
APPENDIX D

**STORMWATER MANAGEMENT WATER QUALITY
CONTROL CALCULATIONS**

Unit Biofiltration Volume Calculations

	Boulevard Biofiltration
Width	2.7 m
Depth	1.25 m
Void Ratio	0.4
Volume	1.35 m ³ /m

	Cul-De-Sac Media
Diameter	8 m
Depth	1.85 m
Area	48.87 m ²
Volume	90.41 m ³

Volume Analysis

Catchment	Length Available in Boulevard (m)	Volume Available in Boulevard (m³)	Volume Available in Cul-De-Sac (m³)	Total Volume (m³)
Development Area 1				
Catchment 212 Street 'H'	147.82	199.56	0.00	199.56
Catchment 213 + 513 Street 'H'	197.76	266.98	90.41	357.39
Catchment 215 Street 'G'	0.00	0.00	90.41	90.41
Total	345.58	466.53	180.82	647.36
Development Area 2				
Catchment 221, 521, 522, 525 + 526 Street 'A'	688.47	929.43	0.00	929.43
Catchment 222, 523, 524 + 527 Street 'A'	79.86	107.81	90.41	198.22
Catchment 221, 521, 522, 525 + 526 Street 'A'	0.00	0.00	0.00	0.00
Total	768.33	1037.25	90.41	1127.66
Development Area 4				
Catchment 242, 541, 542 + 543 Street 'F'	327.40	441.99	90.41	532.40
Catchment 245, 546 + 547 Street 'D' & Street 'E'	356.31	481.02	90.41	571.43
Catchment 247 Street 'D'	88.58	119.58	90.41	209.99
Catchment 2410 Street 'C'	88.82	119.91	90.41	210.32
Catchment 246 Street 'D'	0.00	0.00	0.00	0.00
Total	861.11	1162.50	361.65	1524.14
Development Area 5				
Catchment 252 Street 'J'	182.50	246.38	180.82	427.20
Catchment 253 + 552 Street 'I'	112.50	151.88	180.82	332.70
Total	295.00	398.25	361.65	759.90

Development Area 1	Area (ha)	% Imperviousness (TIMP)	Water Quality Required (m ³)	Erosion Control Required (m ³)	Biofiltration Available (m ³)
Catchment 212	1.05	42%	28.29	130.87	199.56
Catchment 213 + 513	1.32	41%	35.44	160.71	357.39
Catchment 215	0.52	39%	13.95	61.19	90.41
Total	2.89	41%	77.69	352.77	647.36

Development Area 2	Area	% Imperviousness (TIMP)	Water Quality Required (m ³)	Erosion Control Required (m ³)	Biofiltration Available (m ³)
Catchment 221, 521, 522, 525, + 526	4.74	39%	122.88	558.30	929.43
Catchment 222, 523, 524, + 527	3.88	46%	100.61	504.41	198.22
Catchment 232 + 223	0.36	42%	9.34	44.46	0.00
Total	8.97	42%	232.84	1107.17	1127.66

Development Area 4	Area	% Imperviousness (TIMP)	Water Quality Required (m ³)	Erosion Control Required (m ³)	Biofiltration Available (m ³)
Catchment 242, 541, 542 + 543	2.16	41%	56.96	261.26	532.40
Catchment 245, 546, + 547	2.44	41%	64.57	295.94	571.43
Catchment 247	0.90	44%	23.72	114.57	209.99
Catchment 2410	0.85	46%	22.58	111.34	210.32
Catchment 246	0.04	35%	1.00	4.45	0.00
Total	6.39	42%	168.83	787.56	1524.14

Development Area 5	Area	% Imperviousness (TIMP)	Water Quality Required (m ³)	Erosion Control Required (m ³)	Biofiltration Available (m ³)
Catchment 252 + 552	1.48	33%	36.41	160.56	427.20
Catchment 253 + 553	2.19	38%	53.91	256.95	332.70
Total	3.67	36%	90.32	417.51	759.90

**TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS
 (FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)**

Protection Level	SWMP Type	Storage Volume (ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous Flow)	90	150	200	240

DEVELOPMENT AREA 1

Catchment 212

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 42 %

Drainage Area = 1.05 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 26.9 m³/ha

Required Water Quality Storage Volume =	28 m³
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Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.497 (Weighted Impervious = 42%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 1.05 ha x 10 m³ / mm·ha x 0.497

Erosion Control Volume (V) =	131 m³
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Catchment 213 + 513

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 41 %

Drainage Area = 1.32 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 26.9 m³/ha

Required Water Quality Storage Volume = 35 m³

Erosion Control

Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.487 (Weighted Impervious = 41%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 1.32 ha x 10 m³ / mm·ha x 0.487

Erosion Control Volume (V) = 161 m³

Catchment 215

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 39 %

Drainage Area = 0.52 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 26.9 m³/ha

Required Water Quality Storage Volume = 14 m³

Erosion Control

Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.4710 (Weighted Impervious = 41%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 0.52 ha x 10 m³ / mm·ha x 0.4710

Erosion Control Volume (V) = 61 m³
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DEVELOPMENT AREA 2

Catchment 221, 521, 522, 525 + 526

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 39 %

Drainage Area = 4.74 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 26.0 m³/ha

Required Water Quality Storage Volume = 123 m³
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Erosion Control

Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.472 (Weighted Impervious = 39%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 4.74 ha x 10 m³ / mm-ha x 0.472

Erosion Control Volume (V) = 558 m³

Catchment 222, 523, 524 + 527

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 46 %

Drainage Area = 3.88 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 26.0 m³/ha

Required Water Quality Storage Volume = 101 m³
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Erosion Control

Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.520 (Weighted Impervious = 46%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 3.88 ha x 10 m³ / mm·ha x 0.520

Erosion Control Volume (V) = 504 m³

Catchment 232 + 223

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 42 %

Drainage Area = 0.36 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 26.0 m³/ha

Required Water Quality Storage Volume = 9 m³
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Erosion Control

Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.494 (Weighted Impervious = 42%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 0.36 ha x 10 m³ / mm·ha x 0.494

Erosion Control Volume (V) = 44 m³
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DEVELOPMENT AREA 5

Catchment 252

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 33 %

Drainage Area = 1.48 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 24.6 m³/ha

Required Water Quality Storage Volume =	36 m³
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Erosion Control

Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.434 (Weighted Impervious = 33%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 1.48 ha x 10 m³ / mm-ha x 0.434

Erosion Control Volume (V) =	161 m³
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Catchment 253 + 552

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 38 %

Drainage Area = 2.19 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 24.6 m³/ha

Required Water Quality Storage Volume = 54 m³

Erosion Control

Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.469 (Weighted Impervious = 38%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 2.19 ha x 10 m³ / mm·ha x 0.469

Erosion Control Volume (V) = 257 m³

DEVELOPMENT AREA 5

Catchment 252

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 33 %

Drainage Area = 1.48 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 24.6 m³/ha

Required Water Quality Storage Volume = 36 m³

Erosion Control

Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.434 (Weighted Impervious = 33%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 1.48 ha x 10 m³ / mm-ha x 0.434

Erosion Control Volume (V) = 161 m³

Catchment 253 + 552

Water Quality

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 38 %

Drainage Area = 2.19 ha

SWMP Type = 1. Infiltration

Required Water Quality Storage Volume = 24.6 m³/ha

Required Water Quality Storage Volume =	54 m³
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Erosion Control

Using the 25mm - 4 hour Chicago Storm

Weighted Runoff Coefficient (C) = 0.469 (Weighted Impervious = 38%)

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m³) / (mm)(ha) x Weighted Runoff Coefficient

Erosion Control Volume (V) = 25 mm x 2.19 ha x 10 m³ / mm·ha x 0.469

Erosion Control Volume (V) =	257 m³
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