

Self-Storage Development

Stormwater Management Report

Project Location:

Road 120
St. Marys, Ontario

Prepared For:

C&C Stonetown Management

Prepared by:

GRIT Engineering Inc.
169 Huron Street, Ontario

November 16, 2021

GRIT File No: GE021-21



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1.0 Introduction

GRIT Engineering Inc. (GRIT) was retained by C&C Stonetown Management to design the private stormwater management system for the proposed self-storage development to satisfy the site plan approval requirements set forth by the Town of St. Marys.

The proposed development is located on the south side of Highway 9 and west of Road 120 in St. Marys, Ontario and is approximately 2.04 hectares in size. The site is bounded by existing Highway Commercial (zone C3-7) to the west, existing agricultural (zone A) to the east, existing agricultural (zone A-16) to the south and existing Highway Commercial (zone C3) to the north. Figure 1 provides a 2018 aerial image, illustrating the site location and surrounding characteristics.

The Stormwater Management (SWM) report will provide the necessary background and proposed design information to address the site plan approval requirements for the subject site. Furthermore, this SWM report is to be read in conjunction with the included GRIT engineering design drawings, which provides details the proposed design and construction details.



IMAGE SOURCE: MICROSOFT BING MAPS



169 HURON STREET
STRATFORD, ON
N5A 5S9
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Legend

Project:
ROAD 120
SELF STORAGE UNITS

Figure Title:
SITE LOCATION
ST. MARYS, ON.

Figure No:

FIG1



2.0 Design Requirements for Approval

The Town of St. Marys as part of the Site Plan Approval for the development requires the proposed development to meet the following stormwater management design requirements:

Stormwater Quantity Control Requirement

In accordance with Section 6.2.4 of the May 2017 Town of St. Marys Engineering Design Guidelines and Supplemental Specifications for Municipal Services, the post development peak flow rates are to be controlled to the corresponding predevelopment (allowable) peak flow rates for the 2 year through to the 250 year storm events.

Stormwater Quality Control Requirement

In accordance with Section 6. required "Enhanced" Level of treatment as defined in the Ministry of the Environment, Conservation and Parks (MECP) Stormwater Management Planning and Design Manual. It is recommended that the proposed site be designed to promote natural removal of sediment for post 2.1 of the Town of St. Marys Engineering Design Guidelines and Supplemental Specifications for Municipal Services, the post development flows are to be designed to meet the development flows.

3.0 Stormwater Management Design

3.1 Design Approach

Calculation Method

In accordance with Section 5.3 of the Town of St. Marys Engineering Design Guidelines and Supplemental Specifications for Municipal Services, rational method calculations are required. Therefore, GRIT will use the rational method calculations to review the predevelopment (allowable) and post development peak flow rates. When using the rational method calculations, The Town of St. Marys requires the use of time of concentration from Section 5.3.2, and runoff coefficient parameters from Section 5.3.3.

Site Review Methodology

To complete a stormwater management design for the development that achieves the previously noted requirements set forth by the Town of St. Marys, GRIT will complete the following:

- Review of the existing drainage and overland flow route patterns and site characteristics.
- Calculate the predevelopment (allowable) runoff coefficients and peak flow rates for the 2, 5, 10, 25, 50, 100 and 250 year storm events.
- Calculate the post development runoff coefficients and peak flow rates for the 2, 5, 10, 25, 50, 100 and 250 year storm events.
- Determine the onsite quantity control structures based on proposed site characteristics and accurately calculate the size requirements.
- Determine the required onsite stormwater storage volume and surface ponding elevations.
- Review and evaluate stormwater quality control techniques and structures.

3.2 Predevelopment Condition

In a predevelopment condition the site is comprised of two residential buildings, gravel parking areas, and vegetated areas. The Site is generally flat across the entire property.

Stormwater minor and major flows are directed overland towards the northwest of the site.

Figure 2 illustrates the predevelopment catchment areas, the site characteristics analysis, existing drainage and overland flow pattern.

3.3 Post Development Condition

In the post development condition, the site is comprised of six self-storage buildings and outside gravel storage area, two residential buildings, gravel parking areas, and vegetated areas. Figure 3 illustrates the proposed site and the site characteristics analysis chart.

Controlled stormwater minor flows are directed through on site swales and a private storm sewer. Flows are intercepted at a rear grassed swale to the west of the site where stormwater major flows will be overcontrolled and ultimately discharged at the north west portion of the site.

Uncontrolled flows for minor and major flows will maintain the existing drainage patterned and outlet towards the northern site boundary.

3.4 Quantity Control Summary

To meet the stormwater management quantity control criteria as noted in Section 2 of this report, a 200mm diameter PVC storm pipe will be installed in the storm ditch inlet catchbasin (ST-DICB 10) at elevation 325.04m. Sufficient stormwater retention volumes will be provided for the major storm events, while being controlled by the proposed outlet. A 2.0m wide turfstone weir will be installed at an elevation of 325.84m to allow for flows over the 10 year to outlet while maintaining predevelopment flows. Discharge from the weir will be directed over a rip rap spillway toward the northwest corner of the site.

To accommodate the reduced minor and major stormwater flows, the underground storm infrastructure and proposed grading (surface storage) will be used to provide the stormwater retention volumes required. Refer to Appendix A for stage storage discharge and proposed design calculations.

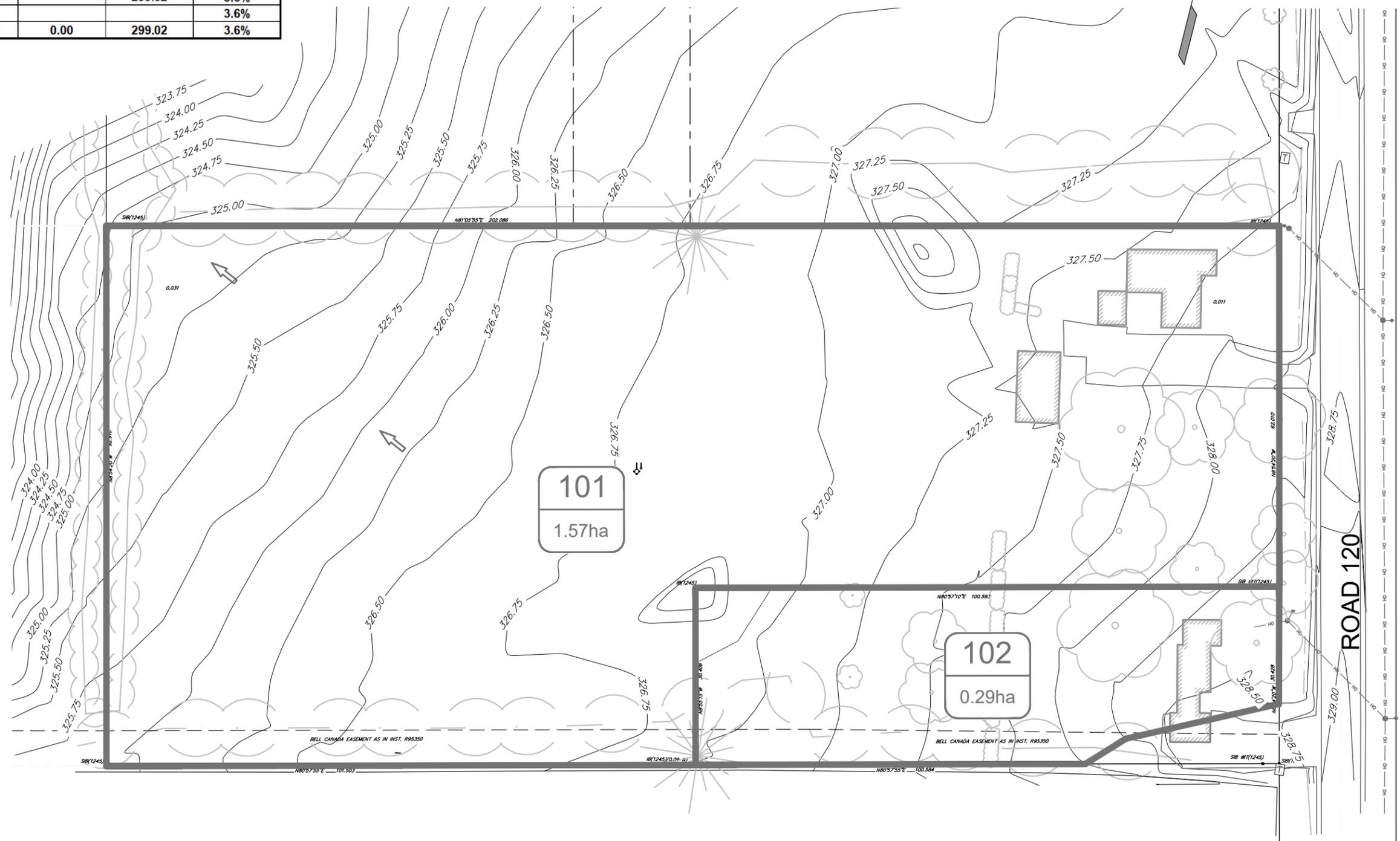
Figure 4 illustrates the location of the proposed stormwater controls, proposed ponding elevations and a design summary chart.

3.5 Quality Control Summary

To meet the recommended stormwater management quality control criteria as noted in Section 2 of this report, low lot level grassed swales, retention area, and increased sumps within the storm structures, should allow adequate natural sedimentation to occur. An oil grit separator (ST-OGS 11) will be installed downstream ST-DICB 10 to provide "Enhanced" level of treatment for the site.

Refer to Appendix B for oil grit separator sizing summary.

CATCHMENT AREA CHARACTERISTICS						
CATCHMENT	AREA (m ²)	BUILDING (m ²)	LANDSCAPED (m ²)	ASP/CONC. (m ²)	Gravel (m ²)	PERCENT IMPERVIOUS (m ²)
101	15,668.62	265.12	15,104.48		299.02	3.6%
102	2,850.93	102.70	2,748.23			3.6%
Total	18,519.55	367.82	17,852.71	0.00	299.02	3.6%



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Legend

- CATCHMENT 101
- CATCHMENT PARAMETER
- EX. OVERLAND FLOW ROUTE

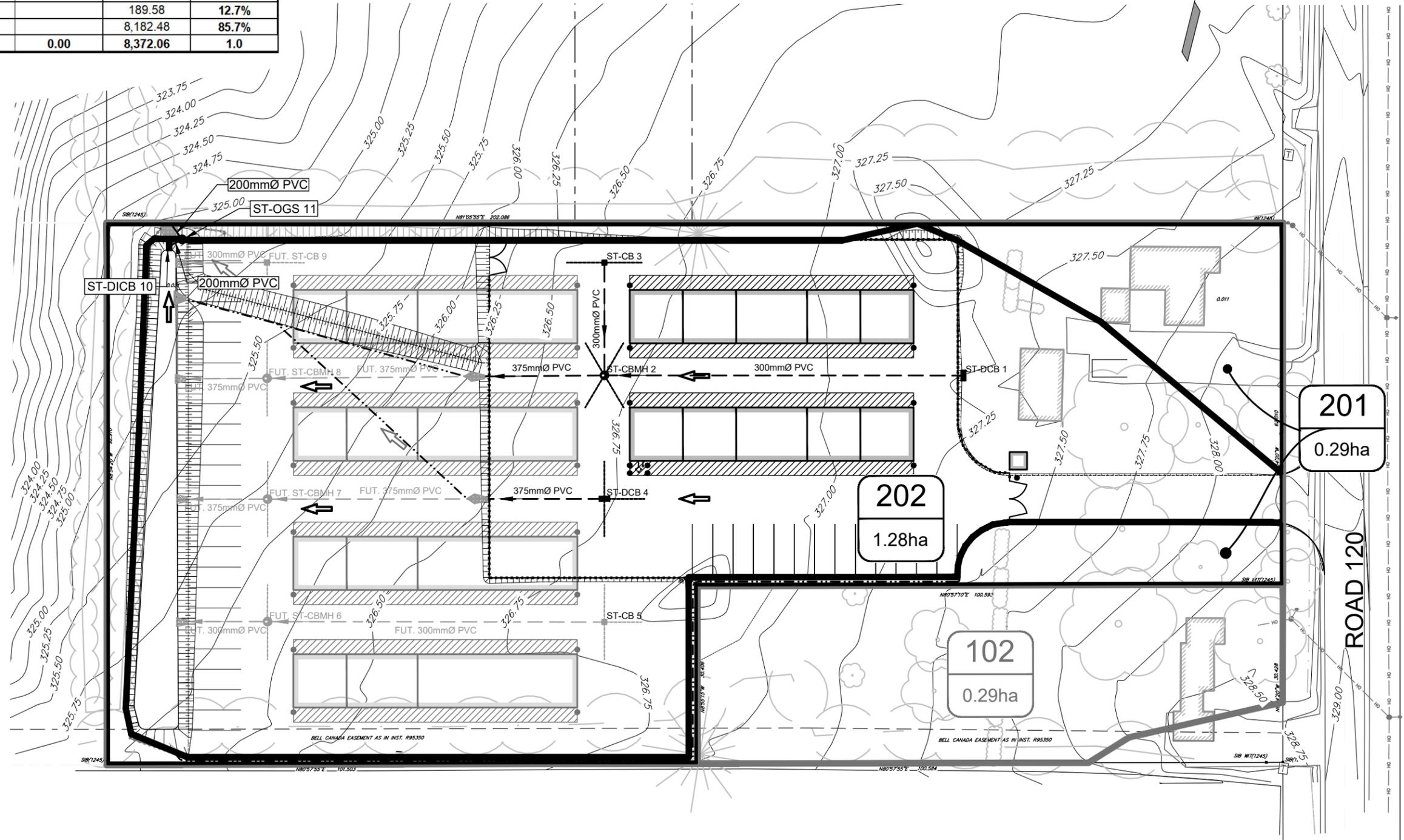
Project:
**ROAD 120
SELF STORAGE UNITS**

Figure Title:
**PREDEVELOPMENT
CATCHMENTS**

Figure No:

FIG2

CATCHMENT AREA CHARACTERISTICS						
CATCHMENT	AREA (m ²)	BUILDING (m ²)	LANDSCAPED (m ²)	ASP/CONC. (m ²)	Gravel (m ²)	PERCENT IMPERVIOUS (m ²)
102	2,850.93	102.70	2,748.23			3.6%
201	2,878.29	175.06	2,513.65		189.58	12.7%
202	12,790.33	2,774.40	1,833.45		8,182.48	85.7%
Total	18,519.55	3,052.16	7,095.33	0.00	8,372.06	1.0



SCALE 1:750



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Legend

- CATCHMENT BOUNDARY
- CATCHMENT PARAMETER 201
0.123
- EX. OVERLAND FLOW ROUTE

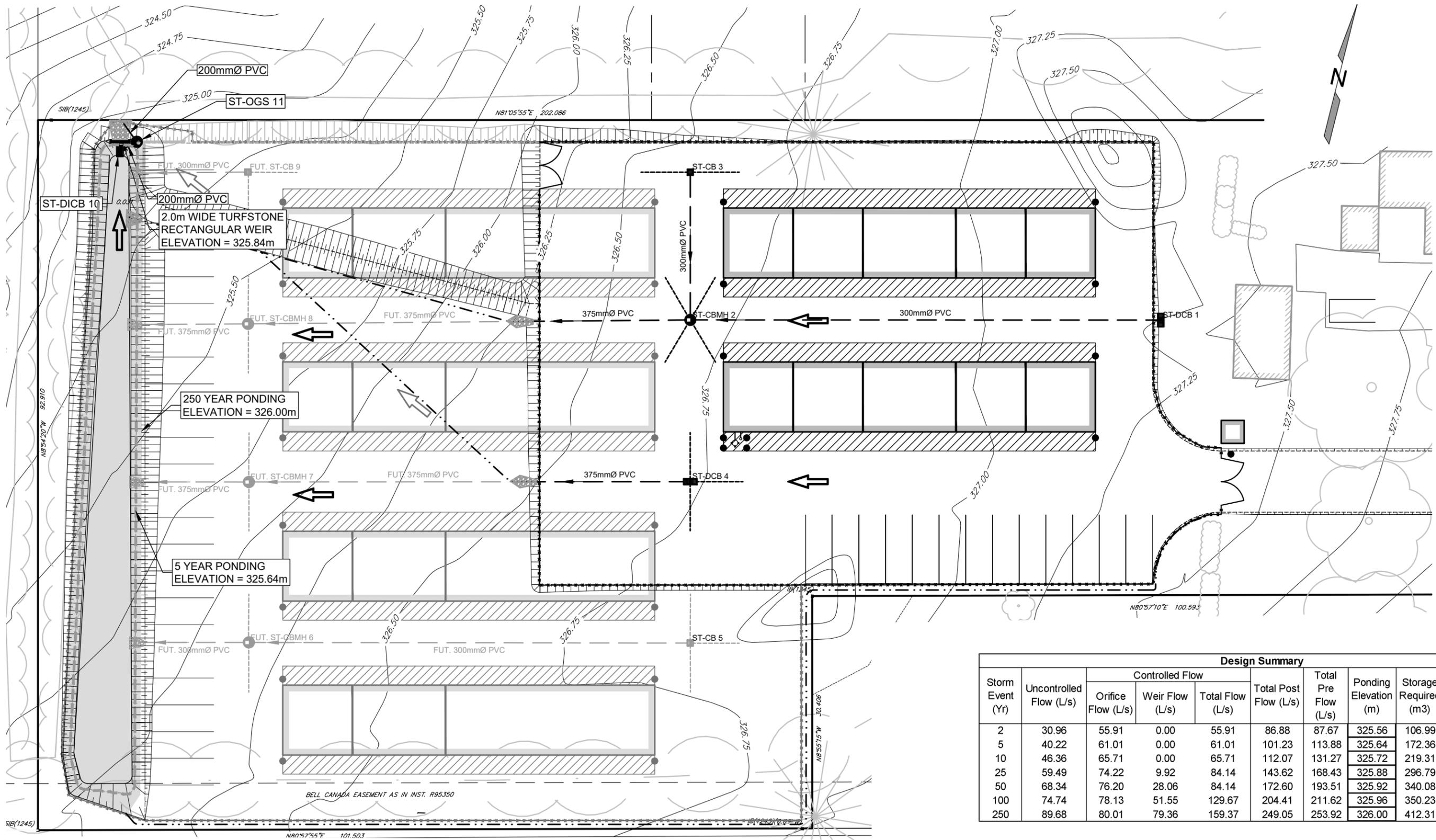
- PROPOSED SWALE 0.2%
- PROPOSED STORM SEWER

Project:
**ROAD 120
SELF STORAGE UNITS**

Figure Title:
**POST DEVELOPMENT
CATCHMENTS**

Figure No:

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Storm Event (Yr)	Uncontrolled Flow (L/s)	Controlled Flow			Total Post Flow (L/s)	Total Pre Flow (L/s)	Ponding Elevation (m)	Storage Required (m3)	Ponding Volume (m3)	Ponding Depth (m)
		Orifice Flow (L/s)	Weir Flow (L/s)	Total Flow (L/s)						
2	30.96	55.91	0.00	55.91	86.88	325.56	106.99	116.24	0.52	
5	40.22	61.01	0.00	61.01	101.23	325.64	172.36	181.74	0.60	
10	46.36	65.71	0.00	65.71	112.07	325.72	219.31	228.71	0.68	
25	59.49	74.22	9.92	84.14	143.62	325.88	296.79	330.70	0.84	
50	68.34	76.20	28.06	84.14	172.60	325.92	340.08	357.80	0.88	
100	74.74	78.13	51.55	129.67	204.41	325.96	350.23	385.75	0.92	
250	89.68	80.01	79.36	159.37	249.05	326.00	412.31	414.26	0.96	

SCALE 1:500

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Legend

- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE
- PROPOSED SWALE
- PROPOSED 5 YEAR PONDING ELEVATION
- PROPOSED 100 YEAR PONDING ELEVATION

- EX. STORM SEWER
- EX. SANITARY SEWER
- EX. WATERMAIN
- EX. MH
- EX. FH
- EX. VALVE

Project:
**ROAD 120
 SELF STORAGE UNITS**

Figure Title:
**STORMWATER MANAGEMENT
 SKETCH**

Figure No:

FIG4

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3.6 Erosion & Sedimentation Control

Erosion and sediment controls are proposed for the site design as illustrated on GRIT Engineering Drawing C300 and further detailed on C500. The proposed measures include sediment control fencing and sediment silt sacs to be installed prior to the start of any construction and maintained with regular maintenance by the contractor until the development is complete with final surface and vegetation stabilized with mature growth.

4.0 Design Summary

- 4.1** The predevelopment and post development characteristics of the site were analyzed and an increase in imperviousness was calculated in the post development condition and therefore quantity control will be required.
- 4.2** The proposed 200mm diameter stormwater control pipe in ditch inlet catchbasin ST-DICB 10 will restrict the post development peak flows to less than the allowable peak flow for the 2 year through to the 250 year storm event utilizing the available stormwater retention.
- 4.3** A 2.0m wide Turfstone weir will be installed at an elevation of 325.84m to discharge additional pre-development flows over the 10 year design storm.
- 4.4** The post development minor and major stormwater flows will outlet to the northwest of the site over a rip rap spillway.
- 4.5** The proposed low lot level swale and retention area and increased sump depth in the storm structures should provide adequate natural sedimentation to occur for best management practice. An oil grit separator (ST-OGS 11) will be installed downstream ST-DICB 10 to provide "Enhanced" level of treatment for the site.

5.0 Design Recommendations

The proposed design recommends the following be installed and constructed in accordance with the GRIT Engineering drawings located in Appendix B:

- 5.1 Install a 200mm diameter pipe in ditch inlet catchbasin ST-DICB 10, at an elevation of 325.04m, as shown on drawing C300 and further detailed on C500;
- 5.2 Construct a 2.0m wide Turfstone weir at an elevation of 325.84m to discharge additional pre-development flows over the 10 year design storm;
- 5.3 Construct an oil grit separator (ST-OGS 11) downstream of ST-DICB 10 to provide "Enhanced" level of treatment for the site;
- 5.4 Construct the proposed site grading to provide the required stormwater retention volume as shown on drawing C300, and;
- 5.5 Install the proposed erosion and sediment control measures as shown on drawing C300 and further detailed on C500.

Yours respectfully,

GRIT Engineering Inc.



Dan Santos
Designer

Montana Wilson, EMBA, M.Eng, P.Eng, PMP
Founder & CEO



Appendix A

Stormwater Quantity Control Calculations

Project No.: GE021-21
 Project Name: Road 120 Self Storage
 Project Location: St. Mary
 Designer: Dan Santos
 Engineer: Montana Wilson
 Date: 11-Nov-21

Rainfall Intensity Formula

$$I = A/(B+t)^C$$

A =Stratford IDF Parameter
 B =Stratford IDF Parameter
 C =Stratford IDF Parameter
 t =Time (Min.)

Modified Rational Method Formula

$$Q = kCIA$$

k =2.78
 C =Runoff coefficient
 I =Rainfall intensity (mm/hr)
 A =Contribution area (ha)

Online Orifice

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

C =Discharge Coefficient (0.62)
 a =Cross sectional area of orifice (m²)
 g =Constant of Gravitational Pull (9.81 m/s²)
 h =Total Head (m)

Weir

Rectangular

$$Q = cLH^{3/2}$$

c =Discharge Coefficient (1.5)
 L =Length of Weir (m)
 H =Maximum head (m)

Rainfall Parameters: **Stratford**

Rainfall Event	A	B	C
2 Year	601.090	4.922	0.767
5 Year	875.105	7.641	0.762
10 Year	1062.156	9.025	0.760
25 Year	1319.273	10.500	0.762
50 Year	1560.739	12.129	0.767
100 Year	1821.990	13.507	0.773
250 Year	2095.179	13.509	0.773



STORMWATER MANAGEMENT CALCULATIONS

PREDEVELOPMENT CONDITION

Project No.: GE021-21
Project Name: Road 120 Self Storage
Project Location: St. Mary
Designer: Dan Santos
Engineer: Montana Wilson
Date: 11-Nov-21

Catchment Number: Catchment 101 - Outlets to NW corner of site

Catchment Characteristics:

Surface Material	Area (m2) (A)	Percent Impervious	Coefficient (C)
Building	265.12	100%	0.90
Asphalt / Concrete	-	100%	0.90
Gravel	299.02	90%	0.90
Grass	15,104.48	10%	0.20
Total / Average	15,668.62	13.0%	0.23

Rainfall Event (Year)	A	B	C	t (min)	Intensity (mm/hr)	C' Multiplier	C	Q (L/s)
2	601.090	4.922	0.767	10	75.616	1.00	0.23	74.18
5	875.105	7.641	0.762	10	98.22	1.00	0.23	96.35
10	1062.156	9.025	0.760	10	113.21	1.00	0.23	111.06
25	1319.273	10.500	0.762	10	132.06	1.10	0.25	142.50
50	1560.739	12.129	0.767	10	145.13	1.15	0.26	163.72
100	1821.990	13.507	0.773	10	158.71	1.15	0.26	179.04
250	2095.179	13.509	0.773	10	182.50	1.20	0.27	214.83

Catchment Number: Catchment 102 - Outlets to NW corner of site

Catchment Characteristics:

Surface Material	Area (m2) (A)	Percent Impervious	Coefficient (C)
Building	102.70	100%	0.90
Asphalt / Concrete	-	100%	0.90
Gravel	-	90%	0.90
Grass	2,748.23	10%	0.20
Total / Average	2,850.93	13.2%	0.23

Rainfall Event (Year)	A	B	C	t (min)	Intensity (mm/hr)	C' Multiplier	C	Q (L/s)
2	601.090	4.922	0.767	10	75.616	1.00	0.23	13.50
5	875.105	7.641	0.762	10	98.22	1.00	0.23	17.53
10	1062.156	9.025	0.760	10	113.21	1.00	0.23	20.21
25	1319.273	10.500	0.762	10	132.06	1.10	0.25	25.93
50	1560.739	12.129	0.767	10	145.13	1.15	0.26	29.79
100	1821.990	13.507	0.773	10	158.71	1.15	0.26	32.58
250	2095.179	13.509	0.773	10	182.50	1.20	0.27	39.09



STORMWATER MANAGEMENT CALCULATIONS

PROPOSED DEVELOPMENT - CHARACTERISTICS

Project No.: GE021-21
Project Name: Road 120 Self Storage
Project Location: St. Mary
Designer: Dan Santos
Engineer: Montana Wilson
Date: 11-Nov-21

Uncontrolled Catchment: Catchment 102 & 201 - Outlets to NW corner of site

Catchment Characteristics:

Surface Material	Area (m2) (A)	Percent Impervious	Coefficient (C)
Building	277.76	100%	0.90
Asphalt / Concrete	-	100%	0.90
Gravel	189.58	90%	0.90
Grass	5,261.88	20%	0.20
Total / Average	5,729.22	26.2%	0.26

Rainfall Event (Year)	A	B	C	t (min)	Intensity (mm/hr)	C' Multiplier	C	Q (L/s)
2	601.090	4.922	0.767	10	75.616	1.00	0.26	30.96
5	875.105	7.641	0.762	10	98.22	1.00	0.26	40.22
10	1062.156	9.025	0.760	10	113.21	1.00	0.26	46.36
25	1319.273	10.500	0.762	10	132.06	1.10	0.28	59.49
50	1560.739	12.129	0.767	10	145.13	1.15	0.30	68.34
100	1821.990	13.507	0.773	10	158.71	1.15	0.30	74.74
250	2095.179	13.509	0.773	10	182.50	1.20	0.31	89.68

Controlled Catchment: Catchment 202 - Outlets to NW corner of site

Catchment Characteristics:

Surface Material	Area (m2) (A)	Percent Impervious	Coefficient (C)
Building	2,774.40	100%	0.90
Asphalt / Concrete	-	100%	0.90
Gravel	8,182.48	90%	0.90
Grass	1,833.45	20%	0.20
Total / Average	12,790.33	82.1%	0.80

Rainfall Event (Year)	A	B	C	t (min)	Intensity (mm/hr)	C' Multiplier	C	Q (L/s)
2	601.090	4.922	0.767	10	75.616	1.00	0.80	215.00
5	875.105	7.641	0.762	10	98.22	1.00	0.80	279.28
10	1062.156	9.025	0.760	10	113.21	1.00	0.80	321.91
25	1319.273	10.500	0.762	10	132.06	1.10	0.88	413.05
50	1560.739	12.129	0.767	10	145.13	1.15	0.92	474.54
100	1821.990	13.507	0.773	10	158.71	1.15	0.92	518.97
250	2095.179	13.509	0.773	10	182.50	1.20	0.96	622.69

Project No.: GE021-21
 Project Name: Road 120 Self Storage
 Project Location: St. Mary
 Designer: Dan Santos
 Engineer: Montana Wilson
 Date: 11-Nov-21

Stage Storage Discharge Pond Characteristics

Top of Grate Elevation= 325.04 m
 Max Ponding Elevation= 325.98 m
 Elevation Increment= 0.04 m
 No of Stages= 30
 Volume in Structures= 3.5 m³

Stage Storage Discharge			
Stage	Elevation (m)	Surface Volume (m ³)	Total Volume (m ³)
1	325.04	0.00	3.50
2	325.08	0.28	3.78
3	325.12	1.50	5.00
4	325.16	3.90	7.40
5	325.20	7.72	11.22
6	325.24	13.18	16.68
7	325.28	20.50	24.00
8	325.32	29.91	33.41
9	325.36	41.59	45.09
10	325.40	55.78	59.28
11	325.44	72.68	76.18
12	325.48	92.21	95.71
13	325.52	97.40	100.90
14	325.56	112.74	116.24
15	325.60	155.75	159.25
16	325.64	178.24	181.74
17	325.68	201.39	204.89
18	325.72	225.21	228.71
19	325.76	249.69	253.19
20	325.80	274.84	278.34
21	325.84	300.68	304.18
22	325.88	327.20	330.70
23	325.92	354.30	357.80
24	325.96	382.25	385.75
25	326.00	410.76	414.26
26	326.04		3.50
27	326.08		3.50
28	326.12		3.50
29	326.16		3.50
30	326.20		3.50

Design Summary										
Storm Event (Yr)	Uncontrolled Flow (L/s)	Controlled Flow			Total Post Flow (L/s)	Total Pre Flow (L/s)	Ponding Elevation (m)	Storage Required (m3)	Ponding Volume (m3)	Ponding Depth (m)
		Orifice Flow (L/s)	Weir Flow (L/s)	Total Flow (L/s)						
2	30.96	55.91	0.00	55.91	86.88	87.67	325.56	106.99	116.24	0.52
5	40.22	61.01	0.00	61.01	101.23	113.88	325.64	172.36	181.74	0.60
10	46.36	65.71	0.00	65.71	112.07	131.27	325.72	219.31	228.71	0.68
25	59.49	74.22	9.92	84.14	143.62	168.43	325.88	296.79	330.70	0.84
50	68.34	76.20	28.06	84.14	172.60	193.51	325.92	340.08	357.80	0.88
100	74.74	78.13	51.55	129.67	204.41	211.62	325.96	350.23	385.75	0.92
250	89.68	80.01	79.36	159.37	249.05	253.92	326.00	412.31	414.26	0.96

Online Orifice = $Ca\sqrt{2gh}$

Orifice Diameter= 200.00 mm
 Invert Elevation= 325.04 m
 Orifice Area= 0.0314 m²
 Weir Coefficient= 0.62

Weir = $cLH^{3/2}$

Elevation= 325.84
 c= 0.62
 L= 2.00
 H= Varies



STORMWATER MANAGEMENT CALCULATIONS

PROPOSED DEVELOPMENT - 2 YEAR SWM

Project No.: GE021-21
Project Name: Road 120 Self Storage
Project Location: St. Mary
Designer: Dan Santos
Engineer: Montana Wilson
Date: 11-Nov-21

Predevelopment Flow Rate 87.67 L/s
Proposed Flow Rate 86.88 L/s

Catchment Characteristics		
	Uncontrolled Catchment	Controlled Catchment
Area (Ha) (A)	0.57	1.28
Coefficient (C)	0.26	0.80

IDF Parameters		
A	B	C
601.090	4.922	0.767

Orifice Details	
Size	200.00 mm
Elevation	325.04 m
Area	0.0314 m ²
Coefficient	0.62
Head	0.52 m
Flow	55.91 L/s

Weir Details	
Elevation	325.84 m
Coefficient	0.62
Length	2 m
Head	0.00 m
Flow	0 L/s

Total Controlled Flow= 55.91 L/s

Storage Required=	106.99 m ³
Storage Available=	116.24 m ³
Ponding Elevation=	325.56 m

Design Chart					
Time (min)	Intensity (l) (mm/hr) (A/(B+t) C)	Uncontrolled Flow (L/s) (=2.78CIA)	Controlled Flow (L/s) (=2.78CIA)	Storage Volume Required	Total Site Flow (L/s)
10	75.62	30.96	215.00	95.45	86.88
15	60.58	24.81	172.26	104.71	80.72
20	51.02	20.89	145.07	106.99	76.81
25	44.35	18.16	126.09	105.27	74.07
30	39.39	16.13	112.00	100.95	72.04
35	35.55	14.56	101.07	94.84	70.47
40	32.47	13.30	92.33	87.40	69.21
45	29.95	12.26	85.15	78.94	68.18
50	27.83	11.40	79.14	69.67	67.31
55	26.03	10.66	74.02	59.76	66.57
60	24.48	10.02	69.61	49.30	65.94
65	23.13	9.47	65.76	38.40	65.38
70	21.93	8.98	62.37	27.10	64.89
75	20.87	8.55	59.35	15.47	64.46
80	19.92	8.16	56.65	3.54	64.07
85	19.07	7.81	54.22	0.00	63.72
90	18.29	7.49	52.02	0.00	63.40



STORMWATER MANAGEMENT CALCULATIONS

PROPOSED DEVELOPMENT - 5 YEAR SWM

Project No.: GE021-21
Project Name: Road 120 Self Storage
Project Location: St. Mary
Designer: Dan Santos
Engineer: Montana Wilson
Date: 11-Nov-21

Predevelopment Flow Rate 113.88 L/s
Proposed Flow Rate 101.23 L/s

Orifice Details	
Size	200.00 mm
Elevation	325.04 m
Area	0.0314 m ²
Coefficient	0.62
Head	0.60 m
Flow	61.01 L/s

Catchment Characteristics		
	Uncontrolled Catchment	Controlled Catchment
Area (Ha) (A)	0.57	1.28
Coefficient (C)	0.26	0.80

Weir Details	
Elevation	325.84 m
Coefficient	0.62
Length	2 m
Head	0.00 m
Flow	0 L/s

IDF Parameters		
A	B	C
875.105	7.641	0.762

Total Controlled Flow= 61.01 L/s

Storage Required=	172.36 m ³
Storage Available=	181.74 m ³
Ponding Elevation=	325.64 m

Design Chart					
Time (min)	Intensity (l) (mm/hr) (A/(B+t) C)	Uncontrolled Flow (L/s) (=2.78CIA)	Controlled Flow (L/s) (=2.78CIA)	Storage Volume Required	Total Site Flow (L/s)
10	98.22	40.22	279.28	130.96	101.23
15	81.21	33.26	230.92	152.92	94.26
20	69.76	28.57	198.35	164.81	89.57
25	61.46	25.17	174.74	170.61	86.17
30	55.13	22.58	156.76	172.36	83.58
35	50.13	20.53	142.55	171.24	81.54
40	46.07	18.87	131.00	167.98	79.87
45	42.70	17.48	121.41	163.08	78.49
50	39.85	16.32	113.30	156.87	77.32
55	37.40	15.31	106.34	149.59	76.32
60	35.27	14.44	100.29	141.43	75.45
65	33.41	13.68	94.99	132.53	74.69
70	31.75	13.00	90.29	122.99	74.01
75	30.28	12.40	86.10	112.91	73.41
80	28.95	11.86	82.33	102.34	72.86
85	27.76	11.37	78.92	91.36	72.37
90	26.67	10.92	75.82	80.00	71.93



STORMWATER MANAGEMENT CALCULATIONS

PROPOSED DEVELOPMENT - 10 YEAR SWM

Project No.: GE021-21
Project Name: Road 120 Self Storage
Project Location: St. Mary
Designer: Dan Santos
Engineer: Montana Wilson
Date: 11-Nov-21

Predevelopment Flow Rate 131.27 L/s
Proposed Flow Rate 112.07 L/s

Orifice Details	
Size	200.00 mm
Elevation	325.04 m
Area	0.0314 m ²
Coefficient	0.62
Head	0.68 m
Flow	65.71 L/s

Catchment Characteristics		
	Uncontrolled Catchment	Controlled Catchment
Area (Ha) (A)	0.57	1.28
Coefficient (C)	0.26	0.80

Weir Details	
Elevation	325.84 m
Coefficient	0.62
Length	2 m
Head	0.00 m
Flow	0 L/s

IDF Parameters		
A	B	C
1062.156	9.025	0.760

Total Controlled Flow= 65.71 L/s

Storage Required=	219.31 m ³
Storage Available=	228.71 m ³
Ponding Elevation=	325.72 m

Design Chart					
Time (min)	Intensity (I) (mm/hr) (A/(B+t) C)	Uncontrolled Flow (L/s) (=2.78CIA)	Controlled Flow (L/s) (=2.78C/A)	Storage Volume Required	Total Site Flow (L/s)
10	113.21	46.36	321.91	153.72	112.07
15	94.82	38.83	269.60	183.50	104.53
20	82.13	33.63	233.51	201.37	99.34
25	72.78	29.80	206.94	211.86	95.51
30	65.58	26.85	186.47	217.37	92.56
35	59.84	24.50	170.14	219.31	90.21
40	55.14	22.58	156.78	218.59	88.29
45	51.22	20.97	145.63	215.79	86.68
50	47.89	19.61	136.15	211.35	85.31
55	45.02	18.43	128.00	205.55	84.14
60	42.52	17.41	120.89	198.65	83.12
65	40.31	16.51	114.63	190.80	82.21
70	38.36	15.71	109.07	182.14	81.41
75	36.61	14.99	104.10	172.79	80.70
80	35.04	14.35	99.63	162.83	80.05
85	33.61	13.76	95.58	152.34	79.47
90	32.32	13.23	91.89	141.38	78.94



STORMWATER MANAGEMENT CALCULATIONS

PROPOSED DEVELOPMENT - 25 YEAR SWM

Project No.: GE021-21
Project Name: Road 120 Self Storage
Project Location: St. Mary
Designer: Dan Santos
Engineer: Montana Wilson
Date: 11-Nov-21

Predevelopment Flow Rate 168.43 L/s
Proposed Flow Rate 143.62 L/s

Orifice Details	
Size	200.00 mm
Elevation	325.04 m
Area	0.0314 m ²
Coefficient	0.62
Head	0.84 m
Flow	74.22 L/s

Catchment Characteristics		
	Uncontrolled Catchment	Controlled Catchment
Area (Ha) (A)	0.57	1.28
Coefficient (C)	0.28	0.88

Weir Details	
Elevation	325.84 m
Coefficient	0.62
Length	2 m
Head	0.04 m
Flow	9.92 L/s

IDF Parameters		
A	B	C
1319.273	10.500	0.762

Total Controlled Flow= 84.14 L/s

Storage Required=	296.79 m ³
Storage Available=	330.70 m ³
Ponding Elevation=	325.88 m

Design Chart					
Time (min)	Intensity (I) (mm/hr) (A/(B+t) C)	Uncontrolled Flow (L/s) (=2.78CIA)	Controlled Flow (L/s) (=2.78CIA)	Storage Volume Required	Total Site Flow (L/s)
10	132.06	59.49	413.05	197.35	143.62
15	111.83	50.37	349.76	239.06	134.51
20	97.57	43.95	305.16	265.22	128.08
25	86.91	39.15	271.82	281.53	123.28
30	78.61	35.41	245.85	291.09	119.54
35	71.93	32.40	224.98	295.78	116.54
40	66.44	29.93	207.80	296.79	114.06
45	61.83	27.85	193.38	294.95	111.99
50	57.89	26.08	181.08	290.81	110.22
55	54.50	24.55	170.44	284.81	108.68
60	51.52	23.21	161.15	277.25	107.35
65	48.90	22.03	152.95	268.39	106.17
70	46.57	20.98	145.66	258.40	105.12
75	44.48	20.04	139.12	247.44	104.17
80	42.60	19.19	133.23	235.63	103.32
85	40.89	18.42	127.88	223.08	102.55
90	39.33	17.71	123.00	209.86	101.85



STORMWATER MANAGEMENT CALCULATIONS

PROPOSED DEVELOPMENT - 50 YEAR SWM

Project No.: GE021-21
Project Name: Road 120 Self Storage
Project Location: St. Mary
Designer: Dan Santos
Engineer: Montana Wilson
Date: 11-Nov-21

Predevelopment Flow Rate 193.51 L/s
Proposed Flow Rate 172.60 L/s

Orifice Details	
Size	200.00 mm
Elevation	325.04 m
Area	0.0314 m ²
Coefficient	0.62
Head	0.88 m
Flow	76.20 L/s

Catchment Characteristics		
	Uncontrolled Catchment	Controlled Catchment
Area (Ha) (A)	0.57	1.28
Coefficient (C)	0.30	0.92

Weir Details	
Elevation	325.84 m
Coefficient	0.62
Length	2 m
Head	0.08 m
Flow	28.058 L/s

IDF Parameters		
A	B	C
1560.739	12.129	0.767

Total Controlled Flow= 104.26 L/s

Storage Required=	340.08 m ³
Storage Available=	357.80 m ³
Ponding Elevation=	325.92 m

Design Chart					
Time (min)	Intensity (l) (mm/hr) (A/(B+t) C)	Uncontrolled Flow (L/s) (=2.78CIA)	Controlled Flow (L/s) (=2.78C/A)	Storage Volume Required	Total Site Flow (L/s)
10	145.13	68.34	474.54	222.17	172.60
15	124.13	58.46	405.90	271.48	162.71
20	109.03	51.34	356.51	302.70	155.60
25	97.58	45.95	319.07	322.23	150.21
30	88.57	41.71	289.60	333.63	145.96
35	81.27	38.27	265.73	339.11	142.53
40	75.22	35.42	245.96	340.08	139.68
45	70.12	33.02	229.27	337.54	137.27
50	65.75	30.96	214.98	332.18	135.22
55	61.96	29.18	202.59	324.51	133.43
60	58.64	27.61	191.73	314.91	131.87
65	55.70	26.23	182.12	303.68	130.48
70	53.08	24.99	173.56	291.06	129.25
75	50.73	23.89	165.86	277.24	128.14
80	48.60	22.89	158.92	262.37	127.14
85	46.67	21.98	152.60	246.57	126.23
90	44.91	21.15	146.84	229.95	125.40



STORMWATER MANAGEMENT CALCULATIONS

PROPOSED DEVELOPMENT - 100 YEAR SWM

Project No.: GE021-21
Project Name: Road 120 Self Storage
Project Location: St. Mary
Designer: Dan Santos
Engineer: Montana Wilson
Date: 11-Nov-21

Predevelopment Flow Rate 211.62 L/s
Proposed Flow Rate 204.41 L/s

Orifice Details	
Size	200.00 mm
Elevation	325.04 m
Area	0.0314 m ²
Coefficient	0.62
Head	0.92 m
Flow	78.13 L/s

Catchment Characteristics		
	Uncontrolled Catchment	Controlled Catchment
Area (Ha) (A)	0.57	1.28
Coefficient (C)	0.30	0.92

Weir Details	
Elevation	325.84 m
Coefficient	0.62
Length	2 m
Head	0.12 m
Flow	51.5458 L/s

IDF Parameters		
A	B	C
1821.990	13.507	0.773

Total Controlled Flow= 129.67 L/s

Storage Required=	350.23 m ³
Storage Available=	385.75 m ³
Ponding Elevation=	325.96 m

Design Chart					
Time (min)	Intensity (I) (mm/hr) (A/(B+t) C)	Uncontrolled Flow (L/s) (=2.78CIA)	Controlled Flow (L/s) (=2.78CIA)	Storage Volume Required	Total Site Flow (L/s)
10	158.71	74.74	518.97	233.58	204.41
15	136.73	64.39	447.09	285.68	194.06
20	120.67	56.83	394.59	317.90	186.50
25	108.37	51.03	354.37	337.04	180.71
30	98.61	46.44	322.45	347.01	176.11
35	90.66	42.69	296.45	350.23	172.37
40	84.04	39.58	274.80	348.30	169.25
45	78.43	36.93	256.46	342.33	166.61
50	73.61	34.67	240.71	333.11	164.34
55	69.43	32.69	227.01	321.23	162.37
60	65.75	30.96	214.98	307.12	160.63
65	62.49	29.43	204.32	291.13	159.10
70	59.57	28.05	194.80	273.52	157.73
75	56.96	26.82	186.23	254.53	156.49
80	54.59	25.71	178.49	234.32	155.38
85	52.43	24.69	171.44	213.04	154.36
90	50.46	23.76	165.01	190.81	153.44



STORMWATER MANAGEMENT CALCULATIONS

PROPOSED DEVELOPMENT - 250 YEAR SWM

Project No.: GE021-21
Project Name: Road 120 Self Storage
Project Location: St. Mary
Designer: Dan Santos
Engineer: Montana Wilson
Date: 11-Nov-21

Predevelopment Flow Rate 253.92 L/s
Proposed Flow Rate 249.05 L/s

Orifice Details	
Size	200.00 mm
Elevation	325.04 m
Area	0.0314 m ²
Coefficient	0.62
Head	0.96 m
Flow	80.01 L/s

Catchment Characteristics		
	Uncontrolled Catchment	Controlled Catchment
Area (Ha) (A)	0.57	1.28
Coefficient (C)	0.31	0.96

Weir Details	
Elevation	325.84 m
Coefficient	0.62
Length	2 m
Head	0.16 m
Flow	79.36 L/s

IDF Parameters		
A	B	C
2095.179	13.509	0.773

Total Controlled Flow= 159.37 L/s

Storage Required=	412.31 m ³
Storage Available=	414.26 m ³
Ponding Elevation=	326.00 m

Design Chart					
Time (min)	Intensity (I) (mm/hr) (A/(B+t) C)	Uncontrolled Flow (L/s) (=2.78CIA)	Controlled Flow (L/s) (=2.78CIA)	Storage Volume Required	Total Site Flow (L/s)
10	182.50	89.68	622.69	277.99	249.05
15	157.22	77.26	536.45	339.38	236.63
20	138.76	68.19	473.46	376.91	227.56
25	124.62	61.24	425.20	398.75	220.60
30	113.40	55.72	386.91	409.58	215.09
35	104.25	51.23	355.71	412.31	210.60
40	96.64	47.49	329.73	408.87	206.86
45	90.19	44.32	307.73	400.57	203.69
50	84.65	41.60	288.83	388.38	200.97
55	79.83	39.23	272.40	372.99	198.60
60	75.60	37.15	257.96	354.93	196.52
65	71.85	35.31	245.17	334.61	194.68
70	68.50	33.66	233.74	312.36	193.03
75	65.49	32.18	223.47	288.44	191.55
80	62.77	30.84	214.17	263.05	190.21
85	60.29	29.63	205.72	236.39	189.00
90	58.03	28.51	198.00	208.58	187.88



Appendix B

Oil Grit Sizing Summary

ADS OGS Sizing Summary

Project Name:	60 Road 120	
Consulting Engineer:	GRIT Engineering	
Location:	St. Mary's, ON	
Sizing Completed By:	C. Neath	Email: cody.neath@ads-pipe.com

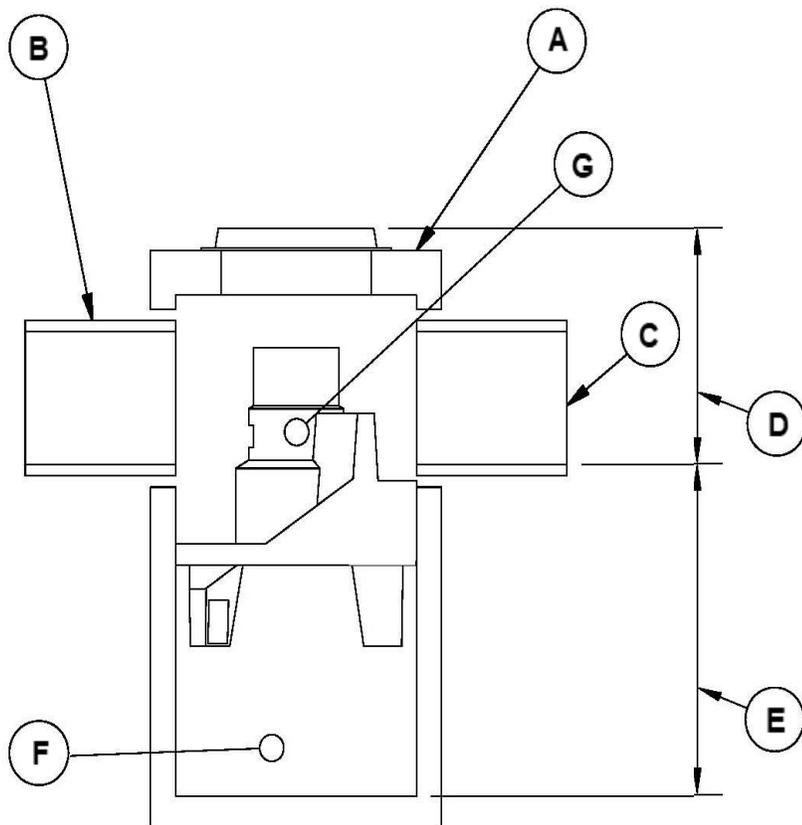
Treatment Requirements		
Treatment Goal:	Enhanced (MOE)	
Selected Parameters:	80% TSS	90% Volume
Selected Unit:	FD-4HC	

Site Details	
Site Area:	1.28 ha
% Impervious:	82%
Rational C:	0.79
Rainfall Station:	Stratford, ONT
Particle Size Distribution:	Fine
Peak Flowrate:	90 L/s

Summary of Results		
Model	TSS Removal	Volume Treated
FD-4HC	84.0%	99.1%
FD-5HC	88.0%	99.6%
FD-6HC	90.0%	99.9%
FD-8HC	94.0%	99.9%

FD-4HC Specification	
Unit Diameter (A):	1,200 mm
Inlet Pipe Diameter (B):	300 mm
Outlet Pipe Diameter (C):	300 mm
Height, T/G to Outlet Invert (D):	1460 mm
Height, Outlet Invert to Sump (E):	1515 mm
Sediment Storage Capacity (F):	0.78 m ³
Oil Storage Capacity (G):	723 L
Recommended Sediment Depth for Maintenance:	440 mm
Max. Pipe Diameter:	600 mm
Peak Flow Capacity:	510 L/s

Site Elevations:	
Rim Elevation:	326.51
Inlet Pipe Elevation:	325.05
Outlet Pipe Elevation:	325.05



Notes:

Removal efficiencies are based on NJDEP Test Protocols and independently verified.

All units supplied by ADS have numerous local, provincial, and international certifications (copies of which can be provided upon request). The design engineer is responsible for ensuring compliance with applicable regulations.



Project Name: 60 Road 120
 Consulting Engineer: GRIT Engineering
 Location: St. Mary's, ON

Net Annual Removal Efficiency Summary: FD-4HC

Rainfall Intensity ⁽¹⁾	Fraction of Rainfall ⁽¹⁾	FD-4HC Removal Efficiency ⁽²⁾	Weighted Net-Annual Removal Efficiency
mm/hr	%	%	%
0.50	0.3%	100.0%	0.3%
1.00	15.5%	94.4%	14.7%
1.50	14.3%	90.9%	13.0%
2.00	13.6%	88.5%	12.0%
2.50	4.0%	86.7%	3.5%
3.00	2.3%	85.3%	2.0%
3.50	8.4%	84.1%	7.1%
4.00	4.6%	83.0%	3.9%
4.50	1.7%	82.1%	1.4%
5.00	4.8%	81.3%	3.9%
6.00	3.8%	79.9%	3.0%
7.00	4.2%	78.8%	3.3%
8.00	3.0%	77.8%	2.3%
9.00	2.2%	77.0%	1.7%
10.00	2.3%	76.2%	1.8%
20.00	9.3%	71.5%	6.7%
30.00	2.8%	68.8%	2.0%
40.00	1.2%	67.0%	0.8%
50.00	0.6%	65.6%	0.4%
100.00	0.8%	61.5%	0.5%
150.00	0.1%	59.3%	0.1%
200.00	0.0%	57.7%	0.0%
Total Net Annual Removal Efficiency:			84.0%
Total Runoff Volume Treated:			99.1%

Notes:

- (1) Rainfall Data: 1965:2007, HLY03, Stratford, ON, 6148105.
- (2) Based on third party verified data and approximating the removal of a PSD similar to the STC Fine distribution
- (3) Rainfall adjusted to 5 min peak intensity based on hourly average.



Appendix C

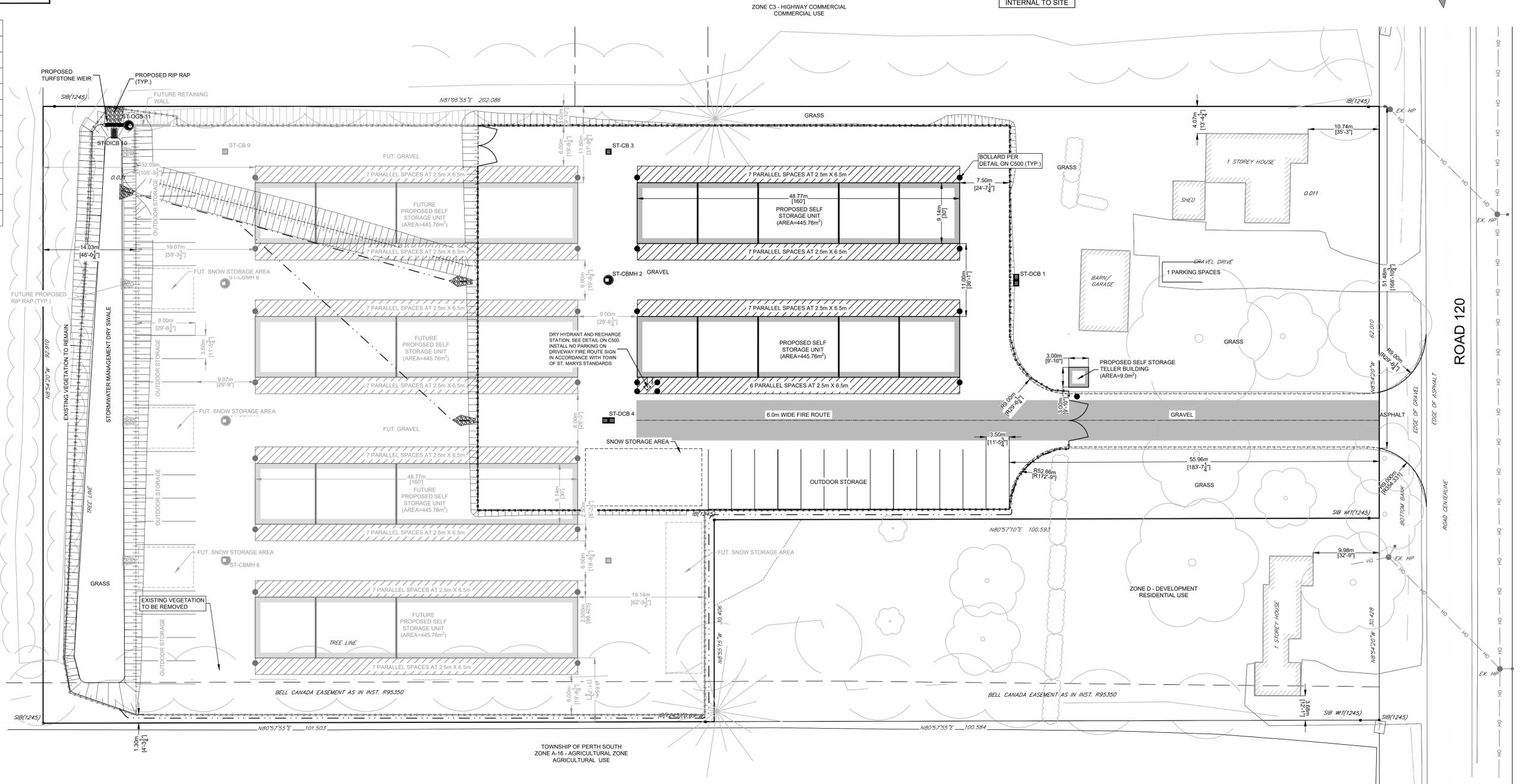
Design Drawings

PROPOSED FEATURES

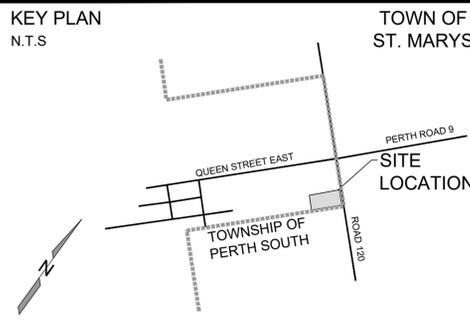
PROPOSED BUILDING	
EXISTING FEATURES	
SITE BOUNDARY	
PROPERTY LINE (OTHERS)	
EASEMENT	
EX. BUILDING	
EX. HYDRO (OVERHEAD)	

ZONING INFORMATION:

ZONING TYPE	EXISTING	PROPOSED	REQUIRED BY ZONING BYLAW
ZONE	M1-HH ₂		
LOT AREA	15,669.0m ²	15,669.0m ²	1,250.0m ² (MIN.)
LOT FRONTAGE	62.01m	62.01m	30.0m (MIN.)
LOT DEPTH	202.08m	202.08m	37.5m (MIN.)
FRONT YARD	10.74m	10.74m	7.5m (MIN.)
REAR YARD	32.08m	32.08m	6.0m (MIN.)
INTERIOR SIDE YARD	4.07m	4.07m	3.0m (MIN.)
EXTERIOR SIDE YARD	4.07m	4.07m	7.5m (MIN.)
LOT COVERAGE	2.81% (449.21m ²)	19.89% (5,132.77m ²)	50.0% (MAX.)
LANDSCAPED OPEN SPACE	95.3% (14,922.19m ²)	23.1% (3,627.19m ²)	20.0% (MIN.)
TOTAL PARKING SPACES	1 SPACES	96 SPACES	1 SPACE PER 40m ² 3,132.77 / 40 = 80 SPACES



NOTE:
ALL GARBAGE TO BE
INTERNAL TO SITE



CONTRACTOR NOTES:

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY ERRORS TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.

ALL DRAWINGS SHALL REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.

DRAWING SHOULD NOT BE SCALED FOR DIMENSIONS PURPOSES.

BENCHMARK
ELEVATIONS ARE RELATED TO TOP SPINDLE OF FIRE HYDRANT ON THE NORTH SIDE OF QUEEN STREET AT THE CORNER OF QUEEN AND 120 ROAD.
ELEVATION: 235.88m

No.	ISSUED DESCRIPTION	DATE
1	ISSUED FOR CLIENT REVIEW	2021-11-12
2	ISSUED FOR SITE PLAN APPROVAL	2021-11-16
3		
4		
5		



**ROAD 120
SELF STORAGE UNITS**

PROJECT INFORMATION: 60 ROAD 120, ST. MARYS, ONTARIO

C & C MANAGEMENT

CLIENT INFORMATION:

DRAWING NAME: **SITE PLAN**

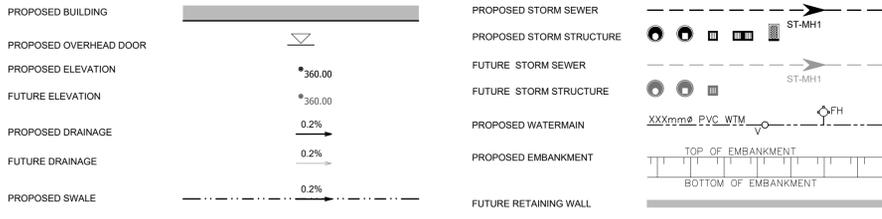
PROJECT No: **GE021-21**

SCALE: **1:300**

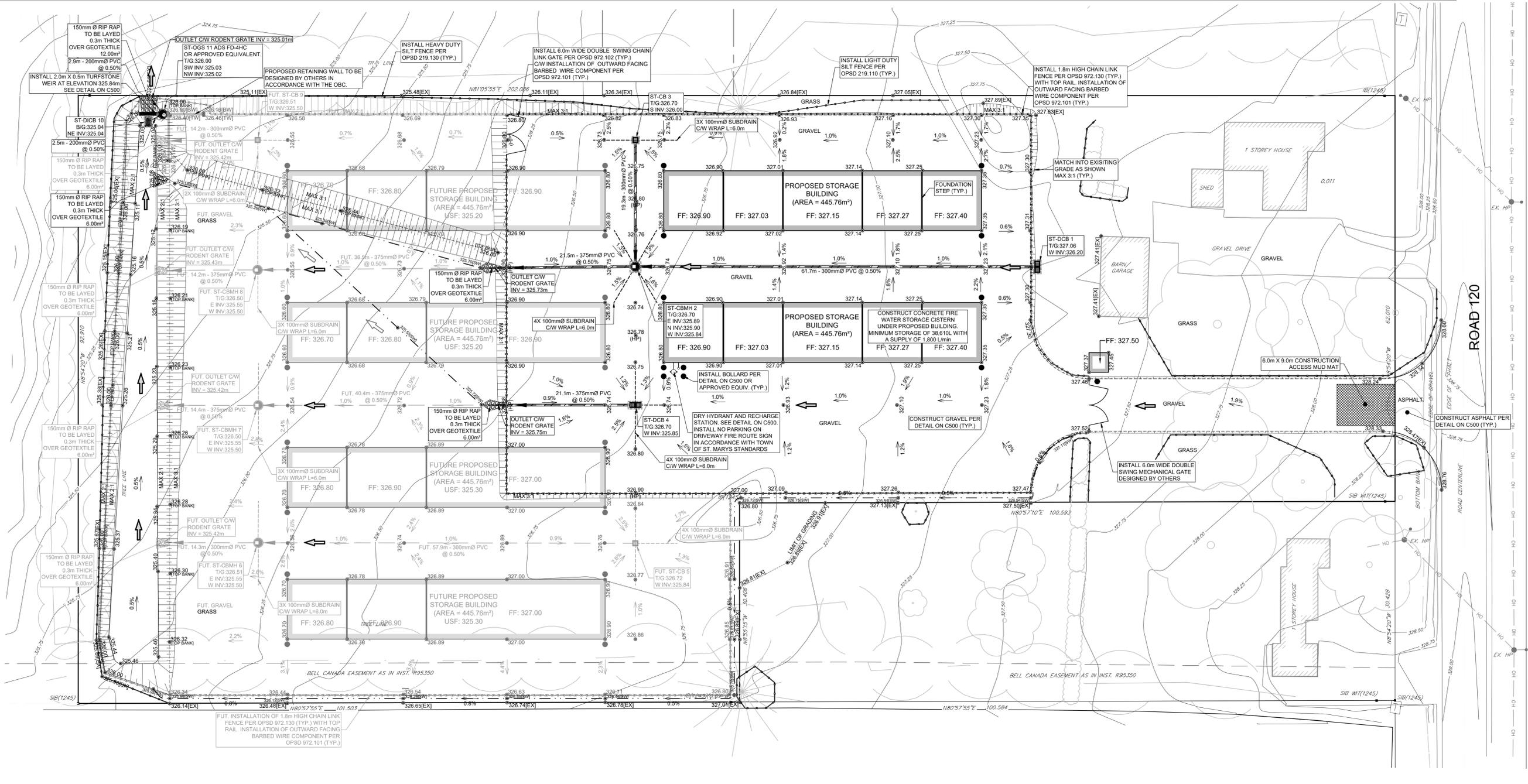
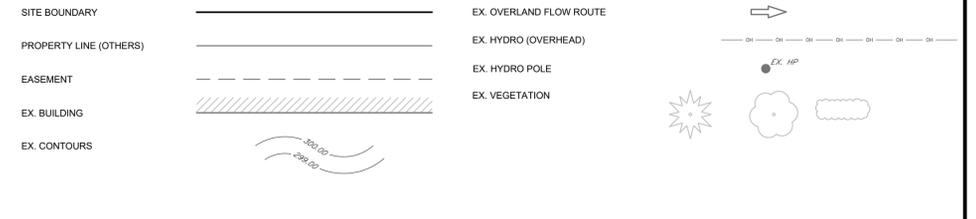
DRAWING No: **C200**

SHEET SET No: **1 of 4**

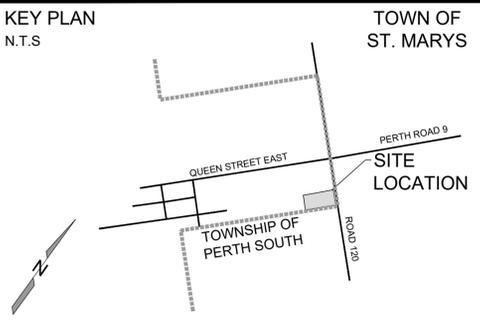
PROPOSED FEATURES



EXISTING FEATURES



CONTRACTOR NOTE:
ALL STORM SEWER PIPING TO BE INSULATED WITH RIGID INSULATION PER DETAIL ON C500



CONTRACTOR NOTES:
CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY ERRORS TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.
ALL DRAWINGS SHALL REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.
DRAWING SHOULD NOT BE SCALED FOR DIMENSIONS PURPOSES.

BENCHMARK
ELEVATIONS ARE RELATED TO TOP SPINDLE OF FIRE HYDRANT ON THE NORTH SIDE OF QUEEN STREET AT THE CORNER OF QUEEN AND 120 ROAD.
ELEVATION: 235.88m

No.	ISSUED DESCRIPTION	DATE
1	ISSUED FOR CLIENT REVIEW	2021-11-12
2	ISSUED FOR SITE PLAN APPROVAL	2021-11-16
3		
4		
5		



**ROAD 120
SELF STORAGE UNITS**

PROJECT INFORMATION: 60 ROAD 120, ST. MARYS, ONTARIO

C & C MANAGEMENT

CLIENT INFORMATION:

**SITE SERVICING, GRADING,
AND EROSION & SEDIMENT
CONTROL PLAN**

PROJECT No: **GE021-21**

SCALE: **1:300**

DRAWING No: **C300**

SHEET SET No: **2 of 4**

GENERAL NOTES AND CONSTRUCTION SPECIFICATIONS

1. **GENERAL NOTES**
- 1.1. THESE PLANS ARE NOT FOR CONSTRUCTION UNTIL SIGNED AND SEALED BY ENGINEER AND APPROVED BY THE TOWN OF ST. MARYS.
- 1.2. ALL CONSTRUCTION WORK TO BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE (MOST RECENT) STANDARDS.
- 1.3. THE PLANS PREPARED BY GRIT ENGINEERING INC. ARE NOT TO BE USED FOR CONSTRUCTION UNTIL SIGNED BY THE ENGINEER AND ACCEPTED BY THE APPROVING AGENCY. THESE PLANS ARE NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF GRIT ENGINEERING INC.
- 1.4. CHANGES TO DRAWINGS ARE NOT PERMITTED UNTIL REVIEWED AND APPROVED BY THE ENGINEER AND ACCEPTED BY THE APPROVING AUTHORITY.
- 1.5. CONTRACTOR TO VERIFY THAT THE DRAWINGS BEING USED FOR THE CONSTRUCTION ARE THE MOST RECENT VERSION.
- 1.6. UTILITY LOCATES AND ALL APPLICABLE PERMITS ARE TO BE OBTAINED PRIOR TO THE START OF CONSTRUCTION AND INSPECTION BEING COMPLETED.
- 1.7. THE CONTRACTOR IS TO VERIFY THE EXISTING CONDITION OF THE SITE. THE VERIFICATION INCLUDES AND NOT LIMITED TO THE SERVICE LOCATION SERVICE ELEVATIONS UTILITY CONFLICTS AND BENCHMARK ELEVATIONS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY AND PRIOR TO THE CONTINUATION OF CONSTRUCTION.
- 1.8. LEGAL INFORMATION AND EXISTING TOPOGRAPHIC INFORMATION TAKEN FROM PLAN PREPARED BY NA GEOMATICS, RECEIVED NOVEMBER 9, 2021.
- 1.9. THE CONTRACTOR IS TO OBTAIN CONSENT FROM THE NEIGHBOR IN THE FORM OF WRITTEN CORRESPONDENCE GRANTING PERMISSION TO ENTERING THE PROPERTY TO COMPLETE ANY CONSTRUCTION ACTIVITY. THE WRITTEN CONSENT IS TO BE PROVIDED TO THE APPROVING AUTHORITY PRIOR TO THE CONTINUATION OF WORK FOR APPROVAL. THE CONTRACTOR WILL ASSUME LIABILITY FOR ALL WORKS IF FAILURE TO COMPLY.
- 1.10. THIS DRAWING IS TO BE READ COMBINATION WITH THE FOLLOWING:
 - 1.10.1. STORMWATER MANAGEMENT REPORT, NOVEMBER 16TH, 2021.
- 1.11. DURING THE CONSTRUCTION, THE CONTRACTOR ASSUMES ALL LIABILITY FOR DAMAGE TO ALL EXISTING FEATURES AND STRUCTURES. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL RESTORATION AND RESTORED TO EXISTING CONDITION OR BETTER.
- 1.12. THESE PLANS ARE TO BE USED FOR SERVING AND GRADING ONLY. ANY OTHER INFORMATION SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. THESE PLANS MUST NOT BE USED TO SITE THE PROPOSED BUILDING.
- 1.13. THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO EXISTING WORKS. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO THE TOWN OF ST. MARYS STANDARDS.
- 1.14. ALL WORKS ON A MUNICIPAL RIGHT-OF-WAY WITH THE EXCEPTION OF WATERMAIN TAPPING TO BE INSTALLED BY THE OWNER'S CONTRACTOR AT OWNER'S EXPENSE IN ACCORDANCE WITH THE TOWN OF ST. MARYS "PROCEDURE FOR OFF-SITE WORKS BY PRIVATE CONTRACTOR". THE OWNER AND CONTRACTOR ARE TO ENSURE OFF-SITE WORKS PERMIT IS IN PLACE PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL AFFECTED PROPERTY TO ORIGINAL CONDITION. ALL BOULEVARD AREAS SHALL BE RESTORED WITH 100mm TOPSOIL AND SOD.
- 1.15. ALL UNDERGROUND SERVICES ARE TO BE CONSTRUCTED IN FULL COMPLIANCE WITH THE ONTARIO PROVINCIAL BUILDING CODE (PART 7, PLUMBING), THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) AND THE REQUIREMENTS OF THE TOWN OF ST. MARYS, WHICH CODES AND REGULATIONS SHALL SUPERSEDE ALL OTHERS.
- 1.16. SITE SERVICING CONTRACTOR TO TERMINATE ALL SERVICES 1 METRE FROM FOUNDATION WALL.
- 1.17. FILTER FABRIC TO BE TERRAFIX 270R OR APPROVED EQUAL.
- 1.18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNALS, DELINEATORS, MARKERS, AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS OF THE TOWN OF ST. MARYS AND THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
- 1.19. THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
- 1.20. FOLLOWING COMPLETION OF PROPOSED WORKS AND PRIOR TO OCCUPANCY INSPECTION, ALL STORM AND SANITARY SEWERS ARE TO BE FLUSHED, AND ALL CATCHBASIN AND CATCHBASIN MANHOLE SUMPS ARE TO BE CLEANED OF DEBRIS AND SILT.
2. **INSPECTION AND CERTIFICATION**
- 2.1. GRIT ENGINEERING INC. REQUIRES A MINIMUM OF 24 HOURS NOTICE PRIOR TO THE REQUIRED INSPECTION BE REQUESTED. INSPECTIONS ARE REQUIRED TO VERIFY PIPE INSTALLATION (MATERIALS, SIZE, LOCATION AND ELEVATION), STRUCTURE PLACEMENT, SURFACE MATERIAL AND FINISHED GRADING.
 - 2.1.1. CONSTRUCTION WORKS WITHIN THE PUBLIC RIGHT-OF-WAY REQUIRE FULL TIME INSPECTION.
 - 2.1.2. CONSTRUCTION WORKS WITHIN PRIVATE LANDS ARE REQUIRED ON A PART TIME AND AS NEEDED BASIS.
- 2.2. FAILURE TO COMPLY WITH GRIT ENGINEERING INC. INSPECTION REQUIREMENTS WILL RESULT IN ADDITIONAL CONSTRUCTION INSPECTION AND VERIFICATION AT THE EXPENSE OF THE CONTRACTOR.
3. **STORM SEWERS AND SERVICING**
- 3.1. PIPE BEDDING FOR RIGID PIPE TO BE CLASS "B" AS PER OPSD 802.033, 802.031, OR 802.032. PIPE BEDDING FOR FLEXIBLE PIPE TO BE AS PER OPSD 802.010. BEDDING MATERIAL AND COVER MATERIAL TO BE GRANULAR "A" TRENCH BACKFILL TO BE NATIVE MATERIAL REPLACED IN 300mm LIFTS AND COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.

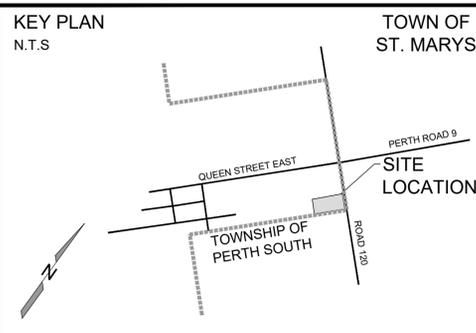
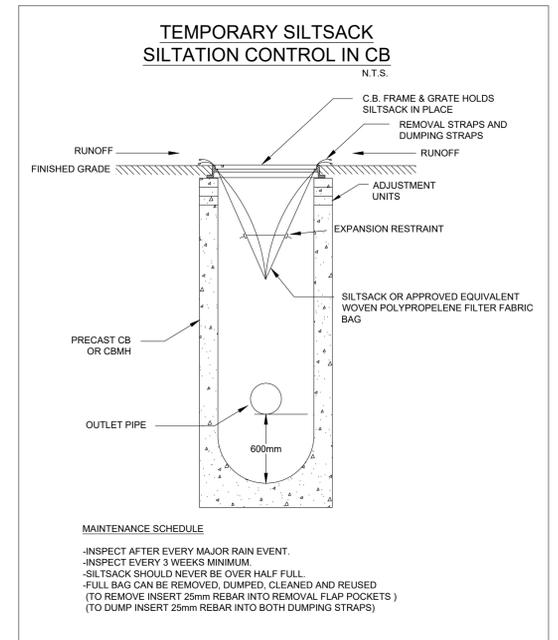
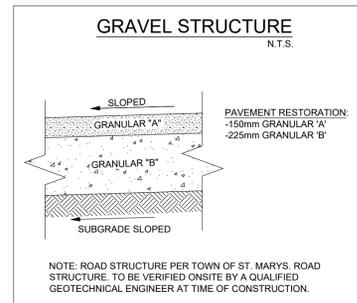
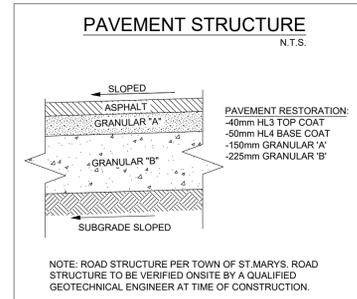
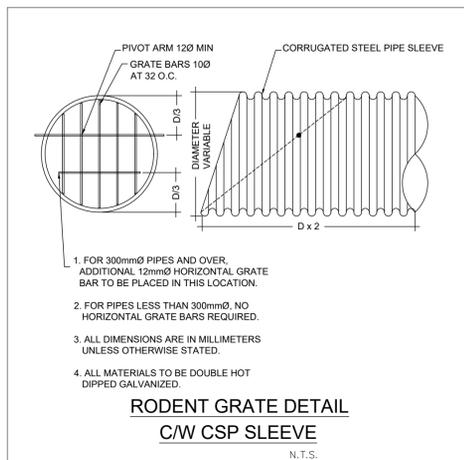
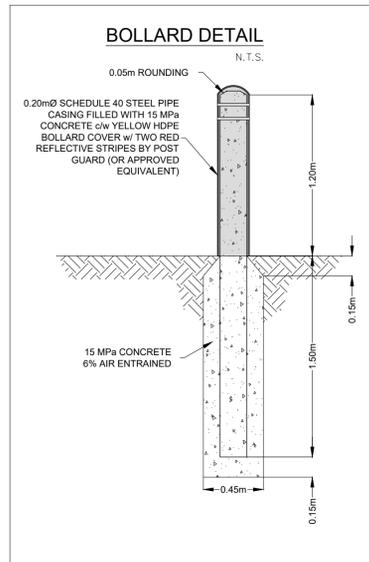
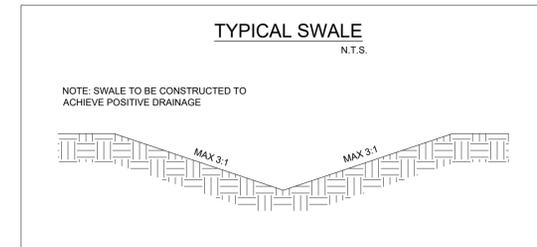
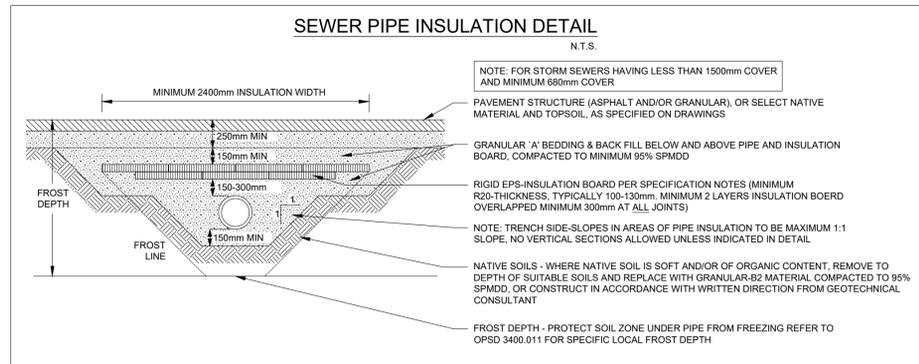
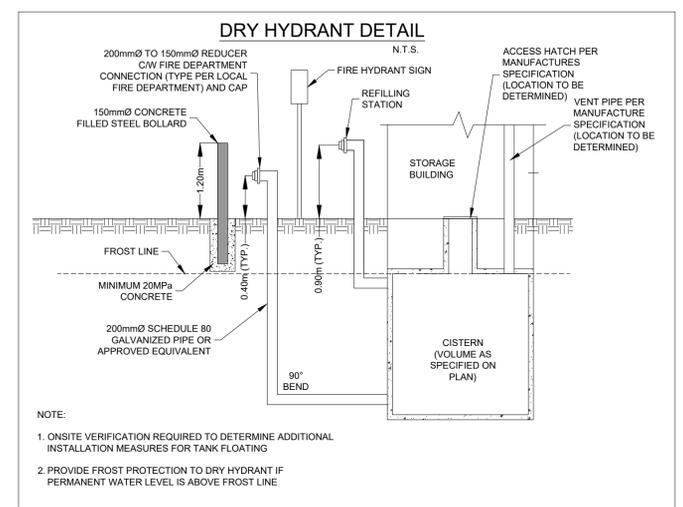
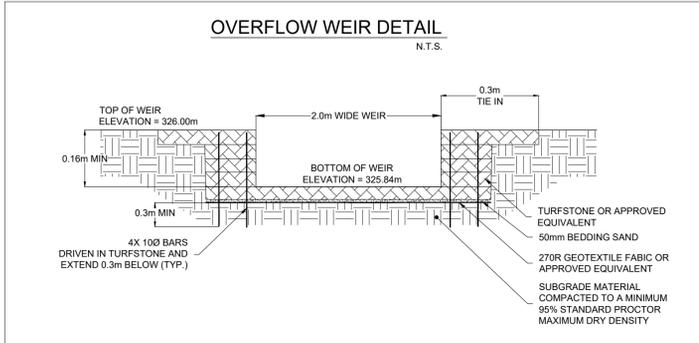
- 3.2. STORM SEWERS 200mmØ TO 450mmØ SHALL BE POLY(VINYL CHLORIDE (PVC) PIPE DR35 ASTM-D3034 OR RIBBED PVC SEWER PIPE CSA B182.4-M90 ASTM-F794 WITH INTEGRAL BELL AND SPIGOT UTILIZING FLEXIBLE ELASTOMERIC SEALS. RIBBED PVC NOT TO BE USED WITHIN-RIGHT-OF-WAY.
- 3.3. MAINTENANCE HOLES AND MAINTENANCE HOLE CATCHBASINS TO BE 1200mmØ PRECAST WITH ALUMINUM STEPS AT 300mm CENTRES AS PER OPSD 701.010 UNLESS OTHERWISE SPECIFIED.
- 3.4. MAINTENANCE HOLES TO BE BENCHED PER OPSD 701.021.
- 3.5. CATCHBASIN STRUCTURES 600mmx600mm PER OPSD 705.010
- 3.6. DITCHINLET CATCHBASIN STRUCTURES 600mmx1200mm PER OPSD 705.040 (TYPE B)
- 3.7. DOUBLE CATCHBASIN STRUCTURES 600mmx1450mm PER OPSD 705.020
- 3.8. OIL GRIT SEPARATOR TO BE ADS MODEL FD-4HC OR APPROVED EQUIVALENT.
- 3.9. CATCHBASIN MAINTENANCE HOLES, CATCHBASINS AND DITCH INLET CATCHBASINS TO HAVE A MINIMUM 600mm DEEP SUMP.
- 3.10. MAINTENANCE HOLE AND CATCHBASIN, FRAMES, GRATES, CASTINGS AND LIDS TO BE QUALITY GREY IRON ASTM A48 CLASS 30B.
- 3.11. STORM MAINTENANCE HOLE LIDS TO BE PER OPSD 401.010 - TYPE 'B' CATCHBASIN AND CATCHBASIN MAINTENANCE HOLE GRATES TO BE PER OPSD 400.100.
- 3.12. STORM SEWERS AND SERVICES TO HAVE MINIMUM 1.2m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED SEWER PIPE PER DETAIL THIS SHEET OR OTHER ENGINEER-APPROVED EQUIVALENT.

4. WATERMANS AND WATER SERVICING

- 4.1. ALL WATER DISTRIBUTION SYSTEM INSTALLATION SHALL BE IN ACCORDANCE WITH CURRENT TOWN OF ST. MARYS STANDARD WATERMAIN SPECIFICATIONS, THE PLUMBING CODE, AND THE AWWA.
- 4.2. ALL WATERMANS AND SERVICES TO HAVE MINIMUM 1.8m COVER. WHERE COVER OVER SERVICES IS DEFICIENT, THE CONTRACTOR SHALL INSULATE WATERMAIN AND SERVICES AS PER DETAIL THIS SHEET.
5. **EROSION AND SEDIMENT CONTROL**
- 5.1. PRIOR TO THE START OF ANY CONSTRUCTION THE CONTRACTOR IS TO INSTALL THE EROSION AND SEDIMENT CONTROLS IN ACCORDANCE TO THE APPROVED PLAN.
- 5.2. NO ALTERNATE EROSION AND SEDIMENT CONTROLS ARE PERMITTED WITHOUT APPROVAL FROM THE ENGINEER AND APPROVING AUTHORITY.
- 5.3. ADDITIONAL EROSION AND SEDIMENT CONTROLS MAY BE REQUIRED AS THE CONSTRUCTION PROGRESSES. THE CONTRACTOR TO INSTALL ADDITIONAL MEASURES AS REQUIRED BY THE ENGINEER AND APPROVING AUTHORITY.
- 5.4. THE CONTRACTOR IS TO PERFORM REGULAR MAINTENANCE, REPAIRS AND REPLACEMENT ON ALL CONTROLS TO ENSURE PROPER FUNCTIONING UNTIL PROJECT IS COMPLETE.
- 5.5. EROSION CONTROL FENCING TO BE INSTALLED AROUND BASE OF ALL STOCKPILES. ALL STOCKPILES TO BE KEPT 2.5m MINIMUM FROM PROPERTY LINE.
- 5.6. EROSION PROTECTION TO BE PROVIDED AROUND ALL STORM AND SANITARY MHS AND Cbs.
- 5.7. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE DEVELOPMENT PROGRESSES, CONTRACTOR TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES.
- 5.8. CONTRACTOR TO CLEAN ROADWAY AND SIDEWALKS OF SEDIMENTS RESULTING FROM CONSTRUCTION TRAFFIC FROM THE SITE EACH DAY.
- 5.9. THE CONTRACTOR IS TO REMOVE ALL EROSION AND SEDIMENT CONTROLS UNTIL DEVELOPMENT IS COMPLETE AND VEGETATION PROPOSED FINISHED HARD SURFACE MATERIALS ARE INSTALLED AND VEGETATION IS STABILIZED WITH MATURE GROWTH.

6. MAINTENANCE RECOMMENDATIONS

- 6.1. EROSION CONTROL STRUCTURES TO BE MONITORED REGULARLY AND ANY DAMAGE REPAIRED IMMEDIATELY. SEDIMENTS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF 1/3 THE HEIGHT OF THE FENCE.
- 6.2. OWNER'S REPRESENTATIVE TO MONITOR EROSION CONTROL STRUCTURES TO ENSURE FENCING IS INSTALLED AND MAINTENANCE IS PERFORMED TO MUNICIPALITY REQUIREMENTS.



CONTRACTOR NOTES:
 CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY ERRORS TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.
 ALL DRAWINGS SHALL REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.
 DRAWING SHOULD NOT BE SCALED FOR DIMENSIONS PURPOSES.

BENCHMARK
 ELEVATIONS ARE RELATED TO TOP SPINDLE OF FIRE HYDRANT ON THE NORTH SIDE OF QUEEN STREET AT THE CORNER OF QUEEN AND 120 ROAD.

ELEVATION: 235.88m

No.	ISSUED DESCRIPTION	DATE
1	ISSUED FOR CLIENT REVIEW	2021-11-12
2	ISSUED FOR SITE PLAN APPROVAL	2021-11-16
3		
4		
5		



**ROAD 120
SELF STORAGE UNITS**

PROJECT INFORMATION: 60 ROAD 120, ST. MARYS, ONTARIO

C & C MANAGEMENT

CLIENT INFORMATION:

NOTES AND DETAILS

DRAWING NAME:
 PROJECT No: **GE021-21**
 SCALE: **AS SHOWN**

DRAWING No:
C500
 SHEET SET No: **4 of 4**