STORM WATER MANAGEMENT CALCULATIONS - QUALITY TREATMENTS

WATERMARK on the BAY SUBDIVISION

COUNTY of PRINCE EDWARD (Village of Rossmore)

CHECK DAMS

Check dams are proposed to be installed in the road side ditches.
Volume of storage behind check dams

Bottom Width (m)	0.5	0.5	0.5	0.75
Side Slopes	3:1	3:1	3:1	2.5:1
Depth of Storage (m)	0.3	0.3	0.3	0.3
Ditch Slope	0.55%	0.50%	1.00%	4.40%
Volume (m^3)	7.6	8.4	4.2	1.0
Number Provided	2	6	2	1
Volume (m^3)	15.3	50.4	8.4	1.0
Total (m^3)		74.1		

CONSTRUCTED WETLAND

Smaller Drainage Area are viable where there is high groundwater table

Based on Table 3.2 Stormwater Management Planning and Design Manual

Enhanced Protection Level (80% Long-Term S.S. Removal)
For Impervious Level of 35% Required Storage Volume would be 80 m^3/ha

Proposed Subdivison is calaculates to be 12% Impervious

Extrapolating, Required Storage Volume would be 50 m^3/ha

Subcatchment Area	9.69	ha
Required Storage Volume	484.5	m^3
Storage Collected Behind Check Dams	74.1	m^3
	410.4	m^3

VEGETATED FILTER STRIP

Discharge from Constructed Wetland to be with a Vegetated Filter Strip

$Q = KLH^{1.5}$

Q = Flow (m^3/s
L = Length (m)
H = Head of Water (m)
K = Constant

K = 2.3
L = 29 m

		Storm Event	
	Quality	5_{yr}	100_{yr}
Q =	0.113	1.712	3.349
Depth of Flow over Filter Strip (mm) =	14.2	87.0	136.1
Velocilty (m/s) =	0.3	0.7	0.8

DITCH CAPACITY CALCULATION SHEET

5yr STORM EVENT ($Q=2.78\ AIR,\ I=25.1^{t-0.687}$)

STREET	FROM	TO	AREAS (ha)		Indiv.	Accum.	Time of	Rainfall	Peak	DITCH DATA											
			R=.20	R=.9	2.78AR	2.78AR	Conc. min.	Intensity I(mm/hr)	Flow Q(l/s)	BOTTOM WIDTH	SIDE SLOPES RIGHT	SIDE SLOPES LEFT	FLOW DEPTH	WETTED PERIMETER	FLOW AREA	SLOPE (%)	LENGTH (m)	CAPACITY (l/s) n= 0.030		VELOCITY (m/s)	TIME of FLOW (min)
LEASIDE STREET																					
101	0+025	0+210	3.222	0.258	2.436	2.436	55.62	26	64.4	0.5	3	3	0.141	1.392	0.130	0.55%	185	66.3	OK	0.51	6.05
102	0+025	0+210	0.348	0.153	0.575	0.575	29.26	41	23.6	0.5	3	3	0.083	1.025	0.062	0.55%	185	23.7	OK	0.38	8.08
NAVIGATION DRIVE																					
103	0+182	0+330	1.036	0.214	1.111	1.111	40.30	33	36.7	0.5	3	3	0.107	1.177	0.088	0.50%	148	36.7	OK	0.42	5.90
104	0+182	0+330	0.231	0.099	0.376	0.376	11.13	80	30.0	0.5	3	3	0.097	1.113	0.077	0.50%	148	30.4	OK	0.40	6.23
105	0+330	0+635	3.017	0.406	2.693	6.241	61.67	25	153.7	0.5	3	3	0.184	1.664	0.194	1.00%	305	153.8	OK	0.79	6.40
106	0+330	0+635	0.400	0.240	0.823	1.199	17.36	59	70.6	0.5	3	3	0.126	1.297	0.111	1.00%	305	71.5	OK	0.65	7.87
Into Wetland						7.440	68.07	23	171.2												
201	0+182	0+005	1.663	0.417	1.968	1.968	45.65	30	59.6	0.5	3	3	0.137	1.366	0.125	0.50%	182	59.7	OK	0.48	6.35
202	0+182	0+005	0.256	0.134	0.478	0.478	11.62	78	37.1	0.5	3	3	0.077	0.987	0.056	0.50%	182	19.7	Surch	0.35	8.69
EAST OUTLET																					
	0+030	0+040				2.446	52.00	28	67.7	0.75	2.5	2.5	0.058	1.062	0.052	8.80%	10	68.6	OK	1.32	0.13
	0+040	0+110				2.446	52.12	28	67.6	0.75	2.5	2.5	0.071	1.132	0.066	4.40%	70	69.1	OK	1.05	1.11

DITCH CAPACITY CALCULATION SHEET

100yr STORM EVENT (Q=2.78 AIR, I= $39.7^{t-0.702}$)

STREET	FROM	TO	AREAS (ha)		Indiv.	Accum.	Time of	Rainfall	Peak	DITCH DATA											
			R=.20	R=.9	2.78AR	2.78AR	Conc. min.	Intensity I(mm/hr)	Flow Q(l/s)	BOTTOM WIDTH	SIDE SLOPES RIGHT	SIDE SLOPES LEFT	FLOW DEPTH	WETTED PERIMETER	FLOW AREA	SLOPE (%)	LENGTH (m)	CAPACITY (l/s) n= 0.030		VELOCITY (m/s)	TIME of FLOW (min)
LEASIDE STREET																					
101	0+025	0+210	3.222	0.258	2.920	2.920	52.34	44	127.6	0.5	3	3	0.195	1.733	0.212	0.55%	185	128.7	OK	0.61	5.07
102	0+025	0+210	0.348	0.153	0.644	0.644	11.85	124	79.9	0.5	3	3	0.155	1.480	0.150	0.55%	185	80.2	OK	0.54	5.75
NAVIGATION DRIVE																					
103	0+182	0+330	1.036	0.214	1.285	1.285	37.72	55	70.7	0.5	3	3	0.150	1.449	0.143	0.50%	148	71.6	OK	0.50	4.91
104	0+182	0+330	0.231	0.099	0.422	0.422	11.13	130	54.7	0.5	3	3	0.132	1.335	0.118	0.50%	148	55.4	OK	0.47	5.27
105	0+330	0+635	3.017	0.406	3.169	7.374	57.41	41	302.0	0.5	3	3	0.253	2.100	0.319	1.00%	305	302.0	OK	0.95	5.36
106	0+330	0+635	0.400	0.240	0.912	1.334	16.40	99	131.7	0.5	3	3	0.171	1.581	0.173	1.00%	305	132.2	OK	0.76	6.66
Into Wetland						8.708	62.77	38	334.9												
201	0+182	0+005	1.663	0.417	2.257	2.257	15.07	105	236.4	0.5	3	3	0.266	2.182	0.345	0.50%	182	238.1	OK	0.69	4.40
202	0+182	0+005	0.256	0.134	0.532	0.532	11.62	126	66.9	0.5	3	3	0.146	1.423	0.137	0.50%	182	67.8	OK	0.49	6.13
EAST OUTLET DITCH																					
	0+030	0+040				2.790	19.47	87	244.0	0.75	2.5	2.5	0.119	1.391	0.125	8.80%	10	246.9	OK	1.98	0.08
	0+040	0+110				2.790	19.55	87	243.3	0.75	2.5	2.5	0.143	1.520	0.158	4.40%	70	245.2	OK	1.55	0.75

Tc CALCULATIONS

WATERMARK on the BAY SUBDIVISION
VILLAGE of ROSSMORE
COUNTY of PRINCE EDWARD (Ameliasburgh Ward)
1470757 ONTARIO INC. - Owner

POST DEVELOPMENT CONDITION

Subcatchment 101

Runoff Coefficient — 5yr Storm Event

C =	0.252	0.2	0.45	0.9
	3.480	3.222		0.258
	0.876	0.644		0.232

Runoff Coefficient — 100yr Storm Event

C =	0.302	0.2	0.45	0.9
	3.480	3.222		0.258
	1.050	0.806		0.245

Airport Formula (C values less than 0.4)

$Elev_H$ =	87.25	$Elev_H$ =	87.25
$Elev_L$ =	80.70	$Elev_L$ =	80.70
A (ha)=	3.480	A (ha)=	3.480
C =	0.252	C =	0.302
L =	490	L =	490
S_w =	1.34%	S_w =	0.013367
T_c =	55.62	T_c =	52.34
I =	26	I =	44
Q_p =	64.42	Q_p =	127.60

Subcatchment 102

Runoff Coefficient — 5yr Storm Event

C =	0.414	0.2	0.45	0.9
	0.500	0.348		0.153
	0.207	0.070		0.137

Runoff Coefficient — 100yr Storm Event

C =	0.464	0.2	0.45	0.9
	0.500	0.348		0.153
	0.232	0.087		0.145

Airport Formula (C values less than 0.4) (C values greater than 0.4)

$Elev_H$ =	83.30	$Elev_H$ =	83.30
$Elev_L$ =	80.60	$Elev_L$ =	80.60
A (ha)=	0.500	A (ha)=	0.500
C =	0.414	C =	0.464
L =	205	L =	205
S_w =	1.32%	S_w =	1.32%
T_c =	29.26	T_c =	11.85
I =	41	I =	124
Q_p =	23.63	Q_p =	79.86

Tc CALCULATIONS

WATERMARK on the BAY SUBDIVISION
VILLAGE of ROSSMORE
COUNTY of PRINCE EDWARD (Ameliasburgh Ward)
1470757 ONTARIO INC. - Owner

POST DEVELOPMENT CONDITION

Subcatchment 103

Runoff Coefficient	5yr Storm Event				Runoff Coefficient	100yr Storm Event			
C =	0.320	0.2	0.45	0.9	C =	0.370	0.2	0.45	0.9
	1.250	1.036		0.214		1.250	1.036		0.214
	0.400	0.207		0.193		0.462	0.259		0.203

Airport Formula (C values less than 0.4)

$Elev_H$ =	82.40	$Elev_H$ =	82.40
$Elev_L$ =	80.70	$Elev_L$ =	80.70
A (ha)=	1.250	A (ha)=	1.250
C =	0.320	C =	0.370
L =	215	L =	215
S_w =	0.79%	S_w =	0.79%
T_c =	40.30	T_c =	37.72
I =	33	I =	55
Q_p =	36.66	Q_p =	70.67

Subcatchment 104

Runoff Coefficient	5yr Storm Event				Runoff Coefficient	100yr Storm Event			
C =	0.410	0.2	0.45	0.9	C =	0.460	0.2	0.45	0.9
	0.330	0.231		0.099		0.330	0.231		0.099
	0.135	0.046		0.089		0.152	0.058		0.094

Bransby-Williams Formula (C values greater than 0.4) (C values greater than 0.4)

$Elev_H$ =	81.55	$Elev_H$ =	81.55
$Elev_L$ =	80.70	$Elev_L$ =	80.70
A (ha)=	0.330	A (ha)=	0.330
C =	0.410	C =	0.460
L =	155	L =	155
S_w =	0.55%	S_w =	0.55%
T_c =	11.13	T_c =	11.13
I =	80	I =	130
Q_p =	30.04	Q_p =	54.66

Tc CALCULATIONS

WATERMARK on the BAY SUBDIVISION
VILLAGE of ROSSMORE
COUNTY of PRINCE EDWARD (Ameliasburgh Ward)
1470757 ONTARIO INC. - Owner

POST DEVELOPMENT CONDITION

Subcatchment 105

Runoff Coefficient	5yr Storm Event			
C =	0.295	0.2	0.45	0.9
	3.490	3.017		0.473
	1.029	0.603		0.426

Airport Formula (C values less than 0.4)

$Elev_H$ =	83.30
$Elev_L$ =	77.75
A (ha)=	3.490
C =	0.295
L =	385
S_w =	1.44%
T_c =	45.64
I =	30
Q_p =	86.68

Runoff Coefficient	100yr Storm Event			
C =	0.345	0.2	0.45	0.9
	3.490	3.017		0.473
	1.204	0.754		0.450

$Elev_H$ =	83.30
$Elev_L$ =	77.75
A (ha)=	3.490
C =	0.345
L =	385
S_w =	1.44%
T_c =	42.81
I =	50
Q_p =	168.41

Subcatchment 106

Runoff Coefficient	5yr Storm Event			
C =	0.463	0.2	0.45	0.9
	0.640	0.400		0.240
	0.296	0.080		0.216

Bransby-Williams Formula (C values greater than 0.4)

$Elev_H$ =	80.75
$Elev_L$ =	77.75
A (ha)=	0.640
C =	0.463
L =	290
S_w =	1.03%
T_c =	17.17
I =	59
Q_p =	48.82

Runoff Coefficient	100yr Storm Event			
C =	0.513	0.2	0.45	0.9
	0.640	0.400		0.240
	0.328	0.100		0.228

(C values greater than 0.4)

$Elev_H$ =	80.75
$Elev_L$ =	77.75
A (ha)=	0.640
C =	0.513
L =	290
S_w =	1.03%
T_c =	17.17
I =	96
Q_p =	87.17

Tc CALCULATIONS

WATERMARK on the BAY SUBDIVISION
VILLAGE of ROSSMORE
COUNTY of PRINCE EDWARD (Ameliasburgh Ward)
1470757 ONTARIO INC. - Owner

POST DEVELOPMENT CONDITION

Subcatchment 201

Runoff Coefficient	5yr Storm Event			
C =	0.340	0.2	0.45	0.9
	2.080	1.663		0.417
	0.708	0.333		0.375

Runoff Coefficient	100yr Storm Event			
C =	0.390	0.2	0.45	0.9
	2.080	1.663		0.417
	0.812	0.416		0.396

Airport Formula	(C values less than 0.4)
$Elev_H$ =	82.20
$Elev_L$ =	80.55
A (ha)=	2.080
C =	0.340
L =	255
S_w =	0.65%
T_c =	45.65
I =	30
Q_p =	59.61

Bransby-Williams Formula	(C values greater than 0.4)
$Elev_H$ =	82.20
$Elev_L$ =	80.55
A (ha)=	1.663
C =	0.200
L =	255
S_w =	0.65%
T_c =	15.07
I =	105
Q_p =	96.81

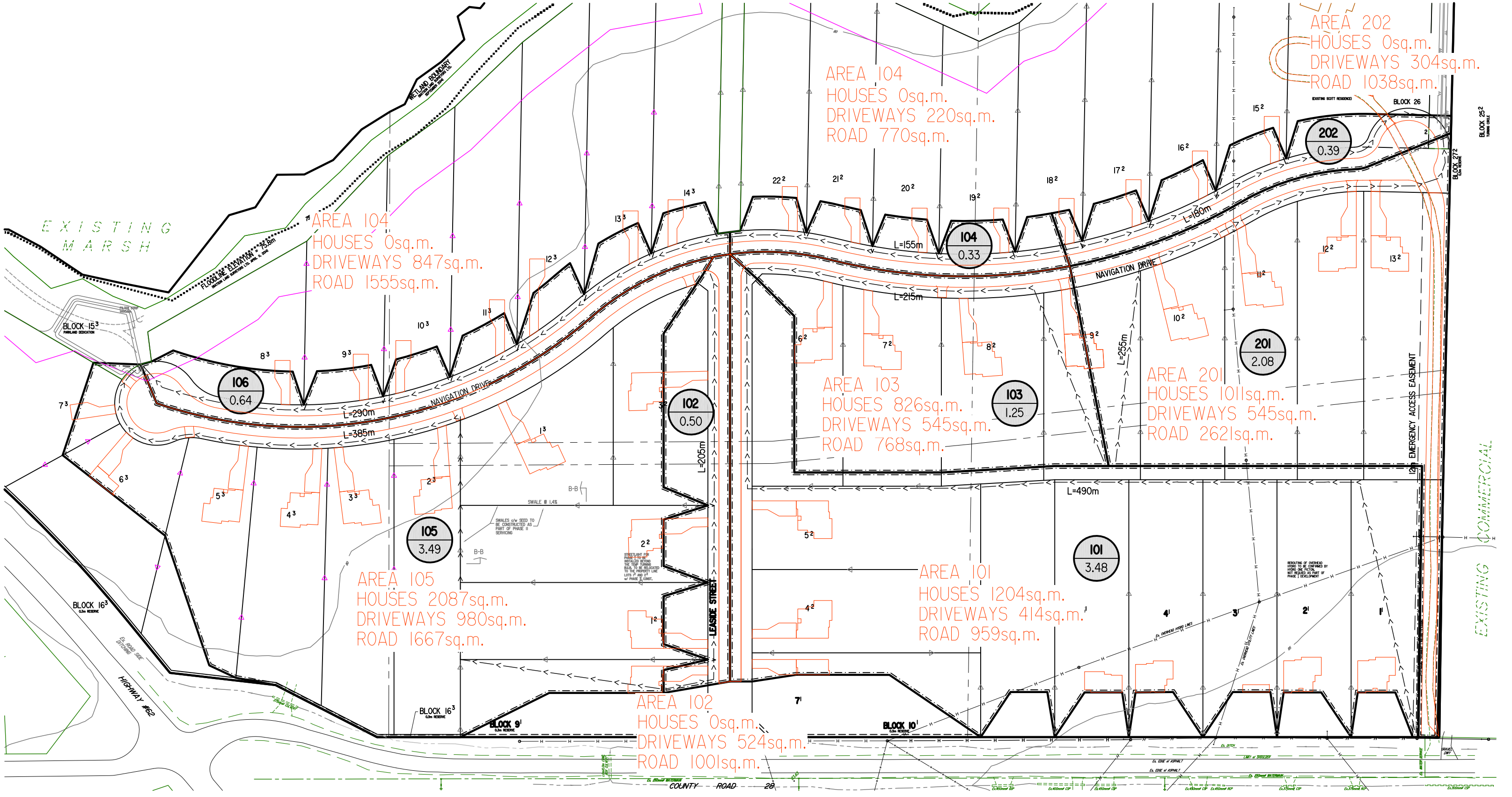
Subcatchment 202

Runoff Coefficient	5yr Storm Event			
C =	0.441	0.2	0.45	0.9
	0.390	0.256		0.134
	0.172	0.051		0.121

Runoff Coefficient	100yr Storm Event			
C =	0.491	0.2	0.45	0.9
	0.390	0.256		0.134
	0.191	0.064		0.127

Airport Formula	(C values greater than 0.4)
$Elev_H$ =	81.55
$Elev_L$ =	80.00
A (ha)=	0.390
C =	0.441
L =	180
S_w =	0.86%
T_c =	11.62
I =	78
Q_p =	37.07

	(C values greater than 0.4)
$Elev_H$ =	81.55
$Elev_L$ =	80.00
A (ha)=	0.390
C =	0.491
L =	180
S_w =	0.86%
T_c =	11.62
I =	126
Q_p =	66.91



VAN MEER LIMITED
LAND DEVELOPMENT · PROJECT MANAGEMENT · ENGINEERING
14 Bridge Street West, Belleville, Ont. K8P 1H7
Tel. 613-969-0171 Fax. 613-969-1781
E-mail Address: meer_drafting@on.aibn.com

WATERMARK BY THE BAY
VILLAGE OF ROSSMORE
1470757 ONTARIO INC. - OWNER

DATE	DESCRIPTION	NAME
Date	Description	By / Chk'd By

REVISIONS

SCALE: 1:1600
DESIGNED: A.H.V.
DRAWN: S.D.S.
DATE: JUNE 2014
COMPUTER: \\Meer_drafting\drawings\O'Brien Parkside Landscaping\587-70_Watermark on the Bay\

DITCH CALCULATION PLAN
SECONDARY INFORMATION
DRAWING 587/70-S12

FILE NAME: Watermark_Comments Aug7-15.dwg - PLOT DATE: September 3, 2015.