PIT / NODE DETAILS

Version 9

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss
Outlet 2	Node					56			0	729.04	-396.4		3	
Outlet 1	Node					56			0	471.28	-394.96		2	

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id
Basin 1	56.04	0.36	0	Orifice		103	56.2			970.96	-386.32	No			1
	56.19	0.36													
	56.2	5.76													
	56.21	5.76													
	56.22	5.76													
	56.23	5.76													
	56.24	5.76													
	56.25	5.76													
	56.26	5.76													
	56.27	5.76													
	56.28	5.76													
	56.29	5.76													
	56.3	5.76													
	56.31	5.76													
	56.32	5.76													
	56.33	5.76													
	56.34	5.76													
	56.35	5.76													
	56.36	5.76													
	56.37	5.76													
	56.38	5.76													
	56.39	5.76													
	56.4	5.76													
	56.41	5.76													
	56.42	5.76													
	56.43	5.76													
	56.53	5.76													
	56.63	5.76													
	56.73	5.76													
	56.83	5.76													
	56.93	5.76													
	57.03	5.76													
	57.13	5.76													
	57.23	5.76													
	57.33	5.76													
	57.43	5.76													
	57.53	5.76													
	57.63	5.76													
	57.73	5.76													
	57.83	5.76													
	57.93	5.76													
	58.03	5.76													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor
Post - Development Ca	Basin 1	0.0523	24	43	33	5	5	5											0		
Pre-Development Catch	Outlet 1	0.0523	35	65	0	5	12	0											0		

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe1	Basin 1	Outlet 2	7	56.125	56.055	1	uPVC, not under roads	150	154	0.03	NewFixed	1	Basin 1	0					

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
OF1	Basin 1	Outlet 2	1	57.31	0.9	1.7	Pathway 4 m wide	0.3	0.15	0.6	1	0	5

PIT / NODE DETAILS

Name	Type	Family	Version 9 Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss
Outlet 2	Node					56			0	729.04	-396.4		3	
Outlet 1	Node					56			0	471.28	-394.96		2	

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id
Basin 1	54.98	0.36	0	Orifice		118	55.14			970.96	-386.32	No			1
	55.13	0.36													
	55.14	9.2													
	55.15	9.2													
	55.16	9.2													
	55.17	9.2													
	55.18	9.2													
	55.19	9.2													
	55.2	9.2													
	55.21	9.2													
	55.22	9.2													
	55.23	9.2													
	55.24	9.2													
	55.25	9.2													
	55.26	9.2													
	55.27	9.2													
	55.28	9.2													
	55.29	9.2													
	55.3	9.2													
	55.31	9.2													
	55.32	9.2													
	55.33	9.2													
	55.34	9.2													
	55.35	9.2													
	55.36	9.2													
	55.37	9.2													
	55.47	9.2													
	55.57	9.2													
	55.67	9.2													
	55.77	9.2													
	55.87	9.2													
	55.97	9.2													
	56.07	9.2													
	56.17	9.2													
	56.27	9.2													
	56.37	9.2													
	56.47	9.2													
	56.57	9.2													
	56.67	9.2													
	56.77	9.2													
	56.87	9.2													
	56.97	9.2													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor
Post - Development Ca	Basin 1	0.0574	14	45	41	5	5	5											0		
Pre-Development Catch	Outlet 1	0.0574	35	65	0	5	12	0											0		

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe1	Basin 1	Outlet 2	3	55.065	55.036	0.97	uPVC, not under roads	150	154	0.03	NewFixed	1	Basin 1	0					

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
OF1	Basin 1	Outlet 2	1	55.92	0.9	1.7	Pathway 4 m wide	0.3	0.15	0.6	1	0	5

Results of a simplified bottom up HGL analysis.
This provides a simple analysis that can be checked manually. It is useful where Council insists on a manual check on HGLs.
The HGLs shown here may be different to the more accurate values normally calculated by Drains because it is assumed here that the maximum flows and HGLs throughout the system occur at the same time. In fact, in different parts of the system, they may occur during different storms, or even at different times within the one storm. Also, pipes are assumed to be flowing full (even when the more accurate analysis in DRAINS shows they are not).

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.033	0.009	0.024	5	5	5	AR&R 100 year, 1.5 hours storm, average 74 mm/h, Zone 1
Pre-Development Catch	0.028	0.013	0.015	5	12	0	AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1

PIPE DETAILS

Pipe	Flow (cu.m/s)	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Int. Dia (mm)	Rough (mm)	Nom.Capacity (cu.m/s)	V (m/sec)	D/S HGL (m)	Friction Loss (m)	U/S HGL (m)

PIT & NODE DETAILS

Node	Headloss Coeff (Ku)	Shock Loss (m)	HGL (m)	Free-board	Overflow (cu.m/s)
Outlet 2			56.175		
Basin 1			56.245		

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	1.931	0	0	0	0	

Results of a simplified bottom up HGL analysis.
This provides a simple analysis that can be checked manually. It is useful where Council insists on a manual check on HGLs.
The HGLs shown here may be different to the more accurate values normally calculated by Drains because it is assumed here that the maximum flows and HGLs throughout the system occur at the same time. In fact, in different parts of the system, they may occur during different storms, or even at different times within the one storm. Also, pipes are assumed to be flowing full (even when the more accurate analysis in DRAINS shows they are not).

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.035	0.006	0.03	5	5	5	AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1
Pre-Development Catch	0.031	0.014	0.017	5	12	0	AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1

PIPE DETAILS

Pipe	Flow (cu.m/s)	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Int. Dia (mm)	Rough (mm)	Nom.Capacity (cu.m/s)	V (m/sec)	D/S HGL (m)	Friction Loss (m)	U/S HGL (m)

PIT & NODE DETAILS

Node	Headloss Coeff (Ku)	Shock Loss (m)	HGL (m)	Free-board	Overflow (cu.m/s)
Outlet 2			55.173		
Basin 1			55.219		

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	1.931	0	0	0	0	

DRAINS results prepared 18 September, 2013 from Version 2008.08

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Version 8 Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Outlet 2	56.18		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.033	0.009	0.024	5	5	5	AR&R 100 year, 1.5 hours storm, average 74 mm/h, Zone 1
Pre-Development Catch	0.028	0.013	0.015	5	12	0	AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.05 impervious + 0.06 pervious = 0.10 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 100 year, 5 minutes storm, average 266 mm/h, Zone 1	23.19	15.68 (67.6%)	6.53 (61.2%)	9.15 (73.1%)
AR&R 100 year, 10 minutes storm, average 210 mm/h, Zone 1	36.61	27.47 (75.0%)	10.49 (62.3%)	16.98 (85.9%)
AR&R 100 year, 15 minutes storm, average 179 mm/h, Zone 1	46.81	36.34 (77.6%)	13.50 (62.7%)	22.84 (90.4%)
AR&R 100 year, 20 minutes storm, average 159 mm/h, Zone 1	55.44	43.82 (79.0%)	16.05 (62.9%)	27.77 (92.8%)
AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1	62.76	49.76 (79.3%)	18.21 (63.1%)	31.56 (93.1%)
AR&R 100 year, 30 minutes storm, average 132 mm/h, Zone 1	69.04	54.93 (79.6%)	20.06 (63.2%)	34.88 (93.6%)
AR&R 100 year, 45 minutes storm, average 109 mm/h, Zone 1	85.51	68.69 (80.3%)	24.92 (63.3%)	43.78 (94.8%)
AR&R 100 year, 1 hour storm, average 94 mm/h, Zone 1	98.32	79.33 (80.7%)	28.70 (63.4%)	50.63 (95.4%)
AR&R 100 year, 1.5 hours storm, average 74 mm/h, Zone 1	116.11	93.55 (80.6%)	33.94 (63.6%)	59.61 (95.1%)
AR&R 100 year, 2 hours storm, average 62 mm/h, Zone 1	129.7	104.19 (80.3%)	37.95 (63.6%)	66.24 (94.6%)
AR&R 100 year, 3 hours storm, average 47.9 mm/h, Zone 1	150.31	119.56 (79.5%)	44.03 (63.7%)	75.53 (93.1%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe1	0.023	1.5	56.245	56.175	AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Chainage (m)	Max HGL (m)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	1.931	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin 1	57.31	6.6	0.023	0.023	0

CONTINUITY CHECK for AR&R 100 year, 1.5 hours storm, average 74 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Basin 1	48.94	48.85	0.08	0
Outlet 2	48.85	48.85	0	0
Outlet 1	44.61	44.61	0	0

Run Log for 101726Detention Lots 2 run at 11:12:00 on 18/9/2013

DRAINS results prepared 18 September, 2013 from Version 2008.08

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Version 8 Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Outlet 2	55.17		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.035	0.006	0.03	5	5	5	AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1
Pre-Development Catch	0.031	0.014	0.017	5	12	0	AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.05 impervious + 0.06 pervious = 0.11 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 100 year, 5 minutes storm, average 266 mm/h, Zone 1	25.45	17.05 (67.0%)	5.95 (52.0%)	11.10 (79.3%)
AR&R 100 year, 10 minutes storm, average 210 mm/h, Zone 1	40.18	29.95 (74.5%)	9.56 (52.9%)	20.39 (92.3%)
AR&R 100 year, 15 minutes storm, average 179 mm/h, Zone 1	51.37	39.66 (77.2%)	12.31 (53.2%)	27.35 (96.8%)
AR&R 100 year, 20 minutes storm, average 159 mm/h, Zone 1	60.84	47.84 (78.6%)	14.63 (53.4%)	33.21 (99.3%)
AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1	68.88	54.34 (78.9%)	16.59 (53.5%)	37.75 (99.6%)
AR&R 100 year, 30 minutes storm, average 132 mm/h, Zone 1	75.77	60.00 (79.2%)	18.28 (53.6%)	41.72 (100.1%)
AR&R 100 year, 45 minutes storm, average 109 mm/h, Zone 1	93.85	75.05 (80.0%)	22.71 (53.8%)	52.34 (101.4%)
AR&R 100 year, 1 hour storm, average 94 mm/h, Zone 1	107.91	86.68 (80.3%)	26.16 (53.9%)	60.53 (102.0%)
AR&R 100 year, 1.5 hours storm, average 74 mm/h, Zone 1	127.43	102.22 (80.2%)	30.94 (54.0%)	71.28 (101.7%)
AR&R 100 year, 2 hours storm, average 62 mm/h, Zone 1	142.35	113.84 (80.0%)	34.59 (54.0%)	79.24 (101.2%)
AR&R 100 year, 3 hours storm, average 47.9 mm/h, Zone 1	164.97	130.60 (79.2%)	40.13 (54.1%)	90.46 (99.7%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe1	0.025	1.4	55.213	55.173	AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Chainage (m)	Max HGL (m)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	1.931	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin 1	55.91	7.3	0.025	0.025	0

CONTINUITY CHECK for AR&R 100 year, 25 minutes storm, average 144 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Basin 1	28.34	28.25	0.05	0.1
Outlet 2	28.25	28.25	0	0
Outlet 1	26.01	26.01	0	0

Run Log for 101726Detention Lots 2 run at 11:12:00 on 18/9/2013

PIT / NODE DETAILS

Version 9

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss
Outlet 2	Node					56			0	729.04	-396.4		3	
Outlet 1	Node					56			0	471.28	-394.96		2	

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id
Basin 1	56.04	0.36	0	Orifice		103	56.2			970.96	-386.32	No			1
	56.19	0.36													
	56.2	5.76													
	56.21	5.76													
	56.22	5.76													
	56.23	5.76													
	56.24	5.76													
	56.25	5.76													
	56.26	5.76													
	56.27	5.76													
	56.28	5.76													
	56.29	5.76													
	56.3	5.76													
	56.31	5.76													
	56.32	5.76													
	56.33	5.76													
	56.34	5.76													
	56.35	5.76													
	56.36	5.76													
	56.37	5.76													
	56.38	5.76													
	56.39	5.76													
	56.4	5.76													
	56.41	5.76													
	56.42	5.76													
	56.43	5.76													
	56.53	5.76													
	56.63	5.76													
	56.73	5.76													
	56.83	5.76													
	56.93	5.76													
	57.03	5.76													
	57.13	5.76													
	57.23	5.76													
	57.33	5.76													
	57.43	5.76													
	57.53	5.76													
	57.63	5.76													
	57.73	5.76													
	57.83	5.76													
	57.93	5.76													
	58.03	5.76													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor
Post - Development Ca	Basin 1	0.0523	24	43	33	5	5	5	5									0			
Pre-Development Catch	Outlet 1	0.0523	35	65	0	5	12	0										0			

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe1	Basin 1	Outlet 2	7	56.125	56.055	1	uPVC, not under roads	150	154	0.03	NewFixed	1	Basin 1	0					

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
OF1	Basin 1	Outlet 2	1	57.31	0.9	1.7	Pathway 4 m wide	0.3	0.15	0.6	1	0	5

PIT / NODE DETAILS

Name	Type	Family	Version 9 Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss
Outlet 2	Node					56			0	729.04	-396.4		3	
Outlet 1	Node					56			0	471.28	-394.96		2	

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id
Basin 1	54.98	0.36	0	Orifice		118	55.14			970.96	-386.32	No			1
	55.13	0.36													
	55.14	9.2													
	55.15	9.2													
	55.16	9.2													
	55.17	9.2													
	55.18	9.2													
	55.19	9.2													
	55.2	9.2													
	55.21	9.2													
	55.22	9.2													
	55.23	9.2													
	55.24	9.2													
	55.25	9.2													
	55.26	9.2													
	55.27	9.2													
	55.28	9.2													
	55.29	9.2													
	55.3	9.2													
	55.31	9.2													
	55.32	9.2													
	55.33	9.2													
	55.34	9.2													
	55.35	9.2													
	55.36	9.2													
	55.37	9.2													
	55.47	9.2													
	55.57	9.2													
	55.67	9.2													
	55.77	9.2													
	55.87	9.2													
	55.97	9.2													
	56.07	9.2													
	56.17	9.2													
	56.27	9.2													
	56.37	9.2													
	56.47	9.2													
	56.57	9.2													
	56.67	9.2													
	56.77	9.2													
	56.87	9.2													
	56.97	9.2													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor
Post - Development Ca	Basin 1	0.0574	14	45	41	5	5	5										0			
Pre-Development Catch	Outlet 1	0.0574	35	65	0	5	12	0										0			

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe1	Basin 1	Outlet 2	3	55.065	55.036	0.97	uPVC, not under roads	150	154	0.03	NewFixed	1	Basin 1	0					

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
OF1	Basin 1	Outlet 2	1	55.91	0.9	1.7	Pathway 4 m wide	0.3	0.15	0.6	1	0	5

Results of a simplified bottom up HGL analysis.
This provides a simple analysis that can be checked manually. It is useful where Council insists on a manual check on HGLs.
The HGLs shown here may be different to the more accurate values normally calculated by Drains because it is assumed here that the maximum flows and HGLs throughout the system occur at the same time. In fact, in different parts of the system, they may occur during different storms, or even at different times within the one storm. Also, pipes are assumed to be flowing full (even when the more accurate analysis in DRAINS shows they are not).

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.027	0.007	0.02	5	5	5	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1
Pre-Development Catch	0.022	0.011	0.011	5	12	0	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1

PIPE DETAILS

Pipe	Flow (cu.m/s)	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Int. Dia (mm)	Rough (mm)	Nom.Capacity (cu.m/s)	V (m/sec)	D/S HGL (m)	Friction Loss (m)	U/S HGL (m)

PIT & NODE DETAILS

Node	Headloss Coeff (Ku)	Shock Loss (m)	HGL (m)	Free-board	Overflow (cu.m/s)
Outlet 2			56.16		
Basin 1			56.23		

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	0.565	0	0	0	0	

Results of a simplified bottom up HGL analysis.
This provides a simple analysis that can be checked manually. It is useful where Council insists on a manual check on HGLs.
The HGLs shown here may be different to the more accurate values normally calculated by Drains because it is assumed here that the maximum flows and HGLs throughout the system occur at the same time. In fact, in different parts of the system, they may occur during different storms, or even at different times within the one storm. Also, pipes are assumed to be flowing full (even when the more accurate analysis in DRAINS shows they are not).

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.03	0.005	0.025	5	5	5	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1
Pre-Development Catch	0.024	0.012	0.012	5	12	0	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1

PIPE DETAILS

Pipe	Flow (cu.m/s)	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Int. Dia (mm)	Rough (mm)	Nom.Capacity (cu.m/s)	V (m/sec)	D/S HGL (m)	Friction Loss (m)	U/S HGL (m)

PIT & NODE DETAILS

Node	Headloss Coeff (Ku)	Shock Loss (m)	HGL (m)	Free-board	Overflow (cu.m/s)
Outlet 2			55.149		
Basin 1			55.178		

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	0.565	0	0	0	0	

DRAINS results prepared 18 September, 2013 from Version 2008.08

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Version 8 Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Outlet 2	56.16			0			

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.027	0.007	0.02	5	5	5	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1
Pre-Development Catch	0.022	0.011	0.011	5	12	0	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.05 impervious + 0.06 pervious = 0.10 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 20 year, 5 minutes storm, average 206 mm/h, Zone 1	17.96	10.55 (58.8%)	4.99 (60.4%)	5.56 (57.4%)
AR&R 20 year, 10 minutes storm, average 162 mm/h, Zone 1	28.24	19.24 (68.1%)	8.02 (61.8%)	11.22 (73.5%)
AR&R 20 year, 15 minutes storm, average 138 mm/h, Zone 1	36.09	25.84 (71.6%)	10.34 (62.3%)	15.50 (79.5%)
AR&R 20 year, 20 minutes storm, average 121 mm/h, Zone 1	42.19	30.84 (73.1%)	12.14 (62.5%)	18.71 (82.1%)
AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1	47.94	35.33 (73.7%)	13.83 (62.7%)	21.49 (83.0%)
AR&R 20 year, 30 minutes storm, average 100 mm/h, Zone 1	52.3	38.48 (73.6%)	15.12 (62.8%)	23.36 (82.7%)
AR&R 20 year, 45 minutes storm, average 82 mm/h, Zone 1	64.33	47.89 (74.4%)	18.67 (63.1%)	29.22 (84.1%)
AR&R 20 year, 1 hour storm, average 71 mm/h, Zone 1	74.27	55.66 (74.9%)	21.60 (63.2%)	34.06 (84.9%)
AR&R 20 year, 1.5 hours storm, average 56 mm/h, Zone 1	87.86	65.60 (74.7%)	25.61 (63.4%)	39.98 (84.3%)
AR&R 20 year, 2 hours storm, average 46.6 mm/h, Zone 1	97.49	72.22 (74.1%)	28.45 (63.4%)	43.77 (83.1%)
AR&R 20 year, 3 hours storm, average 36.2 mm/h, Zone 1	113.6	83.46 (73.5%)	33.20 (63.5%)	50.25 (81.9%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe1	0.02	1.5	56.23	56.16	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Chainage (m)	Max HGL (m)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	0.565	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin 1	56.99	4.7	0.02	0.02	0

CONTINUITY CHECK for AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Basin 1	18.76	18.67	0.08	0.1
Outlet 2	18.67	18.67	0	0
Outlet 1	16.57	16.57	0	0

Run Log for 101726Detention Lots 2 run at 11:12:00 on 18/9/2013

DRAINS results prepared 18 September, 2013 from Version 2008.08

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Version 8 Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Outlet 2	55.15		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.03	0.005	0.025	5	5	5	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1
Pre-Development Catch	0.024	0.012	0.012	5	12	0	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.05 impervious + 0.06 pervious = 0.11 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 20 year, 5 minutes storm, average 206 mm/h, Zone 1	19.71	11.42 (57.9%)	4.55 (51.3%)	6.87 (63.4%)
AR&R 20 year, 10 minutes storm, average 162 mm/h, Zone 1	31	20.92 (67.5%)	7.31 (52.4%)	13.61 (79.8%)
AR&R 20 year, 15 minutes storm, average 138 mm/h, Zone 1	39.61	28.13 (71.0%)	9.42 (52.9%)	18.71 (85.9%)
AR&R 20 year, 20 minutes storm, average 121 mm/h, Zone 1	46.3	33.61 (72.6%)	11.06 (53.1%)	22.54 (88.5%)
AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1	52.62	38.50 (73.2%)	12.61 (53.3%)	25.89 (89.5%)
AR&R 20 year, 30 minutes storm, average 100 mm/h, Zone 1	57.4	41.94 (73.1%)	13.78 (53.4%)	28.16 (89.2%)
AR&R 20 year, 45 minutes storm, average 82 mm/h, Zone 1	70.6	52.22 (74.0%)	17.02 (53.6%)	35.20 (90.7%)
AR&R 20 year, 1 hour storm, average 71 mm/h, Zone 1	81.51	60.70 (74.5%)	19.69 (53.7%)	41.02 (91.5%)
AR&R 20 year, 1.5 hours storm, average 56 mm/h, Zone 1	96.43	71.54 (74.2%)	23.34 (53.8%)	48.20 (90.9%)
AR&R 20 year, 2 hours storm, average 46.6 mm/h, Zone 1	106.99	78.76 (73.6%)	25.93 (53.9%)	52.82 (89.8%)
AR&R 20 year, 3 hours storm, average 36.2 mm/h, Zone 1	124.67	90.96 (73.0%)	30.26 (53.9%)	60.70 (88.5%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe1	0.021	1.4	55.178	55.149	AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Chainage (m)	Max HGL (m)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	0.565	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin 1	55.69	5.2	0.021	0.021	0

CONTINUITY CHECK for AR&R 20 year, 25 minutes storm, average 110 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Basin 1	20.32	20.21	0.05	0.2
Outlet 2	20.21	20.21	0	0
Outlet 1	18.19	18.19	0	0

Run Log for 101726Detention Lots 2 run at 11:12:00 on 18/9/2013

PIT / NODE DETAILS

Version 9

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss
Outlet 2	Node					56			0	729.04	-396.4			3
Outlet 1	Node					56			0	471.28	-394.96			2

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id
Basin 1	56.04	0.36	0	Orifice		103	56.2			970.96	-386.32	No			1
	56.19	0.36													
	56.2	5.76													
	56.21	5.76													
	56.22	5.76													
	56.23	5.76													
	56.24	5.76													
	56.25	5.76													
	56.26	5.76													
	56.27	5.76													
	56.28	5.76													
	56.29	5.76													
	56.3	5.76													
	56.31	5.76													
	56.32	5.76													
	56.33	5.76													
	56.34	5.76													
	56.35	5.76													
	56.36	5.76													
	56.37	5.76													
	56.38	5.76													
	56.39	5.76													
	56.4	5.76													
	56.41	5.76													
	56.42	5.76													
	56.43	5.76													
	56.53	5.76													
	56.63	5.76													
	56.73	5.76													
	56.83	5.76													
	56.93	5.76													
	57.03	5.76													
	57.13	5.76													
	57.23	5.76													
	57.33	5.76													
	57.43	5.76													
	57.53	5.76													
	57.63	5.76													
	57.73	5.76													
	57.83	5.76													
	57.93	5.76													
	58.03	5.76													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%)	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor
Post - Development Ca	Basin 1	0.0523	24	43	33	5	5	5										0			
Pre-Development Catch	Outlet 1	0.0523	35	65	0	5	12	0										0			

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe1	Basin 1	Outlet 2	7	56.125	56.055	1	uPVC, not under roads	150	154	0.03	NewFixed	1	Basin 1	0					

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
OF1	Basin 1	Outlet 2	1	57.31	0.9	1.7	Pathway 4 m wide	0.3	0.15	0.6	1	0	5

PIT / NODE DETAILS

Name	Type	Family	Version 9 Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss
Outlet 2	Node					56			0	729.04	-396.4		3	
Outlet 1	Node					56			0	471.28	-394.96		2	

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id
Basin 1	54.98	0.36	0	Orifice		118	55.14			970.96	-386.32	No			1
	55.13	0.36													
	55.14	9.2													
	55.15	9.2													
	55.16	9.2													
	55.17	9.2													
	55.18	9.2													
	55.19	9.2													
	55.2	9.2													
	55.21	9.2													
	55.22	9.2													
	55.23	9.2													
	55.24	9.2													
	55.25	9.2													
	55.26	9.2													
	55.27	9.2													
	55.28	9.2													
	55.29	9.2													
	55.3	9.2													
	55.31	9.2													
	55.32	9.2													
	55.33	9.2													
	55.34	9.2													
	55.35	9.2													
	55.36	9.2													
	55.37	9.2													
	55.47	9.2													
	55.57	9.2													
	55.67	9.2													
	55.77	9.2													
	55.87	9.2													
	55.97	9.2													
	56.07	9.2													
	56.17	9.2													
	56.27	9.2													
	56.37	9.2													
	56.47	9.2													
	56.57	9.2													
	56.67	9.2													
	56.77	9.2													
	56.87	9.2													
	56.97	9.2													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor
Post - Development Ca	Basin 1	0.0574	14	45	41	5	5	5											0		
Pre-Development Catch	Outlet 1	0.0574	35	65	0	5	12	0											0		

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe ls	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe1	Basin 1	Outlet 2	3	55.065	55.036	0.97	uPVC, not under roads	150	154	0.03	NewFixed	1	Basin 1	0					

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
OF1	Basin 1	Outlet 2	1	55.92	0.9	1.7	Pathway 4 m wide	0.3	0.15	0.6	1	0	5

Results of a simplified bottom up HGL analysis.
This provides a simple analysis that can be checked manually. It is useful where Council insists on a manual check on HGLs.
The HGLs shown here may be different to the more accurate values normally calculated by Drains because it is assumed here that the maximum flows and HGLs throughout the system occur at the same time. In fact, in different parts of the system, they may occur during different storms, or even at different times within the one storm. Also, pipes are assumed to be flowing full (even when the more accurate analysis in DRAINS shows they are not).

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.02	0.006	0.015	5	5	5	AR&R 5 year, 25 minutes storm, average 83 mm/h, Zone 1
Pre-Development Catch	0.015	0.008	0.007	5	12	0	AR&R 5 year, 1.5 hours storm, average 41.7 mm/h, Zone 1

PIPE DETAILS

Pipe	Flow (cu.m/s)	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Int. Dia (mm)	Rough (mm)	Nom.Capacity (cu.m/s)	V (m/sec)	D/S HGL (m)	Friction Loss (m)	U/S HGL (m)

PIT & NODE DETAILS

Node	Headloss Coeff (Ku)	Shock Loss (m)	HGL (m)	Free-board	Overflow (cu.m/s)
Outlet 2			56.141		
Basin 1			56.211		

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	0.565	0	0	0	0	

Results of a simplified bottom up HGL analysis.
This provides a simple analysis that can be checked manually. It is useful where Council insists on a manual check on HGLs.
The HGLs shown here may be different to the more accurate values normally calculated by Drains because it is assumed here that the maximum flows and HGLs throughout the system occur at the same time. In fact, in different parts of the system, they may occur during different storms, or even at different times within the one storm. Also, pipes are assumed to be flowing full (even when the more accurate analysis in DRAINS shows they are not).

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.022	0.004	0.018	5	5	5	AR&R 5 year, 25 minutes storm, average 83 mm/h, Zone 1
Pre-Development Catch	0.017	0.009	0.008	5	12	0	AR&R 5 year, 1.5 hours storm, average 41.7 mm/h, Zone 1

PIPE DETAILS

Pipe	Flow (cu.m/s)	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Int. Dia (mm)	Rough (mm)	Nom.Capacity (cu.m/s)	V (m/sec)	D/S HGL (m)	Friction Loss (m)	U/S HGL (m)

PIT & NODE DETAILS

Node	Headloss Coeff (Ku)	Shock Loss (m)	HGL (m)	Free-board	Overflow (cu.m/s)
Outlet 2			55.128		
Basin 1			55.157		

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	0.565	0	0	0	0	

DRAINS results prepared 18 September, 2013 from Version 2008.08

PIT / NODE DETAILS

Version 8

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Outlet 2	56.14			0			

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.02	0.006	0.015	5	5	5	AR&R 5 year, 25 minutes storm, average 83 mm/h, Zone 1
Pre-Development Catch	0.015	0.008	0.007	5	12	0	AR&R 5 year, 1.5 hours storm, average 41.7 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.05 impervious + 0.06 pervious = 0.10 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 5 year, 5 minutes storm, average 161 mm/h, Zone 1	14.03	6.81 (48.5%)	3.83 (59.4%)	2.98 (39.3%)
AR&R 5 year, 10 minutes storm, average 125 mm/h, Zone 1	21.79	12.94 (59.4%)	6.12 (61.1%)	6.82 (57.9%)
AR&R 5 year, 15 minutes storm, average 106 mm/h, Zone 1	27.72	17.64 (63.6%)	7.87 (61.7%)	9.77 (65.3%)
AR&R 5 year, 20 minutes storm, average 93 mm/h, Zone 1	32.43	21.23 (65.5%)	9.26 (62.1%)	11.98 (68.4%)
AR&R 5 year, 25 minutes storm, average 83 mm/h, Zone 1	36.17	23.81 (65.8%)	10.36 (62.3%)	13.45 (68.8%)
AR&R 5 year, 30 minutes storm, average 76 mm/h, Zone 1	39.75	26.10 (65.7%)	11.42 (62.4%)	14.68 (68.4%)
AR&R 5 year, 45 minutes storm, average 62 mm/h, Zone 1	48.64	32.53 (66.9%)	14.04 (62.8%)	18.49 (70.4%)
AR&R 5 year, 1 hour storm, average 53 mm/h, Zone 1	55.44	37.18 (67.1%)	16.05 (62.9%)	21.13 (70.6%)
AR&R 5 year, 1.5 hours storm, average 41.7 mm/h, Zone 1	65.43	43.47 (66.4%)	18.99 (63.1%)	24.48 (69.3%)
AR&R 5 year, 2 hours storm, average 35.1 mm/h, Zone 1	73.43	48.56 (66.1%)	21.35 (63.2%)	27.21 (68.6%)
AR&R 5 year, 3 hours storm, average 27.4 mm/h, Zone 1	85.98	56.42 (65.6%)	25.06 (63.3%)	31.36 (67.6%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe1	0.015	1.4	56.211	56.141	AR&R 5 year, 25 minutes storm, average 83 mm/h, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Chainage (m)	Max HGL (m)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	0.565	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin 1	56.67	2.9	0.015	0.015	0

CONTINUITY CHECK for AR&R 5 year, 1.5 hours storm, average 41.7 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Basin 1	23.75	23.64	0.08	0.1
Outlet 2	23.64	23.64	0	0
Outlet 1	19.72	19.72	0	0

Run Log for 101726Detention Lots 2 run at 11:12:00 on 18/9/2013

DRAINS results prepared 18 September, 2013 from Version 2008.08

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Version 8 Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Outlet 2	55.13		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Post - Development Ca	0.022	0.004	0.018	5	5	5	AR&R 5 year, 25 minutes storm, average 83 mm/h, Zone 1
Pre-Development Catch	0.017	0.009	0.008	5	12	0	AR&R 5 year, 1.5 hours storm, average 41.7 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.05 impervious + 0.06 pervious = 0.11 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 5 year, 5 minutes storm, average 161 mm/h, Zone 1	15.4	7.31 (47.4%)	3.49 (50.4%)	3.81 (45.0%)
AR&R 5 year, 10 minutes storm, average 125 mm/h, Zone 1	23.92	14.00 (58.5%)	5.58 (51.8%)	8.42 (64.0%)
AR&R 5 year, 15 minutes storm, average 106 mm/h, Zone 1	30.42	19.14 (62.9%)	7.17 (52.4%)	11.97 (71.5%)
AR&R 5 year, 20 minutes storm, average 93 mm/h, Zone 1	35.59	23.06 (64.8%)	8.44 (52.7%)	14.63 (74.7%)
AR&R 5 year, 25 minutes storm, average 83 mm/h, Zone 1	39.7	25.86 (65.1%)	9.45 (52.9%)	16.42 (75.2%)
AR&R 5 year, 30 minutes storm, average 76 mm/h, Zone 1	43.62	28.35 (65.0%)	10.41 (53.0%)	17.95 (74.8%)
AR&R 5 year, 45 minutes storm, average 62 mm/h, Zone 1	53.38	35.37 (66.3%)	12.80 (53.3%)	22.57 (76.9%)
AR&R 5 year, 1 hour storm, average 53 mm/h, Zone 1	60.84	40.43 (66.4%)	14.63 (53.4%)	25.80 (77.1%)
AR&R 5 year, 1.5 hours storm, average 41.7 mm/h, Zone 1	71.81	47.27 (65.8%)	17.31 (53.6%)	29.95 (75.8%)
AR&R 5 year, 2 hours storm, average 35.1 mm/h, Zone 1	80.59	52.79 (65.5%)	19.46 (53.7%)	33.33 (75.2%)
AR&R 5 year, 3 hours storm, average 27.4 mm/h, Zone 1	94.37	61.26 (64.9%)	22.84 (53.8%)	38.42 (74.0%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe1	0.016	1.4	55.157	55.128	AR&R 5 year, 25 minutes storm, average 83 mm/h, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Chainage (m)	Max HGL (m)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0	0	0.565	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin 1	55.46	3.1	0.016	0.016	0

CONTINUITY CHECK for AR&R 5 year, 1.5 hours storm, average 41.7 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Basin 1	25.62	25.43	0.05	0.5
Outlet 2	25.43	25.43	0	0
Outlet 1	21.65	21.65	0	0

Run Log for 101726Detention Lots 2 run at 11:12:00 on 18/9/2013