

MEMORANDUM

DATE: FEBRUARY 18, 2025

TO: JASDEEP BRAR

FROM: MELANIE SCHROEDER, P.ENG.

RE: 541 SOMME STREET
WATER BUDGET ASSESSMENT
NOVATECH PROJECT NO.: 124111

CC: GREG MACDONALD, JEFFERY KELLY, DEREK KULYK

1.0 INTRODUCTION

This memorandum has been prepared to provide a water budget assessment for the proposed office/warehouse building and outdoor storage area located at 541 Somme Street within the Hawthorne Industrial Park in the City of Ottawa. The site location is shown in **Figure 1** Key Plan.

1.1 Background

The site is approximately 0.801 hectares (ha) in area and is currently vacant, consisting of a meadow/grass area with a small, treed portion on the east side of the site. The site is bordered by Somme Street to the west, the Hawthorne Industrial Park SWMF to the north, a vacant undeveloped lot to the south and a bedrock resource area to the east. The existing ground surface of most of the subject site is ranges between approximately 1 to 2% slope. According to the “*Geotechnical Investigation Proposed Commercial Storage Building, 541 Somme Street, Ottawa, Ontario*” report (PG7327-1), prepared by Paterson Group Inc., dated November 25, 2024, the on-site soils are a mix of silty sand to sandy silt. **Figure 2** Existing Conditions shows the existing site conditions.

The proposed development is intended to be an office/ warehouse. The building will be a warehouse and office with second floor mezzanine. A lean-to will project towards the south lot line. A surface parking lot is proposed in front of the proposed building, with access to the site via two entrances from Somme Street. Refer to **Figure 3** for a copy of the latest Site Plan (by Novatech) showing the general layout of the proposed development.

A summary of the pre- and post-development land use is provided in **Table 1**.

Table 1: Land Use Summary

Scenario	Site Area (ha)	Land Use as Percent of Site Area			
		Forest	Meadow	Urban Lawn	Impervious Areas
Pre-Development	0.801	19.5%	80.5%	0.0%	0.0%
Post-Development	0.801	19.5%	0.0%	24.7%	55.8%

2.0 WATER BUDGET CALCULATIONS

The Thornthwaite-Mather (1957) water balance methodology was used to determine conceptual values for precipitation, evapotranspiration, runoff, and infiltration from the proposed development. Water budget calculations have been provided as attachments. A summary of the results is provided in **Table 2**.

Table 2: Water Budget Summary

Scenario	Precipitation (mm/yr)	ET (mm/yr)	Infiltration (mm/yr)	Runoff (mm/yr)
Pre-Development	920	570	199	150
Post-Development	920	536	101	283
Difference	0	-34	-98	132

Due to the increase in impervious area, there is a decrease in annual evapotranspiration and infiltration and an increase in annual runoff. The annual infiltration from the site will decrease by 98 mm/year (or 788 m³/year). The summary for annual infiltration volume is provided in **Table 3**.

Table 3: Infiltration Results Summary

Infiltration Depth (mm/yr)			Infiltration Volume (m ³ /yr)		
Pre-Dev.	Post-Dev.	Difference	Pre-Dev.	Post-Dev.	Difference
199	101	-98	1,594	806	-788

It should be noted that these infiltration results are conservative due to assumptions made in the calculations for the impervious areas. A considerable portion of the calculated impervious area is gravel which will have some capacity for infiltration compared to a paved surface. The site also outlets to roadside ditches through on-site grassed swales which will also provide an opportunity for infiltration for the impervious runoff generated from the site.

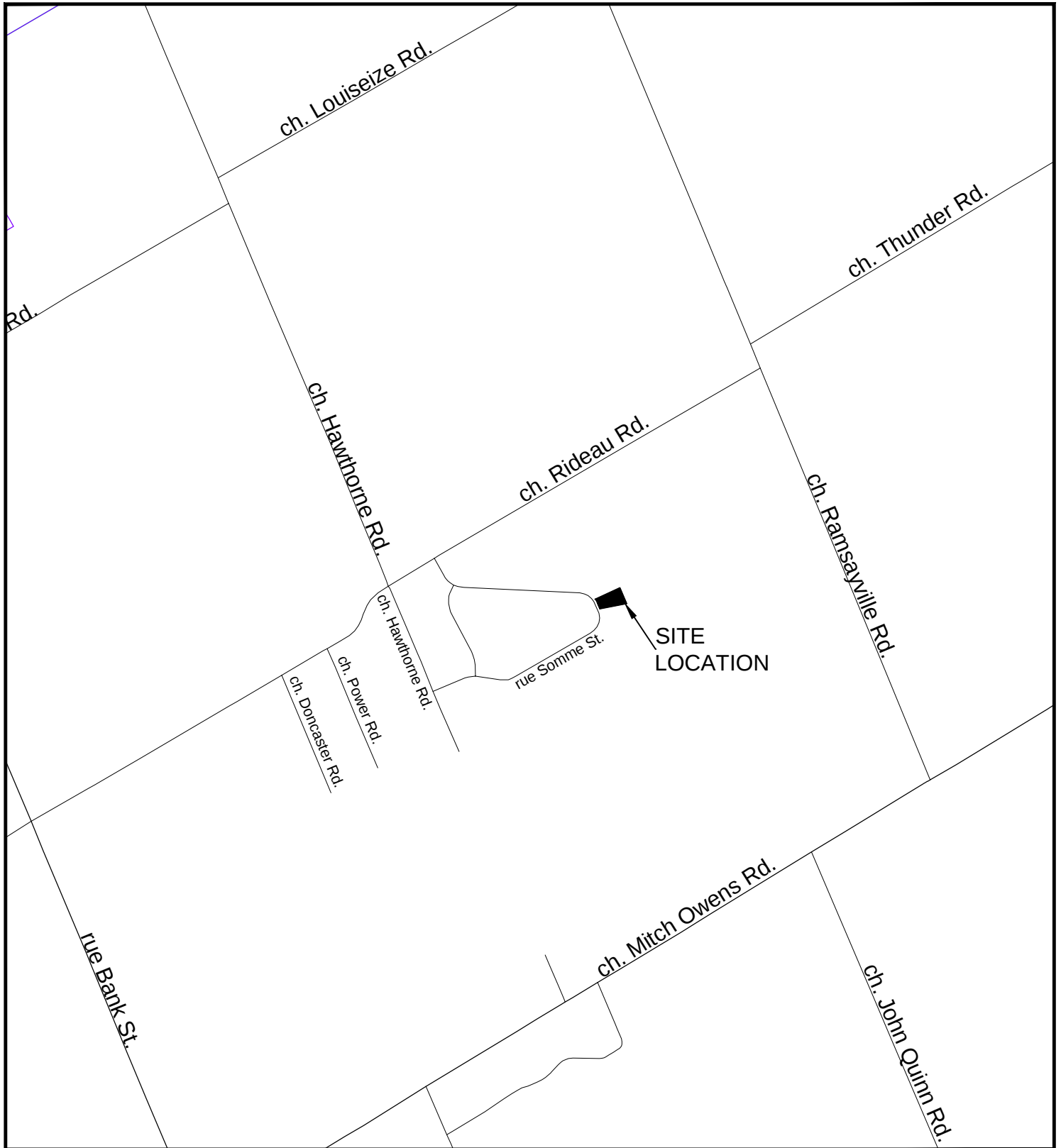
3.0 CONCLUSIONS

Based on the water budget assessment, there will be a decrease in infiltration of 98 mm/year (or 788 m³/year). This result is conservative due to the following assumptions:

- Not accounting for the infiltration capacity of the gravel area by assuming it is fully impervious; and,
- Not accounting for the potential infiltration of impervious runoff outletting through grassed ditches.

Attachments:

1. Figure 1: Key Plan
2. Figure 2: Existing Conditions
3. Figure 3: Site Plan
4. Figure SRF: Surface Types
5. Water Budget Calculations



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CITY OF OTTAWA
541 SOMME STREET

KEY PLAN

SCALE

N.T.S

DATE

FEB 2025

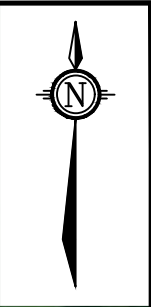
JOB

124111

FIGURE

FIGURE 1

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LEGEND

--- SITE BOUNDARY

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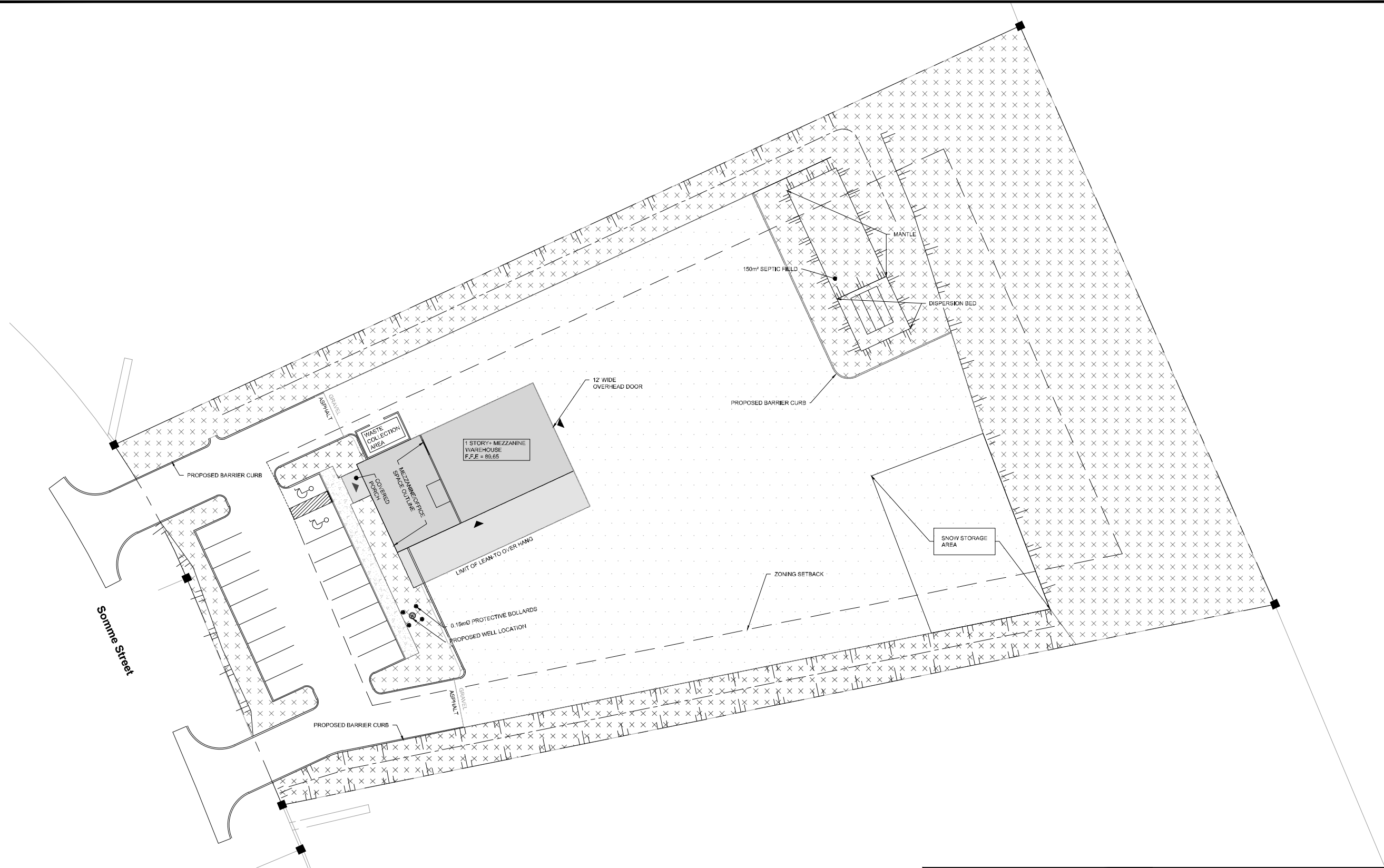
CITY OF OTTAWA
541 SOMME STREET

EXISTING CONDITIONS

SCALE 1 : 1250

DATE	JOB	FIGURE
FEB 2025	124111	FIGURE 2

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LEGEND

	SITE BOUNDARY		3:1 (MAX) TERRACING
	BUILDING		PROPOSED SWALE
	GRAVEL AREA		GRASS AREA

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541 SOMME STREET

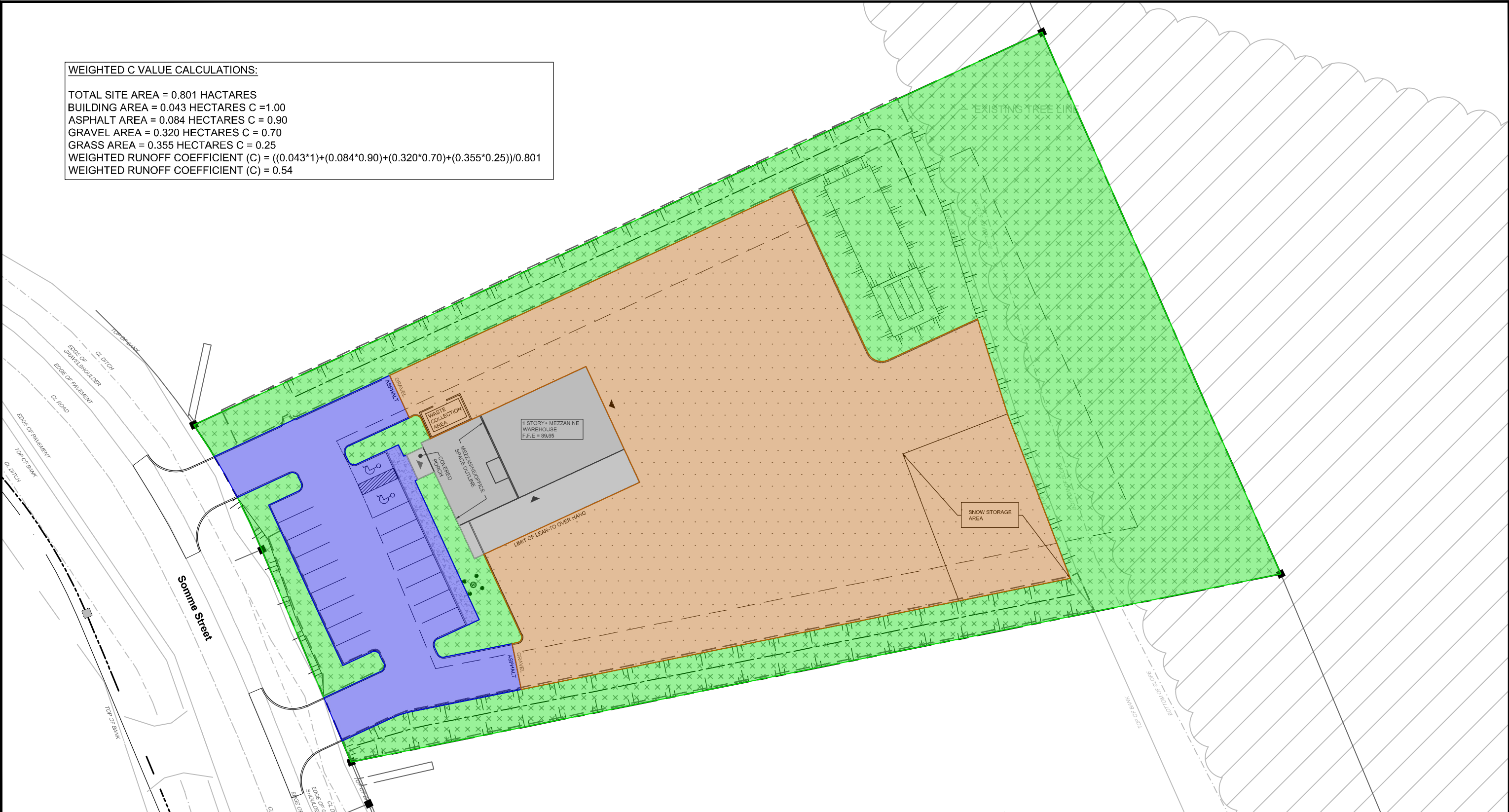
SITE PLAN

SCALE 1 : 500

DATE	JAN 2025	JOB	124111	FIGURE	FIGURE 3
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WEIGHTED C VALUE CALCULATIONS:

TOTAL SITE AREA = 0.801 HACTARES
BUILDING AREA = 0.043 HECTARES C = 1.00
ASPHALT AREA = 0.084 HECTARES C = 0.90
GRAVEL AREA = 0.320 HECTARES C = 0.70
GRASS AREA = 0.355 HECTARES C = 0.25
WEIGHTED RUNOFF COEFFICIENT (C) = ((0.043*1)+(0.084*0.90)+(0.320*0.70)+(0.355*0.25))/0.801
WEIGHTED RUNOFF COEFFICIENT (C) = 0.54



LEGEND



BUILDING = 0.043 HECTARES
ASPHALT = 0.084 HECTARES
GRAVEL = 0.320 HECTARES



GRASS = 0.355 HECTARES



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541 SOMME STREET

SURFACE TYPES

SCALE 1 : 500
DATE FEB 2025 JOB 124111 FIGURE SRF

541 Somme Street (124111)
Water Budget Calculations



Pre-Development

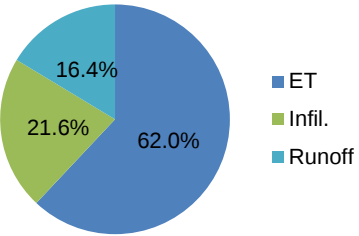
Drainage Area 0.801 ha

Landuse	% of Watershed	Watershed Area	% of Pervious Area within Watershed	Water Holding Capacity	Infiltration Factor	Factor	Condition	Infiltration Factor
Mature Forest	19.5%	0.156	19.5%	350 mm	0.20	Topography	Rolling to Hilly Land	0.15
Pasture/Meadow	80.5%	0.645	80.5%	200 mm	0.10	Soils	Silty sand / sand silt	0.30
Urban Lawns	0.0%	0.000	0.0%	100 mm	0.10		Pervious Infiltration Factor	0.57
Imp. Areas	0.0%	0.000	-	0 mm	0.00		Weighted Infiltration Factor	0.57
Average				229 mm	0.12		Runoff Factor	0.43

*table 3.1 MOE

Total Precipitation (mm)
Potential Evapotranspiration (mm)
Total Precip. - Potential ET (mm)
Soil Moisture Storage (mm)
Change in Soil Moisture Storage (mm)
Deficit (mm)
Actual Evapotranspiration (mm)
Water Surplus (mm)
Annual Infiltration (mm)
Annual Runoff (mm)

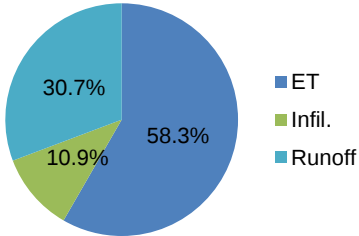
Ottawa (6105976) 1981-2010													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
P	63	50	58	71	87	93	84	84	93	86	83	70	920
PE	0	0	0	0	112	129	136	115	72	43	0	0	607
P-PE	63	50	58	71	-25	-36	-52	-31	21	43	83	70	
ST	229	229	229	229	205	175	140	122	143	185	229	229	
ΔST	0	0	0	0	-24	-30	-36	-18	21	43	44	0	
D	0	0	0	0	1	6	16	13	0	0	0	0	37
AE	0	0	0	0	110	123	120	101	72	43	0	0	570
S	63	50	58	71	0	0	0	0	0	0	39	70	349
I													199
R													150



Post-Development

Drainage Area 0.801 ha

Landuse	% of Watershed	Watershed Area	% of Pervious Area within Watershed	Water Holding Capacity	Infiltration Factor	Factor	Condition	Infiltration Factor
Mature Forest	19.5%	0.156	44.1%	350 mm	0.20	Topography	Rolling to Hilly Land	0.15
Pasture/Meadow	0.0%	0.000	0.0%	200 mm	0.10	Soils	Silty sand / sand silt	0.30
Urban Lawns	24.7%	0.198	55.9%	100 mm	0.10		Pervious Infiltration Factor	0.59
Imp. Areas	55.8%	0.447	-	0 mm	0.00		Weighted Infiltration Factor	0.26
Average				93 mm	0.14		Runoff Factor	0.74



Total Precipitation (mm)
Potential Evapotranspiration (mm)
Total Precip. - Potential Evap. (mm)
Soil Moisture Storage (mm)
Change in Soil Moisture Storage (mm)
Deficit (mm)
Actual Evapotranspiration (mm)
Water Surplus (mm)
Annual Infiltration (mm)
Annual Runoff (mm)

Ottawa (6105976) 1981-2010													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
P	63	50	58	71	87	93	84	84	93	86	83	70	920
PE	0	0	0	0	112	129	136	115	72	43	0	0	607
P-PE	63	50	58	71	-25	-36	-52	-31	21	43	83	70	
ST	93	93	93	93	71	48	27	19	40	83	93	93	
ΔST	0	0	0	0	-22	-23	-21	-8	21	43	10	0	
D	0	0	0	0	3	13	31	23	0	0	0	0	71
AE	0	0	0	0	109	116	105	92	72	43	0	0	536
S	63	50	58	71	0	0	0	0	0	0	72	70	383
I													101
R													283

- Notes:
- 1) Uses measured average monthly total precipitation and potential evaporation data (converted to evapotranspiration based on a cover coefficient of 1.0).
 - 2) Actual evapotranspiration and water surplus calculated using the Thornthwaite & Mather (1957) methodology.
 - 3) Runoff and infiltration calculated as per the MOE SWM Planning and Design Manual (2003) methodology.
 - 4) Impervious areas consist of rooftops, roads, and driveways.

Annual Summary

Scenario	Precipitation	ET		Surplus		Infil.		Runoff	
Pre-Development	920 mm	570 mm	62.0%	349 mm	38.0%	199 mm	21.6%	150 mm	16.4%
Post-Development	920 mm	536 mm	58.3%	383 mm	41.7%	101 mm	10.9%	283 mm	30.7%
Difference (Post - Pre)	0 mm	-34 mm	-3.7%	34 mm	3.7%	-98 mm	-10.7%	132 mm	14.4%

Thornthwaite, C.W., and Mather, J.R. 1957. Instructions and tables for computing potential evapotranspiration and the water balance. Centerton, N.J., Laboratory of Climatology, Publications in Climatology, v.10, no.3, p.185-311

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo- transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
<i>* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.</i>						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	