March 24, 2026

Prince Edward County
332 Picton Main Street, Picton, ON
Picton, ON, K0K 2T0

Re: Technical Addendum
Stormwater Management Brief and Functional Servicing Report
Bloom Resorts Sandbanks
37 Lake Avenue Lane R.R. #1 Cherry Valley, Ontario
Our File No: D3858

Dear Mr. Pordham,

This technical addendum is written in response to the virtual meeting held with Prince Edward County on March 18, 2026 to provide additional information as requested by the County for inclusion into the Stormwater Management Brief and Functional Servicing Report submitted in support of the Site Plan approval application for Bloom Resorts Sandbanks.

Pre-Development Flows

The overall area contributing to potential surface runoff towards the adjacent properties was increased and updated to be 12,364 m² as per previous direction provided by Prince Edward County. Of that total area, 2,237 m² is already developed with approximately ten (10) trailer lots / units. Areas were calculated for each surface type with their corresponding runoff coefficients to obtain an average surface runoff coefficient for the pre-development (existing conditions) of 0.334. Refer to Drawing SPCA-4.2 (Rev. 11, March 20, 2026) outlining the drainage area (shaded blue).

The time of concentration (tc) was referenced using *Airport Drainage, Federal Aviation Administration, 1965 – Figure for Overland Time of Flow* chart based on average coefficient (C), distance and slope. Based on C = 0.33, distance of 157 m (515 ft), and slope of 3.8%, a tc of 23 minutes was estimated. Referencing *Short Duration Rainfall Intensity-Duration-Frequency Data* chart dated October 31, 2022 for nearby Picton, Ontario (Appendix D) the maximum rate of runoff (Q) for a 5-year storm at a duration of 23 minutes, was calculated to be approximately 206.5 m³/hr or 0.057 m³/s.

$$Q = CIA = 0.334 \times 0.05 \text{ m/hr} \times 12{,}364 \text{ m}^2 = 206.5 \text{ m}^3/\text{hr}.$$

Post Development Flows

Utilizing the same overall area and adjusting the coefficients for the added trailer lots, units, roads and grassed areas that are part of the minor re-development, a revised average surface runoff coefficient

was calculated to be 0.424 due to the increased impervious area. Appendix C provides the breakdown of these areas and calculations.

Similar methodology was used to determine the post development flows and based on a C = 0.42, distance of 157 m (515 ft), and slope of 3.8%, a tc of 20 minutes was estimated. Referencing *Short Duration Rainfall Intensity-Duration-Frequency Data* chart dated October 31, 2022 for nearby Picton, Ontario (Appendix D) the maximum rate of runoff (Q) for a 5-year storm at a duration of 20 minutes, was calculated to be approximately 288.3 m^3/hr or 0.080 m^3/s. The 5-year storm was selected as the Quinte Conservation Stormwater Management Submission Guidelines 2012 provides that minor systems must be capable of handling post development flows up to the 5-year frequency.

$$Q = CIA = 0.424 \times 0.055 \text{ m/hr} \times 12{,}364 \text{ m}^2 = 288.3 \text{ m}^3\text{/hr}.$$

The total catchment area is represented as essentially two (2) smaller catchment areas, as shown on Drawing SPCA-4.2; one which outlets into the grassed swale and then into CB No. 1 and one which outlets into the inverted crown roadway and then into CB No. 2. The flow entering the grassed swale from the east into CB No. 1 represents approximately 29% of the flow (0.023 m^3/s) and the flow entering CB No. 2 on the road represents approximately 71% of the flow (0.057 m^3/s). The grassed swale volume of flow is calculated as 0.136 m^3/s (Appendix B). The inverted roadway volume of flow is calculated as 0.054 m^3/s (Appendix B). The storm sewer design sheet is provided in Appendix E.

At the time of concentration of 20 minutes for post development, the inverted road will be storing 144.3 L/min of surplus runoff. If this intensity was maintained for an hour, there would be 8,661 L stored within the road with still 12,839 L available as the total road has a ponding / holding capacity of 21.5 m^3. This holding capacity is sufficient for the 5-year storm.

The dimensions of the road are shown on Drawing SPCA-4.2. The length of the right-of-way is shown with a width of 7 m and this information was added to Drawing SPCA-5 (Rev. 11, March 20, 2026).

We trust that this addendum provides additional information for the functional servicing design for Bloom Resorts Sandbanks.

Sincerely,

GUNNELL ENGINEERING LTD.

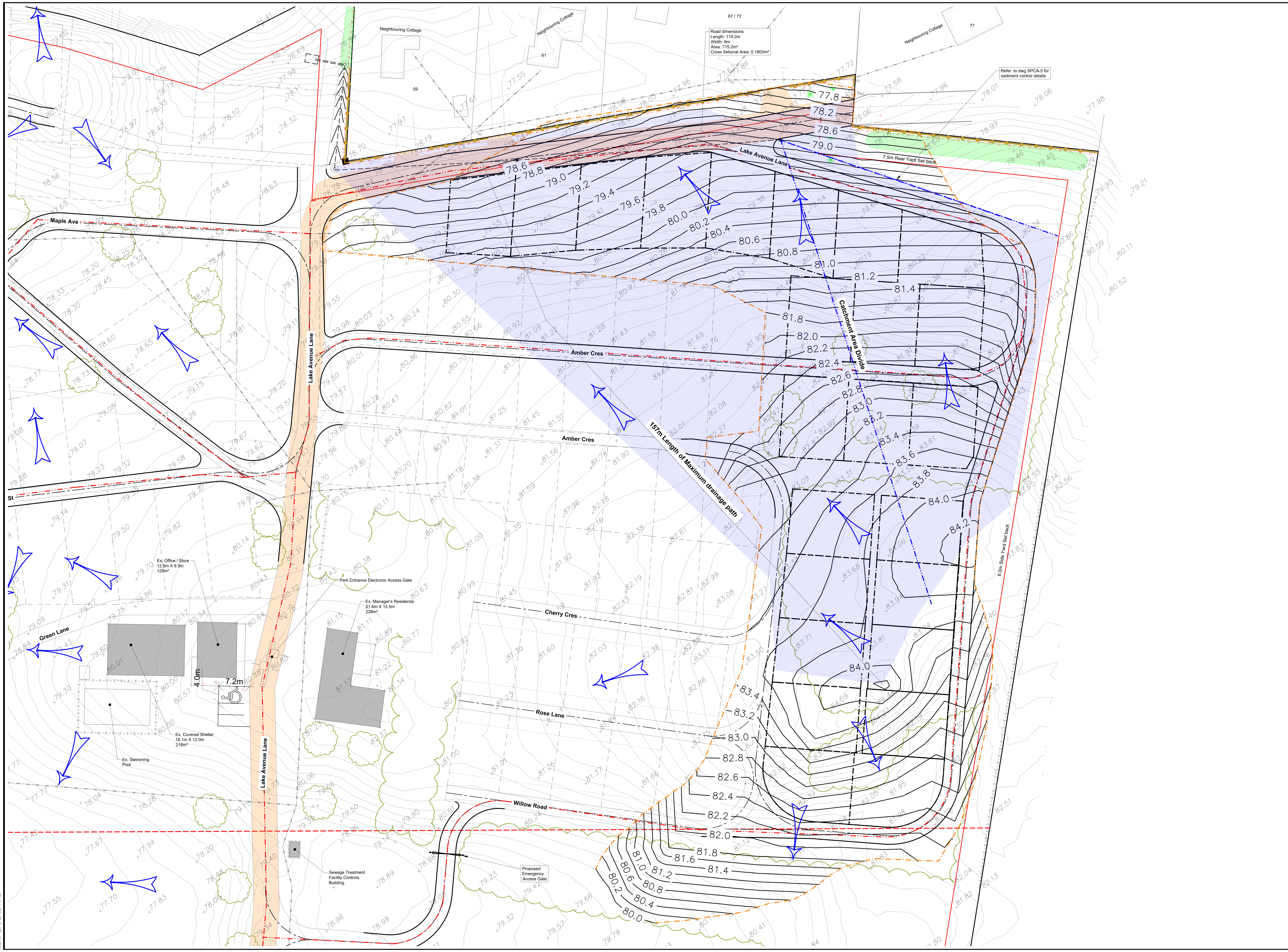
Erin O'Brien, BASc.
Environmental Technologist

Dominic Bauer, P.Eng
Project Engineer

APPENDIX A

GUNNELL ENGINEERING DRAWINGS

SPCA-4.2 & SPCA-5, REVISION #11 MARCH 20, 2026



Gunnell Engineering Ltd.
1110 Stellar Drive, Unit 106
Newmarket, ON L3Y 7B7
bus: 905-868-9400
www.septicdesign.ca

LEGEND

	Existing Contour Interval
78.48	Existing Spot Elevation
	Proposed Contour Interval 0.2m
79.6	Proposed Contour Label
	Surface Water Flow Direction
	Drainage Area
SF	Proposed Silt Fence OPSD 219.130 (See drawing SPCA 5)

Rev. No.	Date	Description	CAD
Rev. 1	11-FEB-2022	Storm drainage updates from review comments	JR
Rev. 2	30-AUG-2023	Revised Right of Way	JR
Rev. 3	30-OCT-2023	Revised Right of Way (Cottages)	JR
Rev. 4	17-JUN-2024	Revised Right of Way (Cottages)	JR
Rev. 5	10-SEP-2024	New-Site dimensions	JR
Rev. 6	24-FEB-2025	Sediment Control Added	JR
Rev. 7	17-APR-2025	PEC Comments Addressed	JR
Rev. 8	12-JUN-2025	Update Drainage Area	JR
Rev. 9	11-NOV-2025	Update Drainage Catchment Design	JR
Rev. 10	19-FEB-2026	New Revised Drainage Plan	JR
Rev. 11	20-MAR-2026	Revised Based on Municipal Comments	JR

Engineer's Stamp:

LICENCED PROFESSIONAL ENGINEER
Mar. 20th, 2026
D. T. BAUER
100226854
PROVINCE OF ONTARIO

Bloom Resorts Sandbanks
37 - 38 Lake Avenue Lane
Cherry Valley, Prince Edward County

Part Site Plan:
Proposed Grading Plan

Scale:	1:400	Designed By:	EG
Date:	21-JUN-2021	Drawn By:	JR
Project No.:		Checked By:	BC
	D3858	Drawing No.:	SPCA-4·2

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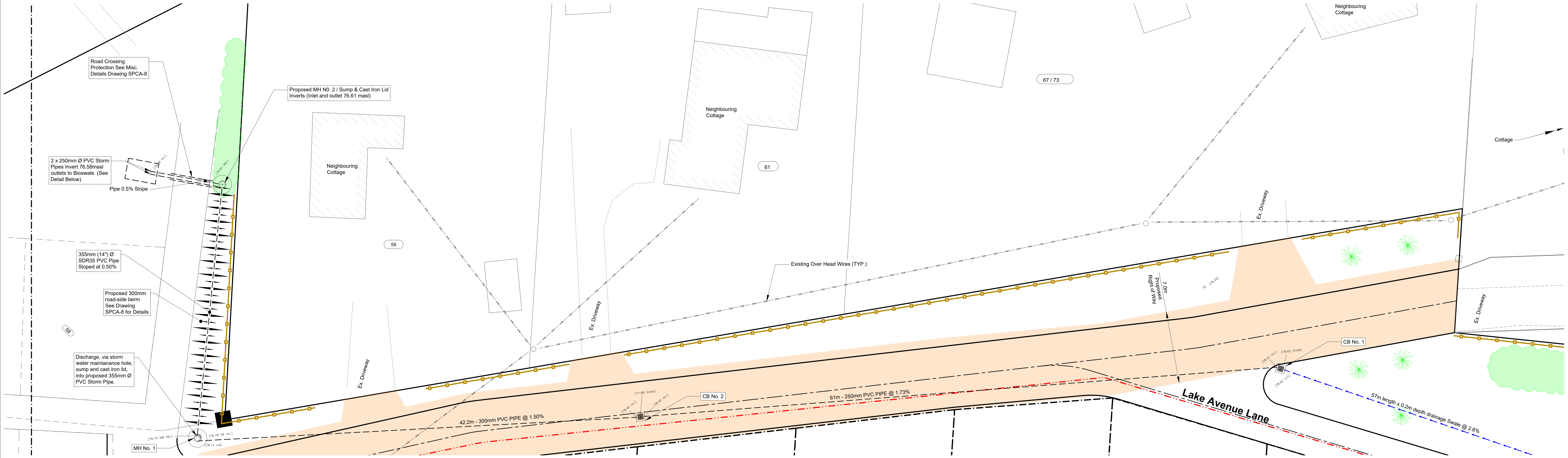
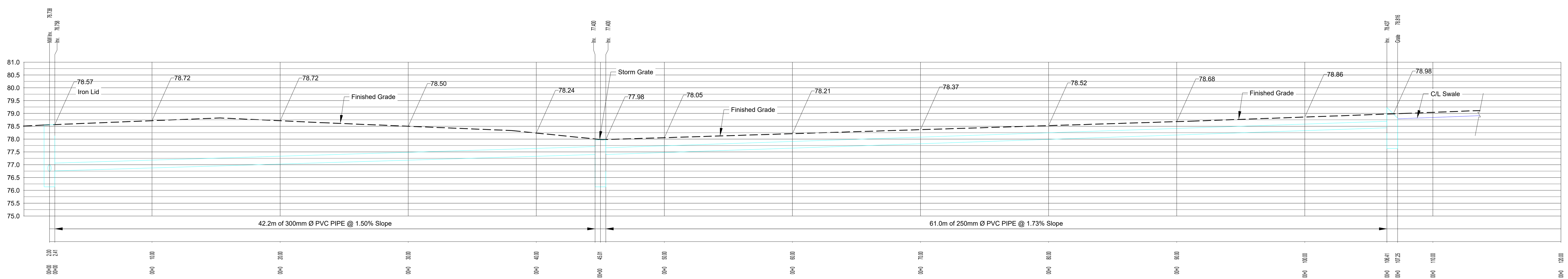
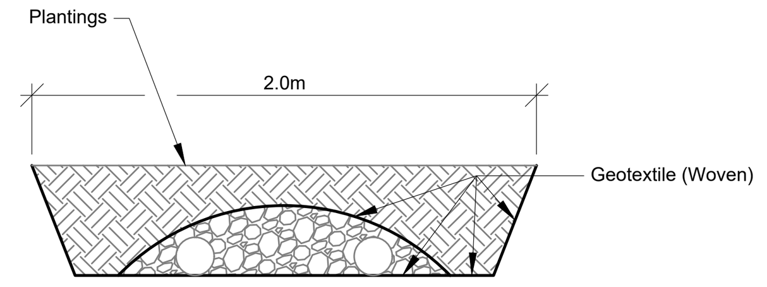
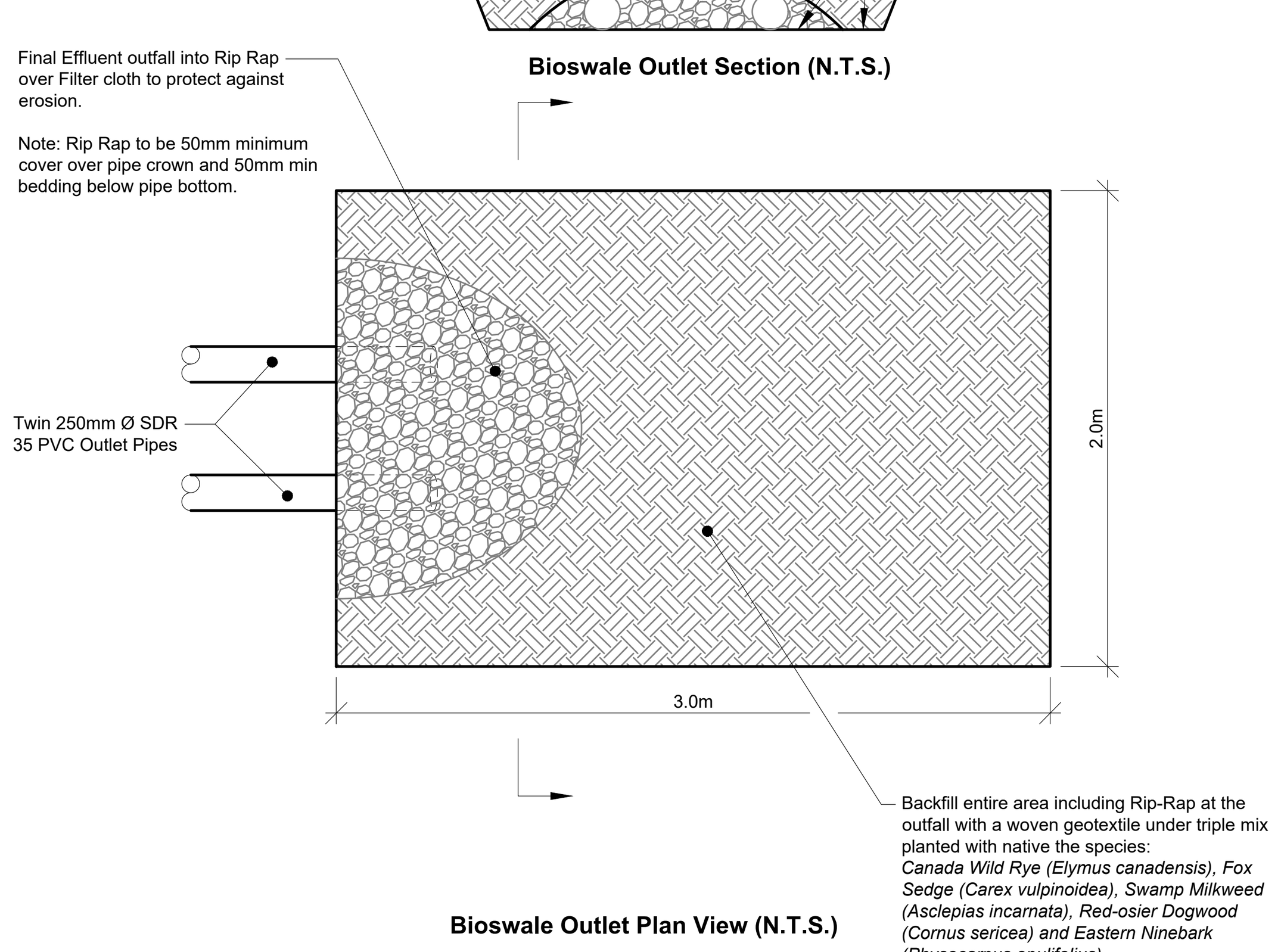




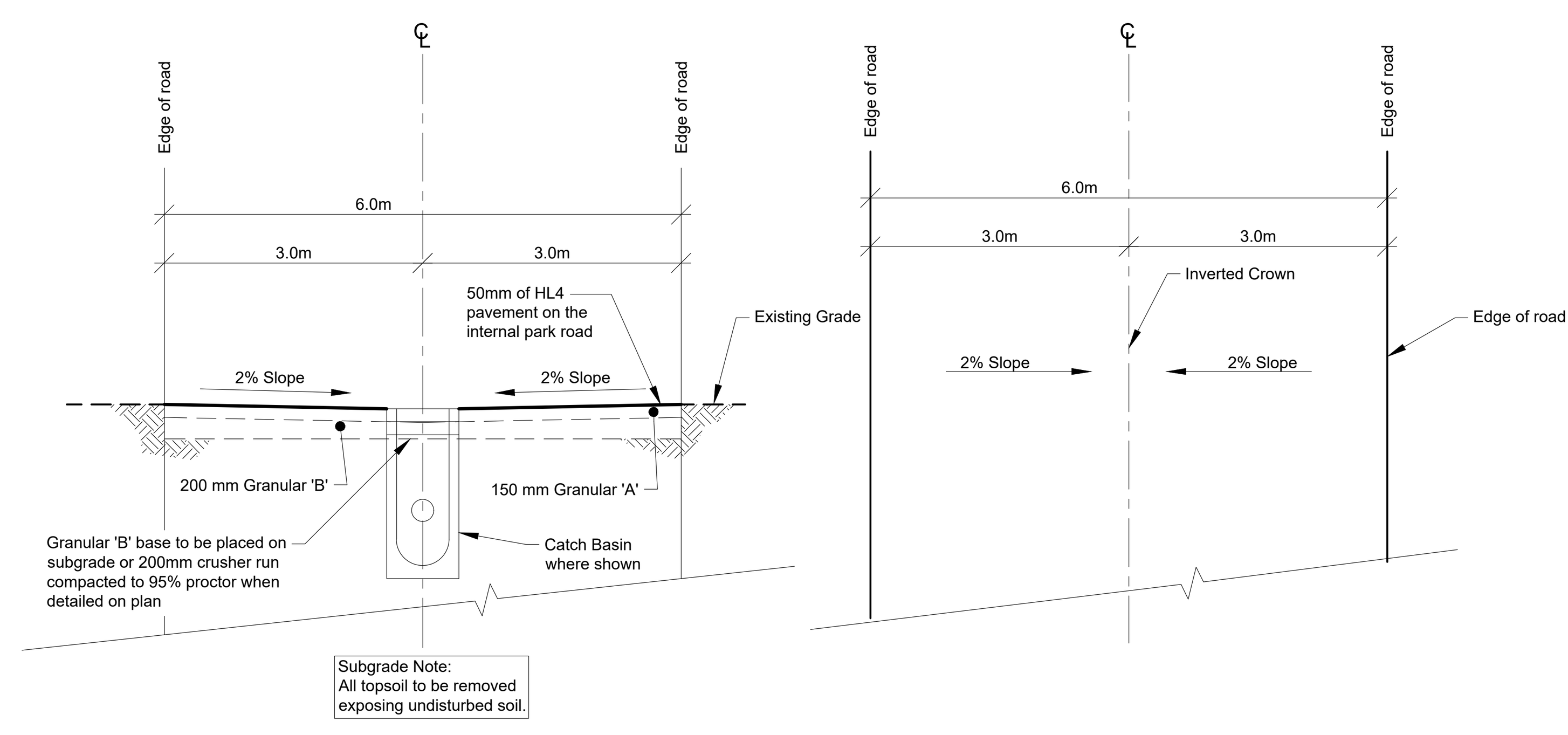
*Storm Pipe Note:
Proposed swale to discharge into storm pipes through surface grate connection OPSD 705.040



Bioswale Outlet Section (N.T.S.)



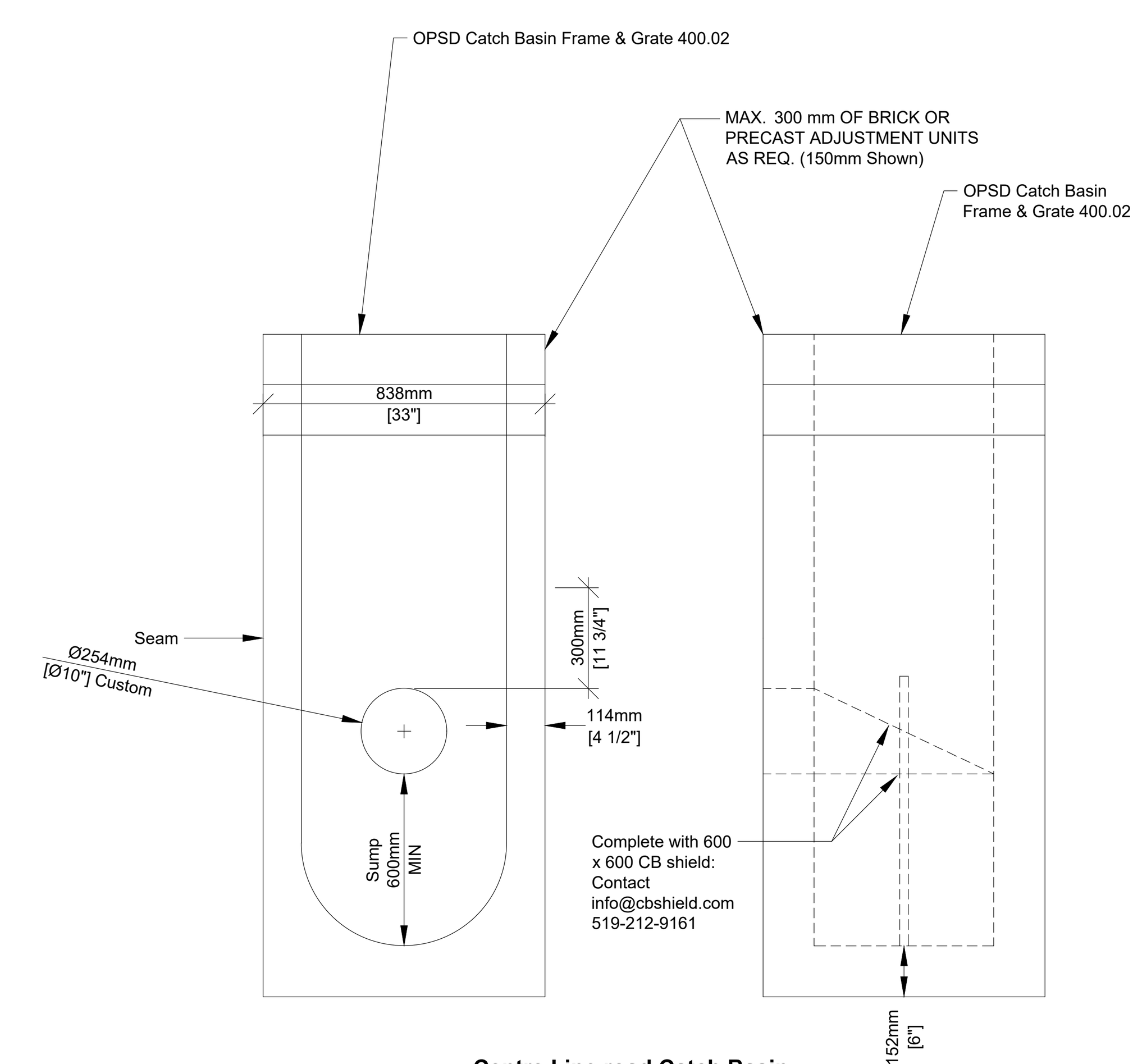
Bioswale Outlet Plan View (N.T.S.)



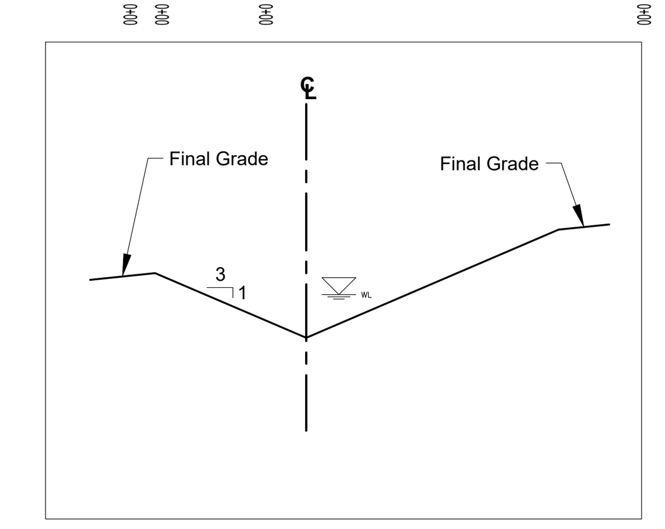
TYPICAL TWO INVERTED PAVED LANE SECTION

Scale N.T.S.

Subgrade Note:
All topsoil to be removed exposing undisturbed soil.

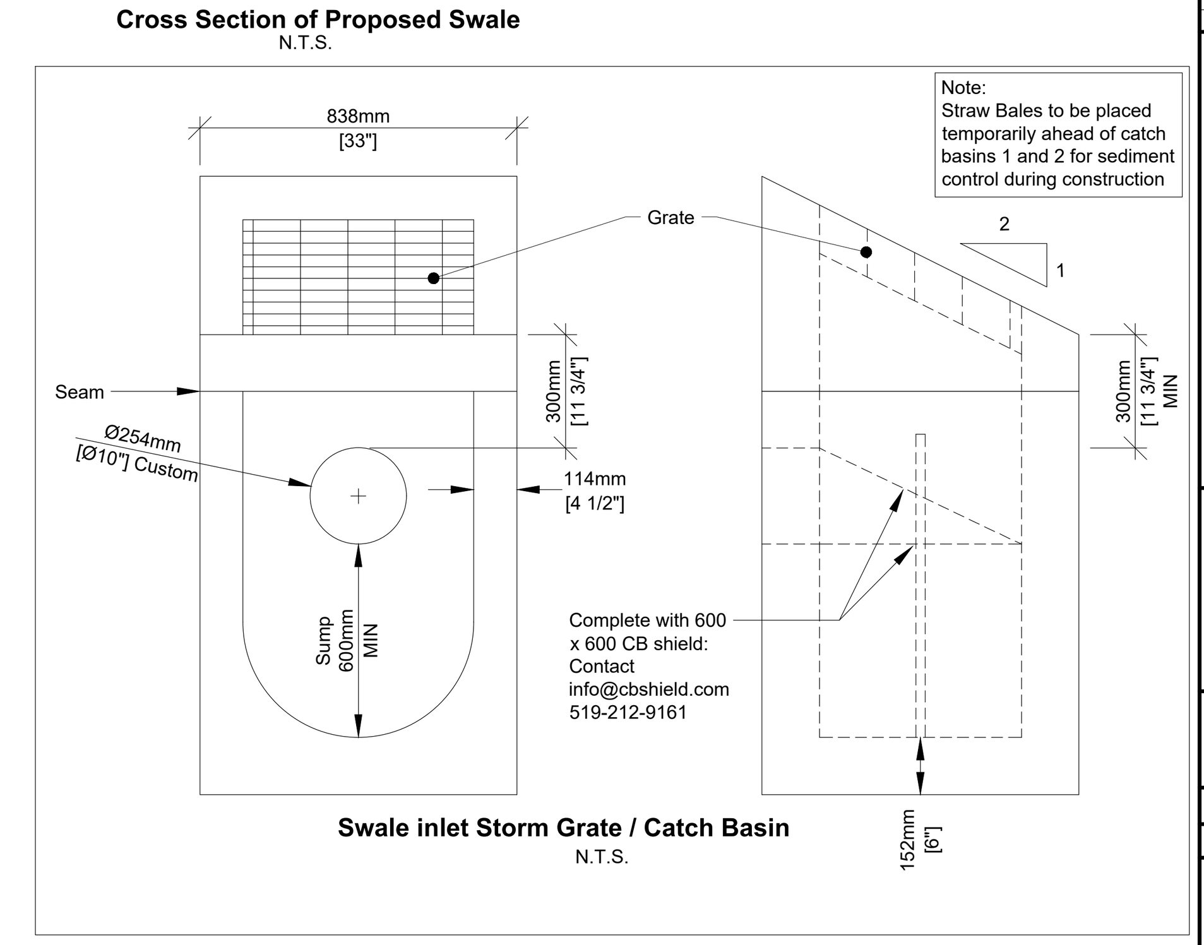


Centre Line road Catch Basin
N.T.S.



Cross Section of Proposed Swale
N.T.S.

Note:
Straw Bales to be placed temporarily ahead of catch basins 1 and 2 for sediment control during construction



Swale inlet Storm Grate / Catch Basin
N.T.S.

Rev. No.	Date	Description	CAD
Rev. 1	11-FEB-2022	Storm drainage updates from review comments	JR
Rev. 2	30-AUG-2023	Revised Right of Way	JR
Rev. 3	30-OCT-2023	Revised Right of Way (Cottages)	JR
Rev. 4	17-JUN-2024	Revised Right of Way (Cottages)	JR
Rev. 5	10-SEP-2024	New-Site dimensions	JR
Rev. 6	24-FEB-2025	Sediment Control Added	JR
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Rev. 8	12-JUN-2025	Update Drainage Area	JR
Rev. 9	11-NOV-2025	Update Drainage Catchment Design	JR
Rev. 10	19-FEB-2026	New Revised Drainage Plan	JR
Rev. 11	20-MAR-2026	Revised Based on Municipal Comments	JR

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LICENCED PROFESSIONAL ENGINEER
Mar. 20th, 2026
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100226854
PROVINCE OF ONTARIO

Bloom Resorts Sandbanks
37 - 38 Lake Avenue Lane
Cherry Valley, Prince Edward County

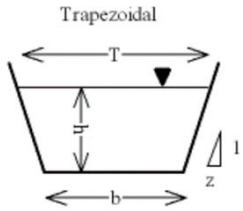
Proposed Stormwater Drainage Works

Scale:	1:200	Designed By:	EG
Date:	21-JUN-2021	Drawn By:	JR
Project No.:		Checked By:	BC
	D3858	Drawing No.:	SPCA-5

APPENDIX B

ROAD AND SWALE CAPACITY CALCULATIONS

Road
Trapezoidal Channel
Flow Area
A = h(b+T)/2



h =	0.06	m	depth of water
b =	0.01	m	width of base
T =	6	m	width of to water level
A =	0.1803	m²	Cross Sectional Area

Wetted Perimeter
P = b + 2(((T - b)/2)^2 +h^2)^(1/2)

P =	6.001202	m

Hydraulic Radius
Rh = (h(b+T)/2/(b+2(((T-b)/2)^2+h^2)^(1/2))

Rh =	0.030044	m

Manning's Formula and Gravity Flow
(Calculate Cross Sectional Average Velocity Flow in Open Channels
v = (kn/n)*Rh^(2/3)S^(1/2)

kn =	1.0		For SI Units (1.486 for Imperial Units)
n =	0.016		Manning's Roughness Coefficient (Use Table to the right →)
Rh =	0.030044	m	Hydraulic Radius (Use based on type of channel you have, calculated above ↑)
S =	0.0025	m/m	Slope or gradient
v =	0.30201	m/s	Cross-Sectional Mean Velocity

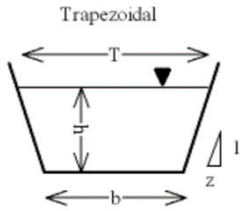
Volume of Flow in the Channel can be Calculated as Follows:
q = A*v

q =	0.054452	m³/s	Channel Flow Volume
	54.45245	L/s	

Manning's Roughness Coefficients vs. Channel Type

Surface Material	Manning's Roughness Coefficient -*n*-
Asbestos cement	0.011
Asphalt	0.016
Brass	0.011
Brick and cement mortar sewers	0.015
Canvas	0.012
Cast or Ductile iron, new	0.012
Clay tile	0.014
Concrete - steel forms	0.011
Concrete (Cement) - finished	0.012
Concrete - wooden forms	0.015
Concrete - centrifugally spun	0.013
Copper	0.011
Corrugated metal	0.022
Earth, smooth	0.018
Earth channel - clean	0.022
Earth channel - gravelly	0.025
Earth channel - weedy	0.03
Earth channel - stony, cobbles	0.035
Floodplains - pasture, farmland	0.035
Floodplains - light brush	0.05
Floodplains - heavy brush	0.075
Floodplains - trees	0.15
Galvanized iron	0.016
Glass	0.01
Gravel, firm	0.023
Lead	0.011
Masonry	0.025
Metal - corrugated	0.022
Natural streams - clean and straight	0.03
Natural streams - major rivers	0.035
Natural streams - sluggish with deep pools	0.04
Natural channels, very poor condition	0.06
Plastic	0.009
Polyethylene PE - Corrugated with smooth inner walls	0.009 - 0.015
Polyethylene PE - Corrugated with corrugated inner walls	0.018 - 0.025
Polyvinyl Chloride PVC - with smooth inner walls	0.009 - 0.011
Rubble Masonry	0.017 - 0.022
Steel - Coal-tar enamel	0.01
Steel - smooth	0.012
Steel - New unlined	0.011
Steel - Riveted	0.019
Vitrified clay sewer pipe	0.013 - 0.015
Wood - planed	0.012
Wood - unplaned	0.013
Wood stave pipe, small diameter	0.011 - 0.012
Wood stave pipe, large diameter	0.012 - 0.013

Grassed Swale
Trapezoidal Channel
Flow Area
A = h(b+T)/2



h =	0.2	m	depth of water
b =	0.01	m	width of base
T =	1.2	m	width of to water level
A =	0.121	m²	Cross Sectional Area

Wetted Perimeter
P = b + 2(((T - b)/2)^2 +h^2)^(1/2)

P =	1.265428	m

Hydraulic Radius
Rh = (h(b+T)/2/(b+2(((T-b)/2)^2+h^2)^(1/2))

Rh =	0.09562	m

Manning's Formula and Gravity Flow
(Calculate Cross Sectional Average Velocity Flow in Open Channels
v = (kn/n)*Rh^(2/3)S^(1/2)

kn =	1.0		For SI Units (1.486 for Imperial Units)
n =	0.030		Manning's Roughness Coefficient (Use Table to the right →)
Rh =	0.09562	m	Hydraulic Radius (Use based on type of channel you have, calculated above ↑)
S =	0.026	m/m	Slope or gradient
v =	1.123908	m/s	Cross-Sectional Mean Velocity

Volume of Flow in the Channel can be Calculated as Follows:
q = A*v

q =	0.135993	m³/s	Channel Flow Volume
	135.9928	L/s	

Manning's Roughness Coefficients vs. Channel Type

Surface Material	Manning's Roughness Coefficient -*n*-
Asbestos cement	0.011
Asphalt	0.016
Brass	0.011
Brick and cement mortar sewers	0.015
Canvas	0.012
Cast or Ductile iron, new	0.012
Clay tile	0.014
Concrete - steel forms	0.011
Concrete (Cement) - finished	0.012
Concrete - wooden forms	0.015
Concrete - centrifugally spun	0.013
Copper	0.011
Corrugated metal	0.022
Earth, smooth	0.018
Earth channel - clean	0.022
Earth channel - gravelly	0.025
Earth channel - weedy	0.03
Earth channel - stony, cobbles	0.035
Floodplains - pasture, farmland	0.035
Floodplains - light brush	0.05
Floodplains - heavy brush	0.075
Floodplains - trees	0.15
Galvanized iron	0.016
Glass	0.01
Gravel, firm	0.023
Lead	0.011
Masonry	0.025
Metal - corrugated	0.022
Natural streams - clean and straight	0.03
Natural streams - major rivers	0.035
Natural streams - sluggish with deep pools	0.04
Natural channels, very poor condition	0.06
Plastic	0.009
Polyethylene PE - Corrugated with smooth inner walls	0.009 - 0.015
Polyethylene PE - Corrugated with corrugated inner walls	0.018 - 0.025
Polyvinyl Chloride PVC - with smooth inner walls	0.009 - 0.011
Rubble Masonry	0.017 - 0.022
Steel - Coal-tar enamel	0.01
Steel - smooth	0.012
Steel - New unlined	0.011
Steel - Riveted	0.019
Vitrified clay sewer pipe	0.013 - 0.015
Wood - planed	0.012
Wood - unplaned	0.013
Wood stave pipe, small diameter	0.011 - 0.012
Wood stave pipe, large diameter	0.012 - 0.013

APPENDIX C

RUNOFF COEFFICIENT CALCULATIONS

D3858

Pre-Development Conditions

Areas	Units	m²	C	Ac	%	
Total Drainage Basin Area		12364	Various	#N/A	1	
Road Area		1258	0.8	1006.4	0.101747	
Trailer Unit Area (37.16m²/unit)	10	371.6	0.95	353.02	0.030055	
Gravel Driveway + Trailer Pad		723	0.5	361.5	0.058476	
Gravel Driveway + Trailer Pad less Trailer Unit		351.4	0.5	175.7	0.028421	
Grassed Area		10383	0.25	2595.75	0.839777	
						Average C
	Check	12364				0.334105

Post-Development Conditions

Areas		m²	C	Ac	%	
Total Drainage Basin Area		12364	Various	#N/A	1	
Road Area		2012	0.8	1609.6	0.162731	
Trailer Unit Area (37.16m²/unit)	30	1114.8	0.95	1059.06	0.090165	
Gravel Driveway + Trailer Pad		2169	0.5	1084.5	0.175429	
Gravel Driveway + Trailer Pad less Trailer Unit		1054.2	0.5	527.1	0.085264	
Grassed Area		8183	0.25	2045.75	0.661841	
						Average C
	Check	12364				0.423933

Pre-Development Conditions

time of concentration (tc) Kirpich Equation
tc = 0.0078*L^(0.77)*S^(-0.385)
tc = time of concentration, min
L = length of travel (ft)
S = slope of the flow path from the most remote part of the basin to the calculation point divided by the horizontal distance between the two points, ft/ft

	m	ft
Length	157	515.0919
	%	
Slope	3.8	
tc =	3.365341	

*Note tc cannot be less than 5 minutes, therefore:
Reference Airport Draingage, Federal Aviation Administration, 1965 - Figure for Overland Time of Flow chart which was used based on the average C, distance, and slope.
tc = 23mins estimated based on chart using C = 0.33, distance = 515ft, and slope of 3.8%

Post-Development Conditions

time of concentration (tc) Kirpich Equation
tc = 0.0078*L^(0.77)*S^(-0.385)
tc = time of concentration, min
L = length of travel (ft)
S = slope of the flow path from the most remote part of the basin to the calculation point divided by the horizontal distance between the two points, ft/ft

	m	ft
Length	157	515.0919
	%	
Slope	3.8	
tc =	3.365341	

*Note tc cannot be less than 5 minutes, therefore:
Reference Airport Draingage, Federal Aviation Administration, 1965 - Figure for Overland Time of Flow chart which was used based on the average C, distance, and slope.
tc = 20mins estimated based on chart using C = 0.42, distance = 515ft, and slope of 3.8%

Pre-Development Conditions

Rational Formula
Q = CIA
Q = Max rate of runoff, (m3/hr or cfs)
C = runoff coefficient
I = avg rainfall intensity for a duration equal to the time of concentration, in (m/hr or in./hr)
A = Drainage area contributing to the design location, (m2 or acres)

C =	0.334105		
	mm/hr	m/hr	in./hr
I =	50	0.05	1.968505
	m²		acres
A =	12364		3.05520622
	m³/hr		cfs
Q =	206.5435		2.00936847
	m³/s		check
	0.057373		0.056898949

Post-Development Conditions

Rational Formula
Q = CIA
Q = Max rate of runoff, (m3/hr or cfs)
C = runoff coefficient
I = avg rainfall intensity for a duration equal to the time of concentration, in (m/hr or in./hr)
A = Drainage area contributing to the design location, (m2 or acres)

C =	0.423933			
	mm/hr	m/hr	in./hr	
I =	55	0.055	2.1653555	
	m²		acres	
A =	12364		3.05520622	
	m³/hr		cfs	
Q =	288.2831	2.804575651	288283.1	4804.718 L/min
	m³/s		check	
	0.080079		0.079416698	

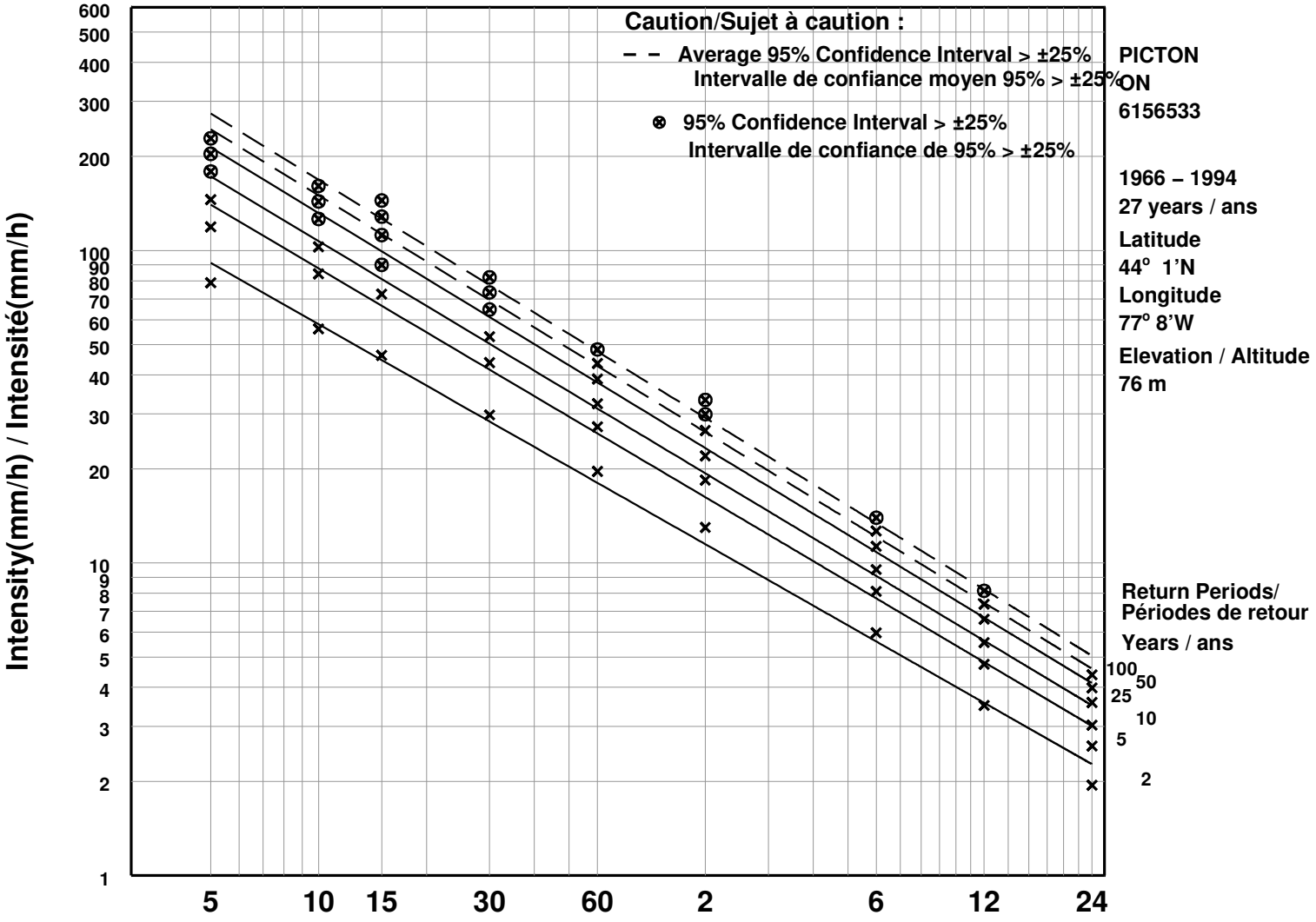
APPENDIX D

SHORT DURATION RAINFALL INTENSITY – DURATION – FREQUENCY DATA FOR PICTON ONTARIO, DATED OCTOBER 31, 2022

Short Duration Rainfall Intensity–Duration–Frequency Data

2022/10/31

Données sur l'intensité, la durée et la fréquence des chutes de pluie de courte durée



Environment Canada Environnement Canada

Canada

APPENDIX E

STORM SEWER DESIGN SHEET

STORM SEWER DESIGN SHEET

Gunnell Engineering Ltd.
1110 Stellar Drive, Unit 106
Newmarket, ON L3Y 7B7
Bus: 905-868-9400
Fax: 905-853-5734
www.gunnellengineering.com

Design Parameters

Manning 'n' = 0.013
Total Catchment Area (ha) = 1.2364

A - Area of pipe = π*r²
W - Perimeter of pipe = π*D
R - Hydraulic radius = A/W

Qa - Actual flow
Qf - Flow Capacity of pipe

Va - Actual velocity of flow in pipe
Vf - Velocity at capacity flowing full

Mannings Formula: V = (R^2/3 * S^1/2)/n
Q= A*V n=0.013 (PVC)

Location			Surface Drainage Area				Rain	Flow Rates (Q)												
Physical	CB	DOWN STREAM PIPE	m²	Acres	Ha	R Run off Coeff.	in / Hr	CFS	m³/sec	[Qa] Actual Flow (L/s)	[D] Pipe Diameter (mm)	[A] π x r² (m²)	[W] π x D (m)	[R] A/W	Qa/Qf	Pipe material	Grade %	[Qf] Capacity 'n' =0.013 (L/sec)	[Vf] Full flow velocity (m/sec)	[Va] Actual velocity at (L/sec)
	CB No. 1		3588	0.89	0.4	0.42393	2.165	0.82	0.023	23.22	254	0.051	0.798	0.064	0.285	PVC	1.73	81.6	1.61	**1.38**
	CB No. 2		12364	3.06	1.2	0.42393	2.165	2.81	0.080	79.57	304.8	0.073	0.958	0.076	0.644	PVC	1.50	123.6	1.69	**1.78**
				--	--			--	--	--		--	--	--	--			--	--	**--**
	MH No. 1		12364	3.06	1.2	0.42393	2.165	2.81	0.080	79.57	355.6	0.099	1.117	0.089	0.739	PVC	0.50	107.6	1.08	**1.18**
				--	--			--	--	--		--	--	--	--			--	--	**--**
Pipe 1	MH No. 2		6182	1.53	0.6	0.42393	2.165	1.4	0.040	39.64	254	0.051	0.798	0.064	0.904	PVC	0.50	43.9	0.87	**0.98**
				--	--			--	--	--		--	--	--	--			--	--	**--**
Pipe 2	MH No. 2		6182	1.53	0.6	0.42393	2.165	1.4	0.040	39.64	254	0.051	0.798	0.064	0.904	PVC	0.50	43.9	0.87	**0.98**
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