STORMWATER MANAGEMENT & FUNCTIONAL SERVICING REPORT

FOR

TIM HORTONS
16054 & 16060 AIRPORT ROAD

TOWN OF CALEDON
REGION OF PEEL

December 6, 2019

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L4L 9R4

Project No. 1918

a.m. candaras associates inc.
consulting engineers

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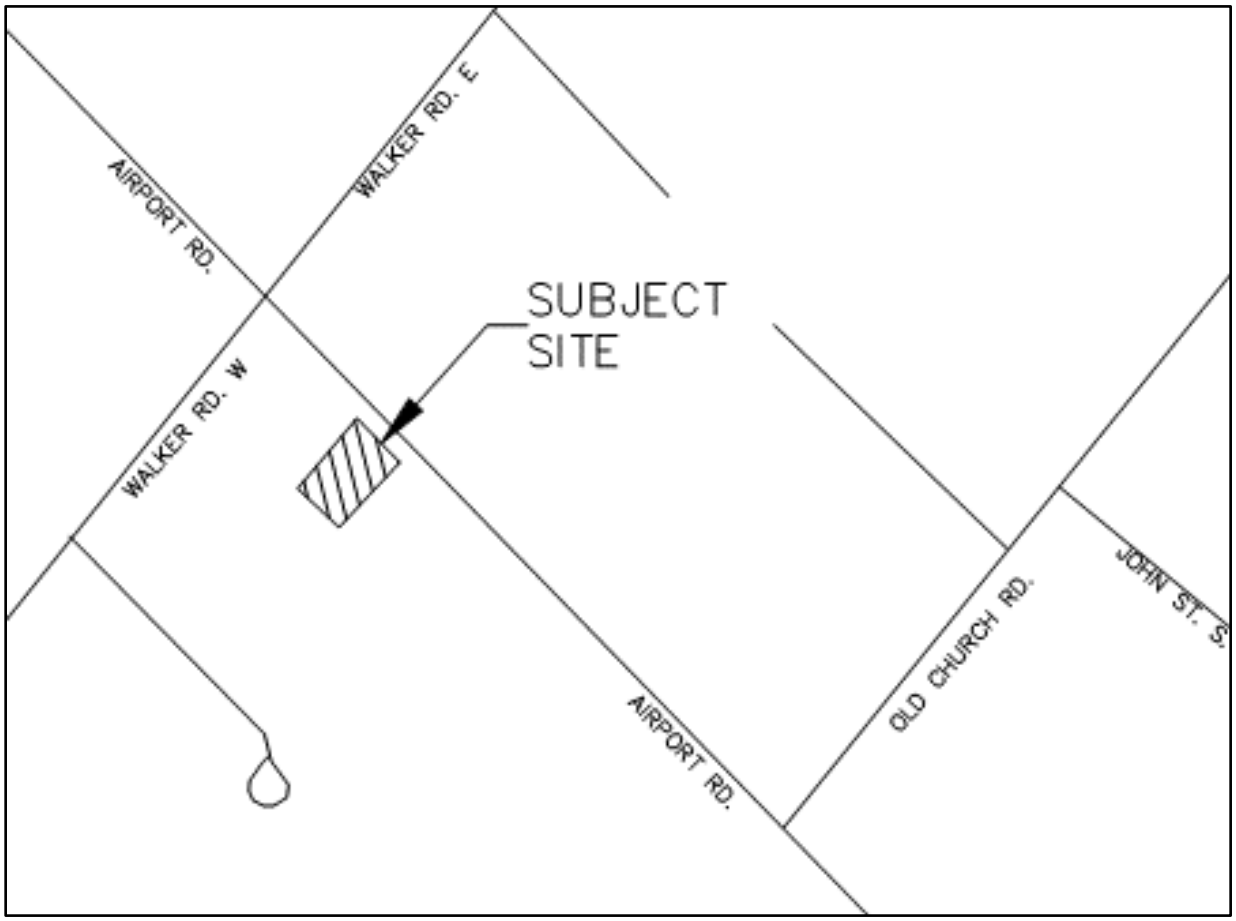
1.0 INTRODUCTION

This report presents the stormwater management (SWM) and functional servicing design for a proposed commercial development located at 16054 & 16060 Airport road within the Town of Caledon, refer to **Figure 1** for site location.

The site is is occupied by two residential dwellings – a 2-storey stone dwelling at 16060 Airport Road and a 1.5 storey vinyl sided frame dwelling at 16054 Airport Road. There are two gravel driveways and the rest of the site is composed of landscaping, bushes and trees.

Figure 1 - Location Plan



2.0 SITE DESCRIPTION

2.1 Existing Site

The existing site drains overland in a southwest direction toward Airport Road. There is no external drainage that enters the site.

Site statistics:

Roof:	=	273.1m^2	@ 0.90
Driveway	=	145.9m^2	@ 0.90
Landscaped:	=	1,592.6m^2	@ 0.25
Total Site Area		2,011.6m^2	@ 0.39

2.2 Proposed Site

The proposed site will outlet to the existing 675mm storm sewer under Church Street which outlets to the existing North Keswick watercourse.

Site statistics:

Roof:	=	232.3m^2	@ 0.90
Paved	=	1,203.5m^2	@ 0.90
Landscaped:	=	575.8m^2	@ 0.25
Total Site Area		2,011.6m^2	@ 0.71

3.0 STORMWATER MANAGEMENT

Stormwater management (SWM) consists of providing rooftop controls, rooftop storage, surface storage and a stone infiltration trench. The SWM design will meet the following criteria:

- The allowable stormwater discharge to be limited to the 2-year pre-development flows;
- Roof drainage limited to 42l/s/ha;
- On-site detention must be provided for all storms up to and including the 100-year storm event;
- Stormwater quality control to provide 80% removal of annual total suspended solids (TSS);
- Infiltration of stormwater runoff into the ground where feasible, satisfying the 5mm infiltration volume as required in overall stormwater management master plan for water balance, as per the TRCA Stormwater Management Criteria;
- An overland flow route shall be provided, within the developed site, to direct runoff in excess of the 100-year storm to Airport Road.

3.1 Quantity Control

The quantity control objective is to control the 100-year post-development flows to the 2-year pre-development flow rates. Controls are provided by means of a Hydro-Brake control device to control the flows discharging from the site, as per Town of Caledon standards. The storage volume to detain is provided on the parking lot surface and roof top.

3.1.1 Allowable Discharge

The allowable site discharge is based on the 2-year storm peak discharge has been calculated using the rational method as follows:

$$Q_S = C \cdot A \cdot I \cdot N$$
$$=(0.39)\ (0.20116ha)\ (85.7mm/hr)\ (2.778)$$
$$=18.7l/s$$

Where:

Q_s = Total site allowable discharge rate (l/s)
A = Site Area
C = Runoff coefficient
I = Intensity (mm/hr)

N = Unit conversion coefficient

Rainfall Intensity for 2-year Storm:

I_{2yr}=1070· $(T + 7.85)^{-0.8759}$ where, T = 10mins

=1070· $(10 + 7.85)^{-0.8759}$

= 85.7mm/hr

3.1.2 Rooftop Controls and Rooftop Storage

As per Tim Hortons standards (TDL), there are no rooftop controls or storage. Rooftop drains will be Thaler RD-14 with no controls, refer to **Appendix A** for details.

3.1.3 Groundwater Discharge

A hydrogeological report was completed by Azimuth Environmental Consulting, Inc. for the subject site. The report has not stated that long term discharge of groundwater is required.

3.1.4 Uncontrolled Runoff

The front of the site will discharge onto Airport Road uncontrolled, refer to **Plan G1** for the uncontrolled drainage area. The uncontrolled area is summarized as follows:

Paved	=	220m^2	@ C=0.95
Landscaped	=	110m^2	@ C=0.31
Total Area	=	330m^2	@ C=0.74

The 100-year storm uncontrolled runoff is determined as follows:

$Q_U = C \cdot A \cdot I \cdot N$

$= (0.74) \cdot (0.0330\text{ha}) \cdot (196.5\text{mm/hr}) \cdot (2.778)$

$= 13.3\text{l/s}$

Where:

$I_{100yr} = 4688 \cdot (17 + 10)^{-0.9624}$ where, T = 10mins

$= 4688 \cdot (17 + 10)^{-0.9624}$

$= 196.5\text{mm/hr}$

3.1.5 Orifice Release Rate, Sizing and Detention Storage Required

An orifice plate will be used to control the discharge from the site to the following rate:

$Q_O = Q_S - Q_U$

$Q_O = 18.7\text{l/s} - 13.3\text{l/s}$

$= 5.4\text{l/s}$

Where:

Q_S =Total site allowable discharge

Q_U =Total uncontrolled discharge

Q_O =Total discharge allowed through orifice

Based on using an orifice and controlling the site to 5.4l/s, 74.0m^3 of detention storage will be required, refer to **Table 2** in **Appendix A** for details.

An orifice tube is located within "MH 3" on the downstream face at the south invert to control discharge from the site, refer to **Plan G1** for details. The initial orifice size is determined based on the total discharge allowed through the orifice and is limited to:

The orifice plate is as follows:

$$Q_O = C \cdot A \cdot \sqrt{(2 \cdot g \cdot h)}$$

Where:

h=HWL – Inv. of Orifice

h=291.45m – 289.70m

h=1.75m

$$A = \frac{Q}{C \cdot \sqrt{(2 \cdot g \cdot h)}}$$

$$A = \frac{0.0054 m^3/s}{(0.63) \cdot \sqrt{(2 \cdot 9.81 m/s^2 \cdot 1.75 m)}}$$

$$A = 0.0015 m^2$$

$$d = \sqrt{\frac{4 \cdot 0.0015 m^2}{\pi}}$$

$$d = 0.044 m$$

A 44mm orifice plate is required to control the discharge from the site. The Town of Caledon minimum allowable orifice size is 75mm. Therefore, a Hydro-brake control device (SCU-0063-5400-1750-5400) is used to control the discharge from the site. A Hydro-Brake control device with a head of 1.75m will release a peak discharge of 5.4l/s, refer to **Appendix A** for the Hydro-Brake design charts.

Based on the 5.4l/s release rate, 74.0m^3 of detention storage volume will be required, refer to **Table 2** in **Appendix A** for details.

A total detention storage volume of 83.3m^3 is provided in the parking area of the site, refer to **Plan G1** for details and ponding limits.

3.2 Quality Control

Quality controls are provided by a Stormceptor EF4 oil grit separator which is sized to for 80% removal of TSS on an annual basis. The Stormceptor is sized based on the net landscaped and paved area reaching it. Refer to **Appendix A** for the Stormceptor sizing details.

3.3 Water Balance

The TRCA requires that the 5mm storm be retained onsite to satisfy the water balance requirements. The retention volume after considering initial abstractions and evapotranspiration is determined as follows:

PARAMETER	DEPTH (mm)	AREA (m^2)	VOLUME (m^3)
Water balance depth required for the site	5	2,011.60	10.1
Landscape	-5	575.8	-2.9
Roof	-1	232.3	-0.2
Paved	-1	1,203.5	-1.2
			$\underline{5.8m^3}$

A stone infiltration trench is sized to retain the minimum water balance volume of $5.8m^3$. Based on a stone having a void ratio of 40%, the required trench volume is:

$$\frac{5.8m^3}{0.40} = 14.5m^3$$

An infiltration trench which has a 0.30m depth, 4.5m width and is 10.7m long is provided west of the building. Discharge from the roof area is directed to the infiltration trench, as roof outflow is considered to be clean, as detailed on Drawing G1.

Trench Stone Volume: = 0.30m deep x 4.5m width x 10.7m long
= $14.5m^3$
Void Ratio Clear Stone = 0.40
Infiltration Volume = $14.5m^3$ x 0.40
= $5.8m^3$

The geotechnical report prepared by Azure Group indicates Borehole BH-3/MW-3 is located in the vicinity of the proposed infiltration stone trench, refer to **Plan G1**. The permeability is estimated to be 36mm/hr and the groundwater level was recorded to be 289.0m, refer to **Appendix B** for details.

The trench is designed so that the clean roof water, which is suitable for infiltration, will enter directly into the trench through "MH 8". After the trench has filled up, the water will bypass the trench into the proposed storm network. The bottom of the stone infiltration trench is set at 290.00m, which is 1.0m above the nearest groundwater level reading of 289.00m. Refer to **Plan G1** for the infiltration trench plan view and details.

3.4 Low Impact Development

As mentioned in the previous Section 3.3, an infiltration trench LID has been designed for the proposed development. As demonstrated, this LID is used to reduce runoff volumes, maintain existing infiltration/water balance patterns and improve water quality.

The CVC/TRCA Low Impact Development Stormwater Management Planning and Design Guide and the MECP (MOE) Stormwater Management Planning and Design Manual were referenced when designing the infiltration trench LID.

4.0 SANITARY

4.1 Total Sanitary Flow Rate

The peak sanitary flows for the total site area were calculated based on the Region of Peel Design Guidelines as follows:

Total Site Area Sanitary Calculations:

Population equivalent based on Commercial: = 50 people/ha
Estimate Population = 0.20116ha x 50 people/ha
Population = 10.1people
Sanitary Flow = 302.8 l/cap/day

Peaking Factor

Peaking Factor M $=1+\frac{14}{4+P^{0.5}}$ where P= Populations in thousands

$=1+\frac{14}{4+(0.0101)^{0.5}}$ = 4.41

Peak Domestic Sewage Flow

$Q = \frac{P \times q \times PF}{86400}$

$Q = \frac{10.1 \times 302.8 \text{ l/cap/day} \times 3.55}{86400}$

=0.13l/s

Infiltration and Inflow

= 0.20116ha x 0.0002 m^3/sec/ha
= 0.00004m^3/sec
= 0.04l/s

Site Peak Sanitary Flow

=0.13l/s + 0.04l/s
=0.17l/s

4.2 Sanitary Service Connection

An existing 250mm sanitary sewer is located on the on Airport Road. The sewer has a slope of 0.53% and results in a capacity of 43.3l/s.

A proposed 150mm sanitary service connection is connected to the existing 250mm sanitary sewer. The service connection has a slope of 4.00% and has a capacity of 18.7l/s. Refer to **Plan G1** for details.

5.0 WATER

There is an existing 300mm watermain located on Airport road. A 150mm service connection is proposed to connect to this existing watermain, refer to **Plan G1** for details.

5.1 Domestic Water Demand

The Region of Peel Design Standards were used to determine the domestic water demand, as follows:

Average Demand:

= People x Average Consumption Rate(1) x Peaking Factor(2)

Where:

(1) Commercial average daily flow factor (300l/person/day)

(2) ICI Peaking factor – Max Day (1.4)

= 10.1people x 300l/person/day x 1.4

= 4,424l/day = 2.95l/min

5.2 Fire Flow Demand

The Fire Underwriters Survey was referenced to determine the fire flow demand for the proposed development. The proposed development consists of a single commercial building. The building will be sprinklered and the building will be constructed using ordinary construction materials.

Estimate of required fire flow:

$$F_1 = 220 \cdot C \cdot \sqrt{A}$$

$$F_1 = 220 \cdot (1.0) \cdot \sqrt{232.2 m^2}$$

$$F_1 = 3{,}353 \frac{l}{min}$$

$$F_2 = 3{,}000 \frac{l}{min}$$

Where:

F = Required fire flow (l/min)

C = Type of construction coefficient (1.0 = ordinary construction)

A = Total floor area (m^2)

Building Occupancy Fire Hazard Assessment:

The building occupancy type is a restaurant and can be classified as Class A. Therefore, the development presents a low hazard risk and the required fire flow can be reduced by 25%.

Sprinkler Reduction:

The required fire flow can also be reduced by 30% as the building will include a sprinkler system designed to NFPA 13 and NFPA standards.

Exposure Charges:

North Side (27m)	= 10%
South Side (10m)	= 20%
East Side (56m)	= 0%
West Side (24m)	= 10%
Total exposure charge	**= 40%**

Final Fire Flow

F_{final} = $F_2 - (F_2 \cdot 25\%) - (F_2 \cdot 30\%) - (F_2 \cdot 40\%)$

= 3,000l/min –(3,000l/min · 25%) - (3,000l/min · 30%) + (3,000l/min · 40%)

= 2,475l/min = 2,000l/min

Total Water Demand

Fire Flow + Max Day required water flow at a minimum of 20psi

= 2,000l/min + 2.95l/min

= 2,002.95l/min = 529USgpm

5.3 Hydrant Flow Test

A hydrant flow test will be performed for the subject development.

Prepared by,

a.m. candaras associates inc.

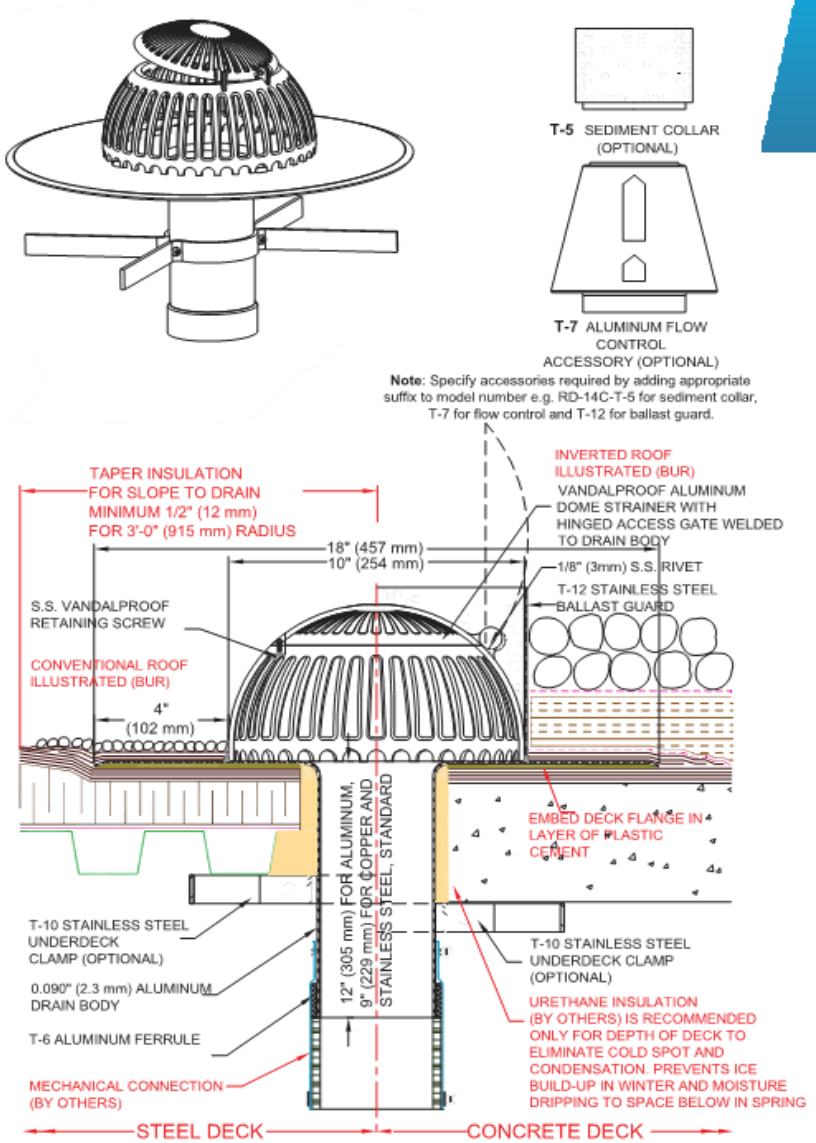
Tas Candaras, P.Eng.
Consulting Engineer

Zachary Schwisberg, P.Eng.
December 6, 2019

APPENDIX A – SUPPORTING DOCUMENTS

ROOF DRAIN DETAIL– THALER RD-14A – NO CONTROLS

Please be advised Thaler products may undergo improvements from time to time and are subject to change without notice.



RD-14A VANDALPROOF ALUMINUM ROOF DRAIN (All Purpose, Straight Outlet) Note: RD-14C (Copper) and RD-14SS (Stainless Steel) Roof Drain similar. See reverse side of page for material change

INSTALLATION:
"Installation Instructions" are provided with every Thaler product. Essentially, the RD-14A roof drain is installed by coring or cutting the roof assembly, fitting the drain outlet into the rainwater leader, installing the dome strainer (including any optional accessories), and as follows:

BUR: Set drain flange over membrane in layer of plastic cement and flash in with 3 overlapping layers of felt flashing.

ModBit: Torch membrane until bitumen is fluid and set drain flange into fluid. Flash in flange with two overlapping layers of ModBit and seal with asphalt sealer.

Single Ply: Set drain flange in layer of membrane adhesive before applying membrane over flange. Note: for PVC membrane, specify PVC coated drain flange by adding suffix P to end of model number, e.g. RD-14A-P; weld roofing to drain flange using PVC torch.

Precautions: If coating drain flange with a bituminous paint on site, allow 24 hours for drying before applying roof membrane.

Ordering and Availability: Available throughout North America. Contact Thaler for list of distributors and current cost information. Most products are readily available from stock.

ROOF SPECIALTIES

RD-14A VANDALPROOF ALUMINUM ROOF DRAIN (All Purpose, Straight Outlet)

DESCRIPTION:
The Thaler RD-14A Roof Drain consists of a vandalproof cast aluminum dome with hinged access gate, flat aluminum body, deck flange and straight outlet fitted with a brass ferrule.

PROMINENT FEATURES:
Non-removable dome strainer eliminates improper strainer installation or lost strainers that can result in plugged drains. Vandalproof hinged access gate (allen-key openable) allows drain to be cleaned if necessary, or dismantled by permitting access to bolts inside drain.

LEADER DIAMETERS:
With Aluminum Ferrule: 2" to 10" (51 mm to 254 mm). See detail at left for specific sizes.

OPTIONS:
Aluminum ferrule on outlet. T-5 aluminum sediment collar. Stainless steel under-deck clamp (provides snug installation in otherwise insecure applications). T-7 aluminum Flow Control accessory (weir) for utilizing roof as temporary reservoir during excessive rainfall. T-12 stainless steel ballast guard. See Thaler Roof Drain Options literature. PVC coated deck flange for PVC roof membrane. Bituminous painted deck flange for BUR and ModBit roof membrane.

RECOMMENDED USE:
For flat roofs in new or existing construction employing conventional roof (membrane above insulation) or inverted roof and new hook-up e.g. new installation in low spots subject to ponding water. Suitable for PVC, cast iron, steel, copper, or other type leaders in both Schedule 40 or 80 leader thicknesses.

APPROVALS:
Conforms to ANSI A112.21.2 Roof Drains standard.

WARRANTY:
20 year warranty against defects in materials and/or manufacture when installed in accordance with Thaler "Installation Instructions". Copy of Warranty Certificate available upon request.

MAINTENANCE:
No maintenance required (maintenance free), however, as per CRCA/NRCA recommendations, drains should be inspected twice a year (spring and fall) and any debris removed from both around and inside the strainer.

SPECIFICATION (SHORT FORM):
Roof drains: Thaler RD-14A aluminum drain for [2" to 10" (51 mm to 254 mm)] leader size with: vandalproof cast aluminum dome with hinged access gate welded to drain body; .090" (2.3 mm) spun aluminum flat drain body, deck flange and straight seamless aluminum outlet with [T-5 aluminum sediment collar;] [T-6 aluminum ferrule;] [T-10 stainless steel under-deck clamp;] [T-7 aluminum flow control accessory;] [T-12 stainless steel ballast guard;] [PVC coated deck flange] [bituminous painted deck flange]; as manufactured by Thaler Metal Industries, 1-800-387-7217 (Mississauga, Ontario, Cana- da) or 1-800-576-1200 (New Braunfels, TX), installed as per manufacturer's written instructions. Provide standard 20 year warranty against defects in materials and/or manufacture.

Table 2 – Detention Volume Required

The rational method is used to determine the required detention volume, based on a controlled release of 5.4l/s, as follows:

TIME PERIOD (min)	INTENSITY (mm/hr)	RUNOFF (l/s)	STORAGE (m^3)
30-35	14	5.1	0.0
35-40	19	6.9	0.4
40-45	29	10.5	1.5
45-50	51	18.4	3.9
50-55	114	41.2	10.7
55-60	239	86.3	24.3
60-65	141	50.9	13.6
65-70	86	31.0	7.7
70-75	59	21.3	4.8
75-80	43	15.5	3.0
80-85	33	11.9	2.0
85-90	26	9.4	1.2
90-95	21	7.6	0.7
95-100	17	6.1	0.2
100-105	15	5.4	0.0
			74.0

PARAMETER	VALUE	UNIT
C	0.77	-
A	0.16816	ha
N	2.778	-
Product	0.361	-
Release Rate	5.4	l/s

Net Paved = 983.5m^2 @ C = 0.95
Net Roof = 232.3m^2 @ C = 0.95
Net Landscaped = 465.8m^2 @ C = 0.31

$$\text{Storage } (m^3) = \frac{(\text{Runoff} - \text{Release Rate}) \cdot 5 \text{ min} \cdot 60 \text{ sec})}{1{,}000}$$

Where,
Release Rate = 5.4l/s

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

ESTIMATED NET ANNNUAL SEDIMENT (TSS) LOAD REDUCTION STORMCEPTOR®

Province :	Ontario
City :	caledon
Nearest Rainfall Station :	TORONTO CENTRAL
NCDC Rainfall Station Id :	0100
Years Of Rainfall Data :	18

Site Name :	1918

Drainage Area (ha) :	0.145
Runoff Coefficient 'c' :	0.74

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

Require Hydrocarbon Spill Capture?	No
Upstream Flow Control?	No
Required Water Quality Runoff Volume Capture (%) :	90.00
Estimated Water Quality Flow Rate (L/s) :	0
Peak Conveyance (maximum) Flow Rate (L/s) :	5.00
Site Sediment Transport Rate (kg/ha/yr) :	

Project Name :	1918
Project Number :	1918
Designer Name :	Zachary Schwisberg
Designer Company :	A.M. Candaras Inc.
Designer Email/Phone :	zachary@amcai.com
EOR Name :	
EOR Company :	
EOR Email/Phone :	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EF4	91
EF6	92
EF8	93
EF10	93
EF12	93

Recommended Stormceptor EF Model : EF4

Estimated Net Annual Sediment (TSS) Load Reduction (%) : 91

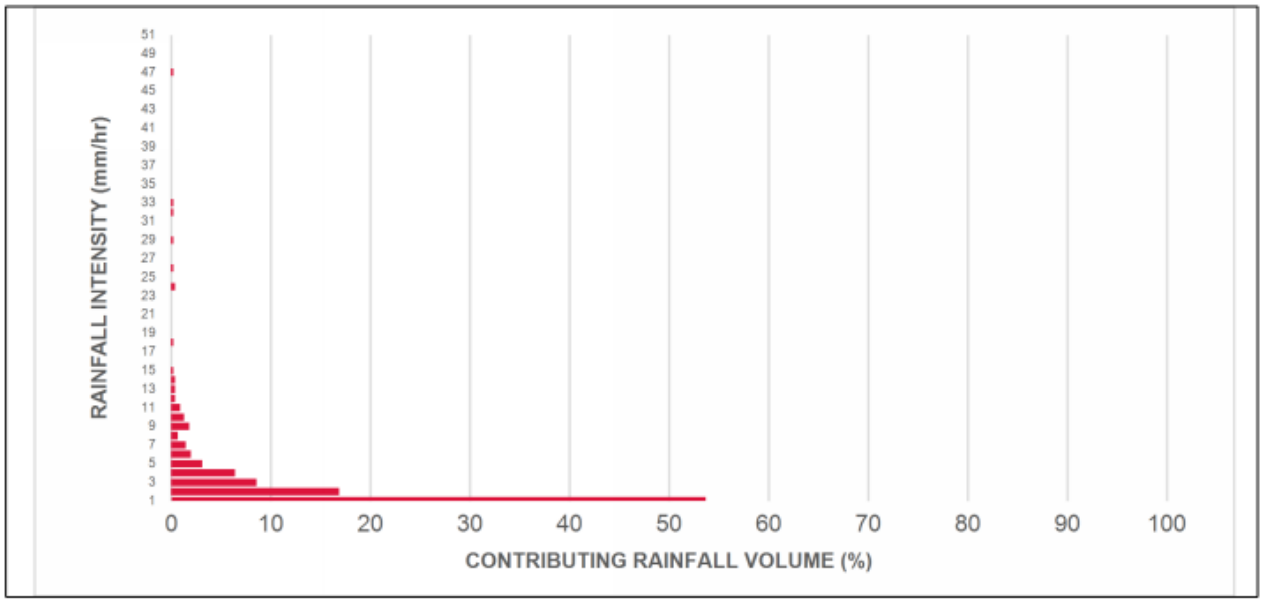
Water Quality Runoff Volume Capture (%) : > 90

imbrium

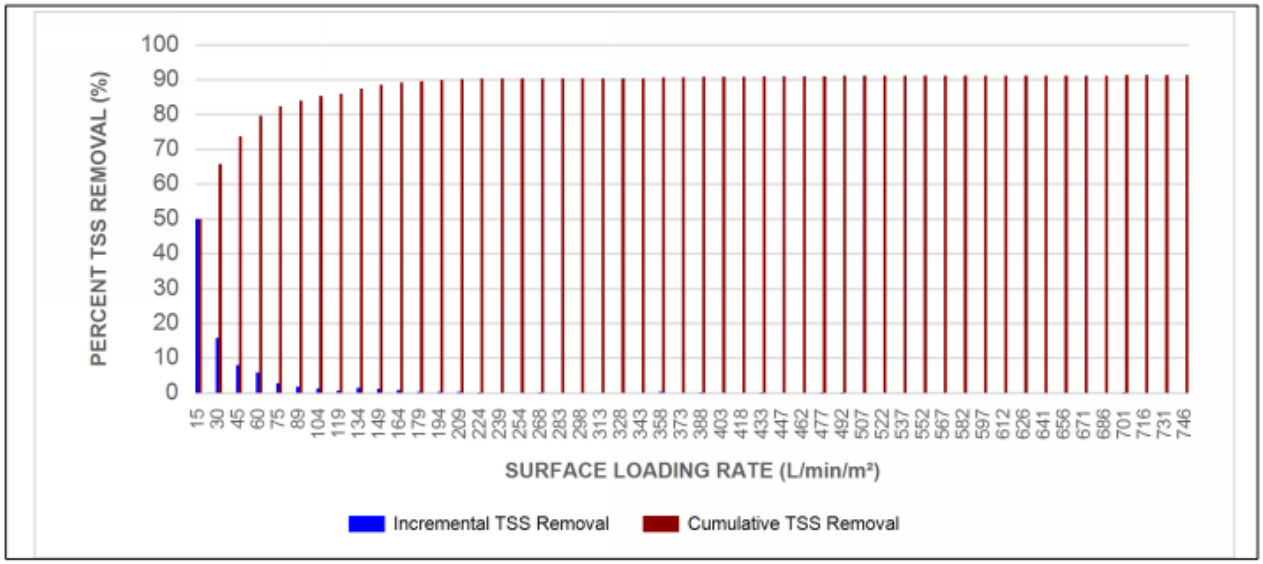
RainFall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	53.7	53.7	0.30	18.0	15.0	93	49.9	49.9
2	16.9	70.6	0.60	36.0	30.0	93	15.7	65.7
3	8.6	79.2	0.89	54.0	45.0	93	8.0	73.7
4	6.4	85.6	1.19	72.0	60.0	91	5.8	79.5
5	3.1	88.7	1.49	89.0	75.0	90	2.8	82.3
6	2.0	90.7	1.79	107.0	89.0	88	1.8	84.0
7	1.5	92.2	2.09	125.0	104.0	87	1.3	85.3
8	0.7	92.9	2.39	143.0	119.0	85	0.6	85.9
9	1.8	94.7	2.68	161.0	134.0	84	1.5	87.4
10	1.3	96.0	2.98	179.0	149.0	81	1.1	88.5
11	0.9	96.9	3.28	197.0	164.0	80	0.7	89.2
12	0.4	97.3	3.58	215.0	179.0	79	0.3	89.5
13	0.4	97.7	3.88	233.0	194.0	77	0.3	89.8
14	0.4	98.1	4.18	251.0	209.0	76	0.3	90.1
15	0.2	98.3	4.47	268.0	224.0	74	0.1	90.3
16	0.0	98.3	4.77	286.0	239.0	73	0.0	90.3
17	0.0	98.3	5.07	304.0	254.0	72	0.0	90.3
18	0.2	98.5	5.37	322.0	268.0	71	0.1	90.4
19	0.0	98.5	5.67	340.0	283.0	69	0.0	90.4
20	0.0	98.5	5.97	358.0	298.0	68	0.0	90.4
21	0.0	98.5	6.26	376.0	313.0	66	0.0	90.4
22	0.0	98.5	6.56	394.0	328.0	65	0.0	90.4
23	0.0	98.5	6.86	412.0	343.0	63	0.0	90.4
24	0.4	98.9	7.16	430.0	358.0	63	0.3	90.7
25	0.0	98.9	7.46	447.0	373.0	61	0.0	90.7

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 (%)
26	0.2	99.1	7.76	465.0	388.0	60	0.1	90.8
27	0.0	99.1	8.05	483.0	403.0	58	0.0	90.8
28	0.0	99.1	8.35	501.0	418.0	58	0.0	90.8
29	0.2	99.3	8.65	519.0	433.0	58	0.1	90.9
30	0.0	99.3	8.95	537.0	447.0	58	0.0	90.9
31	0.0	99.3	9.25	555.0	462.0	57	0.0	90.9
32	0.2	99.5	9.55	573.0	477.0	57	0.1	91.0
33	0.2	99.7	9.84	591.0	492.0	57	0.1	91.1
34	0.0	99.7	10.14	609.0	507.0	57	0.0	91.1
35	0.0	99.7	10.44	626.0	522.0	57	0.0	91.1
36	0.0	99.7	10.74	644.0	537.0	57	0.0	91.1
37	0.0	99.7	11.04	662.0	552.0	57	0.0	91.1
38	0.0	99.7	11.34	680.0	567.0	56	0.0	91.1
39	0.0	99.7	11.63	698.0	582.0	56	0.0	91.1
40	0.0	99.7	11.93	716.0	597.0	56	0.0	91.1
41	0.0	99.7	12.23	734.0	612.0	56	0.0	91.1
42	0.0	99.7	12.53	752.0	626.0	56	0.0	91.1
43	0.0	99.7	12.83	770.0	641.0	56	0.0	91.1
44	0.0	99.7	13.12	787.0	656.0	56	0.0	91.1
45	0.0	99.7	13.42	805.0	671.0	56	0.0	91.1
46	0.0	99.7	13.72	823.0	686.0	56	0.0	91.1
47	0.2	99.9	14.02	841.0	701.0	56	0.1	91.3
48	0.0	99.9	14.32	859.0	716.0	55	0.0	91.3
49	0.0	99.9	14.62	877.0	731.0	55	0.0	91.3
50	0.0	99.9	14.91	895.0	746.0	55	0.0	91.3
Estimated Net Annual Sediment (TSS) Load Reduction =								91 %

RAINFALL DATA FROM TORONTO CENTRAL RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



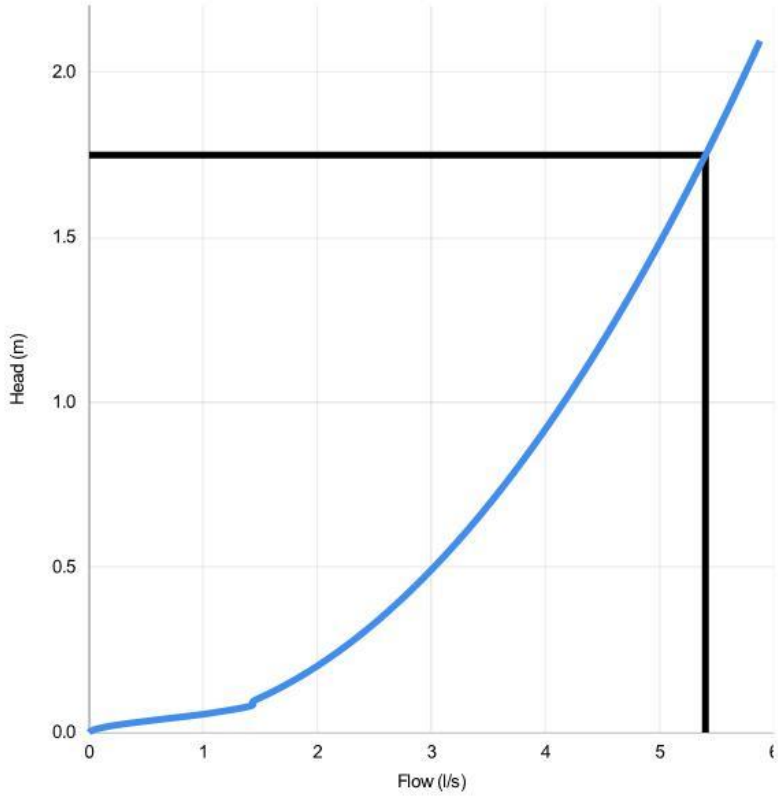
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.750	5.400
Flush-Flo	0.082	1.439
Kick-Flo®	0.095	1.426
Mean Flow		3.681

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

WRc APPROVED
PT/329/0412

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.060	1.085
0.121	1.587
0.181	1.902
0.241	2.165
0.302	2.395
0.362	2.602
0.422	2.792
0.483	2.968
0.543	3.133
0.603	3.289
0.664	3.437
0.724	3.578
0.784	3.713
0.845	3.843
0.905	3.968
0.966	4.089
1.026	4.206
1.086	4.319
1.147	4.430
1.207	4.537
1.267	4.642
1.328	4.744
1.388	4.844
1.448	4.941
1.509	5.036
1.569	5.130
1.629	5.222
1.690	5.312
1.750	5.400

DESIGN ADVICE

The head/flow characteristics of this SCU-0063-5400-1750-5400 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®

DATE	11/21/2019 3:13 PM
Site	
DESIGNER	Zachary Schwisberg
Ref	1918 / 19_12_3501

SCU-0063-5400-1750-5400

Hydro-Brake Optimum®

Technical Specification

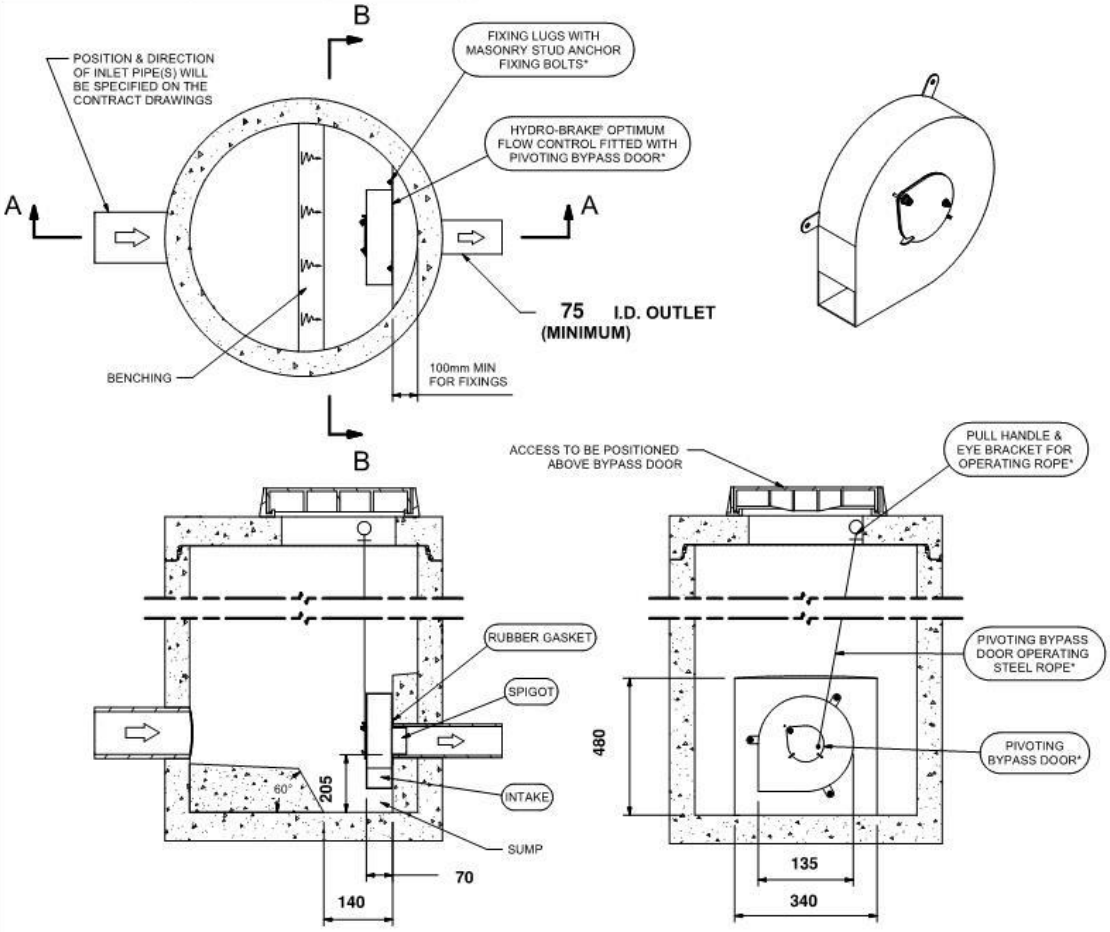
Control Point	Head (m)	Flow (l/s)
Primary Design	1.750	5.400
Flush-Flo™	0.082	1.439
Kick-Flo®	0.095	1.426
Mean Flow		3.681

Hydro-Brake® Optimum Flow Control including:

- **3 mm** grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

WRc Approved PT/320/0412



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® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS 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 SCU-0063-5400-1750-5400 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®

DATE	11/21/2019 3:13 PM
SITE	
DESIGNER	Zachary Schwisberg
REF	1918 / 19_12_3501

SCU-0063-5400-1750-5400
Hydro-Brake® Optimum

 Hydro International Ltd, 94 Hutchins Drive, Portland, Maine, 04102-1930. Tel: +1 (207) 756 6200 Fax: +1 (207) 756 6212 Web: www.hydro-int.com Email: enquiries@hydro-int.com

APPENDIX B – REPORT EXCERPTS

BORING FIGURE NUMBER 3
PAGE 1 OF 1

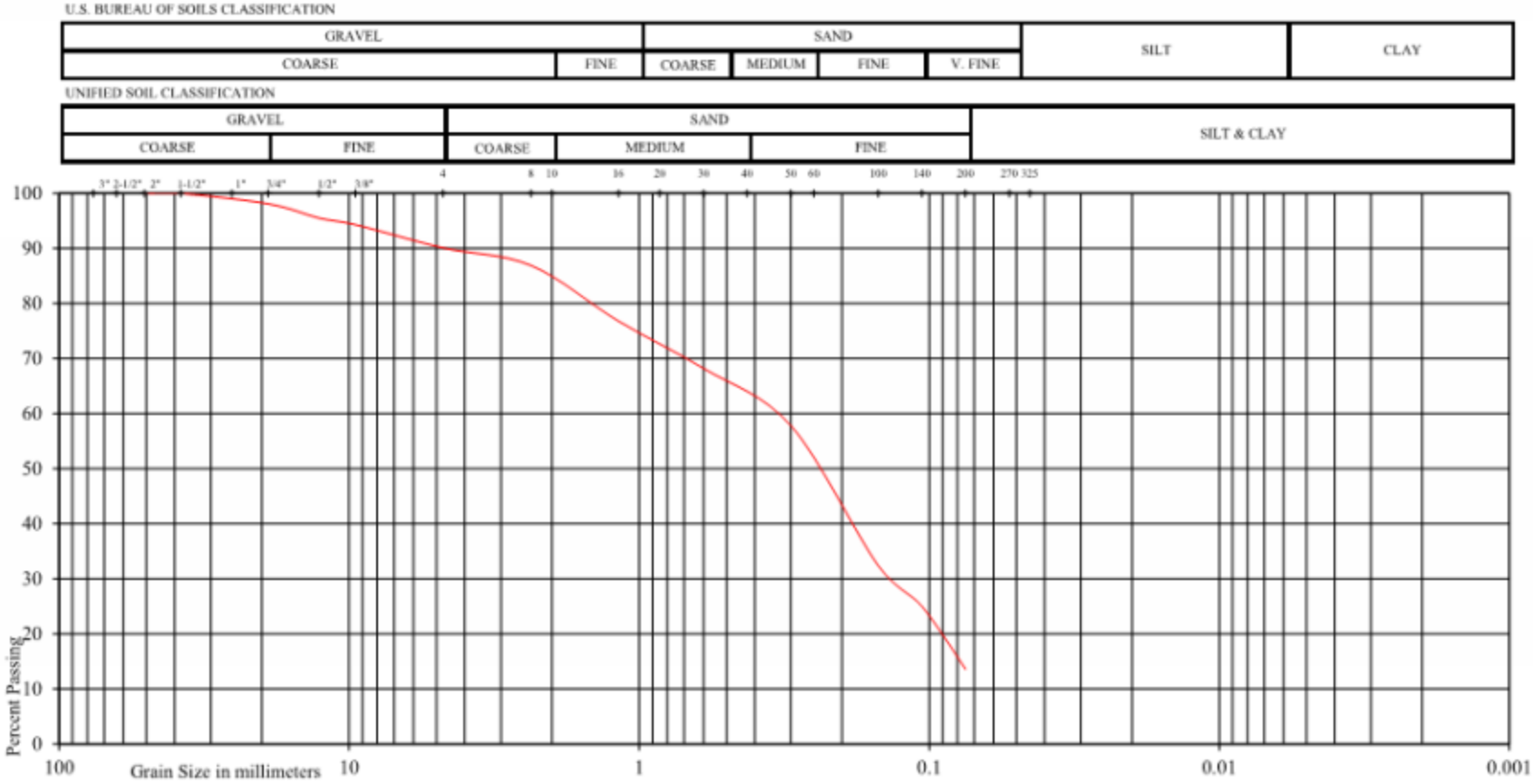
CLIENT: ***2610818 Ontario Ltd.*** *PROJECT NAME:* *Proposed Commercial Property*
PROJECT NUMBER: *1904-006* *PROJECT LOCATION:* ***16054-16060 Airport Rd, Caledon, ON.***

DATE STARTER: ***July/24/2019*** *DATE COMP.:* ***July/24/2019*** *GROUND ELEVATION:* ***293.047 m*** *HOLE SIZE :* ***50 mm***
WATER LEVEL: Dry on completion / Cave in at 10'
DRILLING METHOD: ***CONTINUOUS AUGER***
LOGGED BY: ***A.R.*** *CHECKED BY:* ***A.R.***
NOTES: mointoring well screen found at 8-18'

Depth (ft)	ELEV (293.047 m)	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.		TYPE	N VALUE	% WATER CONTENT	% RECOVERY	"N" VALUE 20 40 60 SHEAR STRENGTH	WATER CONTENT % 10 20 30 PL O LL	REMARKS
1		TOPSOIL Fill- 130 mm thick		DO 1	3	8	63%	•	•	GSA SS5 gravel: 0% sand: 40% silt: > 55% clay:<5%
2		Silty Fine Sand and Silty Sand, trace of clay brown, damp to saturated very loose to compact								
3				DO 2	4	6.6	70%	•	•	
4										
5										
6			weathered	DO 3	12	8.8	100%	•	•	
7										
8			wet silt seam	DO 4	9	21.3	100%	•	•	
9										
10										
11			cave in	DO 5	10	19.8	100%	•	•	
12										
13										
14										
15										
16				DO 6	13	21.2	33%	•	•	
17										
18										
19										
20										
21		Silty Sand Till, traces of clay and gravel brown, wet, compact		DO 7	22	17.5	100%	•	•	
		Borehole end at 21'- mointoring well installed								

GRAIN SIZE DISTRIBUTION

Reference No: 1807-003



Project: Church Street

Location: 36 Church Street, Georgina

Borehole No: 5

Sample No: 2

Depth (m): 0.76 - 1.52

Elevation (m): 99.9

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = 6

36mm/hr = Estimated Permeability (cm./sec.) = 10^{-4}

Classification of Sample [& Group Symbol]: FINE TO COARSE SAND, some silt and clay, a trace of gravel

Figure: 11

RE: 1918 - 16054 & 16060 Airport Road, Caledon

AA

Ahmed Al-Temimi <aaltemimi@azuregroup.ca>
To Zachary Schwisberg; 'Jennifer Millington'; 'Michael Vani'
Cc 'AJ Taylor'; 'Olha Dudar'; Tas Candaras

Reply | Reply All | Forward | ...

Wed 2019-08-28 5:08 PM

16054-16060 Airport Rd-Caledon.kmz
2 KB

Subject: RE: 1918 - 16054 & 16060 Airport Road, Caledon

Hi there

Please see the below updated table based on the elevation data provided. The "stick up" is the distance from the ground to the top of the measuring point that was taken at the same time as the water level measurements. For the flush-mount well our measurements are taken relative to the ground surface. This seems to be similar to your riser measurement, however our values differ. Please also note that the monitor wells were installed in July, and the seasonal high ground water table is measured from March – June so we do not have this data.

Location ID	Ground Elevation*	Total Depth	Stick Up	Manual Water Levels (mbgs)	Manual Water Levels (masl)
	(masl)	(mbgs)	(m)	July-31-2019	July-31-2019
MW-1	291.73	5.01	0.00	3.15	288.6
MW-3	293.05	5.26	0.81	4.09	289.0
MW-4	293.19	5.41	0.75	4.23	289.0

*Provided by Azure via email August 21st 2019

Jennifer Millington, M.A.Sc., P.Geo.
Hydrogeologist

Azimuth Environmental Consulting, Inc.
642 Welham Road
Barrie, ON L4N 9A1
Office: (705) 721-8451 ext. 226
Cell: (705) 790-8451
Fax: (705) 721-8926

Approximate Borehole Locations

Source: York Maps
© 2017 York Region Interactive Maps

Title	Project	Project No.	Scale	Date	Drawing No.
Borehole Locations Plan	36 Church Street, Georgina, ON	1807-003	As drawn	September 10, 2018	2