FUNCTIONAL SERVICING AND

STORMWATER MANAGEMENT REPORT

PROPOSED CEMETERY

12612 AND 12586 WOODBINE AVENUE
WHITCHURCH-STOUFVILLE, ONTARIO

July 10, 2026

CANDEVCON GROUP INC.
CONSULTING ENGINEERS AND PLANNERS
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PROJECT NO. W26027

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1.0 INTRODUCTION

The Owner has proposed to construct a cemetery at the proposed site. The Cemetery will consist of funeral home and crematorium, a mausoleum and burial plots. The site is located at 12612 and 12586 Woodbine Avenue in the Town of Whitchurch-Stouffville as shown on Figure 1.

The objective of this Functional Servicing and Stormwater Management Report is to demonstrate how the proposed development can be serviced. This report also addresses the Stormwater Management (SWM) strategy for the site and is being submitted in support of an application for zoning approval.

2.0 EXISTING CONDITIONS

2.1 General

The site is currently under agricultural use. It is surrounded by the following land uses

- Existing cemetery to the south
- Hwy 404 to the west
- Existing agricultural lands to the north
- Existing agricultural lands to the east

The site has three distinct drainage zones. The front 1/3 drains toward Woodbine Avenue and the rear 2/3 drains to Berczy Creek which runs through the site

2.2 Geotechnical Study

A geotechnical study was prepared by SLR Consulting (Canada) Inc and will be submitted separately from this report. The study determined that the site is underlain by Silty Clay/Clayey silt till.

2.3 Hydrogeological Study

A hydrogeological study was prepared by SLR Consulting (Canada) Inc. and will be submitted separately from this report. The study looked at water table elevations range from 2.0 - 0.2m below ground level and is subject to seasonal fluctuations. They also determined that in one location, the water table was under pressure and above the existing ground elevation.

3.0 PROPOSED DEVELOPMENT PLAN

As noted earlier, the proposed site will be developed as a cemetery with a funeral home, mausoleum, and burial plots. Vehicles parking areas will be provided in front of the funeral home / reception building.

4.0 SANITARY

The are currently no sanitary sewers within Woodbine Avenue to service the site. Therefore, the site will be served by septic systems. Due to the size of the property and the location of the two buildings it is proposed to install one septic system for the funeral home and one for the mausoleum. The approximate locations of the septic systems are shown in Drawings SS-1 and SS-2, and will be sized at the detailed design stage

5.0 WATERMAIN

There is currently no municipal water service available on Woodbine Avenue to service the site. Therefore, water will be provided via private wells. As with the distance between the two buildings, we are proposing that each building be serviced by its own well.

5.1 Fire Supply

As noted above, there is no municipal water supply to the site and therefore no fire protection is available. Therefore, it is proposed that fire protection be provided by underground fire supply tanks. Each building will be provided with individual water tank for fire protection. The following table shows the approximate size of the tanks for each building. Fire flow calculations are shown in Appendix A.

Fire Storage Requirements

Building	Required Fire Flow (L/min)	Required Fire Flow Duration Required (hour)	Storage Required (cu. m.)
Funeral Home	7,000	1.0	420
Mausoleum	18,000	1.0	1,080

The above storage tanks would be provided with a volume float and would be supplemented via the propose well to maintain the require volume.

6.0 STORM DRAINAGE AND STORMWATER MANAGEMENT

6.1 Storm Drainage

As noted earlier, the site is divided into three distinct drainage areas. With a portion of the site draining to Woodbine Avenue and the remaining portion of the site draining toward Berczy Creek.

6.2 Stormwater Management

6.2.1 Design Criteria

The design criteria used for the stormwater management system for the proposed development were taken from the Town of Whitchurch-Stouffville Design Guidelines and MOE - SWM Planning and Design Manual.

The stormwater quantity control, quality control, and water balance measures are summarized below:

a. Quantity Control – Quantity control is to control the Post to Pre of peak flows for storm events up to and including 100-year.
b. Quality Control – As per MOE – SWM Planning and Design Manual, Water Quality Sizing Criteria – 80% TSS Removal.
c. Water Balance – Retention of 5mm rainfall runoff over impervious areas to be provided on-site.

6.2.2 Quantity Control

To facilitate the analysis, we have split the drainage area into 3 parts, i.e. Site Area 1 (West Site), Site Area 2 (Middle Site), and Site Area 3 (East Site).

It is proposed that the SWM Pond will be provided with control manhole equipped with orifice plate and weir to control the flows from the site to allowable flows (pre-development flows). The size of orifice plate and weir will be designed at the detailed design stage.

The following are the allowable flows, minimum permanent pool volume and minimum required storage of the SWM Ponds:

a. Site Area 1 (West Site):

Pre-Development Condition:

Catchment Area = 7.9132ha

Runoff Coefficient, C = 0.25

Time of Concentration = 36.18 minutes

Rainfall Intensity at 100-year = 81.75 mm/hr

Pre-Development Flow (Allowable Q at 100-year storm) = 0.449 m^3/s

Post-Development Condition:

Catchment Area = 7.9132ha

Runoff Coefficient, C = 0.34

Time of Concentration = 15 minutes (Time to peak to get a maximum storage)

Post-Development Flow (Q at 100-year storm) = 1.108 m^3/s

Minimum Storage Required = 593 m^3

SWM Pond No. 1:

Catchment Area = 7.9132ha

Water Quality Storage Volume Required = 689 m^3

Extended Detention Volume Required = 317 m^3

Permanent Pool Volume Required = 372 m^3

Permanent Pool Volume Provided = 430 m^3

Storage Volume Provided + Free Board= 1,130 m^3 (To finalize at detailed design stage)

b. Site Area 2 (Middle Site):

Pre-Development Condition:

Catchment Area = 13.6724ha

Runoff Coefficient, C = 0.25

Time of Concentration = 32.73 minutes

Rainfall Intensity at 100-year = 87.94 mm/hr

Pre-Development Flow (Allowable Q at 100-year storm) = 0.835 m^3/s

Post-Development Condition:

Catchment Area = 13.6724ha

Runoff Coefficient, C = 0.27

Time of Concentration = 11 minutes (Time to peak to get a maximum storage)

Post-Development Flow (Q at 100-year storm) = 1.819 m^3/s

Minimum Storage Required = 650 m^3

SWM Pond No. 2:

Catchment Area = 13.6724ha

Water Quality Storage Volume Required = 810 m^3

Extended Detention Volume Required = 547 m^3

Permanent Pool Volume Required = 263 m^3

Permanent Pool Volume Provided = 305 m^3

Storage Volume Provided + Free Board= 870 m^3 (To finalize at detailed design stage)

c. Site Area 3 (East Site):

Pre-Development Condition:

Catchment Area = 13.3867ha

Runoff Coefficient, C = 0.25

Time of Concentration = 39.21 minutes

Rainfall Intensity at 100-year = 77.04 mm/hr

Pre-Development Flow (Allowable Q at 100-year storm) = 0.716 m^3/s

Post-Development Condition:

Catchment Area = 13.3867ha

Runoff Coefficient, C = 0.27

Time of Concentration = 13 minutes (Time to peak to get a maximum storage)

Post-Development Flow (Q at 100-year storm) = 1.680 m^3/s

Minimum Storage Required = 753 m^3

SWM Pond No. 3:

Catchment Area = 13.3867ha

Water Quality Storage Volume Required = 882 m^3

Extended Detention Volume Required = 535 m^3

Permanent Pool Volume Required = 347 m^3

Permanent Pool Volume Provided = 422 m^3

Storage Volume Provided + Free Board= 1120 m^3 (To finalize at detailed design stage)

6.2.3 Quality Control

Quality control for the site will be facilitated by the proposed SWM Ponds. At detailed design stage, we will review on attaining the 80% total suspended solid (TSS) removal requirements of MOE.

6.2.4 Water Balance

As noted in the hydrogeological report, the site has a high-water table, and infiltration opportunities are limited. Standard infiltration methods such as underground tanks will not be practical due to high ground water table and the requirement to maintain the bottom of any infiltration facility to be a minimum of 1.0m above the high-water table. At the detailed design stage, we will review other options such a swales or gardens.

7.0 SEDIMENT AND EROSION CONTROL

Change is inherent to the land development process; the removal of vegetation, stripping of topsoil and alterations to topography and drainage patterns are common practices during the construction of infrastructure like buildings, roads, bridges, and sewers. Without careful planning and oversight focused on minimizing these changes and mitigating their impacts, construction projects can have adverse impacts on adjacent and downstream natural features and other property[1].

The discharge of high sediment loads to natural watercourses has significant impacts on receiving waters and aquatic habitat. Some specific examples include:

- Degradation of water quality
- Damage or destruction of fish habitat
- Increased flooding.

The following procedures shall be implemented to minimize the transportation of sediment onto the adjacent lands during construction:

- Silt sacks shall be installed at all catch basins on site and adjacent roads
- Roads will be inspected daily to determine if there are dirt and debris on the roadway and will be scraped and swept as required.

These facilities shall be maintained in good operating condition, including the removal of sediment as required, until the site has been paved and landscaped.

All Erosion and Sediment Control (ESC) Measures will be inspected regularly with a minimum inspection frequency to correspond with the schedule defined within the *"Erosion and Sediment Control Guide for Urban Construction"* prepared by the Toronto and Region Conservation Authority, December 2019, with a minimum frequency as follows:

- On a weekly basis
- Before and after every significant rainfall event

[1] *Erosion and Sediment Control Guide for Urban Construction*, December 2019, Toronto and Region Conservation Authority.

- After significant snow melt events
- Daily during extended rain or snow melt periods; and
- Monthly during inactive periods greater than 30 days in duration.

Deficiencies in the ESC Controls will be documented and will be corrected within 24 hours of initial identification.

The ESC monitoring program will continue until the site is fully restored.

8.0 CONCLUSIONS AND COMPLIANCE DECLARATION

This Functional Servicing and Stormwater Management Report describes the existing site conditions and the existing infrastructure in the vicinity of the subject site. The report also provides background information on the overall storm drainage and stormwater management requirements pertaining to the development of the site.

The proposed Grading and Servicing Plans provide a stormwater management strategy to facilitate the proposed development of the site in accordance with the requirements and policies of the City of Markham, Ontario Building Code, Toronto Region Conservation Authority, and MOE-SWM Planning and Design Manual.

The undersigned hereby confirm the following:

i. There are currently no sanitary sewers within Woodbine Avenue to service the site. It is proposed to install one septic system for the funeral home and one for the mausoleum.
ii. There is currently no municipal water service available on Woodbine Avenue to service the site. Private wells will be provided for each building.
iii. As noted, there is no municipal water supply to the site and therefore no fire protection is available. Each building will be provided with individual water tank for fire protection.
iv. Stormwater quality control can be achieved by controlling from Post to Pre. Control manholes complete with orifice plate, and weir will be provided to control the flows from post to pre-development conditions.
v. For water balance, a standard infiltration method is not feasible due to high water table. At the detailed design stage, we will review other options to comply with the requirements.
vi. Erosion and sediment control measures will be implemented and maintained at various stages of construction until adequate ground cover is established.
vii. The drainage of the adjacent lands will not be adversely affected by the proposed stormwater management provisions.

Prepared by:

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FIGURES

12,612 & 12,586 WOODBINE AVENUE
PROPOSED CEMETERY DEVELOPMENT
TOWN OF WHITCHURCH-STOUFFVILLE

LOCATION PLAN

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DATE: JUNE. 10th 2026	JOB No. W26027
DESIGN: S.N.	FIG. No. 1
SCALE: N.T.S.	

APPENDIX “A”

Fire Flow Calculations

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Project: W26027

FIRE FLOW CALCULATION

Project: Proposed Cemetery - Mausoleum

1 Using Fire Underwriter Survey Methodology, an estimate of the Fire Flow is give by the Formula: **$F = 220\ C\ \sqrt{A}$**

where:

F = Required Fire Flow in L/min

C = Coefficient related to the type of construction

A = The total floor area in m^2 (including all storeys but excluding basements at least 50% below grade)

Note: For fire resistive buildings, consider the two largest adjoining floor plus 50% of the remaining floors up to eight, when openings are inadequately protected. For adequately protected vertical openings consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors.

					Ground Floor Area:	9,840	m^2
Type of Construction:		Ordinary Const.	Coefficient:	1.00	Total Floor Area:	14,760	m^2
F =	26,728	L/min			Adequately Protected Vertical Openings:	Yes	
F =	**27,000**	**L/min**					

2 Determine the increase / decrease for occupancy and adjust the value in No. 1:

Occupany Contents:	Limited Combustible	Factor:	-15	%
F =	**22,950**	**L/min**		

3 Determine the decrease, if any, for automatic sprinkler protection and adjust the value in No. 2:

NFPA 13 Sprinkler	Yes	Reduction:	0	%
Standard Water Supply	Yes	Reduction:	10	%
Fully Supervised	Yes	Reduction:	10	%
		Total Reduction:	**20**	**%**
		Sprinkler Reduction:	**4,590**	**L/min**

4 Adjust the value in No. 2 for exposure:

	Separation (m)	Increase	
North	> 45m	0	%
South	> 45m	0	%
East	> 45m	0	%
West	> 45m	0	%
	Total Increase:	**0**	**%**
	Exposure Increase:	**0**	**L/min**

5 Estimated Fire Flow is value in No. 2 minus Sprinkler Reduction plus Exposure Increase and rounded to nearest 1000:

F =	18,360	L/min
F =	**18,000**	**L/min**

Prepared by: JRE
Checked by: SDL

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Project: W26027

FIRE FLOW CALCULATION

Project: Proposed Cemetery - Reception Building

1 Using Fire Underwriter Survey Methodology, an estimate of the Fire Flow is give by the Formula: **$F = 220\ C\ \sqrt{A}$**

where:

F = Required Fire Flow in L/min

C = Coefficient related to the type of construction

A = The total floor area in m^2 (including all storeys but excluding basements at least 50% below grade)

Note: For fire resistive buildings, consider the two largest adjoining floor plus 50% of the remaining floors up to eight, when openings are inadequately protected. For adequately protected vertical openings consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors.

					Ground Floor Area:	1,800	m^2
Type of Construction:		Ordinary Const.	Coefficient:	1.00	Total Floor Area:	2,700	m^2
F =	11,432	L/min			Adequately Protected Vertical Openings:	Yes	
F =	**11,000**	**L/min**					

2 Determine the increase / decrease for occupancy and adjust the value in No. 1:

Occupany Contents:	Limited Combustible	Factor:	-15	%
F =	**9,350**	**L/min**		

3 Determine the decrease, if any, for automatic sprinkler protection and adjust the value in No. 2:

NFPA 13 Sprinkler	Yes	Reduction:	0	%
Standard Water Supply	Yes	Reduction:	10	%
Fully Supervised	Yes	Reduction:	10	%
		Total Reduction:	**20**	**%**
		Sprinkler Reduction:	**1,870**	**L/min**

4 Adjust the value in No. 2 for exposure:

	Separation (m)	Increase	
North	> 45m	0	%
South	> 45m	0	%
East	> 45m	0	%
West	> 45m	0	%
	Total Increase:	**0**	**%**
	Exposure Increase:	**0**	**L/min**

5 Estimated Fire Flow is value in No. 2 minus Sprinkler Reduction plus Exposure Increase and rounded to nearest 1000:

F =	7,480	L/min
F =	**7,000**	**L/min**

Prepared by: JRE
Checked by: SDL

APPENDIX “B”

Storm Drainage and Stormwater Management Calculations

CANDEVCON GROUP INC.

SITE AREA NO. 1 (WEST SITE)
Pre-Development Condition - 100-year storm

A. Time of Concentration:

Highest Elevation (m) =	272.12
Lowest Elecvation (m) =	268.09
Distance (m) =	240
Runoff Coefficient, c =	0.25
Slope, S_w (%)=	1.679

For watershed, where the runoff coefficient is less than 0.40, use Airport Formula:

$tc = \{ 3.26 \times (1.1 - c) \times L^{0.5} \} / Sw^{0.33}$

$tc = \{ 3.26 \times (1.1 - 0.25) \times (240)^{0.5} \} / (1.679)^{0.33}$

tc = 36.18 min.

where:

tc =	Time of Concentration, min.
c =	Runoff Coefficient
Sw =	Watershed Slope, %
L =	Watershed Length, m

B. Allowable Flow @ 100-year Storm Event

Area (ha) =	7.9132	A =	2051.707
c =	0.25	B =	6.230
tc (min)	36.18	C =	0.860
I (mm/hour) =	$A / (tc + B)^C$		
I (mm/hour) =	81.75		
Q (m^3/s)	cIA / 360		
Q (m^3/s)	**0.449**		

CANDEVCON GROUP INC.

STORAGE CALCULATIONS - AREA NO. 1
100-year Post to 100-year Pre

Project: 12612 Woodbine Cemetery **Project No.: W26027**
Location: Whitchurch-Stoufville, Ontario

Post-Storm:

Return Period:		100-year
I (mm/hr)=		$A / (B+T)^C$
	A =	2051.707
	B =	6.230
	C =	0.860

Site Uncontrolled:

Area (ha) =	0.0000
C-Value	0.25
Tc (min) =	10
I (mm/hr)=	186.7
Uncontrolled, Q =	0

Pre-Storm:

Return Period:		100-year
I (mm/hr)=		$A / (B+T)^C$
	A =	2051.707
	B =	6.230
	C =	0.860

Allowable Flow:

Area (ha) =	7.9132
C-Value	0.25
Tc (min) =	36.18
I (mm/hr)=	81.75
Gross Q =	0.449
Less: Uncont. Q =	0.000
Net. Allow. Q =	0.449

Post-Development:

Cont. Area (ha) =	7.9132
C-Value =	0.34

Increment =	1

Time (minutes)	100-year I, (mm/hr)	100-year Q, (m^3/s)	Allowable Q, (m^3/s)	Stored Q, (m^3/s)	Storage ($m^{3)}$
10	186.7	1.396	0.449	0.946	567.8
11	177.4	1.326	0.449	0.876	578.4
12	169.0	1.263	0.449	0.814	585.8
13	161.4	1.206	0.449	0.757	590.4
14	154.5	1.155	0.449	0.706	592.6
15	148.2	1.108	0.449	0.659	592.7
16	142.5	1.065	0.449	0.616	591.0
17	137.2	1.025	0.449	0.576	587.6
18	132.3	0.989	0.449	0.540	582.7
19	127.8	0.955	0.449	0.506	576.5
20	123.6	0.924	0.449	0.474	569.2
21	119.7	0.894	0.449	0.445	560.8
22	116.0	0.867	0.449	0.418	551.5
23	112.6	0.841	0.449	0.392	541.3
24	109.4	0.817	0.449	0.368	530.2
25	106.4	0.795	0.449	0.346	518.5

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AREA NO. 1 (WEST SITE)
POND SIZING CALCULATIONS

A. Water Quality Storage Requirements:

Protection Level = Enhanced 80% long term suspended solid removal
From Table 3.2, MOE SWM Manual:

Percent Imperviousness:

Impervious Area (ha) =	1.0915
Pervious Area (ha) =	6.8217
Site Area (ha) =	7.9132
Percent Imperviousness (%)=	13.8

Water Qualty Storage Volume Requirements (m^3/ha):

13.8% =	X
35% =	140
55% =	190

By extrapolation:
(140 - X) / (35 - 13.8) = (190 - X) / (55 - 13.8)
Storage Volume - X, (m^3/ha) of
13.8% 87

Area = 7.9132ha

Water Quality Storage Volume = = 87 m^3/ha x 7.9132 ha
= 688.5 m^3

Extended Detention Volume = = 40 m^3/ha x 7.9132 ha
= 316.5 m^3

Permanent Pool Volume = = 688.5 - 316.5
= 372.0 m^3

B. Forebay Requirements:

i. Using Settling Method:

Distance = $\{ (r \times Qp) / Vs \}^{0.5}$

where:

r = 1:1 (Length to width ratio of the forebay)

Qp = Peak flow from the pond during design quality storm

'= 0.018m^3/s (estimated orifice discharge at 2-year water level)

Vs = 0.0003m/s (settling velocity for 0.15mm dia particles

Distance = $\{ (r \times Qp) / Vs \}^{0.5}$

Distance = $\{ (1 \times 0.018) / 0.0003 \}^{0.5}$

Distance = 7.74m

ii. Dispersion Length:

Distance = $8Q / d V_f$

where:

Q = Inlet flow rate (0.153m^3/s)

D = Depth of the permanent pool in the forebay (1.10m)

V_f = Design velocity in the forebay (0.50 m/s)

Q = cIA / 360

= (0.34 x 20.52 x 7.9132) / 360

= 0.153m^3/s

c = 0.34

I = 43C + 5.9 = 43 (0.34) + 5.9 = 20.52 mm/hour

A = 7.9132 ha

Distance = (8 x 0.153) / (1.10 x 0.50)

Distance = 2.23m

CANDEVCON GROUP INC.

SITE AREA NO. 2 (MIDDLE SITE)
Pre-Development Condition - 100-year storm

A. Time of Concentration:

Highest Elevation (m) =	274.37
Lowest Elecvation (m) =	267.69
Distance (m) =	260
Runoff Coefficient, c =	0.25
Slope, S_w (%)=	2.569

For watershed, where the runoff coefficient is less than 0.40, use Airport Formula:

$tc = \{ 3.26 \times (1.1 - c) \times L^{0.5} \} / Sw^{0.33}$

$tc = \{ 3.26 \times (1.1 - 0.25) \times (260)^{0.5} \} / (2.569)^{0.33}$

tc = 32.73 min.

where:

tc =	Time of Concentration, min.
c =	Runoff Coefficient
Sw =	Watershed Slope, %
L =	Watershed Length, m

B. Allowable Flow @ 100-year Storm Event

Area (ha) =	13.6724	A =	2051.707
c =	0.25	B =	6.230
tc (min)	32.73	C =	0.860
I (mm/hour) =	$A / (tc + B)^C$		
I (mm/hour) =	87.94		

Q (m^3/s) cIA / 360

Q (m^3/s) 0.835

CANDEVCON GROUP INC.

STORAGE CALCULATIONS - AREA NO. 2
100-year Post to 100-year Pre

Project: 12612 Woodbine Cemetery **Project No.: W26027**
Location: Whitchurch-Stoufville, Ontario

Post-Storm:

Return Period:		100-year
I (mm/hr)=		$A / (B+T)^C$
	A =	2051.707
	B =	6.230
	C =	0.860

Site Uncontrolled:

Area (ha) =	0.0000
C-Value	0.25
Tc (min) =	10
I (mm/hr)=	186.7
Uncontrolled, Q =	0

Pre-Storm:

Return Period:		100-year
I (mm/hr)=		$A / (B+T)^C$
	A =	2051.707
	B =	6.230
	C =	0.860

Allowable Flow:

Area (ha) =	13.6724
C-Value	0.25
Tc (min) =	32.73
I (mm/hr)=	87.94
Gross Q =	0.835
Less: Uncont. Q =	0.000
Net. Allow. Q =	0.835

Post-Development:

Cont. Area (ha) =	13.6724
C-Value =	0.27

Increment =	1

Time (minutes)	100-year I, (mm/hr)	100-year Q, (m^3/s)	Allowable Q, (m^3/s)	Stored Q, (m^3/s)	Storage ($m^{3)}$
10	186.7	1.915	0.835	1.080	648.0
11	177.4	1.819	0.835	0.984	649.4
12	169.0	1.733	0.835	0.898	646.4
13	161.4	1.655	0.835	0.820	639.6
14	154.5	1.584	0.835	0.749	629.5
15	148.2	1.520	0.835	0.685	616.5
16	142.5	1.461	0.835	0.626	601.0
17	137.2	1.407	0.835	0.572	583.2
18	132.3	1.357	0.835	0.522	563.5
19	127.8	1.310	0.835	0.475	541.9
20	123.6	1.267	0.835	0.432	518.7
21	119.7	1.227	0.835	0.392	494.1
22	116.0	1.190	0.835	0.355	468.2
23	112.6	1.155	0.835	0.320	441.0
24	109.4	1.122	0.835	0.287	412.8
25	106.4	1.091	0.835	0.256	383.6

CANDEVCON GROUP INC.

AREA NO. 2 (MIDDLE SITE)
POND SIZING CALCULATIONS

A. Water Quality Storage Requirements:

Protection Level = Enhanced 80% long term suspended solid removal
From Table 3.2, MOE SWM Manual:

Percent Imperviousness:

Impervious Area (ha) =	0.3692
Pervious Area (ha) =	13.3032
Site Area (ha) =	13.6724
Percent Imperviousness (%)=	2.7

Water Qualty Storage Volume Requirements (m^3/ha):

2.7% =	X
35% =	140
55% =	190

By extrapolation:
(140 - X) / (35 - 2.7) = (190 - X) / (55 - 2.7)
Storage Volume - X, (m^3/ha) of
2.7% 59.25

Area = 7.9132ha

Water Quality Storage Volume = = 59.25 m^3/ha x 13.6724 ha
= 810 m^3

Extended Detention Volume = = 40 m^3/ha x 13.6724 ha
= 547 m^3

Permanent Pool Volume = = 810 - 547
= 263.0 m^3

B. Forebay Requirements:

i. Using Settling Method:

Distance = $\{ (r \times Qp) / Vs \}^{0.5}$

where:

r = 1:1 (Length to width ratio of the forebay)

Qp = Peak flow from the pond during design quality storm

'= 0.018m^3/s (estimated orifice discharge at 2-year water level)

Vs = 0.0003m/s (settling velocity for 0.15mm dia particles

Distance = $\{ (r \times Qp) / Vs \}^{0.5}$

Distance = $\{ (1 \times 0.018) / 0.0003 \}^{0.5}$

Distance = 7.74m

ii. Dispersion Length:

Distance = $8Q / d V_f$

where:

Q = Inlet flow rate (0.180m^3/s)

D = Depth of the permanent pool in the forebay (1.10m)

V_f = Design velocity in the forebay (0.50 m/s)

Q = cIA / 360

= (0.27 x 17.51 x 13.6724) / 360

= 0.180m^3/s

c = 0.27

I = 43C + 5.9 = 43 (0.27) + 5.9 = 17.51 mm/hour

A = 13.6724 ha

Distance = (8 x 0.180) / (1.10 x 0.50)

Distance = 2.62m

CANDEVCON GROUP INC.

AREA NO. 3 (EAST SITE)
Pre-Development Condition - 100-year storm

A. Time of Concentration:

Highest Elevation (m) =	274.37
Lowest Elecvation (m) =	266.21
Distance (m) =	350
Runoff Coefficient, c =	0.25
Slope, S_w (%)=	2.331

For watershed, where the runoff coefficient is less than 0.40, use Airport Formula:

$tc = \{ 3.26 \times (1.1 - c) \times L^{0.5} \} / Sw^{0.33}$

$tc = \{ 3.26 \times (1.1 - 0.25) \times (350)^{0.5} \} / (2.331)^{0.33}$

tc = 39.21min.

where:

tc =	Time of Concentration, min.
c =	Runoff Coefficient
Sw =	Watershed Slope, %
L =	Watershed Length, m

B. Allowable Flow @ 100-year Storm Event

Area (ha) =	13.3867	A =	2051.707
c =	0.25	B =	6.230
tc (min)	39.21	C =	0.860
I (mm/hour) =	$A / (tc + B)^C$		
I (mm/hour) =	77.04		
Q (m^3/s)	cIA / 360		
Q (m^3/s)	**0.716**		

CANDEVCON GROUP INC.

STORAGE CALCULATIONS - AREA NO. 3
100-year Post to 100-year Pre

Project: 12612 Woodbine Cemetery **Project No.: W26027**
Location: Whitchurch-Stoufville, Ontario

Post-Storm:

Return Period:		100-year
I (mm/hr)=		$A / (B+T)^C$
	A =	2051.707
	B =	6.230
	C =	0.860

Site Uncontrolled:

Area (ha) =	0.0000
C-Value	0.25
Tc (min) =	10
I (mm/hr)=	186.7
Uncontrolled, Q =	0

Pre-Storm:

Return Period:		100-year
I (mm/hr)=		$A / (B+T)^C$
	A =	2051.707
	B =	6.230
	C =	0.860

Allowable Flow:

Area (ha) =	13.3867
C-Value	0.25
Tc (min) =	39.21
I (mm/hr)=	77.04
Gross Q =	0.716
Less: Uncont. Q =	0.000
Net. Allow. Q =	0.716

Post-Development:

Cont. Area (ha) =	13.3867
C-Value =	0.28

Increment =	1

Time (minutes)	100-year I, (mm/hr)	100-year Q, (m^3/s)	Allowable Q, (m^3/s)	Stored Q, (m^3/s)	Storage ($m^{3)}$)
10	186.7	1.944	0.716	1.228	736.9
11	177.4	1.847	0.716	1.131	746.3
12	169.0	1.759	0.716	1.043	751.1
13	161.4	1.680	0.716	0.964	752.1
14	154.5	1.609	0.716	0.893	749.7
15	148.2	1.543	0.716	0.827	744.5
16	142.5	1.483	0.716	0.767	736.6
17	137.2	1.428	0.716	0.712	726.4
18	132.3	1.378	0.716	0.661	714.2
19	127.8	1.330	0.716	0.614	700.2
20	123.6	1.287	0.716	0.571	684.6
21	119.7	1.246	0.716	0.530	667.5
22	116.0	1.208	0.716	0.492	649.1
23	112.6	1.172	0.716	0.456	629.4
24	109.4	1.139	0.716	0.423	608.6
25	106.4	1.107	0.716	0.391	586.8

CANDEVCON GROUP INC.

AREA NO. 3 (EAST SITE)
POND SIZING CALCULATIONS

A. Water Quality Storage Requirements:

Protection Level = Enhanced 80% long term suspended solid removal
From Table 3.2, MOE SWM Manual:

Percent Imperviousness:

Impervious Area (ha) =	0.7162
Pervious Area (ha) =	12.6705
Site Area (ha) =	13.3867
Percent Imperviousness (%)=	5.35

Water Qualty Storage Volume Requirements (m^3/ha):

5.35% =	X
35% =	140
55% =	190

By extrapolation:
(140 - X) / (35 - 5.35) = (190 - X) / (55 - 5.35)
Storage Volume - X, (m^3/ha) of

5.35%	65.875

Area = 7.9132ha

Water Quality Storage Volume = = 65.875 m^3/ha x 13.3867 ha
= 882m^3

Extended Detention Volume = = 40 m^3/ha x 13.3867 ha
= 535m^3

Permanent Pool Volume = = 882 - 535
= 347.0 m^3

B. Forebay Requirements:

i. Using Settling Method:

Distance = $\{ (r \times Qp) / Vs \}^{0.5}$

where:

r = 1:1 (Length to width ratio of the forebay)

Qp = Peak flow from the pond during design quality storm

'= 0.018m^3/s (estimated orifice discharge at 2-year water level)

Vs = 0.0003m/s (settling velocity for 0.15mm dia particles

Distance = $\{ (r \times Qp) / Vs \}^{0.5}$

Distance = $\{ (1 \times 0.018) / 0.0003 \}^{0.5}$

Distance = 7.74m

ii. Dispersion Length:

Distance = $8Q / d V_f$

where:

Q = Inlet flow rate (0.187m^3/s)

D = Depth of the permanent pool in the forebay (1.10m)

V_f = Design velocity in the forebay (0.50 m/s)

Q = cIA / 360

= (0.28 x 17.94 x 13.3867) / 360

= 0.187m^3/s

c = 0.28

I = 43C + 5.9 = 43 (0.28) + 5.9 = 17.94 mm/hour

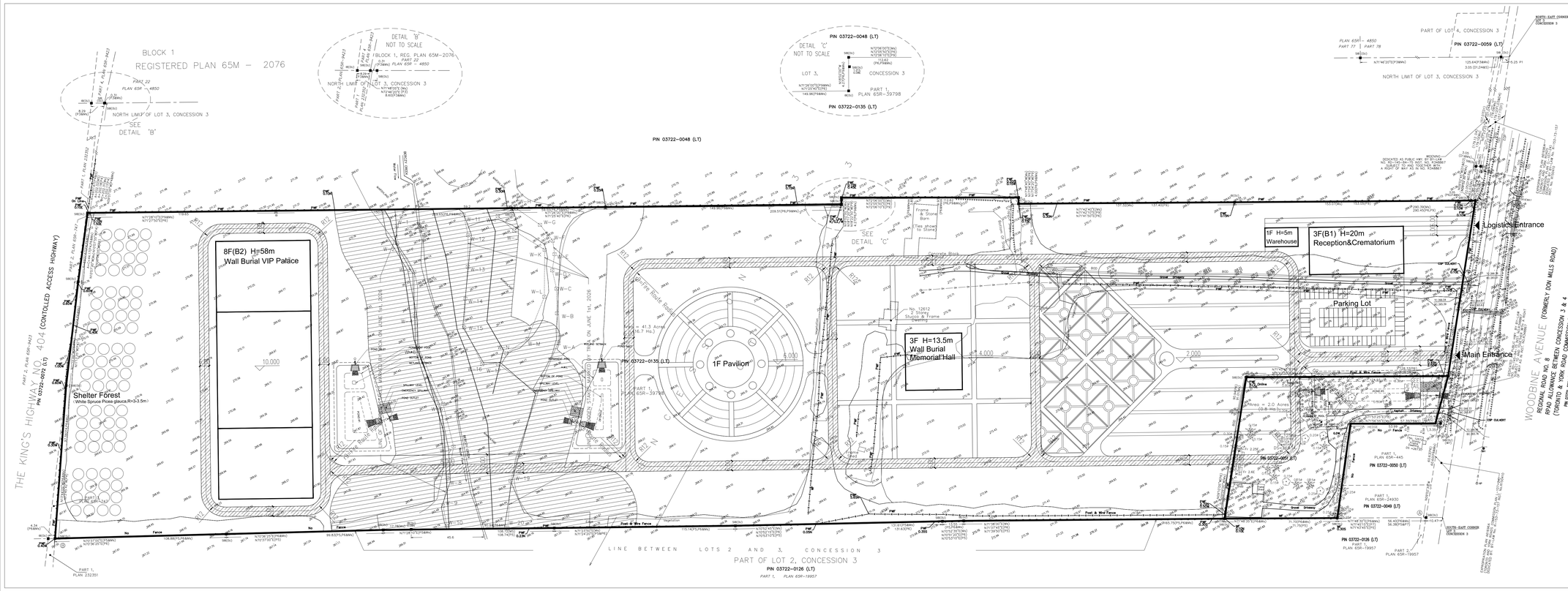
A = 13.3867 ha

Distance = (8 x 0.188) / (1.10 x 0.50)

Distance = 2.72m

APPENDIX “C”

Reference Drawings



PLAN OF SURVEY OF
PLAN OF PART OF LOT 3, CONCESSION 3
TOWN OF WHITCHURCH–STOUFFVILLE
(GEOGRAPHIC TOWNSHIP OF WHITCHURCH COUNTY OF YORK)
REGIONAL MUNICIPALITY OF YORK

SCALE 1:750
0 5 10 15 20 25 50 75 Metres

Metric
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Legend

■	DENOTES	SURVEY MONUMENT FOUND
□	•	SURVEY MONUMENT SET
SIB	•	STANDARD IRON BAR
SSIB	•	SHORT STANDARD IRON BAR
R	•	ROUND
RB	•	REBAR
CC	•	CUT CROSS
WIT	•	WITNESS
Ms	•	MEASURED
S	•	SET
OU	•	ORIGIN UNKNOWN
D1	•	BY–LAW No. RO–145–84–73 INST. No. R348867
D2	•	INST. No. R813620
D3	•	INST. No. R813618
D4	•	INST. No. 65R–8294/4
P1	•	CONSERVATION PLAN A616964 (TORONTO AND YORK COMMISSION PLAN L–107–24 PLAN 65R–4852)
P2	•	PLAN 65R–4852
P3	•	REGISTERED PLAN 65M–2076
P4	•	PLAN 65R–9423
P5	•	PLAN 65R–19957
P6	•	PLAN 65R–39798
P7	•	PLAN 65R–24930
P8	•	PLAN 65R–445
P9	•	PLAN OF SURVEY BY J.D. BARNES LTD. O.L.S., DATED FEBRUARY 7th, 2020 (UPDATED NOV. 1st, 2021)
CLF	•	CHAIN LINK FENCE
IF	•	IRON FENCE
PWF	•	POST & WIRE FENCE
WF	•	WIRE FENCE
⊙	•	DECIDUOUS TREE
⊛	•	CONIFEROUS TREE
TOS	•	TOP OF SLOPE
BOS	•	BOTTOM OF SLOPE
BOD	•	BOTTOM OF DITCH
EOP	•	EDGE OF PAVEMENT
EP	•	EDGE OF PAVE
TE	•	TIE TO ENGINE
IWW	•	INTERLOCKING BRICK WALKWAY
RW	•	RETAINING WALL
DW	•	DRIVEWAY
MB	•	MAIL BOX
HP	•	HYDRO POLE
GW	•	GUY WIRE
OH	•	OVERHEAD UTILITY WIRES
MH	•	MANHOLE
GM	•	GAS METER
CB	•	CATCH BASIN
DS	•	DOOR SILL ELEVATION
CSP	•	CORRUGATED STEEL PIPE
BC	•	BOTTOM OF CULVERT ELEVATION
TC	•	TOP OF CULVERT ELEVATION
W	•	WOODEN STAKES SET BY TRCA
TRCA	•	TORONTO & REGION CONSERVATION AUTHORITY
N,S,E,W	•	NORTH, SOUTH, EAST, WEST

Benchmark
TOWN OF WHITCHURCH–STOUFFVILLE,
Benchmark No.0082018063, Elevation 272.787m

Integration

DISTANCES SHOWN ON THIS PLAN ARE GROUND DISTANCES AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9997041.

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK OBSERVATIONS AND ARE REFERRED TO THE CENTRAL MERIDIAN OF UTM ZONE 17 (81°WEST LONGITUDE), NAD83–CSRS (2010.0).

FOR BEARING COMPARISONS THE FOLLOWING COUNTER–CLOCKWISE ROTATIONS WERE APPLIED:

D1,D3,P4&P1:	–01°06'40"
D2:	–01°05'32"
P2&P3:	–01°02'30"
P4&P5:	–01°02'20"
P7&P8:	–01°05'32"

OBSERVED REFERENCE POINTS DERIVED FROM GPS OVSERVATIONS USING A REAL TIME NETWORK AND ARE REFERRED TO UTM ZONE 17, NAD83–CSRS (2010.0)
COORDINATES TO URBAN ACCURACY PER SEC. 14 (2) O. REG. 216/10

POINT ID	NORTHING	EASTING
A	4857323.205	629958.510
B	4857242.814	629133.437

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE–ESTABLISH CORNERS OF BOUNDARIES SHOWN ON THIS PLAN.

Revision Note
LINE OF WOODEN STAKES MARKED BY TRCA ADDED ON JUNE 18th, 2026

APY SURVEYING INC.
Ontario Land Surveyor
8220 BAYVIEW AVENUE, UNIT 202, THORNHILL, L3T 2S2
TELEPHONE (416) 567–2288 EMAIL jmoss_yorkdistrict@rogers.com
DRAWING: 25–018–TB.DWG PROJECT: 25–018

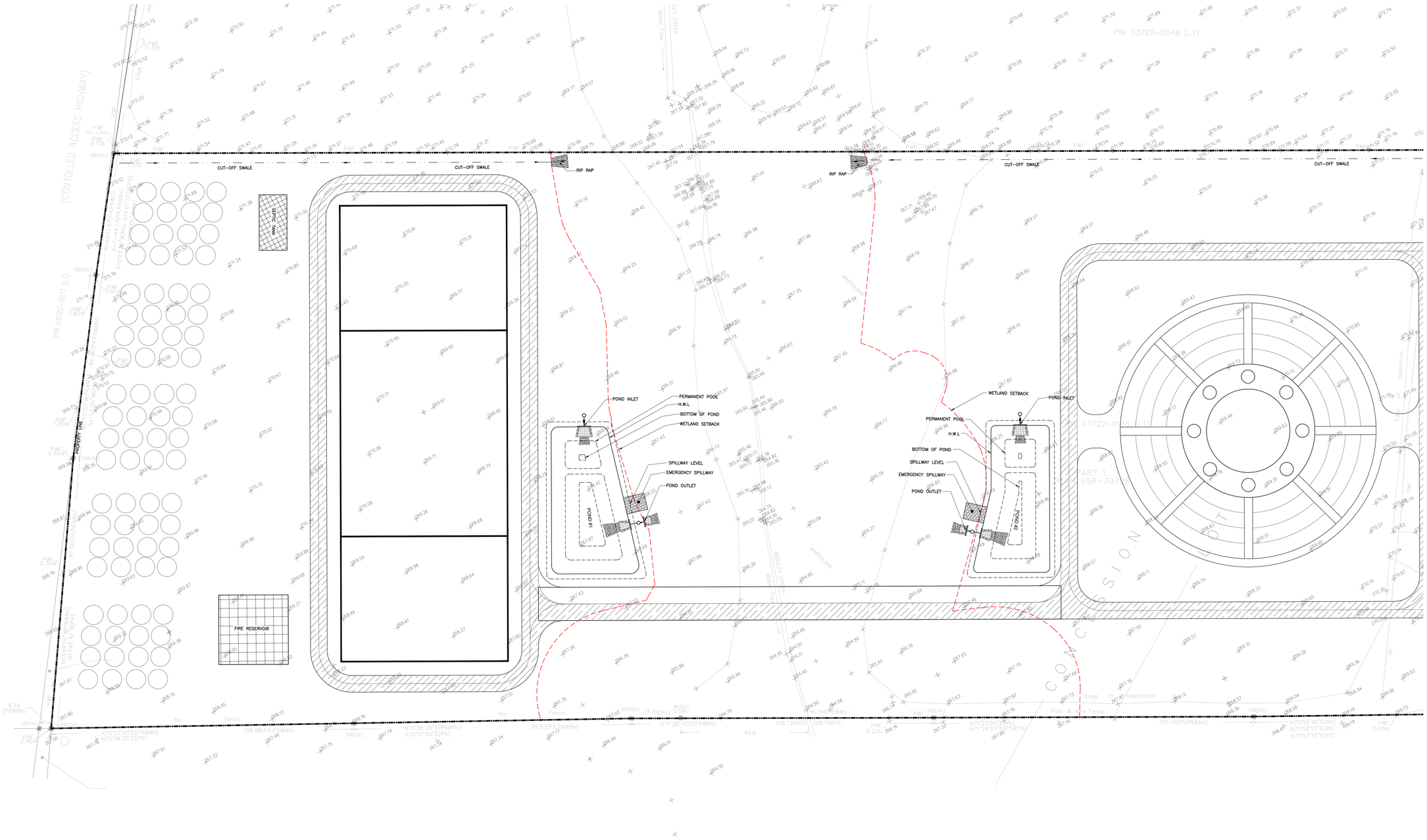
PLAN A

Disruption Area=50%（including the bridges in the wetland）

- Site Entrance
- Fire Access Route(Width=6m,Inner Radius=9m)
- Road Centreline
- Road Radius
- Fire Road Radius
- Road Width
- 3F Building Floors
- H(m) Building Heights
- 404 Highway Setback
- Non-Developable Area
- Shelter Forest

APPENDIX “D”

Candevcon Drawings



KEY PLAN

LEGEND:

PROPERTY LINE

EXISTING ELEVATION

LEGAL DESCRIPTION:

PLAN OF SURVEY OF PLAN OF PART OF LOT 3, CONCESSION 3 TOWN OF WHITCHURCH–STOUFFVILLE

BENCHMARK INFORMATION:

TOWN OF WHITCHURCH–STOFFVILLE.
BENCHMARK No.00820118063 WITH AN ELEVATION OF 272.787m.

TOPOGRAPHIC INFORMATION:

TOPOGRAPHIC INFORMATION TAKEN FROM PROJECT No. 25–018, DRAWING 25–018–TB, DATED SEPTEMBER 11 2025, BY APY SURVEYING INC.

NO.	DESCRIPTION	DATE	BY
5			
4			
3			
2			
1	PRELIMINARY DESIGN	2026.07.10	JRE

REVISIONS

TOWN OF WHITCHURCH–STOUFFVILLE

CANDEVCON GROUP INC.
CONSULTING ENGINEERS AND PLANNERS
9084 GOREWAY DRIVE
BRAMPTON ON. L6P 0M7
TEL (905) 794-0600
FAX (905) 794-0611

REGISTERED PROFESSIONAL ENGINEER
J. E. EKIDAYA
100085341
July 10, 2026
PROVINCE OF ONTARIO

CONSTRUCTION NORTH

PROPOSED CEMETERY

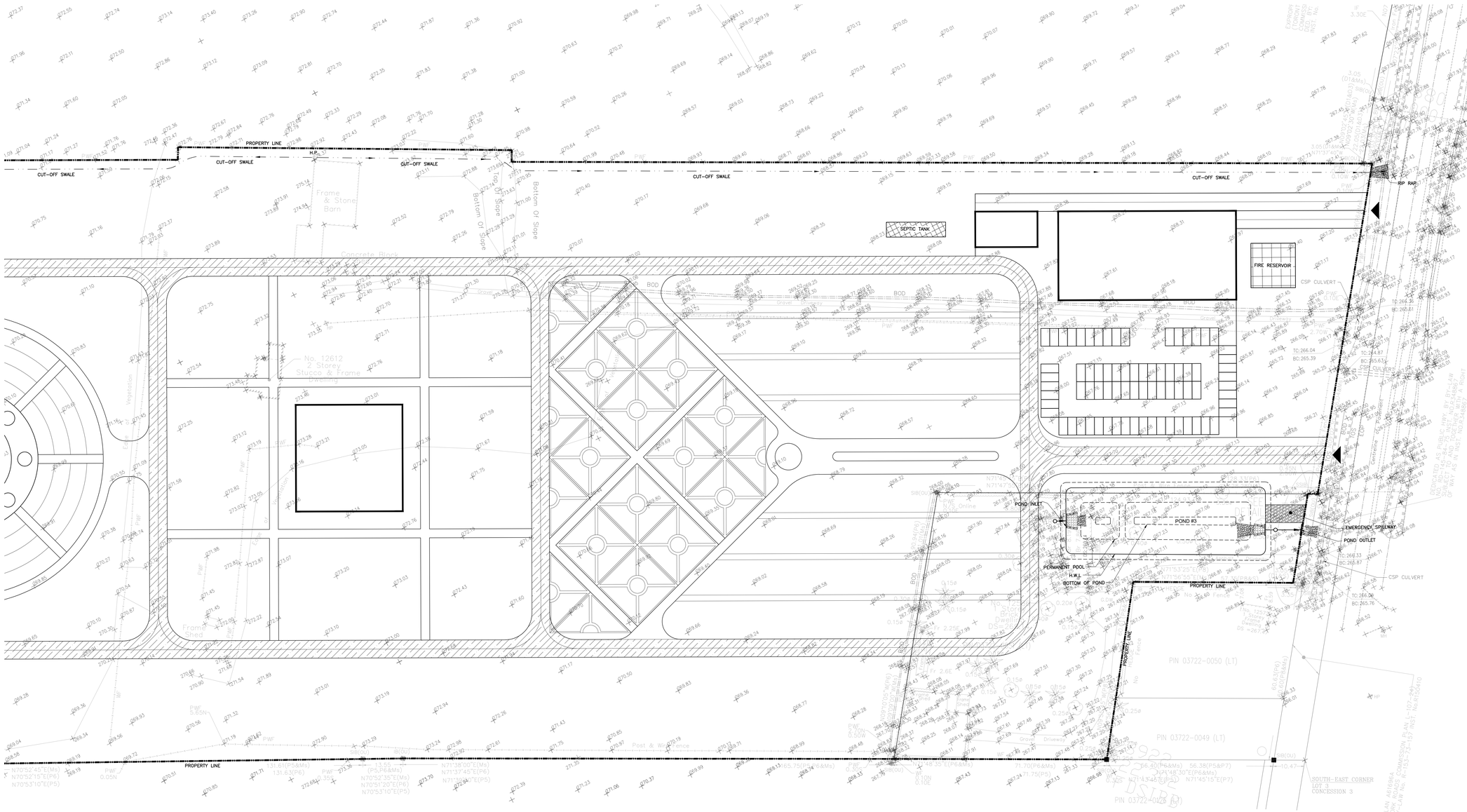
12612 AND 12586
WOODBINE AVENUE
WHITCHURCH–STOFFVILLE, ONTARIO

REGION FILE No.

SHEET TITLE:

SITE SERVICING PLAN

DRAWN BY: R.V.M.	PROJECT No. W26027
CHECKED BY: J.R.E.	DRAWING No. SS-1
SCALE: 1:500	
DATE: JUN. 23, 2026	1



KEY PLAN

LEGEND:

PROPERTY LINE

270.46 EXISTING ELEVATION

LEGAL DESCRIPTION:

PLAN OF SURVEY OF PLAN OF PART OF LOT 3, CONCESSION 3 TOWN OF WHITCHURCH–STOUFFVILLE

BENCHMARK INFORMATION:

TOWN OF WHITCHURCH–STOFVILLE.
BENCHMARK No.00820118063 WITH AN ELEVATION OF 272.787m.

TOPOGRAPHIC INFORMATION:

TOPOGRAPHIC INFORMATION TAKEN FROM PROJECT No. 25–018, DRAWING 25–018–TB, DATED SEPTEMBER 11 2025, BY APY SURVEYING INC.

NO.	DESCRIPTION	DATE	BY
1	PRELIMINARY DESIGN	2026.07.10	JRE
2			
3			
4			
5			

REVISIONS

TOWN OF WHITCHURCH–STOUFFVILLE

CANDEVCON GROUP INC.
CONSULTING ENGINEERS AND PLANNERS
8308 GOREWAY DRIVE
BRAMPTON ON. L6P-0M7
TEL (905) 794-0600
FAX (905) 794-0611

PROFESSIONAL ENGINEER
J.R. ENDAYA
100085341
JULY 10, 2026
PROVINCE OF ONTARIO

CONSTRUCTION NORTH

PROPOSED CEMETERY

12612 AND 12586
WOODBINE AVENUE
WHITCHURCH–STOFVILLE, ONTARIO

REGION FILE No.

SHEET TITLE:

SITE SERVICING PLAN

DRAWN BY: R.V.M.	PROJECT No. W26027
CHECKED BY: J.R.E.	DRAWING No. SS-2
SCALE: 1:500	
DATE: JUN. 23, 2026	1