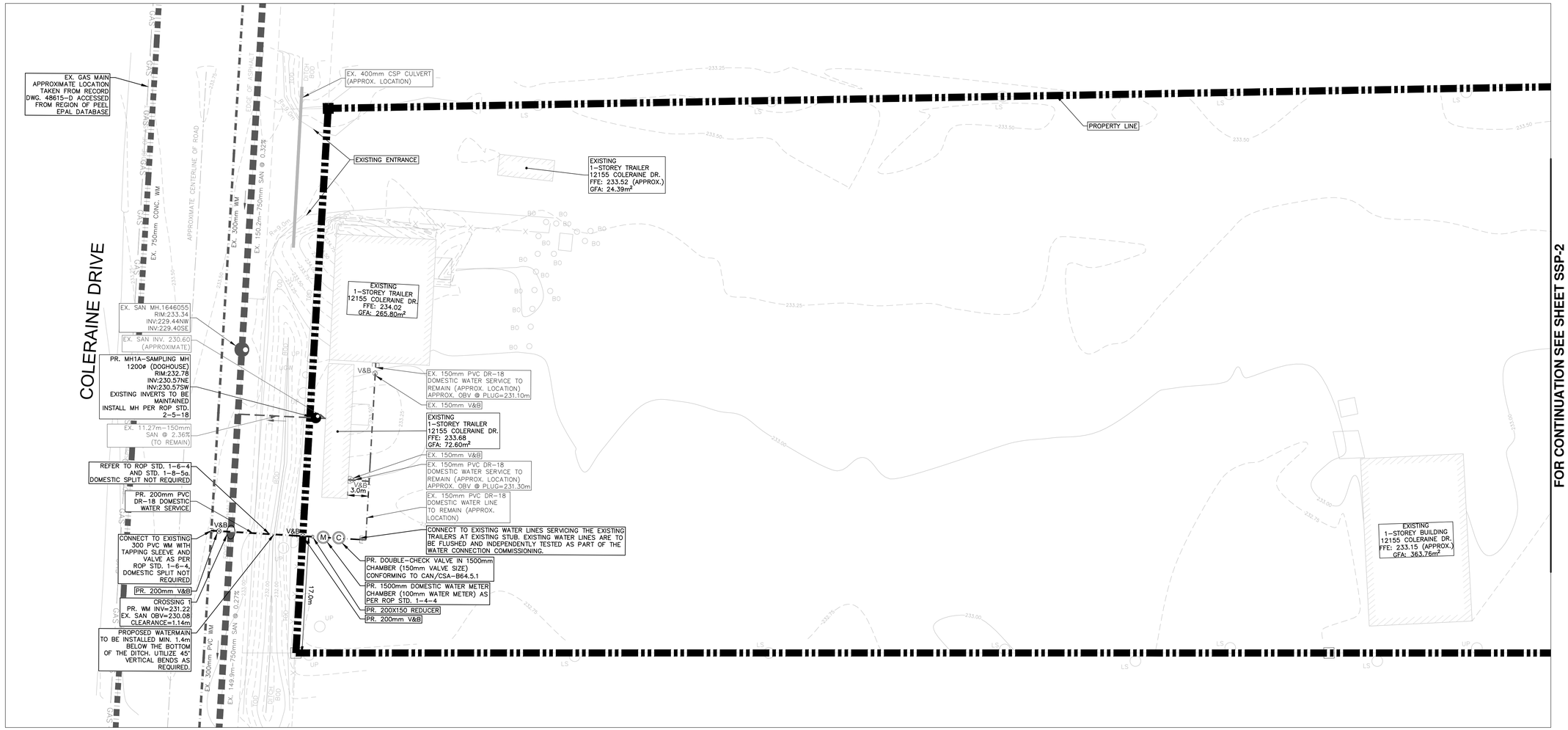
Rev. K
Date: 09/25/17
C.N. No. 137793
Prod. | Dwg. No. Z105

APPENDIX

REGION OF PEEL SITE SERVICING NOTES

1. PUBLIC AND PRIVATE SERVICES, APPURTENANCES, MATERIALS AND CONSTRUCTION METHODS MUST COMPLY WITH THE MOST CURRENT REGION OF PEEL STANDARDS AND SPECIFICATIONS, THE LOCAL MUNICIPALITY'S REQUIREMENTS FOR THE ONTARIO BUILDING CODE AND ONTARIO PROVINCIAL STANDARDS. ALL WORKS SHALL ADHERE TO ALL APPLICABLE LEGISLATION, INCLUDING REGIONAL BYLAWS.
2. WATERMAIN AND / OR WATER SERVICE MATERIALS 100 MM (4") AND LARGER MUST BE DR-18 P.V.C PIPE MANUFACTURED TO A.W.W.A SPEC. C900-16 SPEC. COMPLETE WITH TRACER WIRE. SIZE 50MM (2") AND SMALLER MUST BE POLYETHYLENE CONSTRUCTED AS PER AWWA C901 AND CSA B.137.1O
3. WATERMAINS AND / OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7 M (5'6") WITH A MINIMUM HORIZONTAL SPACING OF 1.2 M (4') FROM THEMSELVES AND ALL OTHER UTILITIES.
4. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED WITH AT LEAST A 50 MM (2") OUTLET ON 100 MM (4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100 MM (4") DIAMETER MINIMUM ON A HYDRANT.
5. ALL CURB STOPS TO BE 3.0 M (10') OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED.
6. HYDRANT AND VALVE SET TO REGION STANDARD 1 – 6 – 1 DIMENSION A AND B, 0.7 M (2') AND 0.9 M (3') AND TO HAVE PUMPER NOZZLE.
7. WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED SITE PLAN. COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
8. WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARANCE OF 0.3 M (12") OVER / 0.5 M (20") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
9. ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING LINES TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
10. ALL LIVE TAPPING, AND OPERATION OF REGION WATER VALVES SHALL BE ARRANGED THROUGH THE REGIONAL INSPECTOR ASSIGNED OR BY CONTACTING THE OPERATIONS AND MAINTENANCE DIVISION.
11. LOCATION OF ALL EXISTING UTILITIES IN THE FIELD TO BE ESTABLISHED BY THE CONTRACTOR.
12. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING OF ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
13. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES PRIOR TO CROSSING SUCH UTILITIES, FOR THE PURPOSE OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF THE CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.
14. ALL PROPOSED WATER PIPING MUST BE ISOLATED THROUGH A TEMPORARY CONNECTION THAT SHALL INCLUDE AN APPROPRIATE CROSS-CONNECTION CONTROL DEVICE, CONSISTENT WITH THE DEGREE OF HAZARD, FOR BACKFLOW PREVENTION OF THE ACTIVE DISTRIBUTION SYSTEM, CONFORMING TO REGION OF PEEL STANDARDS 1-7-7 OR 1-7-8.
15. ALL WATER METERS MUST BE INSTALLED IN A HEATED AND ACCESSIBLE SPACE.
16. PROPOSALS TO CONNECT TO AN EXISTING SERVICE LATERAL REQUIRES APPROVAL FROM THE REGION OF PEEL INSPECTOR AT CONSTRUCTION STAGE.

KEY PLAN
N.T.S.



FOR CONTINUATION SEE SHEET SSP-2

LEGEND

EXISTING	PROPOSED	
MH1		STORM MANHOLE
MH1A		SANITARY MANHOLE
CB		SINGLE CATCHBASIN
	M	WATER METER IN CHAMBER
	C	DETECTOR CHECK VALVE
	VB	VALVE & BOX
		STORM SEWER
		SANITARY SEWER
		WATERMAIN
		LIMIT OF SUBJECT PROPERTY
		EASEMENT
-X-X-	-X-	CHAINLINK FENCE LINE
		BUILDING
		MAJOR CONTOUR LABEL
		MINOR CONTOUR LABEL
×265.22EX		ELEVATION
		WEST RAINBOW CREEK TRIBUTARY
		SIMPSON ROAD EXTENSION EASEMENT

NOTES
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION, AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER
3. ALL WORK SHALL BE IN ACCORDANCE WITH CURRENT REGION OF PEEL STANDARD SPECIFICATIONS AND DRAWINGS UNLESS OTHERWISE NOTED HEREIN.
4. ORDER OF PRECEDENCE OF STANDARDS DRAWINGS IS FIRSTLY REGION OF PEEL, AND SECONDLY ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD).

BENCHMARK

BENCHMARK NO. 00819758057
ELEVATION=251.929 (DATUM COVD 1928:1978)
RED BRICK BUILDING (ELLWOOD MEMORIAL PUBLIC SCHOOL) ON EAST SIDE OF HWY 50, 0.8 KM SOUTH OF JCT OF HWY 50 AND KING ST IN THE TOWN OF CALEDON (BOLTON), 55.2 M NORTH OF ELLWOOD DR AND 104 M EAST OF CENTRELINE OF HWY 50. TABLET IS SET HORIZONTALLY IN WEST FACE OF CONCRETE FOUNDATION OF GYMNASIUM, 1.7 M NORTH OF S.W. CORNER AND 12 CM BELOW BRICKWORK.

SURVEY SOURCE:
ASHENHURST NOUWENS & ASSOCIATES INC.
225 KING WILLIAM STREET, SUITE 204, HAMILTON, ONTARIO L8R 1B1
(905) 529 6316
COMPLETED IN SEPTEMBER, 2022

NO.	REVISION	DATE	BY	APPROVED
01	ISSUED FOR FIRST SUBMISSION	2024/07/19	R.W.B.	
02	ISSUED FOR SECOND SUBMISSION	2024/08/02	R.W.B.	
03	RE-ISSUED FOR SECOND SUBMISSION	2024/08/26	R.W.B.	

NOTE:
1. THE SOURCE OF THE UTILITY INFORMATION IS RECORD DRAWINGS OBTAINED FROM THE REGION OF PEEL EPAL DATABASE. THESE INCLUDE: 05448-D, 05449-D, 05450-D, 05451-D, 29063-D, 29064-D, 29685-D, 48614-D, 48615-D, 48616-D, CF-424580.
2. LOCATIONS AND SIZES OF WATER SERVICE CONNECTIONS ARE TO BE CONFIRMED BY MECHANICAL ENGINEER.
3. THE CONTRACTOR IS CAUTIONED THAT ALL EXISTING UTILITIES ARE NOT INDICATED ON THIS DRAWING. THE CONTRACTOR MUST ARRANGE FOR LOCATES FROM EACH UTILITY COMPANY PRIOR TO ANY CONSTRUCTION OR EXCAVATION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES, INCLUDING THOSE NOT INCLUDED ON THIS DRAWING. GRECK AND ASSOCIATES LIMITED CAN NOT ACCEPT RESPONSIBILITY FOR DAMAGE TO ANY EXISTING UTILITY WHICH MAY, OR MAY NOT BE INDICATED ON THIS DRAWING.
4. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING OF ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
5. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES PRIOR TO CROSSING SUCH UTILITIES, FOR THE PURPOSE OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF THE CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.

DRAWING LIST
(GRECK AND ASSOCIATES LTD.)

SSP-1	SITE SERVICING PLAN PART 1
SSP-2	SITE SERVICING PLAN PART 2
SSP-3	SITE SERVICING PLAN PART 3

Greck
5770 Highway 7, Woodbridge, Ontario, L4L 1T8 www.greck.ca

LICENSED PROFESSIONAL ENGINEER
R. R. WARD-BISHUN
100547064
2024-AUG-26
PROVINCE OF ONTARIO

CLIENT NAME:
TRIPLEX INC.
12155 COLERAINE DRIVE, BOLTON, ONTARIO, L7E 3B4

PROJECT NAME:
12155 COLERAINE DRIVE (C601850)
12155 COLERAINE DRIVE, BOLTON, ONTARIO

SITE SERVICING PLAN

DESIGNED BY: S.G.	SCALES:		PROJECT No. 24-1088
CHECKED BY: R.W.B.	HORIZONTAL:	1:300	DRAWING No. SSP-1
DRAWN BY: S.G.	VERTICAL:	N.A.	SHEET No. 01
DATE: AUG 26, 2024	SHEET SIZE:	24"x36"	

Master Environmental Servicing Plan Update

Simpson Road

Caledon, Ontario

Submitted to:
Simpson Road Landowners Group Inc.
7501 Keele Street,
Vaughan, ON L4K 1Y2

Submitted by:
GEI Consultants Canada Ltd.
75 Tiverton Court, Unit 100
Markham, ON
L3R 4M8

June 2024
Project 2301130

Issues and Revisions Registry

Identification	Date	Description of Issued and/or Revision
First Submission	June 2024	Issued for Block Plan Submission

5.5 Stormwater Management Alternatives

Based on the Stormwater Management Planning and Design Manual dated March 2003, a hierarchy of stormwater management practices are recommended to be incorporated in SWM plan for a development. The hierarchy is as follows:

5.5.1 Lot Level Controls

Lot level controls refer to those measures that can be implemented at the individual lot levels. Lot level controls are primarily used to provide storage and/or on-site infiltration/filtration. Common lot level controls include the following:

- **Rooftop storage:** Provide storage on rooftops by controlling the flows using roof drains;
- **Ponding Areas (Parking and Backyards):** Provide storage on parking lot and rear yards where feasible by implementing Catchbasin restrictors or orifices in the storm sewer system. At Site Plan Application stage, ponding within parking areas and rooftops of the commercial/industrial lands will be considered for water quantity control.;
- **Downspout Disconnection:** Disconnect rooftop leaders onto grassed ponding areas, soak away pits or rain barrels.
- **Permeable Pavers:** Permeable Pavers can be utilized instead of regular asphalt driveways to reduce the amount of runoff from the lot areas and to promote infiltration. However, they are additional operation and maintenance requirements required to ensure efficiency of the system. Considering this measure is costlier to implement than the other infiltration-based measures on site, this measure should generally be considered if other measures are not applicable to the site.
- **Lot grading and Topsoil Amendments:** Overland flow routes can be maximized, and lot grading can be reduced to increase the runoff time and maximize the infiltration potential.
- **Stormwater Reuse:** Stormwater can be collected and reused within industrial/commercial developments for either irrigation or as 'grey water'. This measure is quite effective at reducing runoff volumes and can utilized to meet the retention requirements on site plan. This measure also requires continued operation and maintenance of the facility.
- **Additional Low Impact Development (LID) Measures**: Additional LID measures such as green roofs, rain gardens, constructed infiltrated basins can be reviewed depending on site soil conditions and development plans.

5.5.2 Conveyance Controls

Conveyance controls refer to the measures that can be implemented to convey from the source point i.e Lot Level to the outlet point (either end of pipe control or outlets). Some of the common recommended conveyance controls **include the following:**

- **Perforated storm sewers and catchbasins**: Infiltration can be promoted by utilizing perforated storm sewer system to enhance infiltration. However, pre-treatment is required to ensure only clean water runoff is infiltrated. Additionally, consideration

should be given to the GWL table and feasibility on site. Operation and Maintenance requirements for such type of a system is also expected to increase.

- **Right of Way LID Measures:** Runoff from the roads can be captured in the catchbasins and can be directed to an adjacent bioswale/tree pits to promote infiltration before discharging to the storm sewer system. This measure replaces the traditional curb and gutter drainage system on the right of ways.

5.5.3 End of Pipe Controls

End of pipe controls represent the downstream measures that can be implemented on site prior to discharge to the outlet location. The following are most commonly used end of pipe controls for both quantity and quality control:

- **Wetponds:** Most commonly used end of pipe system. Effective in providing both quantity and quality control if sized as per MECP Standards. Minimum required tributary area to a pond is 5ha.
- **Dryponds:** Utilized in areas where the main goal is to provide quantity/flood control. Additional treatment methods are required to meet the quality controls. Dry ponds are generally recommended to proposed where in parks or a multipurpose land uses to maximize the space available.
- **Underground Storage Tanks and Superpipes:** Recently, underground storage chambers are becoming the most favored measure to provide quantity control or even quality control especially on-site plans where spacing is restricted. When sized appropriately, the underground storage chambers provide all the required SWM controls and can also accommodate infiltration where feasible. There are multiple underground storage chambers available in the industry and the most efficient and applicable system should be utilized.
- **Oil Grit Separators/Filtration Devices:** Quality control is commonly provided by utilizing Oil grit separators (OGS) devices or filtration systems. Considering only quality control is provided by this measure, additional measures need to be implemented on site to meet the SWM criteria. The efficiency of each of the available devices vary and need to be considered in detailed design to meet the 80% TSS removal.

5.5.4 Recommended SWM Measures

Considering the proposed development on subject sites is mainly commercial/industrial and taking into consideration that the development timeline will vary for each of the different site plans, it is recommended to utilize the following measures to meet SWM control within each of the site plan areas. The final SWM strategy will be established at the detailed design stage.

It is proposed that each of the site plans will provide quantity, quality and erosion control and discharge to the proposed bypass culvert. The following SWM Alternatives are recommended to meet the SWM criteria:

- **Quantity Control**: Roof control, ponding storage and/or underground storage/super pipe storage
- **Quality Control**: Filtration Units, Oil Grit Separators (additional treatment required to achieve 80% TSS control), Green Roofs (if feasible).

- **On-site retention (5mm) for Erosion Control:** Rainwater Harvesting Systems to reuse as grey water or for irrigation, green roofs.

5.6 Flood Control & Conveyance of Runoff

While, in the absence of effective stormwater management controls, there is an anticipated elevation in peak flows downstream from the study area during post-development conditions. To address the potential risk of the downstream flooding, quantity control is proposed within each of the site plan blocks. This infrastructure is designed to exert quantitative control over the flows, ensuring that post-development peak flow rates align with those observed in the pre-development phase. This control mechanism is intended to be effective for all storm events, including 100-year storm.

Adhering to the regulations set forth by the Town of Caledon, it is mandatory for all industrial and commercial developments to incorporate onsite controls, which may involve underground storage, rooftop storage, or parking storage. The allowable discharge rates for each of the catchments are further discussed in sections below and are separated based on the discharge locations.

5.6.1 Catchments Draining to Proposed Box Culvert

Control manholes are proposed to collect the flows from the individual site plans and convey the discharge to the proposed bypass Box culvert. The allowable release rates for each of these site plans were established based on the TRCA Unit flows for Sub-Basin 36. The Allowable Release Rates for each of the catchments are presented in **Table 5.7** below.

Table 5.7: Allowable release rate for catchments draining to proposed box culvert

Catchment ID	Area (ha)	Return Period (cms)					
		2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
C1	1.15	0.011	0.017	0.020	0.026	0.030	0.034
C2.1	1.80	0.016	0.025	0.031	0.039	0.046	0.051
C3.1	2.72	0.024	0.037	0.045	0.057	0.067	0.075
C4	4.09	0.035	0.053	0.066	0.083	0.097	0.109
C5	3.91	0.033	0.051	0.063	0.079	0.093	0.105
C10	2.21	0.020	0.030	0.037	0.047	0.055	0.062
C11	2.02	0.018	0.028	0.034	0.043	0.051	0.057
Total Area	17.9	0.157	0.242	0.296	0.374	0.438	0.493

The maximum required quantity control volume for each of the site plan blocks is presented in **Table 5.8** below. The required volumes were based on the 4hr Chicago design storms which was found to be governing than the 6hr/12hr/24hr AES design storms. Refer to **Appendix D.3** for detailed calculations and VO output.

EX POND

EX POND DISCHARGES TO SITE

3.0m STM EASEMENT

12.6m STM EASEMENT

4m STM EASEMENT

12.6m STM EASEMENT

APPROVED POND

APPROVED CULVERT CROSSING

EX. CULVERT CROSSING

EX POND DISCHARGES TO RAINBOW CREEK

EX. CULVERT CROSSING

COLERAINE DR

MAYFIELD RD

CONCESSION

LOT

C1 1.15ha 0.9

C2.1 1.80ha 0.9

C2.2.1 0.71ha 0.81

C2.2.2 1.26ha 0.81

C3.1 2.72ha 0.9

C3.2.1 0.24ha 0.81

C3.2.2 1.03ha 0.81

C4 4.09ha 0.9

C5 3.91ha 0.9

C6 0.19ha 0.9

C7 0.21ha 0.9

C8 0.23ha 0.9

C9 0.45ha 0.9

C10 2.21ha 0.9

C11 2.02ha 0.9

C12 1.12ha 0.9

R1 1.41ha 0.76

LEGEND:

- PROPERTY LINE
- PROPOSED STORM DRAINAGE AREA BOUNDARY TO BOX CULVERT
- PROPOSED STORM DRAINAGE AREA BOUNDARY TO POND
- PROPOSED STORM DRAINAGE AREA BOUNDARY TO EXISTING STORM SEWER
- PROPOSED OVERLAND FLOW DIRECTION
- EXISTING CULVERT CROSSING

STORM DRAINAGE AREA NUMBER — A1 POST — RUNOFF COEFFICIENT

DRAINAGE AREA IN HECTARES — 0.25ha — 0.50

GEI Consultants

POST-DEVELOPMENT DRAINAGE AREA FIGURE

SIMPSON ROAD MESP UPDATE

SIMPSON ROAD LANDOWNER GROUP

PROJECT No:	2301130
DRAWING No:	5-7
SCALE:	1:1500
DATE:	FEBRUARY 2024

The total area considered in the Equity Prestige Business Park SWMF was 4.67ha (SCE Catchments 203+ 204 +205) which is greater than the sum of R1/ C2.2.1/C2.2.2/C3.2.1/C3.2.2 =4.65ha, therefore no constraints are expected in the downstream pond. Please refer to **Appendix D.5** for additional information.

5.7 Water Quality Control

Enhanced quality controls are required to meet the 80% TSS removal design requirements. The quality control requirements for each of the site plans discharging to the Box culvert and the existing storm sewer system is proposed to be met via onsite quality controls while the proposed Simpson Road ROW extension as well as Catchments C2.2.1/C2.2.2/C3.2.1/C3.2.2 are proposed to drain to the Equity Prestige Business Park SWMF where quality control is provided utilizing the permanent pool volume. The total area draining to the SWMF from the subject lands as well as the ROW extension remained the same or it is lower, therefore no additional measures are required on these site plans.

On-site control for the site plans can include either infiltration/filtration based Low Impact Development Measures or manufactured filtration (such as Jellyfish Filter units) or oil/grit separator devices (OGS's). It's worth highlighting the variability in performance levels among different oil/grit separators (OGS); some can meet the water quality criteria of achieving an 80% removal of suspended solids, while others may fall short of this criterion. Conservation authorities generally assign only 50% credit to OGS devices, therefore additional measures are required in addition to the OGS to meet the 80% TSS removal. On contrary, filtration devices such as a Jellyfish Filter (JF) units are assigned 80% TSS removal, therefore, there are currently considered as most preferred option for site plans.

However, the choice of quality control measures should be tailored at the detailed design stage to the specific characteristics and requirements of the site plan, considering both efficacy and feasibility. The sizing for the proposed treatment measures will be completed at the site plan stage when additional details are available.

5.8 Erosion Control

As detailed in the preceding section, a slight alteration in imperviousness, approximately 5%, has been discussed, and this change is not anticipated to result in a substantial increase in erosion.

Where feasible, it is proposed to retain the first 5mm from the impervious areas of all events on-site for each of the site plan areas draining directly to the box culvert or the existing storm sewer system. The site plans draining to the SWM pond are not required to provide onsite control as the downstream SWM facility provides the required erosion control. The required 5mm retention volumes for each of the catchment areas are presented in **Table 5.12** below based on the assumptions that the site plans are 100% impervious.

6.2.1 Part 1: PT LT 1 CON 6 ALBION – (Participating Landowners)

Part 1 is split into two locations and will require two separate connections with Simpson Road extension running through it. All connections will connect into Simpson Roads infrastructure. The storm service will be a min. 250mm diameter @ 2.0% and connect into the approved 600mm diameter storm sewer. The sanitary sewer will be a min. 200mm diameter @ 2.0% and connect into the approved 250mm diameter sanitary sewer. The watermain will be min. 200mm diameter and connect into the approved 300mm watermain. The site access will front Simpson Road with two (2) required accesses.

6.2.2 Part 2: 12155 Coleraine Drive – (Participating Landowners)

Part 2 is split into two locations and will require two separate connections with Simpson Road extension running through it. All connections will connect into Simpson Roads infrastructure. The storm service will be a min. 250mm diameter @ 2.0% and connect into the approved 600mm diameter storm sewer. The sanitary sewer will be a min. 200mm diameter @ 2.0% and connect into the approved 250mm diameter sanitary sewer. The watermain will be min. 200mm diameter and connect into the approved 300mm watermain. Part 2A site access will front Coleraine Drive and Part 2B site access will front Simpson Road.

6.2.3 Part 3: PT LT 1 CON 6 ALBION – (Participating Landowners)

All Part 3 connections will connect into Simpson Roads infrastructure. The storm service will be a min. 250mm diameter @ 2.0% and connect into the approved 1050mm diameter storm sewer. The sanitary sewer will be a min. 200mm diameter @ 2.0% and connect into the approved 250mm diameter. The watermain will be min. 200mm diameter and connect into the approved 300mm watermain The site access will front Simpson Road.

6.2.4 0 Coleraine Drive – (Participating Landowners)

All Part 4 connections will connect into Simpson Roads infrastructure. The storm service will be a min. 250mm diameter @ 2.0% and connect into the approved 1200mm diameter storm sewer. The sanitary sewer will be a min. 200mm diameter @ 2.0% and connect into the approved 250mm diameter. The watermain will be min. 200mm diameter and connect into the approved 300mm watermain. The site access will front Coleraine Drive.

6.2.5 Part 5: 8602 Mayfield Road – (Participating Landowners)

All Part 5 connections will connect into Simpson Roads infrastructure. The storm service will be a min. 250mm diameter @ 2.0% and connect into the approved 1800x900mm storm sewer. The sanitary sewer will be a min. 200mm diameter @ 2.0% and connect into the approved 250mm diameter sanitary sewer. The watermain will be min. 200mm diameter and connect into the approved 300mm watermain. The site access will front both Simpson Road and Mayfield Road.

Revised Report on
Geotechnical Investigation
Proposed Industrial Development
12071 & 12155 Coleraine Drive
Bolton, Ontario

Prepared For:

Wheelwright Group Inc.

Project No: 24-317-100
Date: April 17, 2025

DS CONSULTANTS LTD.
6221 Highway 7, Unit 16
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Atterberg Limits test of the same five (5) soil samples from silty clay till ((BH24-1/SS4, BH24-4/SS4, BH24-10/SS4, BH24-18/SS3, and BH24-21/SS3) were conducted and the results are presented on respective borehole logs and on Drawing 25, as summarized below:

Liquid Limit: 33 to 35 %

Plastic Limit: 14 to 15 %

Plastic Index: 18 to 20

Cohesionless Deposits of Sandy Silt to Silty Sand:

Below the upper silty clay till deposits, cohesionless sandy soils of sandy silt to silty sand deposits were encountered in BH24-1, BH24-8, BH24-13, BH24-14, BH24-18 and BH24-19 below depths ranging from 5.8m to 7.3m and extended to the maximum explored depths of these boreholes, ie 7.9 to 8.2m. The cohesionless sandy soils were generally wet and present in a compact to dense state, as indicated with the measured SPT 'N' values ranging from 18 to over 50 blows per 300 mm of spoon penetration.

3.2 Groundwater Conditions

During drilling, short-term (unstabilized) groundwater table was found in some boreholes at depths of 4m to 6m below the existing grade. Perched water within the fill materials was also found in some boreholes during drilling. Groundwater levels measured in the monitoring wells installed at three (3) borehole locations (BH24-1, BH24-8 and BH24-13) were at depths of 1.8 to 4.3m below the existing grade, corresponding to Elevation 228.4 to 230.8 m, as listed on Table 1:

Table 1: Groundwater Levels Observed in Monitoring Wells

Monitoring Well No.	Ground Surface Elevation (m)	Date of Observation	Groundwater Depth (mbgs)	Elevation of Groundwater (m)
BH24-1	233.5	Aug. 30, 2024	2.7	230.8
BH24-8	232.7	Aug. 30, 2024	4.3	228.4
BH24-13	232.1	Aug. 30, 2024	1.8	230.3

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events. Further monitoring of groundwater levels in the monitoring wells is recommended.

J:\2024 Projects\24-317-100 Geo - Truck maintenance facilities, 12125-12155 Coleraine Drive, Bolton, ON\Geotechnical\QGIS\1-QGIS\Drawing 1 Borehole Location Plan.qgs Sep-03

Legend

- Approx Site Boundary
- Borehole
- Monitoring Well

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Client: WHEELWRIGHT GROUP INC.

Project: GEOTECHNICAL INVESTIGATION
12071-12155 Coleraine Drive, Bolton, ON

Title: **BOREHOLE LOCATION PLAN**

N

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	A.S	K.T	September 2024
Rev: 0	Scale: As Shown	Project No.: 24-317-100	Drawing No.: 1

Image/Map Source: *Google Satellite Image*

DS CONSULTANTS LTD.
Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH24-8

PROJECT: Geotechnical Investigation
CLIENT: Wheelwright Group Inc.
PROJECT LOCATION: 12071-12155 Coleraine Drive, Bolton, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4855486.897 E 603999.233

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Aug/20/2024

REF. NO.: 24-317-100
ENCL NO.: 9

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
232.7							
0.0	**FILL:** recycled asphalt, dark grey, moist, very dense		1	SS	65		
231.9							232
0.8	**SILTY CLAY TILL:** some sand, occasional cobble / boulder, trace gravel, brown, moist, very stiff to hard		2	SS	15		
			3	SS	18		231
			4	SS	18		230
			5	SS	37		229
	brownish grey at 4.6m		6	SS	23	W. L. 228.4 m Aug 30, 2024	228
	grey, sand seams below 6.1m		7	SS	15		227
225.4							226
7.3	**SILTY SAND:** trace clay, trace gravel, brown, wet, dense		8	SS	31		225
224.5							
8.2	**END OF BOREHOLE**						

Notes:
1) 50mm dia. monitoring well (MW) was installed upon completion.
2) Water level Readings:

Date:	W.L. Depth (mbgs):
August 30, 2024	4.3

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	3.600	23.700
Flush-Flo™	0.766	20.377
Kick-Flo®	1.576	15.974
Mean Flow		19.001

This Hydro-Brake® Optimum includes:

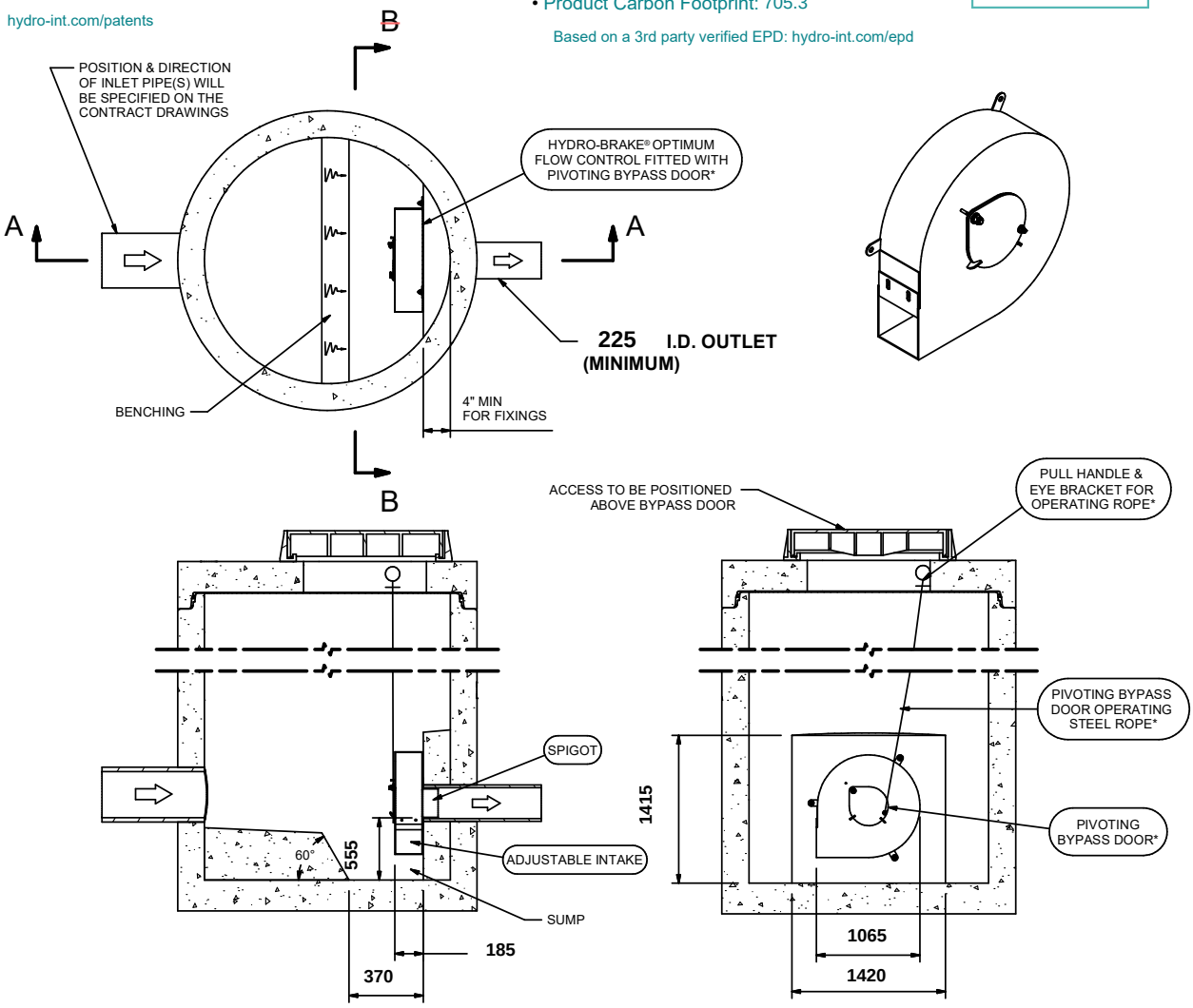
- All in 8 mm Grade 304L stainless steel
- Integral pivoting by-pass door allowing clear line of sight through to outlet, c/w operating rope
- Media blasted for corrosion resistance
- Variable flow rate post installation via adjustable inlet (if necessary)
- Indicative Weight: 160 kg
- Product Carbon Footprint: 705.3

Based on a 3rd party verified EPD: hydro-int.com/epd

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

wrc approved PT/503/0422 Valid: 01/04/2022 - 31/03/2027

hydro-int.com/patents



SECTION A-A

SECTION B-B

IMPORTANT: ⬭ LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® IS A REGISTERED TRADEMARK FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE

The head/flow characteristics of this SHE-0176-2370-3600-2370 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International — A CRH COMPANY

DATE	6/12/2025 3:20 PM
SITE	12155 Coleraine Drive
DESIGNER	**Ryan Adams**
REF	**MH#3**

SHE-0176-2370-3600-2370

Hydro-Brake® Optimum

ryan@amcai.com

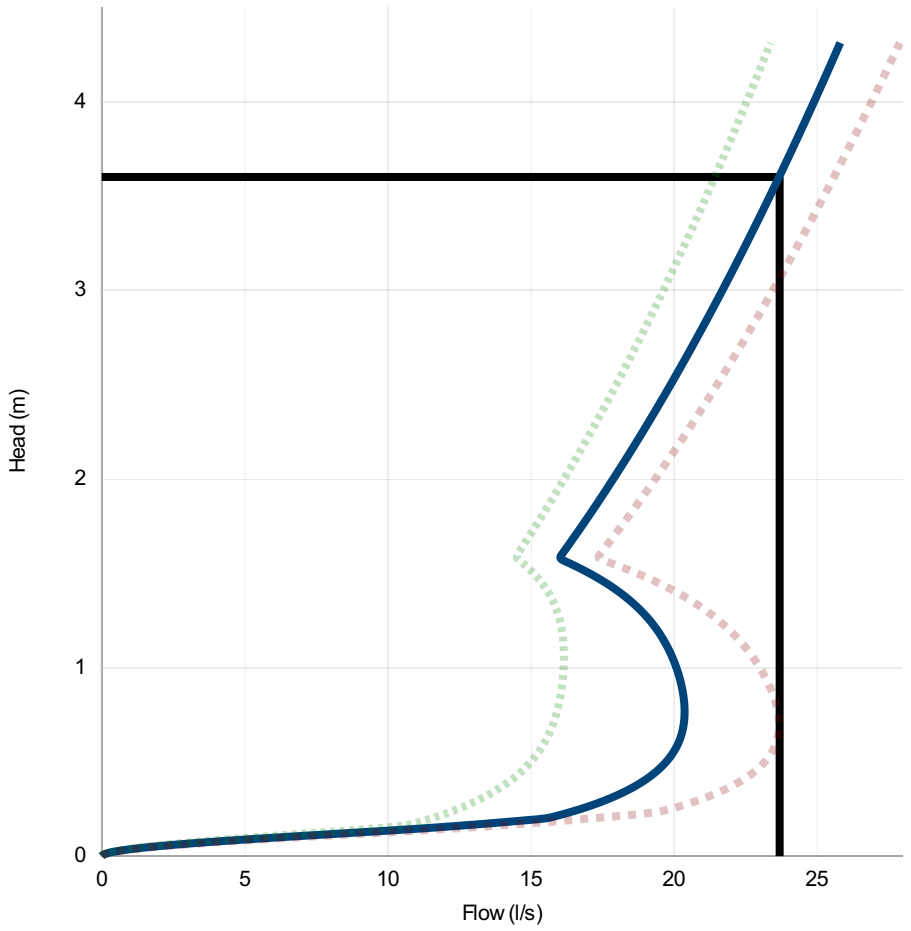
Technical Specification

	Original Setting		Minimum Setting		Maximum Setting	
Control Point	**Head (m)**	**Flow (l/s)**	**Head (m)**	**Flow (l/s)**	**Head (m)**	**Flow (l/s)**
Primary Design	3.600	23.700	3.600	21.435	3.600	25.596
Flush-Flo™	0.766	20.377	1.056	16.158	0.696	23.681
Kick-Flo®	1.576	15.974	1.582	14.457	1.578	17.301
Mean Flow		19.001		16.398		21.044

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

wrc approved™
PT/503/0422
Valid: 01/04/2022 - 31/03/2027

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.124	8.833
0.248	16.711
0.372	18.666
0.497	19.715
0.621	20.216
0.745	20.374
0.869	20.315
0.993	20.103
1.117	19.748
1.241	19.204
1.366	18.383
1.490	17.162
1.614	16.154
1.738	16.732
1.862	17.289
1.986	17.828
2.110	18.349
2.234	18.856
2.359	19.348
2.483	19.827
2.607	20.294
2.731	20.749
2.855	21.194
2.979	21.630
3.103	22.056
3.228	22.474
3.352	22.883
3.476	23.285
3.600	23.680

DESIGN ADVICE

The head/flow characteristics of this SHE-0176-2370-3600-2370 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modeling evaluates the full head/flow characteristic curve.

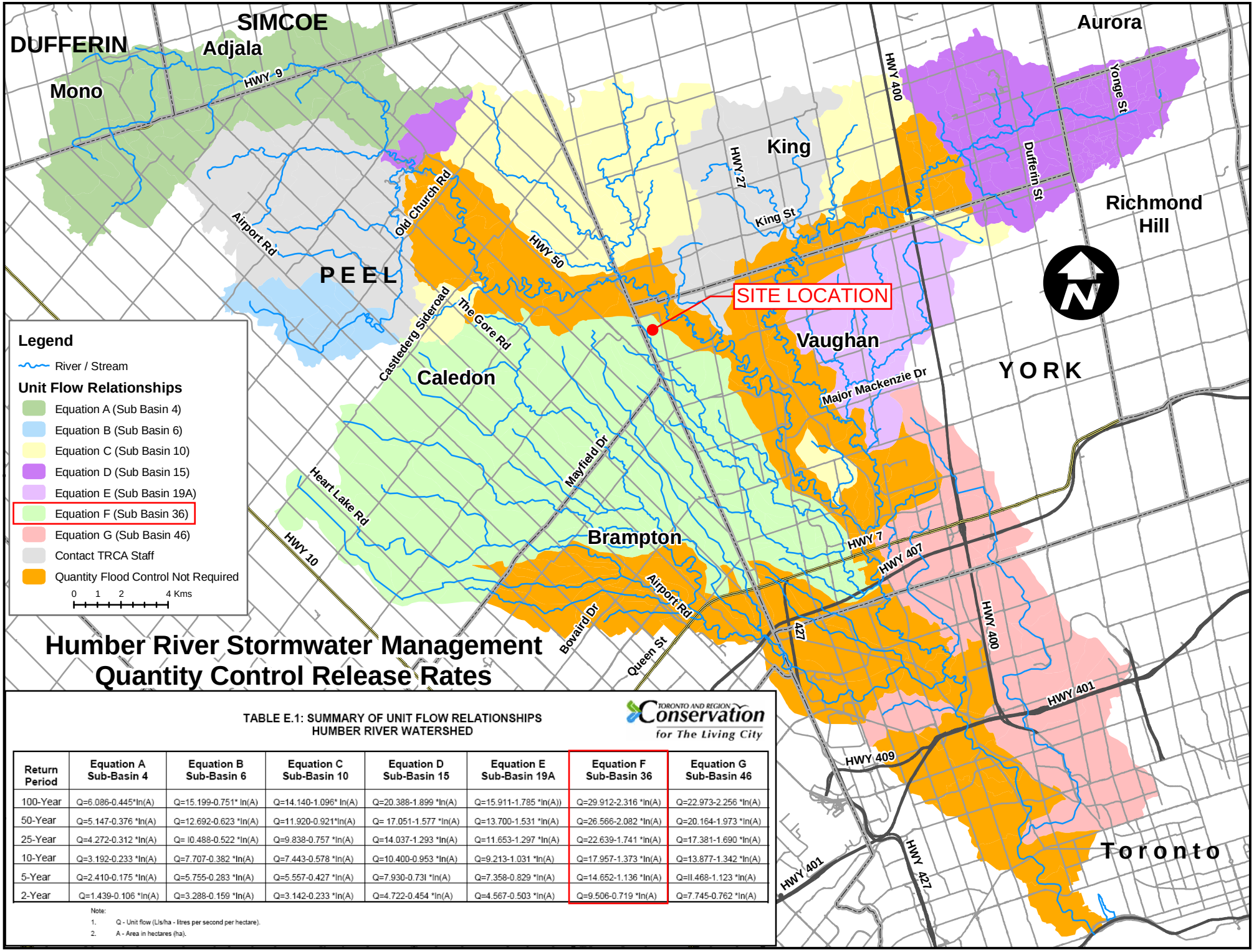
! **The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

Hydro International
A CRH COMPANY

DATE	6/12/2025 3:20 PM
Site	12155 Coleraine Drive
DESIGNER	Ryan Adams
Ref	MH#3

SHE-0176-2370-3600-2370

Hydro-Brake® Optimum



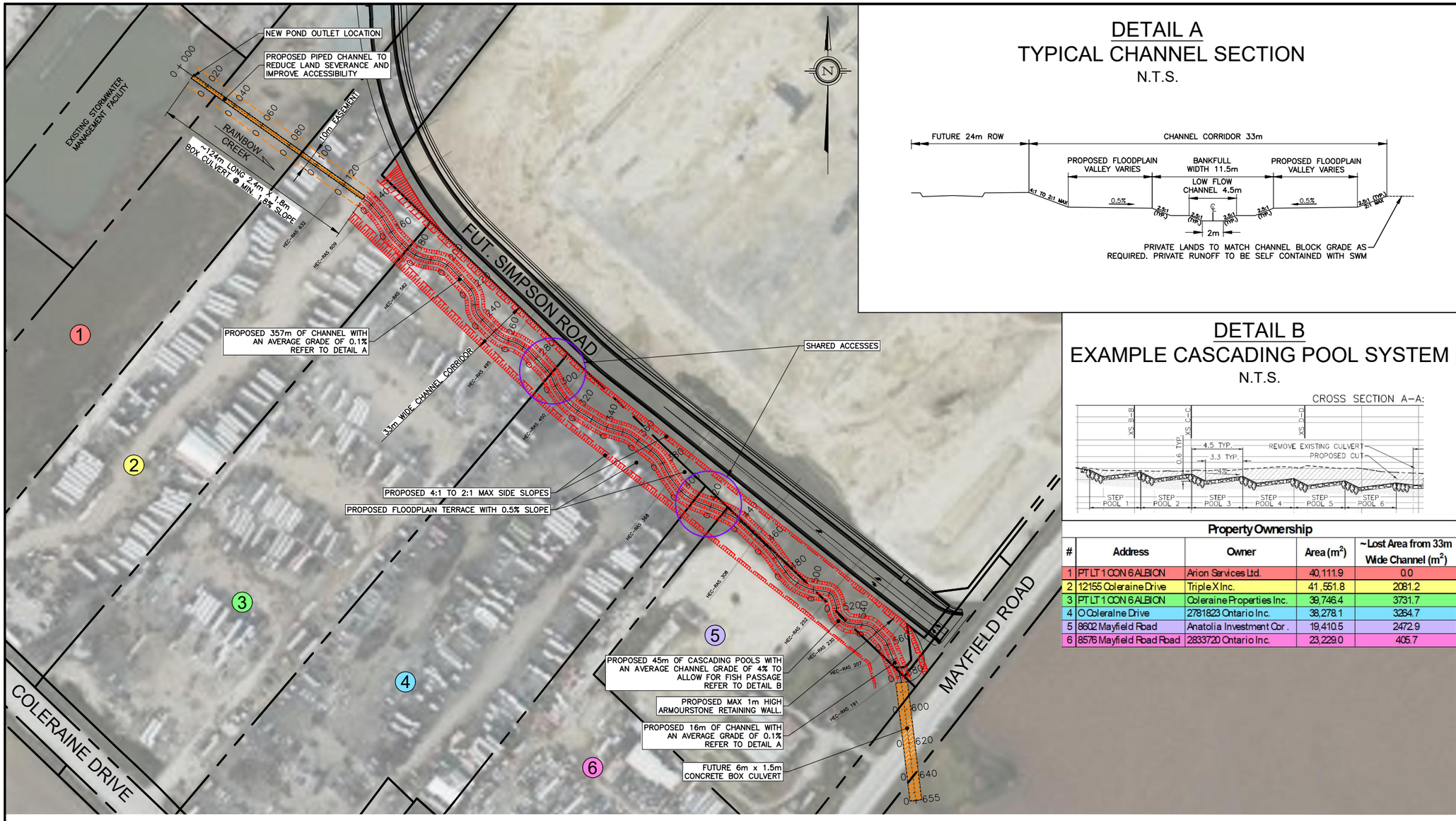
Humber River Stormwater Management Quantity Control Release Rates

TABLE E.1: SUMMARY OF UNIT FLOW RELATIONSHIPS
HUMBER RIVER WATERSHED

Toronto and Region Conservation for The Living City

Return Period	Equation A Sub-Basin 4	Equation B Sub-Basin 6	Equation C Sub-Basin 10	Equation D Sub-Basin 15	Equation E Sub-Basin 19A	Equation F Sub-Basin 36	Equation G Sub-Basin 46
100-Year	Q=6.086-0.445*ln(A)	Q=15.199-0.751* ln(A)	Q=14.140-1.096* ln(A)	Q=20.388-1.899 *ln(A)	Q=15.911-1.785 *ln(A))	Q=29.912-2.316 *ln(A)	Q=22.973-2.256 *ln(A)
50-Year	Q=5.147-0.376 *ln(A)	Q=12.692-0.623 *ln(A)	Q=11.920-0.921*ln(A)	Q= 17.051-1.577 *ln(A)	Q=13.700-1.531 *ln(A)	Q=26.566-2.082 *ln(A)	Q=20.164-1.973 *ln(A)
25-Year	Q=4.272-0.312 *ln(A)	Q= I0.488-0.522 *ln(A)	Q=9.838-0.757 *ln(A)	Q=14.037-1.293 *ln(A)	Q=11.653-1.297 *ln(A)	Q=22.639-1.741 *ln(A)	Q=17.381-1.690 *ln(A)
10-Year	Q=3.192-0.233 *ln(A)	Q=7.707-0.382 *ln(A)	Q=7.443-0.578 *ln(A)	Q=10.400-0.953 *ln(A)	Q=9.213-1.031 *ln(A)	Q=17.957-1.373 *ln(A)	Q=13.877-1.342 *ln(A)
5-Year	Q=2.410-0.175 *ln(A)	Q=5.755-0.283 *ln(A)	Q=5.557-0.427 *ln(A)	Q=7.930-0.73l *ln(A)	Q=7.358-0.829 *ln(A)	Q=14.652-1.136 *ln(A)	Q=II.468-1.123 *ln(A)
2-Year	Q=1.439-0.106 *ln(A)	Q=3.288-0.159 *ln(A)	Q=3.142-0.233 *ln(A)	Q=4.722-0.454 *ln(A)	Q=4.567-0.503 *ln(A)	Q=9.506-0.719 *ln(A)	Q=7.745-0.762 *ln(A)

Note:
1. Q - Unit flow (Lls/ha - litres per second per hectare).
2. A - Area in hectares (ha).

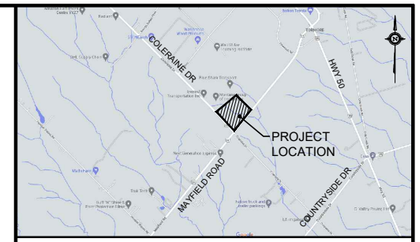


DETAIL A
TYPICAL CHANNEL SECTION
N.T.S.

DETAIL B
EXAMPLE CASCADING POOL SYSTEM
N.T.S.

Property Ownership

#	Address	Owner	Area (m^2)	~Lost Area from 33m Wide Channel (m^2)
1	PT LT 1 CON 6 ALBION	Arion Services Ltd.	40,111.9	0.0
2	12155 Coleraine Drive	Triple X Inc.	41,551.8	2081.2
3	PT LT 1 CON 6 ALBION	Coleraine Properties Inc.	39,746.4	3731.7
4	0 Coleraine Drive	2781823 Ontario Inc.	38,278.1	3264.7
5	8602 Mayfield Road	Anatolia Investment Cor.	19,410.5	2472.9
6	8576 Mayfield Road Road	2833720 Ontario Inc.	23,229.0	405.7

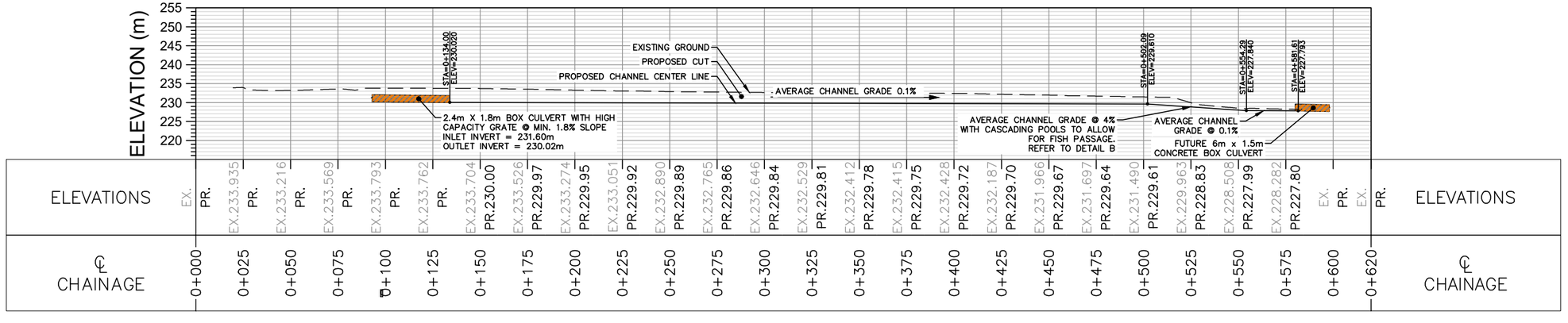


KEY PLAN
N.T.S.

LEGEND

EXISTING	PROPOSED
	PROPERTY LINE
	RAINBOW CREEK
	TOP OF SLOPE
	BOTTOM OF SLOPE
	CHANNEL CENTRE LINE
	HEC-RAS CROSS SECTION
	CULVERT
	CULVERT EASEMENT

PROPOSED CHANNEL CENTER LINE



NOTES
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

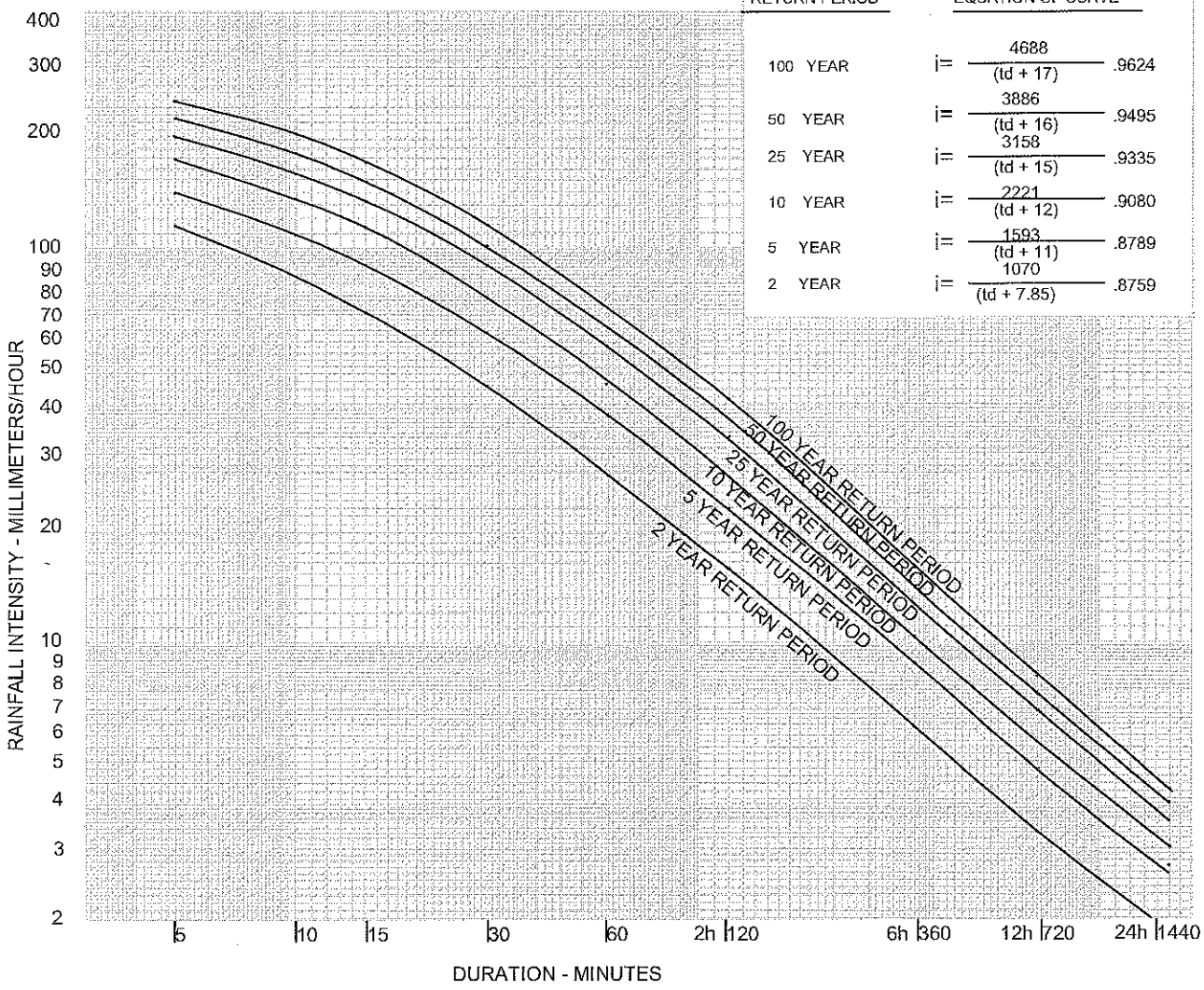
Greck
5770 Highway 7, Woodbridge, Ontario, L4L 1T8 www.greck.ca

CLIENT NAME:
ANATOLIA CAPITAL CORP
8300 HUNTINGTON ROAD
VAUGHAN, ON

PROJECT NAME:
RIANBOW CREEK CHANNEL RE-ALIGNMENT

CASCADING POOL CHANNEL DESIGN WITH ARMOURSTONE RETAINING WALLS

DESIGNED BY:	J.C.	SCALES:		PROJECT No.	20-717
CHECKED BY:	E.G.	HORIZONTAL:	1:2500	DRAWING No.	C1
DRAWN BY:	P.G.	VERTICAL:		SHEET No.	
DATE:	APRIL 2025	SHEET SIZE:	24"x36"		



RETURN PERIOD	EQUATION OF CURVE	
100 YEAR	$i = \frac{4688}{(td + 17)}$	.9624
50 YEAR	$i = \frac{3886}{(td + 16)}$	.9495
25 YEAR	$i = \frac{3158}{(td + 15)}$	.9335
10 YEAR	$i = \frac{2221}{(td + 12)}$	.9080
5 YEAR	$i = \frac{1593}{(td + 11)}$	.8789
2 YEAR	$i = \frac{1070}{(td + 7.85)}$	.8759

INLET TIMES

SUBURBAN RESIDENTIAL	
(ROOF DRAINS UNCONNECTED)	15 min
(ROOF DRAINS CONNECTED)	10 min
SUBURBAN, COMMERCIAL, INDUSTRIAL MULTIPLE FAMILY	10 min
DOWNTOWN COMMERCIAL, HIGH DENSITY APARTMENTS, EXPRESSWAYS	5 min

RUNOFF COEFFICIENT

COMMERCIAL	
- DOWNTOWN & SUBURBAN SHOPPING	0.90
INDUSTRIAL	
- DOWNTOWN	0.90
- SUBURBAN INDUSTRIAL PARKS	0.75
RESIDENTIAL	
- APARTMENTS	0.75
- ROW DWELLINGS	0.70
- DUPLEX DWELLINGS	0.70
- SEMIDETACHED - DOWNTOWN	0.60
- SINGLE FAMILY - DOWNTOWN	0.60
- SEMIDETACHED - SUBURBAN	0.50
- SINGLE FAMILY - SUBURBAN	0.40
SCHOOLS, CHURCHES, HOSPITALS	0.75
PARKS, CEMETERIES, RAIL YARDS	
(OVER 4 Ha)	0.20
(UNDER 4 Ha)	0.25

TOWN OF CALEDON

RAINFALL INTENSITY CURVES

NO.	REVISION	APR'D	DATE
1	STANDARD 112.01 NOW 104		JUNE 08

APR'D: C.C. DATE: FEB 2000

DRAWN: BJM SCALE: N.T.S.

STANDARD No. 104

001:0013---
****
*100yr STORM, 24HR HYETOGRAPH
****

| CHICAGO STORM |
| Ptotal=101.55 mm |

IDF curve parameters: A=4688.000
B= 17.000
C= .962
used in: INTENSITY = A / (t + B)^C

Duration of storm = 24.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	.213	6.17	1.460	12.17	1.177	18.17	.358
.33	.218	6.33	1.682	12.33	1.113	18.33	.350
.50	.224	6.50	1.969	12.50	1.056	18.50	.343
.67	.230	6.67	2.354	12.67	1.004	18.67	.337
.83	.237	6.83	2.890	12.83	.956	18.83	.330
1.00	.243	7.00	3.671	13.00	.912	19.00	.324
1.17	.251	7.17	4.889	13.17	.871	19.17	.318
1.33	.258	7.33	6.967	13.33	.834	19.33	.312
1.50	.266	7.50	11.031	13.50	.800	19.50	.307
1.67	.275	7.67	21.055	13.67	.768	19.67	.301
1.83	.284	7.83	62.153	13.83	.738	19.83	.296
2.00	.294	8.00	196.536	14.00	.711	20.00	.291
2.17	.304	8.17	83.078	14.17	.685	20.17	.286
2.33	.315	8.33	41.228	14.33	.661	20.33	.282
2.50	.327	8.50	25.060	14.50	.638	20.50	.277
2.67	.340	8.67	17.051	14.67	.617	20.67	.273
2.83	.354	8.83	12.471	14.83	.597	20.83	.268
3.00	.369	9.00	9.590	15.00	.578	21.00	.264
3.17	.385	9.17	7.653	15.17	.561	21.17	.260
3.33	.403	9.33	6.282	15.33	.544	21.33	.256

3.50	.422	9.50	5.273	15.50	.528	21.50	.252
3.67	.443	9.67	4.506	15.67	.513	21.67	.249
3.83	.467	9.83	3.909	15.83	.499	21.83	.245
4.00	.492	10.00	3.434	16.00	.485	22.00	.242
4.17	.521	10.17	3.048	16.17	.473	22.17	.238
4.33	.552	10.33	2.731	16.33	.460	22.33	.235
4.50	.588	10.50	2.466	16.50	.449	22.50	.232
4.67	.627	10.67	2.242	16.67	.438	22.67	.229
4.83	.673	10.83	2.051	16.83	.427	22.83	.226
5.00	.724	11.00	1.887	17.00	.417	23.00	.223
5.17	.784	11.17	1.744	17.17	.407	23.17	.220
5.33	.853	11.33	1.619	17.33	.398	23.33	.217
5.50	.934	11.50	1.509	17.50	.389	23.50	.214
5.67	1.030	11.67	1.412	17.67	.381	23.67	.211
5.83	1.145	11.83	1.325	17.83	.373	23.83	.209
6.00	1.286	12.00	1.247	18.00	.365	24.00	.206

001:0014

FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2021-09-10 at 10:25:16

Stormceptor®

Rinker MATERIALS™

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

06/11/2025

Province:	Ontario
City:	Caledon
Nearest Rainfall Station:	TORONTO CITY
Climate Station Id:	6158355
Years of Rainfall Data:	20

Site Name:	12155 Coleraine Drive

Drainage Area (ha):	2.48
% Imperviousness:	92.00

Runoff Coefficient 'c': 0.85

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	68.27
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	2404
Estimated Average Annual Sediment Volume (L/yr):	1955

Project Name:	12155 Coleraine Drive
Project Number:	2417
Designer Name:	Ryan Adams
Designer Company:	A.M.Candaras Inc.
Designer Email:	ryan@amcai.com
Designer Phone:	905-850-8020
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	57
EFO5	66
EFO6	73
EFO8	82
EFO10	87
EFO12	91

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 82

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

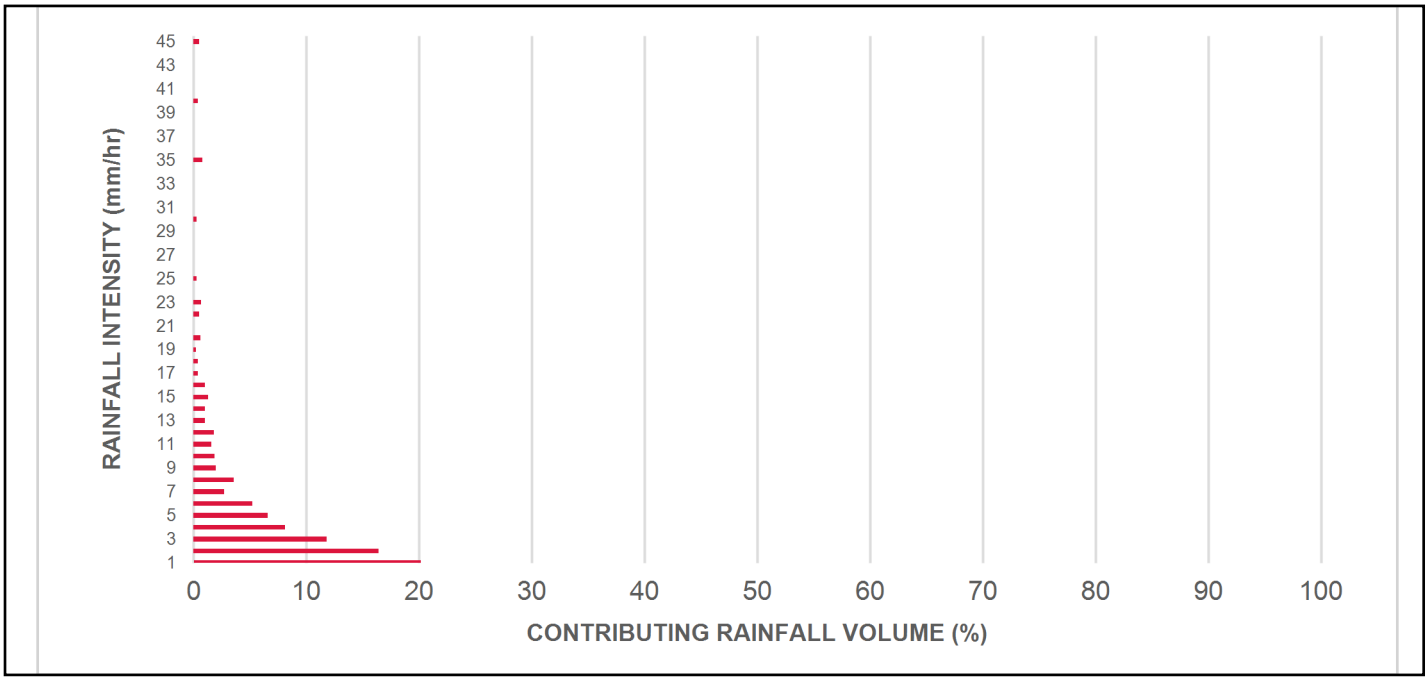
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

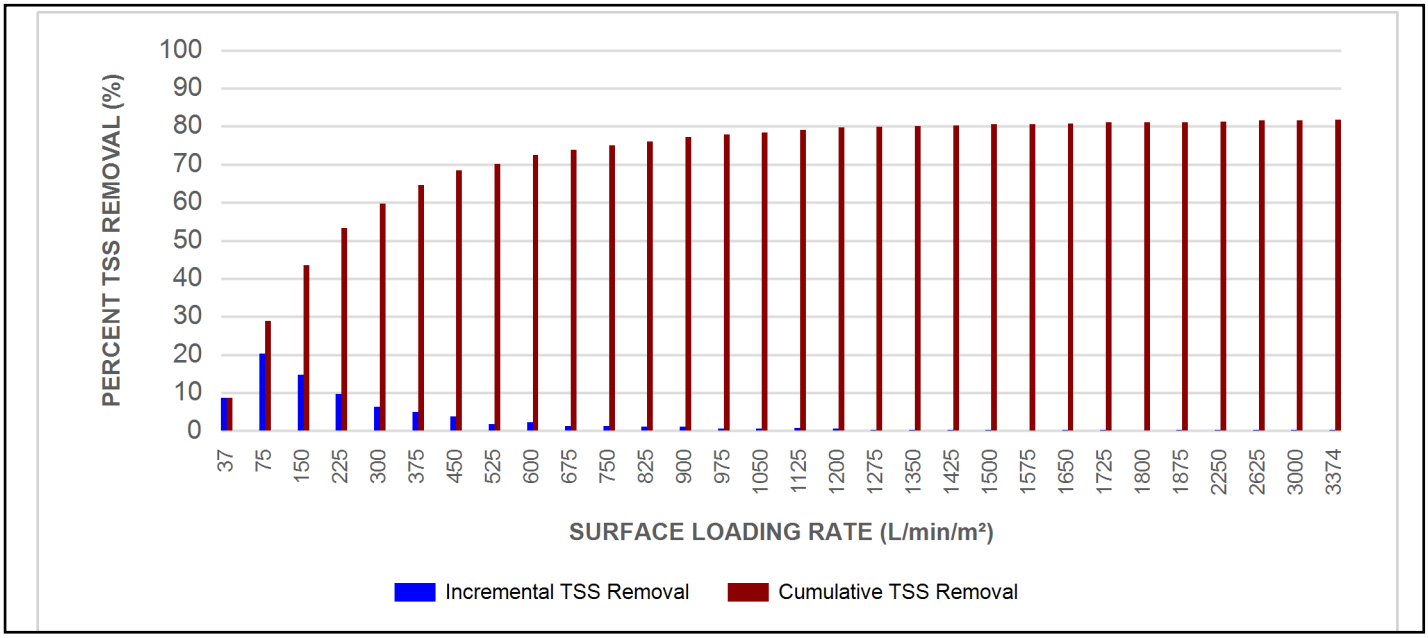
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.7	8.7	2.94	176.0	37.0	100	8.7	8.7
1.00	20.2	28.9	5.87	352.0	75.0	100	20.2	28.9
2.00	16.4	45.3	11.75	705.0	150.0	89	14.7	43.6
3.00	11.8	57.1	17.62	1057.0	225.0	82	9.7	53.3
4.00	8.1	65.2	23.50	1410.0	300.0	78	6.4	59.7
5.00	6.6	71.9	29.37	1762.0	375.0	75	5.0	64.6
6.00	5.2	77.1	35.24	2115.0	450.0	72	3.7	68.4
7.00	2.7	79.8	41.12	2467.0	525.0	68	1.8	70.2
8.00	3.6	83.4	46.99	2820.0	600.0	65	2.3	72.5
9.00	2.0	85.4	52.87	3172.0	675.0	64	1.3	73.8
10.00	1.9	87.3	58.74	3524.0	750.0	63	1.2	75.0
11.00	1.6	88.9	64.61	3877.0	825.0	63	1.0	76.0
12.00	1.8	90.7	70.49	4229.0	900.0	62	1.1	77.2
13.00	1.0	91.6	76.36	4582.0	975.0	62	0.6	77.8
14.00	1.0	92.7	82.24	4934.0	1050.0	60	0.6	78.4
15.00	1.3	93.9	88.11	5287.0	1125.0	59	0.8	79.1
16.00	1.0	95.0	93.98	5639.0	1200.0	57	0.6	79.7
17.00	0.4	95.3	99.86	5992.0	1275.0	55	0.2	79.9
18.00	0.4	95.7	105.73	6344.0	1350.0	53	0.2	80.1
19.00	0.2	95.9	111.61	6696.0	1425.0	52	0.1	80.2
20.00	0.6	96.5	117.48	7049.0	1500.0	49	0.3	80.5
21.00	0.0	96.5	123.35	7401.0	1575.0	47	0.0	80.5
22.00	0.5	97.0	129.23	7754.0	1650.0	44	0.2	80.7
23.00	0.7	97.7	135.10	8106.0	1725.0	43	0.3	81.0
24.00	0.0	97.7	140.98	8459.0	1800.0	41	0.0	81.0
25.00	0.3	98.0	146.85	8811.0	1875.0	39	0.1	81.1
30.00	0.3	98.3	176.22	10573.0	2250.0	33	0.1	81.2
35.00	0.8	99.1	205.59	12335.0	2625.0	28	0.2	81.5
40.00	0.4	99.5	234.96	14098.0	3000.0	24	0.1	81.6
45.00	0.5	100.0	264.33	15860.0	3374.0	22	0.1	81.7
Estimated Net Annual Sediment (TSS) Load Reduction =								**82 %**

Climate Station ID: 6158355 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO CITY RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

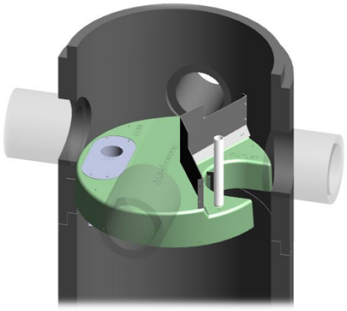
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

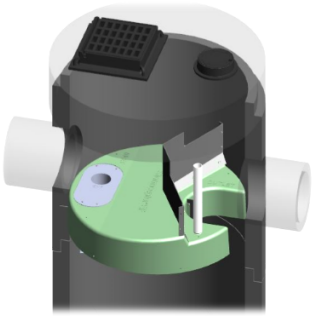
DESIGN FLEXIBILITY

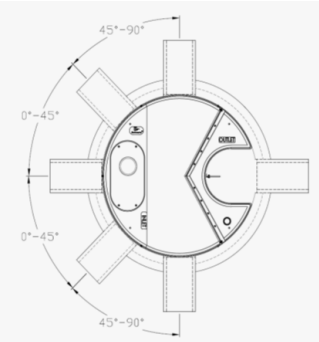
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Region of Peel
working with you

Water and Wastewater Modelling Demand Table

Site Plan Applications

Version	Date	Description of Revision
1.0	January 10 2023	Posted to Peel Website
2.0	August 30 2024	Reflects 2023 Linear Wastewater Standards and ICI population estimates as per Peel 2020 DC background study

Introduction

Water and wastewater modelling may be required as a condition of the development approval process or prior to regional site servicing connection approval where intensification is proposed, where a possible increase in water demand or wastewater discharge is identified or where deemed necessary by Regional staff.

A completed table includes the Professional Engineer's signature and stamp as well as a site servicing concept. The table will be deemed complete once all the information below is submitted and/or included. Modelling will commence once the information is deemed complete. All required calculations must be submitted with the completed demand table. The calculations shall be based on the specific development proposal.

Application Information

Application Number:	SP-24-087C
Address:	12155 Coleraine Drive
Consulting Engineer:	a.m. candaras associates inc.
Date Prepared:	June 12, 2025

Population

Existing

		Units	Persons
1	Residential [8)]		
2	Institutional/Employment [8)]		174
3	Total		174

Proposed

			Units	Persons
4	Residential [1)]	singles/semis (4.2 ppu)		
5		Townhomes (3.4 ppu)		
6		Large apartments (>1 bedroom – 3.1 ppu)		
7		Small apartments (<=1 bedroom – 1.7 ppu)		
8		Total proposed residential		
9	Proposed Institutional[2)]			
10	Proposed employment [3)]			174
11	Total Proposed			174

Other

12	Existing gross floor area for commercial and/or retail (sqm)	
13	Proposed gross floor area for commercial and/or retail (sqm)	
14	Land area (ha)	2.48

Water Connection

Hydrant flow test [4)]

15	Location 1	
16	Location 2	

		Pressure (kPa)	Flow (L/s)	Time
17	Minimum water pressure			
18	Maximum water pressure			

Water Demands (L/s)

		Use 1 [6]	Use 2 [6]	Use 3 [6]	Total
19	Existing fire flow [5] [8]				
20	Proposed average day flow	0.50l/s			0.50l/s
21	Proposed maximum day flow	0.70l/s			0.70l/s
22	Proposed peak hour flow	1.51l/s			1.51l/s
23	Proposed fire flow [5]				100.7l/s

Water calculations

Please use the following updated typical water demand criteria as per Peel's 2020 Development Charges background study.

Population Type	Unit	Average Consumption Rate	Max Day Factor	Peak Hour Factor
Residential	L/cap/d	270	1.8	3.0
Institutional/Commercial/ Industrial	L/emp/d	250	1.4	3.0

Wastewater Connection

Wastewater Effluent (L/s)

		Discharge location [7)]	Flow
24	Existing effluent [8)]		
25	Proposed effluent	Connection to existing Doghouse Manhole at property line	2.89l/s
26	Proposed effluent		
27	Proposed effluent		
28	Proposed additional effluent [8)]		
29	Other proposed effluent*		
30	Total proposed effluent		2.89l/s

*Please specify other proposed effluent (ex. occasional tank purges, off peak discharge, pool drainage)

Wastewater calculations

Please use the following updated daily per capita as per 2023 Peel Linear Wastewater Standards

Population Type	Unit	Average Day Demand	Min Peaking Factor	Max Peaking Factor	Inflow and Infiltration**
Residential	L/cap/d	290	2	4	0.26L/s/Ha
Non-residential	L/emp/d	270	2	4	0.26L/s/Ha

**For maintenance holes that are flood prone or located in low lying areas, an extra 0.28 L/s per maintenance hole may be added to the I&I calculation.

Notes

1) In accordance with Peel Linear Wastewater Standards and Region of Peel 2020 DC background Study
2) refer to Peel Linear Wastewater Standards
3) For the commercial and industrial design flow calculations, please refer to Schedule 8b on page A-9 of the Region of Peel 2020 DC background Study to determine population.
4) Please include the graphs associated with the hydrant flow test data. Hydrant flow tests should be performed within 2 years of submission to the Region. The Region will not permit hydrant flow tests during the winter, please contact Region Water Operations for scheduling. The Region reserves the right to request an updated hydrant flow test as required at any time.
5) Please reference the Fire Underwriters Survey Document
6) Please identify the flows for each use type, **if applicable**
7) Please include drainage plan for multiple discharge locations
8) For Intensification, sites with additions to buildings or additional buildings please provide existing flow for existing buildings and the added flows for the new proposal, **if applicable**