

Appendix A

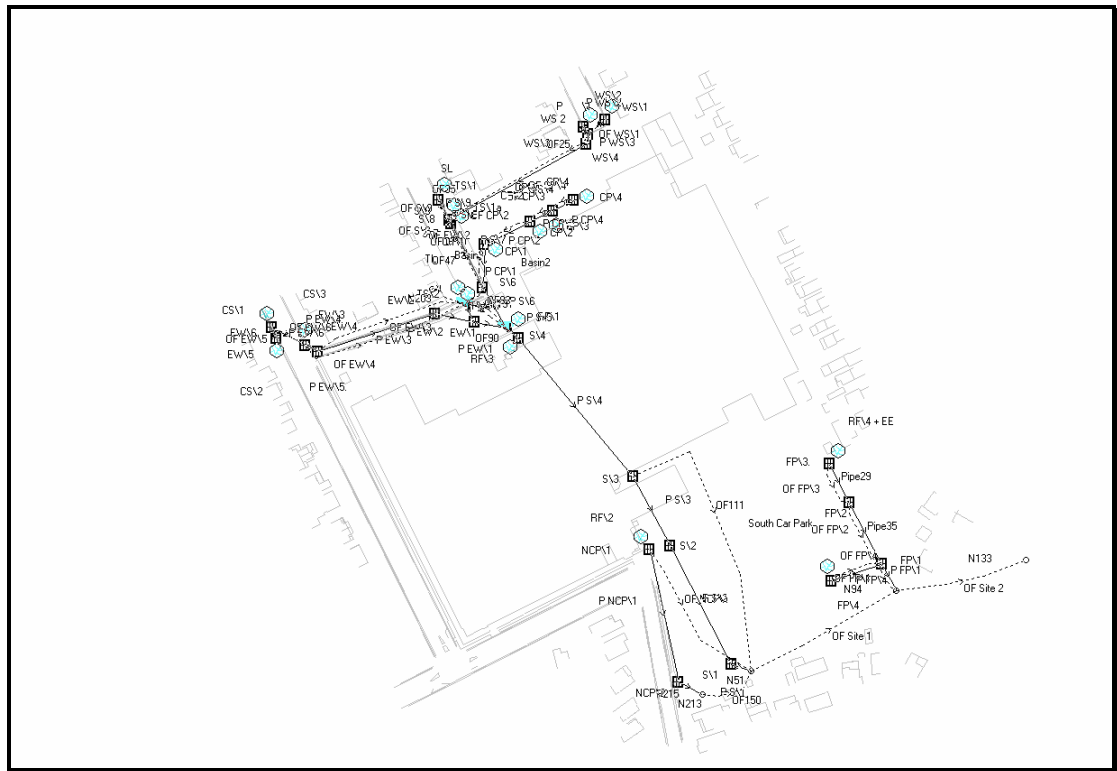
Existing Catchment Summary

Table A2 – Existing catchment Condition

Catchment Name	Area (ha)	Percentage Impervious (%)	Percentage Pervious (%)
WS\1	1.78	70	30
WS\2	0.24	100	0
SL	0.27	70	30
TS\1	1.83	70	30
TS\2	0.06	100	0
TL	2.7	70	30
CP\1	0.06	100	0
CP\2	0.04	100	0
CP\3	0.05	100	0
CP\4	0.15	100	0
RF\3	1.35	100	0
CS\1	5.73	80	20
CS\2	0.88	70	30
CS\3	0.25	100	0
RF\1	0.53	100	0
RF\2	1.32	100	0
RF\4 + EE	1.5	80	20
SCP	1.1	100	0

Appendix B

Existing Condition – DRAINS Model Input and Output



DRAINS Model Name and File Path: F:\AA001875\02-Calculations\E-Stormwater\C-DrainsDesignFiles\4000-AA001875-00 Existing 2008-09-18.drn												DATA					
DRAINS Version:		2008.06-15 May 2008															
Modeller's Name:		Darlan Castro															
Description:		Clemton Park Redevelopment															
PIT & NODE DETAILS																	
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		
WS 1	OnGrade	NSW Dept. of Hous	2.4 m lintel (all grades)			4	28.9	0	0.2	324617.765	6244950.73	No		1	1 x Ku		
WS/3	Sag	NSW Dept. of Hous	1.68 m lintel (all grades)	10		0.8	28.6	0.2	0	0.5	324608.617	6244942.974	No		3	1 x Ku	
WS/4	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.8	28.85		0	0.2	324607.572	6244937.536	No		101	1 x Ku	
S/8	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			2	27.2		0	0.2	324533.885	6244896.852	No		12	1 x Ku	
S/7	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.5	27.07		0	0.2	324534.796	6244894.924	No		5	1 x Ku	
S/6	OnGrade	Unlimited	Unlimited			0.8	25.5		0	0.2	324552.095	6244860.644	No		6	1 x Ku	
S/4	OnGrade	Unlimited	Unlimited			0.1	24.86		0	0.2	324571.274	6244833.246	No		141	1 x Ku	
S/3	OnGrade	Unlimited	Unlimited			0.5	21.84		0	0.2	324632.623	6244759.234	No		131	1 x Ku	
S/2	OnGrade	Unlimited	Unlimited			0.5	21.67		0	0.2	324652.78	6244722.193	Yes		32	1 x Ku	
S/1	OnGrade	Unlimited	Unlimited			2	20.75		0	0.2	324685.229	6244658.788	Yes		33	1 x Ku	
N51	Node					20.4			0		324695.932	6244655.193			117		
WS 2	OnGrade	NSW Dept. of Hous	3.6 m lintel (all grades)			4	28.78		0	0.2	324606.137	6244946.549	No		2	1 x Ku	
S/9	OnGrade	NSW Dept. of Hous	1.68 m lintel (all grades)			4	27.93		0	0.2	324528.354	6244907.854	No		4	1 x Ku	
EW/5	OnGrade	Unlimited	Unlimited			2	27.21		0	0.2	324441.352	6244833.676	No		10	1 x Ku	
EW/6	OnGrade	Unlimited	Unlimited			0.5	27.18		0	0.2	324438.712	6244839.035	No		11	1 x Ku	
EW/4	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)			0.5	27.02		0	0.2	324456.811	6244829.681	No		9	1 x Ku	
EW/3	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.8	26.86		0	0.2	324463.441	6244826.221	No		184	1 x Ku	
EW/2	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.8	25.43		0	0.2	324526.479	6244846.755	Yes		172	1 x Ku	
EW/1	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.8	25.4		0	0.2	324547.429	6244842.022	Yes		44	1 x Ku	
CP/4	OnGrade	Unlimited	Unlimited			2	27.57		0	0.2	324601.051	6244907.356	No		16	1 x Ku	
CP/3	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.5	27.34		0	0.2	324589.465	6244901.675	No		15	1 x Ku	
CP/2	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.5	27.2		0	0.2	324577.793	6244895.922	No		14	1 x Ku	
CP/1	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.8	26.58		0	0.2	324552.926	6244883.601	No		13	1 x Ku	
FP/3	OnGrade	Unlimited	Unlimited			4	21.43		0	0.2	324738.123	6244766.309	No		19	1 x Ku	
FP/2	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.5	20.95		0	0.2	324748.739	6244745.249	No		30	1 x Ku	
FP/1	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.8	20.33		0	0.2	324766.097	6244712.309	No		20	1 x Ku	
N94	Node					19.81			0		324774.049	6244698.16			247		
FP/4	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at			0.8	20.34		0	0.2	324739.026	6244703.358	No		21	1 x Ku	
N133	Node					19.81			0		324843.384	6244714.285			393		
N203	Node								0		324524.744	6244859.536			127275443		
NCP/1	OnGrade	Unlimited	Unlimited			0.5	22.08		0	0.2	324641.503	6244720.03	No		144281704	1 x Ku	
NCP/2	OnGrade	Unlimited	Unlimited			2	21.22		0	0.2	324657.054	6244649.242	Yes		144281706	1 x Ku	
N213	Node					20.64			0		324670.087	6244642.257			144281707		
DETENTION BASIN DETAILS																	
Name	Elev	Volume	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length			
Basin2	23.38	0		0 Culvert		1				324564.335	6244839.129	No					
	24.7	8.22															
	24.75	15.54															
	24.8	25.56															
	24.85	38.303															
	24.9	53.593															
	24.95	71.53															
	25	92.57															
	25.05	117.11															
	25.1	150.07															
	25.15	202.75															
	25.2	269.34															
	25.25	348.5															
	25.3	439.31															
	25.35	541.24															
	25.4	659.54															
	25.45	804.15															
	25.5	969.99															
	25.55	1153.14															
	25.6	1340.32															
	25.65	1530.32															
	25.7	1723.03															
	25.75	1917.64															
	25.8	2113.53															
	25.85	2310.53															
	25.9	2506.56															
	25.95	2707.52															
	26	2907.35															
	26.05	3107.98															
	26.1	3309.34															
	26.15	3511.4															
	26.2	3714.13															
Basin3	24.58	0		0 Culvert		0.5				324542.416	6244851.661	No					
	25.35	1.31															
	25.4	2.5															
	25.45	5.9															
	25.5	12.3															
	25.55	21.8															
	25.6	35.64															
	25.65	54.74															
	25.7	79.22															
	25.75	108.24															
	25.8	141.25															
	25.85	177.56															
	25.9	216.94															
	25.95	259.42															
	26	305.5															
	26.05	354.62															
	26.1	406.83															
	26.15	462.11															
	26.2	520.32															

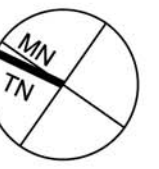
SUB-CATCHMENT DETAILS															
Name	Pit or Node	Total Area (ha)	Paved Area (%)	Grass Area (%)	Supp Area (%)	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope (%)	Grass Slope (%)	Supp Slope (%)	
WS1	WS 1	1.779	70	30	0	6	8	0							
SL	S/6	0.268	70	30	0	4	6	0							
TS1a	S/7	0.0025	100	0	0	1	0	0							
TS2	S/6	0.0624	100	0	0	1	0	0							
RP1	Basin2	0.5464	100	0	0	3	0	0							
RP3	S/4	1.3426	100	0	0	3	0	0							
WS2	WS 2	0.243	100	0	0	3	0	0							
TS1	S/9	1.83	70	30	0	6	8	0							
CS2	EW/5	0.833	100	0	0	5	7	0							
CS1	EW/6	5.73	80	20	0	6	8	0							
CS3	EW/4	0.337	100	0	0	3	0	0							
CP4	CP/4	0.1576	100	0	0	3	0	0							
CP3	CP/3	0.055	100	0	0	2	0	0							
CP2	CP/2	0.045	100	0	0	1	0	0							
CP1	CP/1	0.0618	100	0	0	1	0	0							
RP4 + EE	FP/3	1.5	80	20	0	5	7	0							
South Car Pa	FP/4	1.09	100	0	0	3	0	0							
TL	Basin3	2.68	70	30	0	6	8	0							
RP2	NCP/1	1.321	100	0	0	3	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	
P WS1	WS 1	WS/3	11.9936	28.1	27.92	1.5	Concrete, und	375	375	0.3	New	1	WS 1	0	
P WS3	WS/3	WS/4	5.55281	27.68	27.597	1.49	Concrete, und	450	450	0.3	New	1	WS/3	0	
P WS4	WS/4	S/8	83.8155	27.597	26.3	1.55	Concrete, und	450	450	0.3	New	1	WS/4	0	
P S8	S/8	S/7	2	26.3	26.22	4	Concrete, und	450	450	0.3	New	1	S/8	0	
P S7	S/7	S/6	38.4	26.19	24.35	4.27	Concrete, und	450	450	0.3	New	1	S/7	0	
P S6	S/6	Basin2	24.7214	24.55	23.67	3.56	Concrete, und	600	600	0.3	NewFixed	1	S/6	0	
P S5	Basin2	S/4	9.86316	23.38	22.99	3.95	Concrete, und	1050	1070	0.3	NewFixed	1	Basin2	0	
P S4	S/4	S/3	104.78	22.96	20.04	2.79	Sydney Water1.143W x 1.371H			0.3	Existing	1	S/4	0	
P S3	S/3	S/2	33.5221	20.04	19.872	0.5	Sydney Water1W x 1H			0.3	NewFixed	2	S/3	0	
P S2	S/2	S/1	71.127	19.872	19.19	0.96	Sydney Water1W x 1H			0.3	Existing	2	S/2	0	
P S1	S/1	N51	11.1875	19.19	19.05	1.25	Concrete, und	1050	1070	0.3	New	1	S/1	0	
P WS2	WS 2	WS/3	4.35108	28.09	27.92	3.91	Concrete, und	450	450	0.3	New	1	WS 2	0	
P S9	S/9	S/8	12.02	26.87	26.3	4.74	Concrete, und	375	375	0.3	New	1	S/9	0	
P EW6	EW/5	EW/6	5.97442	26.51	26.5	0.17	Concrete, und	450	450	0.3	New	1	EW/5	0	
P EW5	EW/6	EW/4	20	25.96	25.69	1.35	Concrete, und	1050	1070	0.3	New	1	EW/6	0	
P EW4	EW/4	EW/3	6.7062	25.69	25.489	3	Concrete, und	1050	1070	0.3	New	1	EW/4	0	
P EW3	EW/3	EW/2	66.7511	25.46	23.96	2.25	Concrete, und	1050	1070	0.3	New	1	EW/3	0	
P EW2	EW/2	EW/1	37.644	23.926	23.55	1	Concrete, und	1050	1070	0.3	New	1	EW/2	0	
P EW1	EW/1	Basin2	16.1	23.541	23.38	1	Concrete, und	1050	1070	0.3	NewFixed	1	EW/1	0	
P CP4	CP/4	CP/3	12.8864	26.86	26.66	1.55	Concrete, und	225	225	0.3	New	1	CP/4	0	
P CP3	CP/3	CP/2	13.0134	26.62	26.4	1.69	Concrete, und	225	225	0.3	New	1	CP/3	0	
P CP2	CP/2	CP/1	27.7544	26.36	25.84	1.87	Concrete, und	300	300	0.3	New	1	CP/2	0	
P CP1	CP/1	S/6	22.9733	25.7	24.5	5.22	Concrete, und	300	300	0.3	New	1	CP/1	0	
Pipe29	FP/3	FP/2	23.3659	20.29	19.842	1.9	Concrete, und	675	675	0.3	New	1	FP/3	0	
Pipe35	FP/2	FP/1	37.241	19.842	19.47	1	Concrete, und	675	675	0.3	New	1	FP/2	0	
P FP1	FP/1	N94	16.6647	19.39	18.94	2.7	Concrete, und	675	675	0.3	New	1	FP/1	0	
P FP4	FP/4	FP/1	27	19.57	19.46	0.41	Concrete, und	450	450	0.3	New	1	FP/4	0	
Pipe47	Basin3	EW/1	10.664	24.58	24.26	3	Concrete, und	450	450	0.3	NewFixed	1	Basin3	0	
NCP1	NCP/1	NCP/2	80.4	20.17	19.47	0.87	Concrete, und	675	675	0.3	New	2	NCP/1	0	
N215	NCP/2	N213	4	19.46	19.42	1	Concrete, und	1050	1070	0.3	New	1	NCP/2	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					
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 DxDV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %		id	
OF WS1	WS 1	WS/3	0.3				Dummy used	0.2	0.05	0.6	1	0		337	
OF35	WS/3	S/8	1.5				Dummy used	0.2	0.05	0.6	1	0		345	
OF S8	S/8	S/7	0.1				Dummy used	0.2	0.05	0.6	1	0		355	
OF47	S/7	S/6	0.8				Dummy used	0.2	0.05	0.6	1	0		363	
OF90	S/6	Basin3	0.1				Dummy used	0.2	0.05	0.6	1	0		4784/75	
OF111	S/3	N51	1				Dummy used	0.2	0.05	0.6	1	0		14510804	
OF Site 1	N51	N94	1				Dummy used	0.2	0.05	0.6	1	0		369	
OF25	WS 2	WS/3	0.1				Dummy used	0.2	0.05	0.6	1	0		332	
OF S9	S/9	S/8	0.2				Dummy used	0.2	0.05	0.6	1	0		351	
OF EW5	EW/5	EW/6	0.1				Dummy used	0.2	0.05	0.6	1	0		304	
OF EW6	EW/6	EW/4	0.2				Dummy used	0.2	0.05	0.6	1	0		306	
OF EW4	EW/4	Basin3	1.2				Dummy used	0.2	0.05	0.6	1	0		310	
OF EW3	EW/3	Basin3	1.2				Dummy used	0.2	0.05	0.6	1	0		321	
OF CP4	CP/4	CP/3	0.1				Dummy used	0.2	0.05	0.6	1	0		370	
OF CP3	CP/3	CP/2	0.1				Dummy used	0.2	0.05	0.6	1	0		374	
OF CP2	CP/2	CP/1	0.5				Dummy used	0.2	0.05	0.6	1	0		376	
OF CP1	CP/1	S/6	0.25				Dummy used	0.2	0.05	0.6	1	0		385	
OF FP3	FP/3	FP/2	0.1				Dummy used	0.2	0.05	0.6	1	0		476	
OF FP2	FP/2	FP/1	0.5				Dummy used	0.2	0.05	0.6	1	0		479	
OF FP1	FP/1	N94	0.1				Dummy used	0.2	0.05	0.6	1	0		485	
OF Site 2	N94	N133	0.1				Dummy used	0.2	0.05	0.6	1	0		395	
OF FP4	FP/4	FP/1	0.5				Dummy used	0.2	0.05	0.6	1	0		482	
OF131	Basin3	Basin2	0.1	25.5	5	1.6	Dummy used	0.2	0.05	0.6	1	0		119613074	
OF93	Basin3	Basin2	0.1	25.55	30	1.6	Dummy used	0.2	0.05	0.6	1	0		4784/78	
OF EW2	N203	Basin3	0.5				Dummy used	0.2	0.05	0.6	1	0		323	
OF NCP1	NCP/1	N51	1.2				Dummy used	0.2	0.05	0.6	1	0		144281726	
OF150	N213	N51	0.5				Dummy used	0.2	0.05	0.6	1	0		144281733	

DRAINS Model Name and File Path: F:\AA001875-D-Calculations\E-Stormwater\C-DrainsDesignFiles\4000-AA001875-00-Existing-2008										RESULTS 100 YEAR ARI	
DRAINS Version:		2008.06.15 May 2008									
Modeller's Name:		Darlan Castro									
Description:		Clemton Park Redevelopment									
DRAINS results prepared 02 October, 2008 from Version 2008.06											
PIT / NODE DETAILS											
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				
WS 1	28.71		1.086		0.19	0.974	Inlet Capacity				
WS/3	28.46	28.8	1.025	10	0.14	0.9	None				
WS/4	28.21				0.64		None				
S/8	27.2		2.004		0	2.132	Outlet System				
S/7	26.77		2.133		0.3	2.077	Inlet Capacity				
S/6	25.5		2.118		0	3.066	Outlet System				
S/4	23.73		0.962		1.13		None				
S/3	21.84		0		0	3.543	Outlet System				
S/2	21.84		0		-0.17		Outlet System				
S/1	21.83		0		-1.08		Outlet System				
N51	21.8		4.405								
WS 2	28.61		0.174		0.17	0.065	Inlet Capacity				
S/9	27.43		1.117		0.5	1.009	Inlet Capacity				
EW/5	27.21		0.53		0	0.445	Outlet System				
EW/6	27.18		3.999		0	2.073	Outlet System				
EW/4	27.01		2.289		0.01	2.181	Inlet Capacity				
EW/3	26.86		0		0	0.211	Outlet System				
EW/2	26.54		0		-1.11		Outlet System				
EW/1	26.29		0		-0.89		Outlet System				
CP/4	27.57		0.113		0	0.066	Outlet System				
CP/3	27.34		0.105		0	0.061	Outlet System				
CP/2	26.89		0.094		0.31	0.042	Inlet Capacity				
CP/1	26.42		0.087		0.16	0.037	Inlet Capacity				
FP/3	21.43		0.975		0	0.431	Outlet System				
FP/2	20.46		0.431		0.49	0.378	Inlet Capacity				
FP/1	20.21		1.058		0.12	1.005	Inlet Capacity				
N94	19.25		5.949								
FP/4	20.22		0.781		0.12	0.728	Inlet Capacity				
NCP/1	22.08		0.947		0	0.028	Outlet System				
NCP/2	21.9		0		-0.68		Outlet System				
N213	21.8		0								
SUB-CATCHMENT DETAILS											
Name	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				
WS/1	1.086	0.8	0.286	6	8	0	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
SL	0.173	0.127	0.046	4	6	0	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
TS/1a	0.002	0.002	0	1	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
TS/2	0.045	0.045	0	3	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
RF/1	0.392	0.392	0	3	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
RF/3	0.962	0.962	0	3	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
WS/2	0.174	0.174	0	3	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
TS/1	1.117	0.823	0.294	6	8	0	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
CS/2	0.53	0.395	0.135	5	7	0	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
CS/1	3.557	2.943	0.614	6	8	0	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
CS/3	0.242	0.242	0	3	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
CP/4	0.113	0.113	0	3	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
CP/3	0.039	0.039	0	2	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
CP/2	0.032	0.032	0	1	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
CP/1	0.044	0.044	0	1	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
RF/4 + EE	0.975	0.813	0.162	5	7	0	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
South Car Pa	0.781	0.781	0	3	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
TL	1.635	1.205	0.431	6	8	0	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
RF/2	0.947	0.947	0	3	0	0	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
Outflow Volumes for Total Catchment (16.2 impervious + 3.66 pervious = 19.9 total ha)											
Storm	Total Rainfall cu.m	Total Runoff cu.m	Impervious Runoff cu.m	Pervious Runoff cu.m	Runoff %						
R&R 100 year	4275.12	3774.50	88.33	3325.38	95.34	449.12	(57.0%)				
AR&R 100 year	6727.52	6150.92	91.45	5325.96	97.08	824.96	(66.6%)				
AR&R 100 year	8599.96	7959.00	92.58	5853.52	97.11	1105.48	(69.8%)				
AR&R 100 year	10074.71	9377.62	93.18	6056.51	98.13	1321.11	(71.2%)				
AR&R 100 year	11433.47	10678.61	93.91	6165.08	98.33	1513.53	(71.9%)				
AR&R 100 year	12527.11	11723.44	93.10	6057.34	98.16	1666.10	(72.2%)				
AR&R 100 year	15509.75	14585.99	94.12	490.43	98.20	2095.56	(73.3%)				
AR&R 100 year	17697.03	16678.85	94.14	274.78	98.24	2404.08	(73.7%)				
AR&R 100 year	20580.25	19411.63	94.16	265.51	99.27	2785.12	(73.5%)				
AR&R 100 year	22668.1	21373.94	94.18	329.71	99.30	3044.23	(72.9%)				
AR&R 100 year	26247.27	24727.46	94.19	2146.37	99.34	3481.10	(72.0%)				
AR&R 100 year	30154.54	28339.92	94.24	432.45	99.39	3907.47	(70.3%)				
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						
P WS/1	0.112	1	28.493	28.461	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1						
P WS/3	0.346	2.2	28.268	28.214	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P WS/4	0.346	2.2	28.021	27.72	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P S/8	0.326	2.1	26.786	26.769	AR&R 100 year, 4.5 hours storm, average 33.7 mm/h, Zone 1						
P S/7	0.377	4.6	26.419	25.5	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P S/6	0.819	2.9	25.62	26.185	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1						
P S/5	3.521	7.6	23.928	23.728	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1						
P S/4	4.142	7.1	23.47	21.84	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1						
P S/3	3.188	1.6	21.84	21.838	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1						
P S/2	3.188	1.6	21.836	21.833	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1						
P S/1	3.188	3.5	21.802	21.8	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1						
P WS/2	0.109	0.8	28.465	28.461	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P S/9	0.108	1	27.232	27.2	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P EW/6	0.253	1.6	27.189	27.18	AR&R 100 year, 3 hours storm, average 44 mm/h, Zone 1						
P EW/5	2.303	2.6	27.072	27.009	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P EW/4	2.411	2.7	26.883	26.86	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P EW/3	2.411	2.7	26.713	26.54	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P EW/2	2.411	2.7	26.392	26.295	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P EW/1	2.591	2.9	26.207	26.185	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P CP/4	0.068	1.7	27.43	27.34	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P CP/3	0.102	2.6	27.21	26.885	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P CP/2	0.145	2	26.787	26.421	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P CP/1	0.192	2.7	26.142	25.5	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
Pipe29	0.561	3.7	20.588	20.457	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1						
Pipe35	0.598	2.1	20.346	20.213	AR&R 100 year, 20 minutes storm, average 152 mm/h, Zone 1						
P FP/1	0.053	4.5	19.696	19.246	AR&R 100 year, 20 minutes storm, average 152 mm/h, Zone 1						
P FP/4	0.703	0.3	26.2	20.213	AR&R 100 year, 10 minutes storm, average 203 mm/h, Zone 1						
P FP/7	0.357	2.2	26.295	26.235	AR&R 100 year, 2 hours storm, average 57 mm/h, Zone 1						
P NCP/1	0.947	1.3	22.043	21.895	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1						
P215	0.947	1.1	21.803	21.8	R&R 100 year, 5 minutes storm, average 258 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	
OF WS/1	0.974	0.974	7.665	0.086	0.08	21.15	0.96	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF35	0.9	0.9	7.665	0.083	0.08	20.61	0.94	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF S/8	2.132	2.132	7.665	0.119	0.14	27.8	1.16	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF47	2.077	2.077	7.665	0.118	0.14	27.62	1.15	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF90	3.066	3.066	7.665	0.138	0.18	31.57	1.28	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF111	3.543	3.543	7.665	0.146	0.19	33.19	1.34	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF Site 1	5.006	5.006	7.665	0.168	0.24	37.68	1.45	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
OF25	0.065	0.065	7.665	0.03	0.01	10.02	0.43	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
OF S/9	1.009	1.009	7.665	0.088	0.08	21.51	0.95	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF EW/5	0.445	0.445	7.665	0.062	0.05	16.48	0.77	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1	
OF EW/6	2.073	2.073	7.665	0.117	0.14	27.44	1.16	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF EW/4	2.181	2.181	7.665	0.12	0.14	27.98	1.17	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF EW/3	0.211	0.211	7.665	0.046	0.03	13.25	0.62	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1	
OF CP/4	0.066	0.066	7.665	0.03	0.01	10.02	0.44	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
OF CP/3	0.061	0.061	7.665	0.029	0.01	9.73	0.43	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
OF CP/2	0.042	0.042	7.665	0.026	0.01	8.53	0.39	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
OF CP/1	0.037	0.037	7.665	0.024	0.01	7.93	0.39	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
OF FP/3	0.431	0.431	7.665	0.062	0.05	16.3	0.76	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1	
OF FP/2	0.378	0.378	7.665	0.059	0.04	15.76	0.72	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1	
OF FP/1	1.005	1.005	7.665	0.088	0.08	21.51	0.95	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1	
OF Site 2	6.653	6.653	7.665	0.189	0.29	41.81	1.56	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
OF FP/4	0.728	0.728	7.665	0.077	0.07	19.36	0.87	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
OF131	1.252	1.252	7.665	0.096	0.1	23.13	1.01	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF93	5.656	5.656	7.665	0.177	0.26	39.47	1.49	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF EW/2	0	0	7.665	0	0	0	0		
OF NCP/1	0.028	0.028	7.665	0.022	0.01	7.33	0.35	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
OF150	0.947	0.947	7.665	0.085	0.08	20.97	0.95	R&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
DETENTION BASIN DETAILS									
Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level				
Basin2	26.18	3651.5	3.521	3.521	0				
Basin3	25.79	134.9	7.265	0.357	6.908				
CONTINUITY CHECK for AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1									
Node	Inflow (cu.m)	Outflow (cu.m)	Storage Chan (cu.m)	Difference %					
WS 1	924.01	924	0	0					
WS/3	1061.3	1061.28	0	0					
WS/4	487.54	487.55	0	0					
S/8	2151.17	2151.15	0	0					
S/7	2152.55	2152.54	0	0					
S/6	2368.23	2368.16	0	0					
Basin2	7751.74	7751.29	0.01	0					
S/4	8509.9	8509.86	0	0					
S/3	8509.86	8509.82	0	0					
S/2	1290.76	1290.76	0	0					
S/1	1290.76	1290.84	0	0					
N51	9256.25	9256.23	0	0					
WS 2	137.29	137.29	0	0					
S/9	950.5	950.49	0	0					
EW/5	432.92	432.91	0	0					
EW/6	3496.16	3495.77	0	0					
EW/4	3686.19	3685.64	0	0					
EW/3	2782.38	2781.72	0	0					
EW/2	2770.94	2770.35	0	0					
EW/1	2503.44	2502.09	0	0.1					
CP/4	89.04	89.03	0	0					
CP/3	120.1	120.1	0	0					
CP/2	145.52	145.49	0	0					
CP/1	180.4	180.42	0	0					
FP/3	802.21	802.21	0	0					
FP/2	802.21	802.56	0	0					
FP/1	1418.45	1418.41	0	0					
N94	10674.63	10674.62	0	0					
FP/4	615.85	615.85	0	0					
N133	10674.62	10674.62	0	0					
Basin3	5188.4	5188.29	0	0					
N203	0	0	0	0					
NCP/1	746.36	746.36	0	0					
NCP/2	742.58	742.58	0	0					
N213	742.58	742.58	0	0					
Run Log for 4000 run at 11:58:27 on 2/10/2008									
Upwelling occurred at EW/3, S/3, S/8, S/6									
Freeboard was less than 0.15m at NCP/1, FP/4, FP/1, FP/3, CP/4, CP/3, EW/6, EW/5, EW/4, WS/3									
The following detention basins have little effect (less than 2%) in reducing peak discharge: Basin3 You might consider upsizing these, or removing them from the model.									
The low level outflow from the following detention basins may be unstable: Basin3, A common reason for this is that the low level outlet is large compared with the capacity of the syst									

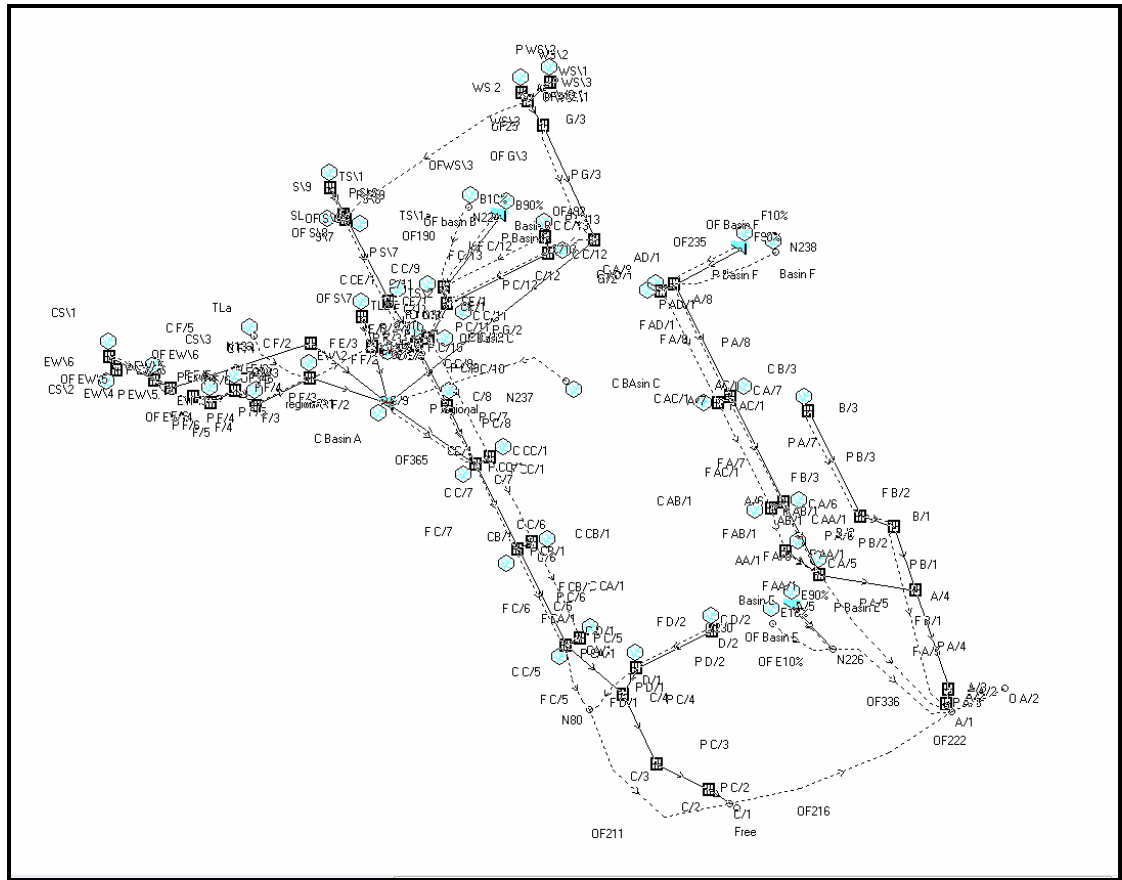
Appendix C

Precinct Plan



Appendix D

Proposed Condition – DRAINS Model Input and Output



DRAINS Model Name and File Path: F:\AA001875\0-Calculations\E-Stormwater\0-DrainsDesignFiles\4000-AA001875-00-Existing-2008-09-18.drn																
DRAINS Version: 2008.06.15 May 2008																
Modeler's Name: Darlan Castro																
Description: Clemton Park Redevelopment																
Version 9																
PIT / NODE DETAILS		Name	Type	Family	Size	Ponding Volume	Pressure Change	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down	id	Part Full Shock Loss
						(cu.m)	Coef. Ku									
AA/1	OnGrade	NSW Dept. of Hous	2.4 m lintel (all grades)		4	22.727				0	0.2	324713.539	6244759.991	No	11	1 x Ku
A/5	Sag	NSW Dept. of Hous	2.4 m lintel (all grades)	1	0.8	22.524			0.15	0	0.2	324727.412	6244750.39	No	5	1 x Ku
A/4	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		0.8	20.52				0	0.2	324766.213	6244744.082	Yes	4	1 x Ku
A/3	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		0.8	19.956				0	0.2	324779.797	6244704.047	Yes	3	1 x Ku
A/2	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		0.8	19.897				0	0.2	324778.763	6244697.912	Yes	2	1 x Ku
A/1	Node					19.771				0		324780.707	6244694.941		1	
AB/1	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		4	22.985				0	0	324707.56	6244777.498	No	12	1 x Ku
A/6	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		0.8	22.985				0	0.2	324712.566	6244780.008	No	6	1 x Ku
AC/1	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		4	23.463				0	0	324688.139	6244820.248	No	13	1 x Ku
A/7	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		1.2	23.463				0	0.2	324691.137	6244822.758	No	7	1 x Ku
AD/1	OnGrade	Weldiok	GG78-62		4	24.792				0	0.2	324662.783	6244865.82	No	14	1 x Ku
A/8	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		2.5	24.792				0	0.2	324668.191	6244868.532	No	8	1 x Ku
B/3	OnGrade	unlimited	unlimited		4	23.813				0	0	324722.464	6244817.116	No	17	1 x Ku
B/2	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		1	21.917				0	0.2	324743.927	6244774.291	No	16	1 x Ku
B/1	OnGrade	Weldiok	GG78-62		1	21.283				0	0.2	324757.411	6244770.023	No	15	1 x Ku
CI/3	OnGrade	Weldiok	GG78-62		4	26.067				0	0.2	324615.785	6244887.886	No	30	1 x Ku
CI/2	OnGrade	Weldiok	GG78-62		2	26.053				0	0	324616.956	6244881.202	No	29	1 x Ku
CI/1	OnGrade	Weldiok	GG78-62		0.8	25.732				0	0.2	324575.833	6244860.588	No	28	1 x Ku
C/10	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		0.8	25.331				0	0	324568.45	6244846.428	No	27	1 x Ku
C/9	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		0.8	25.331				0	0.2	324563.444	6244843.919	No	26	1 x Ku
C/8	OnGrade	unlimited	unlimited		0.5	24.629				0	0.2	324575.878	6244819.114	No	25	1 x Ku
C/7	OnGrade	unlimited	unlimited		0.5	23.649				0	0.2	324587.352	6244795.22	No	24	1 x Ku
C/6	OnGrade	Weldiok	GG78-62		0.5	22.701				0	0.2	324604.535	6244760.941	No	23	1 x Ku
C/5	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		0.8	22.102				0	0.2	324624.253	6244721.608	No	22	1 x Ku
C/4	OnGrade	Weldiok	GG78-62		0.8	21.688				0	0	324647.303	6244701.985	Yes	21	1 x Ku
C/3	OnGrade	Weldiok	GG78-62		0.8	21.101				0	0	324661.087	6244673.416	Yes	20	1 x Ku
C/2	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		0.5	20.547				0	0	324682.392	6244663.014	Yes	19	1 x Ku
C/1	Node					20.408				0		324690.84	6244657.436		18	
CA/1	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		4	22.102				0	0.2	324630.054	6244724.519	No	31	1 x Ku
CB/1	OnGrade	Weldiok	GG78-62		4	22.701				0	0.2	324610.346	6244763.854	No	32	1 x Ku
CC/1	OnGrade	Weldiok	GG78-62		4	23.652				0	0	324593.125	6244798.208	No	33	1 x Ku
CI/2	OnGrade	Weldiok	GG78-62		4	22.266				0	0	324683.366	6244727.808	No	37	1 x Ku
D/1	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		0.8	21.925				0	0.2	324652.888	6244712.53	No	36	1 x Ku
E/3	Sag	NSW Dept. of Hous	2.4 m lintel (all grades)	10	4	25.359			0	0	0	324541.313	6244855.107	No	40	1 x Ku
E/2	Sag	Customized	Customized 2	2	0.5	25.16			0.4	0	0.5	324545.656	6244843.168	No	39	1 x Ku
F/6	OnGrade	NSW Dept. of Hous	2.4 m lintel (all grades)		4	26.656				0	0.2	324472.854	6244822.727	No	46	1 x Ku
F/5	OnGrade	NSW Dept. of Hous	2.4 m lintel (all grades)		2	26.706				0	0.2	324479.589	6244820.453	No	45	1 x Ku
F/4	OnGrade	NSW Dept. of Hous	2.4 m lintel (all grades)		2	26.367				0	0.2	324489.895	6244825.498	No	44	1 x Ku
F/3	OnGrade	NSW Dept. of Hous	2.4 m lintel (all grades)		2	25.689				0	0.2	324497.899	6244819.229	No	43	1 x Ku
F/2	OnGrade	NSW Dept. of Hous	3.6 m lintel (all grades)		2	25.197				0	0.2	324520.232	6244830.423	No	42	1 x Ku
O A/2	Node					19.897				0		324802.409	6244704.158		47	
O E/2	Node					25.328				0		324550.656	6244848.168		49	
N80	Node									0		324633.823	6244695.462		35	
N238	Node					26				0		324709.223	6244881.457		426	
N230	Node					26				0		324707.95	6244730.461		430	
N224	Node									0		324584.691	6244899.816		432	
EW/5	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		2	27.21				0	0.2	324441.352	6244833.678	No	441	1 x Ku
EW/6	OnGrade	unlimited	unlimited		0.5	27.18				0	0.2	324438.712	6244839.035	No	440	1 x Ku
EW/4	OnGrade	NSW Dept. of Hous	1.8 m lintel (all grades)		0.5	27.05				0	0.2	324456.811	6244829.681	No	442	1 x Ku
EW/3	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		0.8	26.88				0	0.2	324463.441	6244826.221	No	437	1 x Ku
EW/2	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		0.8	25.6				0	0.2	324520.36	6244844.576	Yes	438	1 x Ku
S/9	OnGrade	NSW Dept. of Hous	1.68 m lintel (all grades)		4	27.93				0	0.2	324528.354	6244907.654	No	444	1 x Ku
S/8	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		0.8	27.2				0	0.2	324533.885	6244896.852	No	439	1 x Ku
S/7	OnGrade	NSW Dept. of Hous	RM.7 Grated Accessway Pit at		0.5	27.07				0	0.2	324534.796	6244894.924	No	443	1 x Ku
CD/1	OnGrade	unlimited	unlimited		0.5	25.465				0	0.2	324552.258	6244861.406	No	294289401	1 x Ku
WS 2	OnGrade	NSW Dept. of Hous	3.6 m lintel (all grades)		4	28.78				0	0.2	324606.137	6244946.549	No	446	1 x Ku
WS/3	Sag	Customized	Customized 1	10	0.8	26.6			0.2	0	0.5	324608.617	6244942.974	No	445	1 x Ku
G/3	OnGrade	unlimited	unlimited		0.5	29.334				0	0	324614.876	6244933.03	No	491615249	1 x Ku
G/2	OnGrade	Weldiok	GG78-62		0.8	26.248				0	0	324635.787	6244886.703	No	491615248	1 x Ku
WS 1	OnGrade	NSW Dept. of Hous	2.4 m lintel (all grades)		4	28.9				0	0.2	324617.765	6244950.73	No	447	1 x Ku
N226	Node					26				0		324732.645	6244720.29		431	
CE/1	OnGrade	Weldiok	GG78-62		2	25.855				0	0.2	324574.663	6244867.272	No	35	1 x Ku
N139	Node									0		324489.335	6244827.342		247452787	
N237	Node					26				0		324624.164	6244829.029		491615374	
Free	Node					20.408				0		324693.742	6244655.824		588629717	
DETENTION BASIN DETAILS																
Name	Elev	Volume	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length		
regional/1	22.5	823	0	0 Orifice		930	22.52			324551.678	6244820.157	No				
	23	2023														
	23.5	3223														
	24	4423														
	24.5	5623														
Basin F	24	0	0 Orifice			150	24.5			324695.245	6244883.105	No				
	24.5	2														
	24.51	37														
	25	87														
	25.5	172														
	26	257														
Basin E	24	0	0 Orifice			200	24.5			324716.315	6244737.786	No				
	24.5	2														
	24.51	57														
	25	187														
	25.5	372														
	26	557														
Basin B	24	0	0 Orifice			130	24.5			324597.322	6244896.389	No				
	24.5	2														
	24.51	34														
	25	72														
	25.5	142														
	26	212														

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 %	
C AA/1	AA/1	0.0191	100	0	0	3	0	0	0	0	0				
C A/5	A/5	0.0449	100	0	0	3	10	0	0	0	0				
C AB/1	AB/1	0.041	100	0	0	3	10	0	0	0	0				
C A/6	A/6	0.032	100	0	0	3	0	0	0	0	0				
C AC/1	AC/1	0.046	100	0	0	3	0	0	0	0	0				
C A/7	A/7	0.0339	100	0	0	3	0	0	0	0	0				
C AD/1	AD/1	0.0311	100	0	0	3	0	0	0	0	0				
C A/8	A/8	0.0564	100	0	0	3	0	0	0	0	0				
C B/3	B/3	0.73	70	30	0	5	7	0	0	0	0				
C C/13	C/13	0.0199	100	0	0	2	10	0	0	0	0				
C C/12	C/12	0.0216	100	0	0	2	10	0	-1	-1	-1	-1	-1	-1	-1
C C/11	C/11	0.046	100	0	0	3	0	0	0	0	0				
C C/10	C/10	0.0341	100	0	0	3	0	0	0	0	0				
C C/9	C/9	0.0354	100	0	0	3	0	0	0	0	0				
C C/8	C/8	0.0235	100	0	0	3	0	0	0	0	0				
C C/7	C/7	0.0242	100	0	0	3	0	0	0	0	0				
C C/6	C/6	0.0339	100	0	0	3	0	0	0	0	0				
C C/5	C/5	0.041	100	0	0	3	0	0	0	0	0				
C CA/1	CA/1	0.0406	100	0	0	3	0	0	0	0	0				
C CB/1	CB/1	0.0342	100	0	0	3	0	0	0	0	0				
C CC/1	CC/1	0.0473	100	0	0	3	0	0	0	0	0				
C D/2	D/2	0.061	100	0	0	3	0	0	0	0	0				
C D/1	D/1	0.0613	100	0	0	3	0	0	0	0	0				
TLb	E/3	0.3	100	0	0	3	10	0	0	0	0				
C E/2	E/2	0.0451	90	10	0	5	10	0	-1	-1	-1	-1	-1	-1	-1
C Basin A	regional/1	1.4	100	0	0	5	0	0							
C F/5	F/5	0.0148	100	0	0	5	0	0	0	0	0				
C F/4	F/4	0.0104	100	0	0	3	10	0	0	0	0				
C F/3	F/3	0.0391	100	0	0	3	10	0	0	0	0				
C F/2	F/2	0.0412	100	0	0	3	10	0	0	0	0				
E10%	N238	0.049	0	100	0	5	5	0							
E10%	N230	0.09	0	100	0	5	5	0							
B10%	N224	0.03	0	100	0	5	5	0							
CS/2	EW/5	0.833	70	30	0	5	7	0							
CS/1	EW/6	5.73	80	20	0	6	8	0							
CS/3	EW/4	0.337	100	0	0	3	0	0							
TS/1	S/9	1.83	70	30	0	6	8	0							
SL	S/8	0.288	70	30	0	4	6	0							
TS/1a	S/7	0.0025	100	0	0	1	0	0							
TS/2	CD/1	0.0624	100	0	0	3	10	0							
WS/2	WS/2	0.243	100	0	0	3	0	0							
WS/1	WS/1	1.779	70	30	0	6	8	0							
F90%	Basin F	0.44	100	0	0	5	0	0							
E90%	Basin E	0.89	100	0	0	5	5	0							
B90%	Basin B	0.35	100	0	0	5	5	0							
C CE/1	CE/1	0.0384	100	0	0	2	0	0							
La	N139	2.38	70	30	0	6	8	0							
C Basin C	N237	1.2	90	10	0	5	5	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	
P AA/1	AA/1	A/5	16.871	21.252	21.049	1.24	Concrete, unc	375	375		0.3 New		1 AA/1		0
P A/5	A/5	A/4	39.31	20.049	19.011	2.64	Concrete, unc	450	450		0.3 New		1 A/5		0
P A/4	A/4	A/3	42.277	18.98	18.558	1	Concrete, unc	750	750		0.3 New		1 A/4		0
P A/3	A/3	A/2	6.222	18.528	18.465	1.01	Concrete, unc	750	750		0.3 New		1 A/3		0
P A/2	A/2	A/1	3.55	18.435	18.4	0.99	Concrete, unc	750	750		0.3 New		1 A/2		0
P AB/1	AB/1	A/6	5.6	21.526	21.47	1	Concrete, unc	375	375		0.3 New		1 AB/1		0
P A/6	A/6	A/5	33.13	21.23	20.899	1	Concrete, unc	375	375		0.3 New		1 A/6		0
P AC/1	AC/1	A/7	5.601	22.005	21.949	1	Concrete, unc	375	375		0.3 New		1 AC/1		0
P A/7	A/7	A/6	47.82	21.738	21.26	1	Concrete, unc	375	375		0.3 New		1 A/7		0
P AD/1	AD/1	A/8	6.05	23.259	23.203	0.93	Concrete, unc	375	375		0.3 New		1 AD/1		0
P A/8	A/8	A/7	51.203	22.995	21.768	2.4	Concrete, unc	375	375		0.3 New		1 A/8		0
P B/3	B/3	B/2	47.902	22.257	20.406	3.86	Concrete, unc	525	525		0.3 New		1 B/3		0
P B/2	B/2	B/1	14.143	20.363	19.786	4.08	Concrete, unc	525	525		0.3 New		1 B/2		0
P B/1	B/1	A/4	27.394	19.74	19.003	2.68	Concrete, unc	525	525		0.3 New		1 B/1		0
P C/13	C/13	C/12	6.786	24.714	24.646	1	Concrete, unc	375	375		0.3 New		1 C/13		0
P C/12	C/12	C/11	46	24.616	24.156	1	Concrete, unc	450	450		0.3 New		1 C/12		0
P C/11	C/11	C/10	15.969	24.126	23.967	1	Concrete, unc	450	450		0.3 New		1 C/11		0
P C/10	C/10	C/9	5.6	23.937	23.881	1	Concrete, unc	450	450		0.3 New		1 C/10		0
P C/9	C/9	C/8	27.747	23.851	23.215	2.29	Concrete, unc	750	750		0.3 New		1 C/9		0
P C/8	C/8	C/7	25.506	23.185	22.126	4	Concrete, unc	825	825		0.3 New		1 C/8		0
P C/7	C/7	C/6	38.345	21.417	20.732	1.79	Box Culverts	2.44W x 1.21H			0.3 NewFixed		1 C/7		0
P C/6	C/6	C/5	44	20.702	20.186	1.17	Box Culverts	2.44W x 1.21H			0.3 NewFixed		1 C/6		0
P C/5	C/5	C/4	30.27	20.156	19.786	1.22	Box Culverts	2.44W x 1.21H			0.3 NewFixed		1 C/5		0
P C/4	C/4	C/3	31.72	19.756	19.439	1	Box Culverts	2.44W x 1.21H			0.3 NewFixed		1 C/4		0
P C/3	C/3	C/2	23.709	19.409	19.172	1	Box Culverts	2.44W x 1.21H			0.3 NewFixed		1 C/3		0
P C/2	C/2	C/1	11.587	19.142	19.026	1	Box Culverts	2.44W x 1.21H			0.3 Existing		1 C/2		0
P CA/1	CA/1	C/5	6.5	20.63	20.565	1	Concrete, unc	375	375		0.3 New		1 CA/1		0
P CB/1	CB/1	C/6	6.5	21.229	21.164	1	Concrete, unc	375	375		0.3 New		1 CB/1		0
P CC/1	CC/1	C/7	6.5	22.18	22.115	1	Concrete, unc	375	375		0.3 New		1 CC/1		0
P D/2	D/2	D/1	34.093	20.746	20.405	1	Concrete, unc	375	375		0.3 New		1 D/2		0
P D/1	D/1	C/4	11.933	20.375	20.255	1.01	Concrete, unc	375	375		0.3 New		1 D/1		0
P E/3	E/3	E/2	12.704	23.784	23.657	1	Concrete, unc	450	450		0.3 New		1 E/3		0
P E/2	E/2	regional/1	4.072	23.627	23.5	3.12	Concrete, unc	1200	1200		0.3 NewFixed		1 E/2		0
P regional	regional/1	C/7	10	22.5	5	5	Concrete, unc	1200	1200		0.3 NewFixed		1 regional/1		0
P F/6	F/6	F/5	7.109	24.383	24.241	2	Concrete, unc	900	900		0.3 New		1 F/6		0
P F/5	F/5	F/4	11.475	24.211	23.981	2	Concrete, unc	900	900		0.3 New		1 F/5		0
P F/4	F/4	F/3	10.167	23.951	23.849	1	Concrete, unc	900	900		0.3 New		1 F/4		0
P F/3	F/3	F/2	24.981	23.819	23.57	1	Concrete, unc	900	900		0.3 New		1 F/3		0
P F/2	F/2	regional/1	3.953	23.54	23.5	1.01	Concrete, unc	900	900		0.3 NewFixed		1 F/2		0
P EW/6	EW/6	EW/5	5.97442	26.51	26.5	0.17	Concrete, unc	450	450		0.3 New		1 EW/5		0
P EW/5	EW/6	EW/4	20	25.96	25.69	1.35	Concrete, unc	1050	1070		0.3 New		1 EW/6		0
P EW/4	EW/4	EW/3	6.7062	25.69	25.489	3	Concrete, unc	1050	1070		0.3 New		1 EW/4		0
P EW/3	EW/3	EW/2	64	25.49	23.8	2.64	Concrete, unc	1050	1070		0.3 New		1 EW/3		0
P EW/2	EW/2	regional/1	25	23.8	23.55	1	Concrete, unc	1050	1070		0.3 NewFixed		1 EW/2		0
P S/9	S/9	S/8	12.02	26.87	26.3	4.74	Concrete, unc	375	375		0.3 New		1 S/9		0
P S/8	S/8	S/7	2	26.3	26.22	4	Concrete, unc	450	450		0.3 New		1 S/8		0
P S/7	CD/1	S/7	38.4	26.19											

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				
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 DvV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %		id
F AA/1	AA/1	A/5	0.1				Pathway 4 m	0.3	0.15	0.6	1	0		131
F A/5	A/5	A/1	0.5				8 m wide road	0.3	0.15	0.4	1	0		491615260
OF222	A/1	O A/2	0.1				8 m wide road	0.3	0.15	0.6	1	0		419
F AB/1	AB/1	AA/1	0.1				8 m wide road	0.3	0.15	0.4	1	100		132
F A/6	A/6	A/5	0.1				8 m wide road	0.3	0.15	0.4	1	100		126
F AC/1	AC/1	AB/1	0.1				Dish drain	0.2	0.2	0.4	1	100		133
F A/7	A/7	A/6	0.1				Dish drain	0.2	0.2	0.4	1	100		127
F AD/1	AD/1	AC/1	0.1				Dish drain	0.2	0.2	0.4	4	100		134
F A/8	A/8	A/7	0.1				8 m wide road	0.3	0.15	0.4	4	100		128
F B/3	B/3	B/2	0.1				Dummy used	0.2	0.05	0.6	1	0		137
F B/2	B/2	B/1	0.1				8 m wide road	0.3	0.15	0.4	1	0		136
F B/1	B/1	A/1	0.5				8 m wide road	0.3	0.15	0.4	1	0		491615261
F C/13	C/13	CE/1	0.1				Dish drain	0.2	0.2	0.4	1.25	100		149
F C/12	C/12	C/11	0.1				Dish drain	0.2	0.2	0.4	1.25	100		148
F C/11	C/11	C/10	0.1				8 m wide road	0.3	0.15	0.4	1.5	100		147
F C/10	C/10	CC/1	0.2				8 m wide road	0.3	0.15	0.4	4.3	100		146
F C/9	C/9	C/8	0.1				8 m wide road	0.3	0.15	0.4	0.7	100		145
F C/8	C/8	C/7	0.1				Dish drain	0.2	0.2	0.4	4	100		144
F C/7	C/7	C/6	0.2				Dish drain	0.2	0.2	0.4	4	100		143
F C/6	C/6	C/5	0.2				Dish drain	0.2	0.2	0.4	1	100		142
F C/5	C/5	N80	0.1				8 m wide road	0.3	0.15	0.4	1	0		491615262
OF216	C/1	A/1	0.5				8 m wide road	0.3	0.15	0.6	1	0		412
F CA/1	CA/1	C/5	0.1				8 m wide road	0.3	0.15	0.4	1	0		491615263
F CB/1	CB/1	CA/1	0.2				Dish drain	0.2	0.2	0.4	1	100		151
F CC/1	CC/1	CB/1	0.2				Dish drain	0.2	0.2	0.4	4	100		152
F D/2	D/2	D/1	0.1				Dish drain	0.2	0.2	0.4	1	100		156
F D/1	D/1	N80	0.1				8 m wide road	0.3	0.15	0.4	1	0		491615265
F E/3	E/3	E/2	0.1				Pathway 4 m	0.3	0.15	0.6	1	0		158
F E/2	E/2	C/9	0.1				8 m wide road	0.3	0.15	0.4	0.5	0		491615266
OF365	regional/1	C/7	0.1	24.6		3	1.6 8 m wide road	0.3	0.15	0.6	1	0		247452941
F F/6	F/6	F/5	0.1				8 m wide road	0.3	0.15	0.4	1	0		163
F F/5	F/5	F/4	0.1				8 m wide road	0.3	0.15	0.4	1	0		162
F F/4	F/4	F/3	0.1				8 m wide road	0.3	0.15	0.4	1	0		161
F F/3	F/3	F/2	0.1				8 m wide road	0.3	0.15	0.4	1	0		160
F F/2	F/2	E/2	0.1				8 m wide road	0.3	0.15	0.4	0.5	100		491615267
OF211	N80	C/1	0.5				8 m wide road	0.3	0.15	0.6	1	0		407
OF235	N238	A/6	0.1				Dummy used	0.2	0.05	0.6	1	0		140794324
OF E10%	N230	N226	0.1				Dummy used	0.2	0.05	0.6	1	0		140794286
OF190	N224	CE/1	0.1				Dummy used	0.2	0.05	0.6	1	0		140794247
OF EW5	EW/5	EW/6	0.1				Dummy used	0.2	0.05	0.6	1	0		304
OF EW6	EW/6	EW/4	0.2				Dummy used	0.2	0.05	0.6	1	0		306
OF EW4	EW/4	F/6	0.1				8 m wide road	0.3	0.15	0.6	1	0		247452690
OF S/9	S/9	S/8	0.2				Dummy used	0.2	0.05	0.6	1	0		351
OF S/8	S/8	S/7	0.1				Dummy used	0.2	0.05	0.6	1	0		355
OF S/7	S/7	CD/1	0.5				Dummy used	0.2	0.05	0.6	1	0		247452685
F CD/1	CD/1	C/9	1				Pathway 4 m	0.3	0.15	0.6	1	0		491615264
OF25	WS 2	WS/3	0.1				Dummy used	0.2	0.05	0.6	1	0		332
OFWS/3	WS/3	S/7	1				Dummy used	0.2	0.05	0.6	1	0		491615311
OF G/3	G/3	G/2	0.3				Dummy used	0.2	0.05	0.6	1	0		491615320
OF482	G/2	C/12	0.1				Dish drain	0.2	0.2	0.6	1.25	0		491615336
OF WS/1	WS 1	WS/3	0.3				Dummy used	0.2	0.05	0.6	1	0		337
OF Basin F	Basin F	A/6	0.1	25.9		3	1.6	Dummy used	0.2	0.05	0.6	1	0	140794304
OF Basin E	Basin E	N226	0.1	25.9		5	1.6	Dummy used	0.2	0.05	0.6	1	0	140794254
OF336	N226	A/1	0.1				Dummy used	0.2	0.05	0.6	1	0		247452768
OF Basin B	Basin B	CE/1	0.1	25.9		0.5	1.6	Dummy used	0.2	0.05	0.6	1	0	140794225
F CE/1	CE/1	C/11	0.1				Pathway 4 m	0.3	0.15	0.6	1	0		154
OF346	N139	F/2	0.1				8 m wide road	0.3	0.15	0.6	1	0		247452788
OF Basin C	N237	regional/1	0.1				Dummy used	0.2	0.05	0.6	1	0		140794212

DRAINS Model Name and File Path: F:\AA001875-D-Calculations\E-Stormwater\C-DrainsDesignFiles\4000-AA001875-00-Existing-2008										RESULTS 10 YEAR ARI	
DRAINS Version:		2008.06.15 May 2008									
Modeller's Name:		Darlan Castro									
Description:		Clemton Park Redevelopment									
DRAINS results prepared 02 October, 2008 from Version 2008.06											
PIT / NODE DETAILS											
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				
AA/1	21.38		0.009		1.34	0	None				
A/5	20.48	22.55	0.022	0.1	2.04	0	None				
A/4	19.58		0		0.94	0	None				
A/3	19.15		0		0.81	0	None				
A/2	19.03		0		0.86	0	None				
A/1	18.73		3.083								
AB/1	21.73		0.02		1.25	0	None				
A/6	21.7		0.016		1.29	0	None				
AC/1	22.24		0.026		1.22	0	None				
A/7	22.2		0.019		1.26	0	None				
AD/1	23.47		0.015		1.33	0.004	Inlet Capacity				
A/8	23.46		0.048		1.33	0.003	Inlet Capacity				
B/3	23.26		0.332		0.56	0	None				
B/2	21		0		0.91	0	None				
B/1	20.38		0		0.9	0	None				
C/13	24.87		0.01		1.2	0.002	Inlet Capacity				
C/12	24.86		0.011		1.19	0.002	Inlet Capacity				
C/11	24.85		0.036		0.88	0.013	Inlet Capacity				
C/10	24.84		0.03		0.49	0	None				
C/9	24.82		0.017		0.51	0	None				
C/8	23.93		0.011		0.7	0	None				
C/7	22.04		0.012		1.61	0	None				
C/6	21.33		0.017		1.37	0.004	Inlet Capacity				
C/5	20.89		0.024		1.21	0	None				
C/4	20.5		0		1.19	0	None				
C/3	20.15		0		0.95	0	None				
C/2	19.78		0		0.77	0	None				
C/1	19.33		0.001								
CA/1	20.9		0.027		1.2	0	None				
CB/1	21.4		0.023		1.3	0.007	Inlet Capacity				
CC/1	22.36		0.023		1.29	0.006	Inlet Capacity				
D/2	20.95		0.03		1.32	0.009	Inlet Capacity				
D/1	20.6		0.039		1.32	0.001	Inlet Capacity				
E/3	24.4	25.36	0.146	10	0.96	0.146	None				
E/2	24.4	25.16	1.502	0	0.76	0	None				
F/6	24.75		0.893		1.9	0.781	Inlet Capacity				
F/5	24.66		0.788		2.05	0.675	Inlet Capacity				
F/4	24.55		0.68		1.82	0.567	Inlet Capacity				
F/3	24.47		0.584		1.22	0.472	Inlet Capacity				
F/2	24.29		1.477		0.91	1.355	Inlet Capacity				
EW/5	27.19		0.379		0.02	0.326	Inlet Capacity				
EW/6	27.18		2.873		0	0.844	Outlet System				
EW/4	26.97		1.001		0.08	0.893	Inlet Capacity				
EW/3	26.79		0		0.07	0	None				
EW/2	24.97		0		0.63	0	None				
S/9	27.44		0.796		0.49	0.688	Inlet Capacity				
S/8	26.68		0.807		0.52	0.751	Inlet Capacity				
S/7	26.58		0.752		0.49	0.696	Inlet Capacity				
CD/1	25.03		0.721		0.44	0	None				
WS/2	28.52		0.118		0.26	0.027	Inlet Capacity				
WS/3	27.89	28.72	0.686	1.8	0.71	0	None				
G/3	27.3		0		2.03	0	None				
G/2	25.24		0		1.01	0	None				
WS/1	28.68		0.774		0.22	0.661	Inlet Capacity				
N226	24.02		0.038								
CE/1	24.87		0.033		0.99	0.012	Inlet Capacity				
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				
C AA/1	0.009	0.009	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C A/5	0.022	0.022	0	3	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C AB/1	0.02	0.02	0	3	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C A/6	0.016	0.016	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C AC/1	0.022	0.022	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C A/7	0.016	0.016	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C AD/1	0.015	0.015	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C A/8	0.027	0.027	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C B/3	0.332	0.249	0.083	5	7	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/13	0.01	0.01	0	2	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/12	0.011	0.011	0	2	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/11	0.022	0.022	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/10	0.017	0.017	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/9	0.017	0.017	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/8	0.011	0.011	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/7	0.012	0.012	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/6	0.017	0.017	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/5	0.02	0.02	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C CA/1	0.02	0.02	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C CB/1	0.017	0.017	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C CC/1	0.023	0.023	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C D/2	0.03	0.03	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C D/1	0.03	0.03	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
TLB	0.146	0.146	0	3	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C E/2	0.021	0.019	0.001	5.39	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C Basin A	0.682	0.682	0	5	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C F/5	0.007	0.007	0	5	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C F/4	0.005	0.005	0	3	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C F/3	0.019	0.019	0	3	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C F/2	0.02	0.02	0	3	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
E10%	0.021	0	0.021	5	5	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
E10%	0.038	0	0.038	5	5	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
B10%	0.013	0	0.013	5	5	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
CS/2	0.379	0.284	0.095	5	7	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
CS/1	2.549	2.13	0.419	6	8	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
CS/3	0.164	0.164	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
TS/1	0.796	0.595	0.201	6	8	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
SL	0.123	0.091	0.032	4	6	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
TS/1a	0.001	0.001	0	1	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
TS/2	0.03	0.03	0	3	10	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
WS/2	0.118	0.118	0	3	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
WS/1	0.774	0.579	0.195	6	8	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
F90%	0.215	0.215	0	5	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
E90%	0.434	0.434	0	5	5	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
CCE/1	0.171	0.171	0	5	5	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C C/6	0.019	0.019	0	2	0	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C Basin G	0.533	0.774	0.261	9	8	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
C Basin G	0.533	0.774	0.261	9	8	0	0 AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				

Outflow Volumes for Total Catchment (16.2 impervious + 3.79 pervious = 20.0 total ha)									
Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)					
AR&R 10 year	2877.61	2371.07 (82.42)	1710.12 (93.20)	200.94 (36.8%)					
AR&R 10 year	4491.07	3907.04 (87.01)	3477.58 (95.45)	429.45 (50.4%)					
AR&R 10 year	5688.69	5040.89 (88.63)	4448.09 (96.36)	592.79 (54.9%)					
AR&R 10 year	6653.43	5954.31 (89.5)	5229.86 (97.0)	724.46 (57.4%)					
AR&R 10 year	7485.11	6724.73 (90.0)	5903.74 (97.3)	821.00 (57.8%)					
AR&R 10 year	8283.52	7469.83 (90.2)	6550.81 (97.8)	919.02 (58.5%)					
AR&R 10 year	10030.05	9093.38 (90.7)	7966.15 (98.0)	1127.23 (59.3%)					
AR&R 10 year	11576.97	10543.65 (91.2)	9219.65 (98.3)	1324.00 (60.3%)					
AR&R 10 year	13353.44	12162.15 (91.1)	10658.96 (98.1)	1503.19 (59.4%)					
AR&R 10 year	14850.47	13530.16 (91.1)	11872.04 (98.1)	1658.13 (58.9%)					
AR&R 10 year	17125.94	15598.74 (91.1)	13715.13 (98.1)	1883.60 (58.0%)					
AR&R 10 year	19760.7	17926.73 (90.8)	15851.48 (99.2)	2075.25 (55.4%)					
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				
P AA/1	0.009	1.1	21.3	21.097	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P A/5	0.201	3.3	20.234	19.579	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P A/4	0.534	2.8	19.311	19.15	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P A/3	0.534	1.7	19.034	19.034	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P A/2	0.534	2.8	18.767	18.732	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P AB/1	0.02	0.4	21.697	21.697	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P A/6	0.171	2.2	21.483	21.152	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P AC/1	0.026	0.4	22.203	22.203	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P A/7	0.137	2.1	21.952	21.697	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P AD/1	0.011	0.2	23.46	23.46	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P A/8	0.094	2.6	23.131	22.203	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P B/3	0.332	4.2	22.463	21.002	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P B/2	0.332	4.3	20.566	20.379	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P B/1	0.332	3.7	19.966	19.579	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P C/13	0.008	0.2	24.859	24.859	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P C/12	0.016	0.2	24.855	24.854	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P C/11	0.08	0.5	24.845	24.838	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P C/10	0.108	0.7	24.821	24.816	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P C/9	1.048	4.6	24.233	23.931	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P C/8	1.057	5.6	23.503	22.444	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P C/7	2.884	4.8	21.665	21.327	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P C/6	2.905	4.2	20.987	20.893	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P C/5	2.941	3.5	20.5	20.5	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P C/4	2.984	3.1	20.153	20.153	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P C/3	2.984	3.3	19.778	19.778	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P C/2	2.984	4	19.447	19.331	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P CA/1	0.027	0.3	20.893	20.893	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P CB/1	0.016	0.7	21.327	21.327	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P CC/1	0.017	1.3	22.245	22.18	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P D/2	0.02	1.4	20.819	20.605	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P D/1	0.059	1.7	20.509	20.5	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P E/3	0	0	24.402	24.402	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P E/2	1.502	3.3	24.139	24.139	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P regional	2.072	7.2	22.863	22.363	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P F/6	0.112	0.7	24.657	24.657	AR&R 10 year, 30 minutes storm, average 83 mm/h, Zone 1				
P F/5	0.225	1	24.551	24.551	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P F/4	0.337	0.9	24.471	24.471	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P F/3	0.448	1.3	24.288	24.288	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P F/2	0.57	1.3	24.139	24.139	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P EW/6	0.053	0.3	27.182	27.18	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P EW/5	2.102	2.3	27.045	26.967	AR&R 10 year, 5 minutes storm, average 173 mm/h, Zone 1				
P EW/4	2.191	2.4	26.816	26.787	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P292	2.191	5.8	25.96	24.968	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P EW/2	2.191	4	24.726	24.171	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P S/9	0.108	3.5	26.991	26.683	AR&R 10 year, 20 minutes storm, average 100 mm/h, Zone 1				
P S/8	0.164	1.6	26.584	26.584	AR&R 10 year, 20 minutes storm, average 100 mm/h, Zone 1				
P S/7	0.22	3.9	26.362	25.027	AR&R 10 year, 20 minutes storm, average 100 mm/h, Zone 1				
P CD/1	0.941	2.1	24.912	24.816	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P WS/2	0.091	3.3	28.194	28.024	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P WS/3	0.882	3.6	27.417	27.302	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P G/3	0.882	5.8	26.783	25.238	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P G/2	0.882	5.5	24.641	24.139	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1				
P WS/1	0.112	2.3	28.327	28.089	AR&R 10 year, 15 minutes storm, average 114 mm/h, Zone 1				
P Basin F	0.044	1.6	24.091	23.991	AR&R 10 year, 1 hour storm, average 58 mm/h, Zone 1				
P Basin E	0.079	1.9	24.124	24.024	AR&R 10 year, 1 hour storm, average 58 mm/h, Zone 1				
P Basin B	0.037	0.1	24.867	24.867	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1				
P CE/1	0.049	0.4	24.856	24.854	AR&R 10 year, 2 hours storm, average 37.2 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 Dv	Max Width	Max V	Due to Storm	
F AA/1	0	0	0.565	0	0	0	0		
F A/5	0	0	0.238	0	0	0	0		
OF222	3.502	3.502	0.238	0.338	0.88	6.4	2.59	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1	
F AB/1	0	0.009	0.238	0.056	0.04	0.5	0.73	AR&R 10 year, 5 minutes storm, average 173 mm/h, Zone 1	
F A/6	0	0.022	0.238	0.073	0.06	1.09	0.82	AR&R 10 year, 5 minutes storm, average 173 mm/h, Zone 1	
F AC/1	0	0.02	1.133	0.066	0.06	0.71	0.85	AR&R 10 year, 5 minutes storm, average 173 mm/h, Zone 1	
F A/7	0	0.016	1.133	0.06	0.05	0.65	0.8	AR&R 10 year, 5 minutes storm, average 173 mm/h, Zone 1	
F AD/1	0.004	0.026	0.937	0.057	0.09	0.61	1.52	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F A/8	0.003	0.019	0.476	0.056	0.08	0.52	1.46	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F B/3	0	0	0.256	0	0	0	0		
F B/2	0	0	0.238	0	0	0	0		
F B/1	0	0	0.238	0	0	0	0		
F C/13	0.002	0.021	1.179	0.064	0.06	0.69	0.94	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F C/12	0.002	0.024	1.179	0.068	0.07	0.73	0.97	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F C/11	0.013	0.03	0.291	0.075	0.08	1.15	1.02	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F C/10	0	0.023	0.493	0.059	0.09	0.61	1.57	AR&R 10 year, 5 minutes storm, average 173 mm/h, Zone 1	
F C/9	0	0.011	0.199	0.063	0.04	0.75	0.66	AR&R 10 year, 5 minutes storm, average 173 mm/h, Zone 1	
F C/8	0	0.012	0.937	0.042	0.05	0.45	1.24	AR&R 10 year, 5 minutes storm, average 173 mm/h, Zone 1	
F C/7	0	0.017	0.937	0.047	0.07	0.51	1.38	AR&R 10 year, 5 minutes storm, average 173 mm/h, Zone 1	
F C/6	0.004	0.024	1.133	0.071	0.06	0.77	0.89	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F C/5	0	0	0.238	0	0	0	0		
OF216	2.984	2.984	0.238	0.318	0.78	6.4	2.44	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1	
F CA/1	0	0	0.238	0	0	0	0		
F CB/1	0.007	0.027	1.133	0.074	0.07	0.8	0.91	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F CC/1	0.006	0.023	0.937	0.054	0.08	0.58	1.49	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F D/2	0.009	0.039	1.133	0.096	0.06	2.86	0.64	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F D/1	0.031	0.238	0.921	0.021	0.01	0.17	0.35	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F E/3	0.146	0.146	0.565	0.092	0.08	3.88	0.85	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F E/2	0	0	0.168	0	0	0	0		
OF365	0	0	0.238	0	0	0	0		
F F/6	0.781	0.781	0.238	0.21	0.31	6.4	1.46	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F F/5	0.675	0.675	0.238	0.203	0.28	6.4	1.38	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F F/4	0.567	0.567	0.238	0.195	0.25	6.26	1.29	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F F/3	0.031	0.038	0.186	0.23	0.52	5.82	0.23	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
F F/2	1.355	1.375	0.168	0.274	0.4	6.4	1.46	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	
OF211	0.991	0.991	0.238	0.291	0.91	6.17	0.31	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1	

OF235	0.021	0.021	0.256	0.019	0.01	6.44	0.33	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF E10%	0.038	0.038	0.256	0.025	0.01	8.23	0.37	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF190	0.013	0.013	0.256	0.017	0	5.54	0.27	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF EW/5	0.326	0.326	0.256	0.055	0.04	15.05	0.7	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF EW/6	0.844	0.844	0.256	0.081	0.07	20.25	0.91	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF EW/4	0.893	0.893	0.238	0.218	0.33	6.4	1.53	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF S/9	0.688	0.688	0.256	0.075	0.06	19	0.86	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF S/8	0.751	0.751	0.256	0.078	0.07	19.54	0.88	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF S/7	0.696	0.696	0.256	0.075	0.07	19	0.87	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
F CD/1	0	0	0.565	0	0	0	0	
OF25	0.027	0.027	0.256	0.022	0.01	7.33	0.34	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OFWS/3	0	0	0.256	0	0	0	0	
OF G/3	0	0	0.256	0	0	0	0	
OF492	0	0	1.267	0	0	0	0	
OF WS/1	0.661	0.661	0.256	0.073	0.06	18.64	0.86	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF Basin F	0	0	0.256	0	0	0	0	
OF Basin E	0	0	0.256	0	0	0	0	
OF336	0.106	0.106	0.256	0.035	0.02	11.09	0.51	AR&R 10 year, 1.5 hours storm, average 44.6 mm/h, Zone 1
OF basin B	0	0	0.256	0	0	0	0	
F CE/1	0.012	0.012	0.565	0.036	0.02	1.43	0.46	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF346	1.035	1.035	0.238	0.227	0.37	6.4	1.62	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
OF Basin C	0.577	0.577	0.256	0.07	0.06	17.92	0.82	AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1
DETENTION BASIN DETAILS								
Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level			
regional\1	24.14	3557.4	2.072	2.072	0			
Basin F	25.37	149.4	0.044	0.044	0			
Basin E	25.36	320.9	0.079	0.079	0			
Basin B	25.4	128.5	0.037	0.037	0			
CONTINUITY CHECK for AR&R 10 year, 25 minutes storm, average 90 mm/h, Zone 1								
Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %				
AA/1	6.97	6.97	0	0				
A/5	268.87	268.8	0	0				
A/4	503.7	503.88	0	0				
A/3	503.88	503.81	0	0				
A/2	503.81	503.74	0	0				
A/1	6562.62	6562.55	0	0				
AB/1	14.96	14.96	0	0				
A/6	245.57	245.51	0	0				
AC/1	18.86	18.86	0	0				
A/7	218.97	218.92	0	0				
AD/1	11.35	11.35	0	0				
A/8	188.18	188.11	0	0				
B/3	234.09	234.09	0	0				
B/2	234.09	234.89	0	-0.3				
B/1	234.89	234.9	0	0				
C/13	7.26	7.26	0	0				
C/12	14.13	14.13	0	0				
C/11	160.63	160.56	0	0				
C/10	173.01	172.85	0	0.1				
C/9	881.95	881.99	0	0				
C/8	890.57	890.53	0	0				
C/7	5663.31	5662.69	0	0				
C/6	5687.33	5687.18	0	0				
C/5	5720.75	5720.38	0	0				
C/4	5764.9	5764.37	0	0				
C/3	5764.37	5764.16	0	0				
C/2	5764.16	5763.94	0	0				
C/1	5764.05	5763.51	0	0				
CA/1	18.61	18.61	0	0				
CB/1	16.08	16.08	0	0				
CC/1	17.26	17.26	0	0				
D/2	22.26	22.27	0	0				
D/1	44.64	44.63	0	0				
E/3	109.5	99.5	10	0				
E/2	772.78	772.78	0	0				
regional\1	4819.44	4750.28	68.51	0				
F/6	219.65	219.65	0	0				
F/5	225.05	225.05	0	0				
F/4	228.85	228.85	0	0				
F/3	243.12	243.12	0	0				
F/2	1020.93	1020.93	0	0				
O A/2	6562.08	6562.08	0	0				
O E/2	0	0	0	0				
N80	0.11	0.11	0	0				
N238	10.7	10.7	0	0				
N230	19.66	19.66	0	0				
N224	6.55	6.55	0	0				
EW/5	267.12	267.12	0	0				
EW/6	2188.55	2188.55	0	0				
EW/4	2311.55	2311.66	0	0				
EW/3	2092.01	2091.98	0	0				
EW/2	2091.98	2092.03	0	0				
S/9	586.5	586.5	0	0				
S/8	672.49	672.49	0	0				
S/7	673.41	673.4	0	0				
CD/1	696.18	696.18	0	0				
WS/2	88.69	88.69	0	0				
WS/3	658.85	658.85	0	0				
G/3	658.85	659.75	0	-0.1				
G/2	659.75	659.78	0	0				
WS/1	570.16	570.16	0	0				
Basin F	160.6	147.6	13.1	-0.1				
Basin E	324.85	277.12	47.88	0				
N226	296.79	296.62	0	0.1				
Basin B	127.75	108.21	19.63	-0.1				
CE/1	129.79	129.71	0	0.1				
N139	762.77	762.77	0	0				
N237	420.41	420.41	0	0				
Free	0	0	0	0				
Run Log for 4000 run at 12:27:16 on 2/10/2008								
No water upwelling from any pit.								
Freeboard was less than 0.15m at EW/4, EW/5, EW/6, EW/3								
The maximum flow exceeded the safe value in the following overflow routes: F F/2, OF346, OF EW/4, OF S/7, OF Basin C, OF S/8, OF EW/6, OF EW/5, OF S/9, OF WS/1, OF222, OF								
The following overflow routes carried water uphill (adding energy): F F/6								
These results may be invalid. You should check for water flowing round in circles at these locations. You may need to reformulate the model.								

DRAINS Model Name and File Path: F:\AA001875-D-Calculations\E-Stormwater\C-DrainsDesignFiles\4000-AA001875-00-Existing-2008										RESULTS	
DRAINS Version: 2008.06.15 May 2008										100 YEAR ARI	
Modeller's Name: Darlan Castro											
Description: Clemton Park Redevelopment											
DRAINS results prepared 02 October, 2008 from Version 2008.06											
PIT / NODE DETAILS											
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				
AA/1	21.41		0.014		1.31	0	None				
A/5	21.38	22.55	0.032	0.1	1.14	0	None				
A/4	21		0		-0.48		Outlet System				
A/3	20.8		0		-0.85		Outlet System				
A/2	20.7		0		-0.8		Outlet System				
A/1	20.6		4.906								
AB/1	21.99		0.029		0.99	0	None				
A/6	21.98		0.023		1	0	None				
AC/1	22.56		0.04		0.9	0	None				
A/7	22.53		0.033		0.93	0	None				
AD/1	23.53		0.022		1.27	0.007	Inlet Capacity				
A/8	23.52		0.068		1.27	0.011	Inlet Capacity				
B/3	23.71		0.465		0.1	0	None				
B/2	21.63		0		0.29	0	None				
B/1	21.28		0		0	0.089	Outlet System				
C/13	25.09		0.014		0.97	0.004	Inlet Capacity				
C/12	25.09		0.015		0.96	0.004	Inlet Capacity				
C/11	25.09		0.054		0.64	0.023	Inlet Capacity				
C/10	25.06		0.047		0.27	0	Inlet Capacity				
C/9	25.02		0.025		0.31	0	None				
C/8	24.19		0.017		0.44	0	None				
C/7	22.39		1.237		1.26	0	None				
C/6	22.22		0.024		0.48	0.008	Inlet Capacity				
C/5	22.1		0.071		0	0.983	Outlet System				
C/4	22.01		0		-0.32		Outlet System				
C/3	21.93		0		-0.83		Outlet System				
C/2	21.85		0		-1.3		Outlet System				
C/1	21.8		1.122								
CA/1	22.1		0.042		0	0.037	Outlet System				
CB/1	22.22		0.036		0.48	0.013	Inlet Capacity				
CC/1	22.4		0.034		1.26	0.011	Inlet Capacity				
D/2	21.95		0.044		0.32	0.016	Inlet Capacity				
D/1	21.92		0.06		0	0.197	Outlet System				
E/3	25.01	25.36	0.215	10	0.34	0.215	None				
E/2	25.01	25.16	3.203	0	0.15	0	None				
F/6	25.16		2.104		1.49	1.992	Inlet Capacity				
F/5	25.15		2.002		1.55	1.89	Inlet Capacity				
F/4	25.14		1.896		1.23	1.784	Inlet Capacity				
F/3	25.11		1.807		0.58	1.695	Inlet Capacity				
F/2	25.06		3.117		0.14	2.997	Inlet Capacity				
EW/5	27.2		0.53		0.01	0.478	Inlet Capacity				
EW/4	27.18		4.031		0	1.995	Outlet System				
EW/3	26.97		2.212		0.08	2.104	Inlet Capacity				
EW/2	26.79		0		0.07	None	None				
EW/1	25.34		0		0.26	None	None				
S/9	27.44		1.117		0.49	1.009	Inlet Capacity				
S/8	26.68		1.176		0.52	1.12	Inlet Capacity				
S/7	26.58		1.121		0.49	1.065	Inlet Capacity				
SD/1	25.44		1.1		0.03	0	None				
WS/2	28.63		0.174		0.15	0.065	Inlet Capacity				
WS/3	28.15	28.75	1.025	2.8	0.45	0	None				
G/3	27.44		0		1.9	0	None				
G/2	25.46		0		0.79	0	None				
WS/1	28.68		1.086		0.22	0.974	Inlet Capacity				
N226	24.04		0.056								
CE/1	25.11		0.048		0.75	0.019	Inlet Capacity				
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				
C AA/1	0.014	0.014	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C A/5	0.032	0.032	0	3	10	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C AB/1	0.029	0.029	0	3	10	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C A/6	0.023	0.023	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C AC/1	0.033	0.033	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C A/7	0.024	0.024	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C AD/1	0.022	0.022	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C A/8	0.04	0.04	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C B/3	0.465	0.346	0.118	5	7	0	0 AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
C C/13	0.014	0.014	0	2	10	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C C/12	0.015	0.015	0	2	10	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C C/11	0.033	0.033	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C C/10	0.024	0.024	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C C/9	0.025	0.025	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C C/8	0.017	0.017	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C C/7	0.017	0.017	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C C/6	0.024	0.024	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C C/5	0.029	0.029	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C CA/1	0.029	0.029	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C CB/1	0.025	0.025	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C CC/1	0.034	0.034	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C CD/1	0.044	0.044	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C D/1	0.044	0.044	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
TLB	0.215	0.215	0	3	10	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C E/2	0.029	0.024	0.002	5.39	10	0	0 AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
C Basin A	0.957	0.957	0	5	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C F/5	0.01	0.01	0	5	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C F/4	0.007	0.007	0	3	10	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C F/3	0.028	0.028	0	3	10	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C F/2	0.03	0.03	0	3	10	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
F10%	0.031	0	0.031	5	5	0	0 AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
E10%	0.056	0	0.056	5	5	0	0 AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
B10%	0.019	0	0.019	5	5	0	0 AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
CS/2	0.53	0.395	0.135	5	7	0	0 AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
CS/1	3.557	2.943	0.614	6	8	0	0 AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
CS/3	0.242	0.242	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
TS/1	1.117	0.823	0.294	6	8	0	0 AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
SL	0.173	0.127	0.046	4	6	0	0 AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
TS1a	0.002	0.002	0	1	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
TS/2	0.045	0.045	0	3	10	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
WS/2	0.174	0.174	0	3	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
WS/1	1.086	0.8	0.286	6	8	0	0 AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
F90%	0.301	0.301	0	5	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
E90%	0.608	0.608	0	5	5	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
B90%	0.239	0.239	0	5	5	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C CE/1	0.028	0.028	0	2	0	0	0 AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
C E/1	1.452	1.07	0.383	6	8	0	0 AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
C Basin E	0.894	0.732	0.222	6	8	0	0 AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				

Outflow Volumes for Total Catchment (16.2 impervious + 3.79 pervious = 20.0 total ha)									
Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Impervious %)	Pervious Runoff cu.m (Pervious %)					
AR&R 100 ye	4291.46	3781.49 (88.1%)	3315.93 (95.3%)	465.56 (12.2%)					
AR&R 100 ye	6753.23	6164.56 (91.3%)	5310.70 (97.0%)	853.85 (66.7%)					
AR&R 100 ye	8632.83	7977.40 (92.4%)	6833.89 (97.7%)	1143.51 (69.8%)					
AR&R 100 ye	10113.22	9399.61 (92.9%)	8033.51 (98.0%)	1366.10 (71.2%)					
AR&R 100 ye	11477.17	10703.68 (93.3%)	9138.74 (98.3%)	1564.94 (71.9%)					
AR&R 100 ye	12574.99	11750.94 (93.5%)	10026.40 (98.7%)	1724.54 (72.2%)					
AR&R 100 ye	15569.04	14620.78 (93.9%)	12454.64 (98.2%)	2166.14 (73.4%)					
AR&R 100 ye	17764.67	16718.68 (94.1%)	14233.83 (98.2%)	2484.85 (73.8%)					
AR&R 100 ye	20658.91	19458.04 (94.2%)	16579.49 (99.2%)	2878.55 (73.5%)					
AR&R 100 ye	22754.74	21423.74 (94.2%)	18277.43 (99.3%)	3146.31 (72.9%)					
AR&R 100 ye	26347.59	24787.19 (94.1%)	21189.48 (99.3%)	3597.71 (72.0%)					
AR&R 100 ye	30269.79	28403.67 (93.8%)	24365.40 (99.3%)	4038.26 (70.3%)					
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				
P AA/1	0.014	0.4	21.383	21.383	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P A/5	0.293	1.8	21.254	20.995	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P A/4	0.654	1.5	20.906	20.802	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P A/3	0.854	1.5	20.713	20.698	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P A/2	0.654	1.5	20.609	20.6	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P AB/1	0.029	0.3	21.981	21.98	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P A/6	0.24	2.2	21.788	21.383	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P AC/1	0.04	0.4	22.537	22.535	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P A/7	0.191	1.7	22.352	21.98	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P AD/1	0.016	0.2	23.52	23.52	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P A/8	0.121	2.8	23.151	22.535	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P B/3	0.465	4.7	22.504	21.629	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
P B/2	0.465	2.1	21.394	21.263	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
P B/1	0.399	1.8	21.133	20.985	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
P C/13	0.011	0.1	25.092	25.092	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P C/12	0.023	0.1	25.09	25.088	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P C/11	0.106	0.7	25.073	25.061	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P C/10	0.151	1	25.03	25.023	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P C/9	1.468	3.5	24.524	24.186	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P C/8	1.48	6.2	23.564	22.505	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P C/7	4.744	2.3	22.257	22.219	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P C/6	4.756	1.6	22.14	22.102	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P C/5	3.791	1.3	22.021	22.012	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P C/4	3.675	1.2	21.937	21.927	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P C/3	3.675	1.2	21.851	21.848	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P C/2	3.675	1.2	21.8	21.8	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P CA/1	0.041	0.4	22.102	22.102	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P CB/1	0.023	0.2	22.219	22.219	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P CC/1	0.023	0.4	22.393	22.393	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P D/2	0.028	0.3	21.334	21.925	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P D/1	0.081	0.7	21.928	22.012	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P E/3	0	0	25.014	25.014	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1				
P E/2	3.203	2.8	25.005	25.004	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1				
P regional	2.65	7.6	22.918	22.418	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P F/6	0.112	0.2	25.155	25.154	AR&R 100 year, 10 minutes storm, average 203 mm/h, Zone 1				
P F/5	0.225	0.4	25.143	25.141	AR&R 100 year, 10 minutes storm, average 203 mm/h, Zone 1				
P F/4	0.337	1.5	25.115	25.112	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P F/3	0.449	0.7	25.067	25.058	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P F/2	0.571	0.9	25.004	25.004	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P EW/6	0.053	0.3	27.187	27.18	AR&R 100 year, 30 minutes storm, average 126 mm/h, Zone 1				
P EW/5	2.102	2.3	27.048	26.97	AR&R 100 year, 3 hours storm, average 44 mm/h, Zone 1				
P EW/4	2.197	0.4	26.817	26.789	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P EW/3	2.197	5.8	25.961	25.343	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P EW/2	2.197	2.4	25.102	25.004	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P S/9	0.108	3.5	26.991	26.683	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1				
P S/8	0.164	1.6	26.584	26.584	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1				
P S/7	0.22	3.9	26.362	25.437	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1				
P C/1/1	0.132	3	25.211	25.023	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P WS/2	0.109	1.4	28.574	28.147	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1				
P WS/3	1.236	3.5	27.661	27.436	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P G/3	1.236	6.4	26.844	25.462	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P G/2	1.236	3.5	25.103	25.004	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P WS/1	0.112	1.6	28.327	28.147	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1				
P Basin F	0.107	1.8	24.103	24.003	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1				
P Basin E	0.101	2	24.142	24.042	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P Basin B	0.045	0.2	25.107	25.107	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1				
P CE/1	0.058	0.5	25.091	25.088	AR&R 100 year, 1 hour storm, average 89 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 Dv	Max Width	Max V	Due to Storm	
F AA/1	0	0	1.931	0	0	0	0		
F A/5	0	0	1.19	0	0	0	0		
OF222	5.196	5.196	2.134	0.396	1.19	6.4	3.02	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
F AB/1	0	0.014	1.19	0.063	0.05	0.75	0.78	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F A/6	0	0.032	1.19	0.082	0.07	1.38	0.85	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F AC/1	0	0.029	1.133	0.077	0.07	0.82	0.94	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F A/7	0	0.023	1.133	0.07	0.06	0.75	0.88	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F AD/1	0.007	0.004	0.937	0.066	0.11	0.71	1.69	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F A/8	0.011	0.033	0.731	0.067	0.11	0.88	1.58	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
F B/3	0	0	7.665	0	0	0	0		
F B/2	0	0	1.19	0	0	0	0		
F B/1	0.089	0.089	1.19	0.111	0.11	2.35	0.96	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
F C/13	0.004	0.031	1.179	0.075	0.08	0.8	1.03	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F C/12	0.004	0.037	1.179	0.079	0.09	0.85	1.08	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F C/11	0.023	0.047	1.073	0.087	0.09	1.54	1.05	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F C/10	0	0.034	0.719	0.067	0.11	0.88	1.65	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F C/9	0	0.017	1.29	0.071	0.05	1.02	0.68	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F C/8	0	0.017	0.937	0.049	0.07	0.52	1.36	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F C/7	0	0.024	0.937	0.055	0.08	0.59	1.48	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F C/6	0.008	0.037	1.133	0.095	0.06	2.62	0.65	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F C/5	0.983	0.983	1.19	0.223	0.36	6.4	1.59	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
OF216	4.797	4.797	2.134	0.383	1.12	6.4	2.93	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
F CA/1	0.037	0.037	1.19	0.086	0.07	1.49	0.86	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
F CB/1	0.013	0.042	1.133	0.099	0.06	3.21	0.62	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
CC/11	0.011	0.036	0.937	0.063	0.11	0.68	1.27	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F D/2	0.016	0.06	1.133	0.105	0.07	4.25	0.65	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F D/1	0.197	0.197	1.19	0.141	0.16	3.35	1.11	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
F E/3	0.215	0.215	1.931	0.106	0.1	4	0.97	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1	
F E/2	0	0	1.364	0	0	0	0		
OF365	1.232	1.232	0.134	0.238	0.41	6.4	1.73	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	
F F/6	1.992	1.992	1.19	0.276	0.58	6.4	2.09	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
F F/5	1.89	1.89	1.19	0.271	0.56	6.4	2.05	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
F F/4	1.784	1.784	1.19	0.266	0.53	6.4	2	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
F F/3	1.695	1.695	1.19	0.262	0.51	6.4	1.96	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	
F F/2	2.997	3.024	1.364	0.365	0.72	6.4	1.98	AR&R 100 year, 1.5 hours storm, average 173 mm/h, Zone 1	
OF211	1.122	1.122	2.134	0.231	0.39	6.4	1.68	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1	

OF235	0.031	0.031	7.665	0.023	0.01	7.63	0.35	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1
OF E10%	0.056	0.056	7.665	0.028	0.01	9.43	0.42	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1
OF190	0.019	0.019	7.665	0.018	0.01	6.14	0.33	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1
OF EW/5	0.478	0.478	7.665	0.064	0.05	16.84	0.78	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1
OF EW/6	1.995	1.995	7.665	0.115	0.13	27.08	1.15	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1
OF EW/4	2.104	2.104	2.134	0.281	0.6	6.4	2.13	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1
OF S/9	1.009	1.009	7.665	0.088	0.08	21.51	0.95	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1
OF S/8	1.12	1.12	7.665	0.091	0.09	22.23	0.99	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1
OF S/7	1.065	1.065	7.665	0.089	0.09	21.87	0.97	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1
F CD/1	0	0	1.931	0	0	0	0	
OF25	0.065	0.065	7.665	0.03	0.01	10.02	0.43	AR&R 100 year, 5 minutes storm, average 258 mm/h, Zone 1
OF WS/3	0	0	7.665	0	0	0	0	
OF G/3	0	0	7.665	0	0	0	0	
OF492	0	0	1.267	0	0	0	0	
OF WS/1	0.974	0.974	7.665	0.086	0.08	21.15	0.96	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1
OF Basin F	0.011	0.011	7.665	0.015	0	4.94	0.29	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1
OF Basin E	0.013	0.013	7.665	0.017	0	5.54	0.27	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1
OF336	0.142	0.142	7.665	0.04	0.02	11.99	0.55	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1
OF basin B	0.013	0.013	7.665	0.017	0	5.54	0.28	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1
F CE/1	0.019	0.019	1.931	0.043	0.02	1.73	0.51	AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1
OF346	1.452	1.452	2.134	0.25	0.46	6.4	1.85	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1
OF Basin C	0.804	0.804	7.665	0.079	0.07	19.9	0.9	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1
DETENTION BASIN DETAILS								
Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level			
regional/1	25	5632.4	3.882	2.65	1.232			
Basin F	25.92	242.9	0.068	0.057	0.011			
Basin E	25.91	525	0.113	0.101	0.013			
Basin B	25.96	206.9	0.058	0.045	0.013			
CONTINUITY CHECK for AR&R 100 year, 1.5 hours storm, average 69 mm/h, Zone 1								
Node	Inflow (cu.m)	Outflow (cu.m)	Storage (cu.m)	Chart Difference %				
AA/1	19.58	19.58	0	0				
A/5	745.74	745.62	0	0				
A/4	1428.07	1428.07	0	0				
A/3	1428.07	1428.07	0	0				
A/2	1428.07	1428.07	0	0				
A/1	19077.38	19077.22	0	0				
AB/1	42.03	42.03	0	0				
A/6	680.25	680.15	0	0				
AC/1	52.48	52.48	0	0				
A/7	605.52	605.42	0	0				
AD/1	31.88	31.88	0	0				
A/8	519.48	519.32	0	0				
B/3	690.35	690.35	0	0				
B/2	690.35	690.77	0	-0.1				
B/1	690.77	690.81	0	0				
C/13	20.4	20.4	0	0				
C/12	40.34	40.34	0	0				
C/11	447.64	447.53	0	0				
C/10	482.48	482.34	0	0				
C/9	2568.98	2568.96	0	0				
C/8	2593.06	2593.31	0	0				
C/7	16549.5	16549.37	0	0				
C/6	16618.62	16618.35	0	0				
C/5	16711.79	16711.84	0	0				
C/4	16269.29	16269.31	0	0				
C/3	16269.31	16269.31	0	0				
C/2	16269.31	16269.31	0	0				
C/1	16837.19	16836.88	0	0				
CA/1	51.46	51.44	0	0				
CB/1	44.42	44.42	0	0				
CC/1	48.53	48.53	0	0				
D/2	62.52	62.51	0	0				
D/1	125.35	125.32	0	0				
E/3	307.5	297.5	10	0				
E/2	2433.49	2433.49	0	0				
regional/1	13966.59	13892.37	73.91	0				
F/6	769.43	769.43	0	0				
F/5	784.6	784.6	0	0				
F/4	795.25	795.15	0	0				
F/3	835.23	833.44	0	0.2				
F/2	3126.18	3123.76	0	0.1				
O A/2	19076.43	19076.43	0	0				
O E/2	0	0	0	0				
N80	567.87	567.87	0	0				
N238	37.31	37.31	0	0				
N230	68.52	68.52	0	0				
N224	22.84	22.84	0	0				
EW/5	787.76	787.76	0	0				
EW/6	6357.63	6357.62	0	0				
EW/4	6703.08	6703.06	0	0				
EW/3	5933.61	5933.61	0	0				
EW/2	5933.61	5933.76	0	0				
S/9	1730.41	1730.41	0	0				
S/8	1983.88	1983.89	0	0				
S/7	1986.45	1986.45	0	0				
CD/1	2050.4	2050.41	0	0				
WS 2	249.08	249.07	0	0				
WS/3	1931.25	1931.26	0	0				
G/3	1931.26	1933.08	0	-0.1				
G/2	1933.08	1933.19	0	0				
WS 1	1682.19	1682.19	0	0				
Basin F	451	397.81	53.32	0				
Basin E	912.25	737.8	174.71	0				
N225	806.32	806	0	0				
Basin B	358.75	295.82	63.01	0				
CE/1	360.22	360.15	0	0				
N139	2250.48	2250.48	0	0				
N237	1198.36	1198.36	0	0				
Free	0	0	0	0				
Run Log for 4000 run at 12:23:12 on 2/10/2008								
Upwelling occurred at D/1, CA/1, C/5, B/1								
Freeboard was less than 0.15m at CD/1, WS 2, EW/4, EW/5, EW/6, EW/3, F/2, E/2, B/3								
The maximum flow exceeded the safe value in the following overflow routes: F F/2, OF222, OF216, F F/3, F F/4, F F/5, F F/6								
The following overflow routes carried water uphill (adding energy): F C/5, F D/1, F F/6								
These results may be invalid. You should check for water flowing round in circles at these locations. You may need to reformulate the model.								

Appendix E

Sydney Water Feasibility Letter



Case Number: **112942**

26th September 2008

Hyder Consulting Pty Ltd
C/- Michael Bell and Partners Pty Ltd
P.O. Box 478
Roseville NSW 2069

FEASIBILITY LETTER

Developer:	Hyder Consulting Pty Ltd.
Your Reference:	08154.
Development:	Lot A DP 431356 and Lot 1 DP 721721 (No: 60) Charlotte Street, Clemton Park.
Development Description:	Re-development of the existing Sunbeam Factory/Warehouse into a mixed Commercial/Residential and Industrial development.
Your Application date:	27 th August 2008.

Dear Applicant,

This Feasibility Letter (Letter) is a guide only. It provides general information about what Sydney Water's requirements could be if you applied to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.**

If you obtain development consent for that development from your consent authority (this is usually your local Council) they will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (Coordinator).

Sydney Water will then send you either a:

- Notice of Requirements (Notice) and Works Agreement (Agreement); or
- Certificate.

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's requirements between the issue dates of this Letter and the Notice or Certificate. The changes may be:

1. Developer Charges

- (a) Adjustment of charges due to the Consumer Price Index (CPI);

- (b) Adjustment of charges because of a scheduled review by the Independent Pricing and Review Tribunal (IPART). After that review and registration of the new charges, Sydney Water has to apply those charges; or
- (c) If there is rezoning of any land within the development proposal then new charges will apply.

2. Reticulation Recovery Charges

These charges recover part of the cost of works that have been paid for by Sydney Water or other developers and that benefit your development. This charge has been made before your points of connection have been determined. If your completed designs show that your development will be connected to other main/s, the charge may be changed and/or you may need to construct other works.

3. Changing the Proposed Development

If you change your proposed development, e.g. the development description or the plan/site layout, after today, the requirements in this Letter could change when you submit your new application.

Also, if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

You have made an application for specific information. Sydney Water's possible requirements are:

Development Servicing Plan Charges

The proposed development site is located within the Southern Suburbs Water and SWSOOS Sewer DSP Areas. Currently, there are no applicable rates in either of these areas.

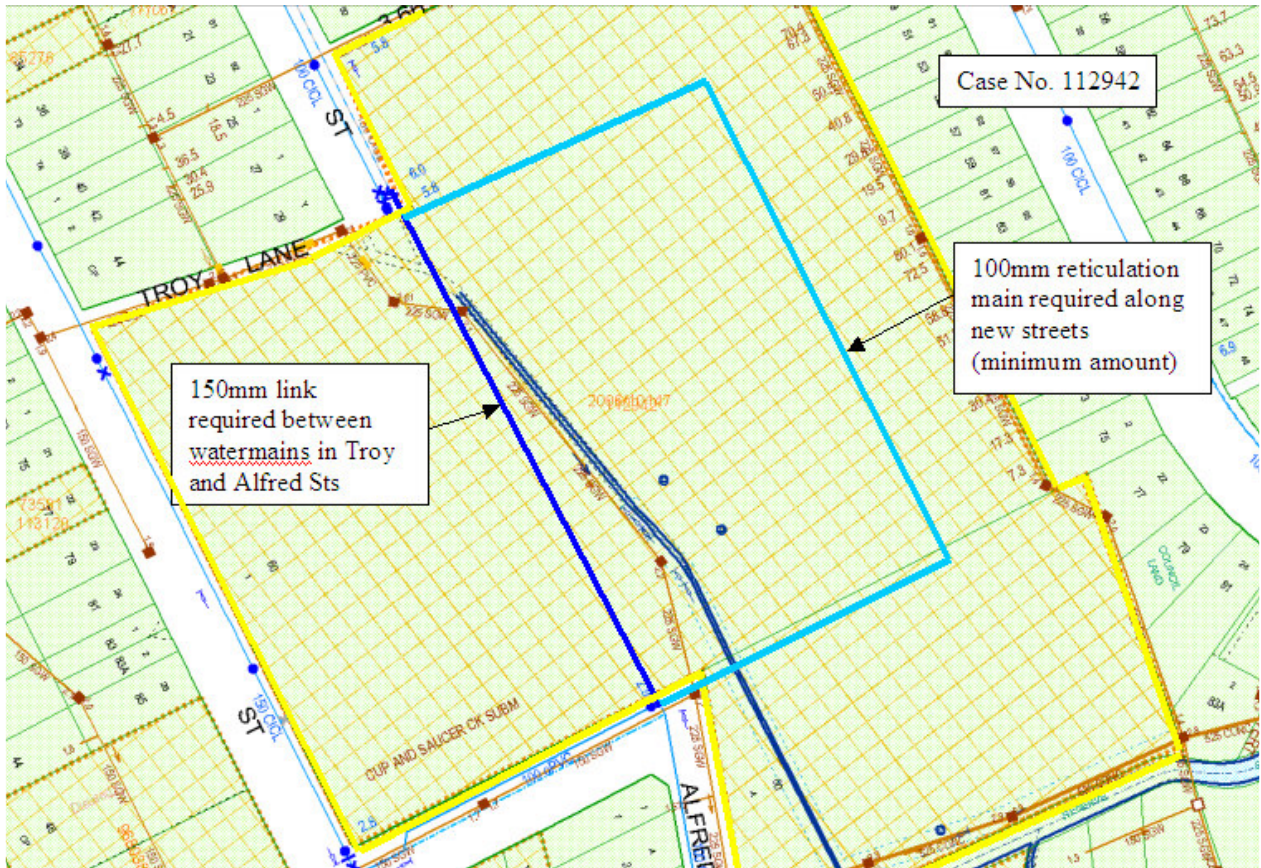
However, Sydney Water advises that Developer Charges are currently being reviewed and new Developer Charges are due to be implemented on 1 July 2009. As a result of the review, some of the charges quoted above may decrease, others may increase and **new charges may be introduced**. For the latest information on this review you can visit our website www.sydneywater.com.au ➤ Building and Developing ➤ Developing Your Land. The new developer charges will be applied after they are registered with IPART.

Drinking Water Facilities

Based on the limited information provided with this application, it has been found that the existing Wiley Park Elevated Water Supply System has insufficient capacity to cater for this development.

The Developer will therefore need to construct a DN150 water main between the DN150 main in Troy Street and the DN100 main in Alfred Street. In addition, DN100 watermains will need to be constructed in New Troy, New Wade and New Harp Streets. The attached sketch provides an indication of the anticipated minimum scope of work required.

Any works you are required to construct, must be carried out in accordance with the standards set out in the “Water Supply Code of Australia – Sydney Water Edition”.



A water main extension from the DN150 main in Charlotte Street is not preferred due to the adverse impact on the pressure available to surrounding properties.

Assessment of any fire-fighting capability of Sydney Water main is **not** part of the Section 73 Certificate system capability assessment, which is for predicted normal domestic supply only. Fire-fighting capability assessment is the **responsibility of the applicant**. Sydney Water can assist only by indicating modelled pressures at flows nominated by the applicant (provided that such flows do not exceed water supply capability) on a standard pressure enquiry form submitted with the scheduled fee.

Sewer Facilities

Preliminary investigations have revealed that the DN525 sewer (SO 46580) adjoining the southern boundary of the site, the DN225 sewer located along the eastern boundary of the site and the DN225 SGW sewer located within the site and close to an existing stormwater

- The location of the sewer connection should be at a point at least one (1) meter within the property boundary and the depth of connection must comply with Section 4.6.5 of the “Sewerage Code of Australia – Sydney Water Edition”.
- You should refer to Section 6.4 of the Sewer Code for requirements on location of Maintenance Holes. An area of clearance of at least 1m from the outside rim of the Maintenance Hole to a building is to be maintained with available access of at least 1m from a roadway to the Maintenance Hole. Sydney Water requires 24hr access to the Maintenance Holes. Sydney Water does permit the location of Maintenance Holes within habitable areas such as industrial factory floor space.

Stormwater Discharge Advice

Based on information available at Sydney Water the above property drains to the Alfred Street Branch (77F) of Cup and Saucer Creek (SWC77) before discharging to the Cooks River (SWG 13). The Cup and Saucer Creek Capacity Assessment dated April 1999 indicates that the capacity of the Sydney Water drainage system downstream of the above property is approximately a 5-year ARI.

1. *Relocate the existing stormwater pipeline that passes through the site (currently under the existing factory building) and discharges into the open channel along the site southern boundary.*

There is no objection in principle to the abandonment (either filled or removed) and replacement with a new pipeline in an alternate, mutually agreed, location that better suits the proposed development. It is understood that the Developer’s intention is for the new pipeline to be generally located under the kerb line of the road carriageway of New Alfred Street.

The capacity of the existing pipeline is quite high – in excess of 50 year ARI. The high capacity was likely put in place because there was limited opportunity for overland flows to pass around the factory building. The Developer must ensure that the new development layout ensures an adequate overland flow path would be provided.

On this basis the capacity of the combined pipe / overland flow system should safely convey the local Q100 year ARI runoff through the site to the open channel.

The design capacity of the replacement pipeline would be the greater of the following:

- The local Council street drainage standard design ARI capacity.
- Sufficient such that the overland flows through / around the site in the Q100 year ARI local design storm event do not exceed “safe” hydraulic conditions in terms of depth and velocity.

2. *The open concrete channel along the southern boundary of the site has only limited hydraulic capacity – approximately 1 in 5 year ARI. Consequently, from time to time it is likely that significant overbank flooding will occur.*

This issue raises some concern with regard to the proposed development, particularly in the vicinity of buildings E1 and E2 and E3 alongside the concrete drainage channel. The Developer would need to undertake additional investigations to ascertain:

- The potential impacts of the proposed development on the local flood regime.

- The potential impacts of the local flood regime on the buildings and residents / occupants of the proposed development.

There is potential for:

- The proposed buildings to displace flood storage and obstruct overbank flood flows consequently diverting floodwaters to the detriment of other nearby properties.
- Hazardous flood conditions to interrupt access to / from the proposed buildings.
- Flood waters to cause damage to buildings, vehicles or other site improvements.

In particular, the proposed building E3 in close proximity to the existing channel should be assessed in close detail. The additional investigations would need to take the form of a Local Flood Study and Floodplain Risk Management Study.

No buildings should be located in the local floodway and reasonable care is to be taken to ensure that local floodplain storage is not unreasonably diminished. The design of the development in close proximity to the creek should ideally aim for a balanced cut / fill design that preserves the floodplain storage.

Under these design constraints, it is anticipated that a corridor parallel to the existing channel would need to remain clear to allow the free passage of floodwaters. Given the relatively low ARI capacity of the existing concrete channel it is plausible that future amplification works by Council or Sydney Water could be identified in future following a catchment wide Flood Study and Floodplain Risk Management Study.

The Developer will need to understand and comply with the following Standard Conditions:

- Sydney Water's On-Site Detention Policy
- Sydney Water's Standard Conditions for Stormwater Connection
- Sydney Water's Standard Conditions for Building Over Stormwater Channels
- Sydney Water's Standard Conditions for Building Adjacent to Stormwater Channels
- Sydney Water's Standard Conditions for Deviating Stormwater Channels

ON-SITE DETENTION POLICY

1 POLICY

1.1 General Statement

On-Site Detention (OSD) policy applies for all developments and re-developments where it is proposed to connect stormwater drainage directly into the Sydney Water's stormwater system.

Note: On-Site Detention (OSD) applies for all developments and re-developments within the City of Sydney Council areas.

1.2 Application

The policy applies to:

- All residential development, except for single unit dwellings.
- All commercial and industrial developments
- All special use and open space areas

1.3 Exclusions

The policy shall not apply to:

- Refurbishment of an existing building and maintaining the existing drainage system.
- Developments at the lower portion of a catchment - subject to Sydney Water's approval.
- Minor additions - subject to Sydney Water's assessment.
- Where the site acts as a floodway during frequent rainfall events and council has approved a designated floodway.
- Portions of existing properties that are not being developed.

Note: Even though no OSD is required under the above circumstances a "silt arrestor/control pit" must be provided according to the site area. Generally this would be 1m³ for site area less than 1000m², 2m³ for site area between 1000m² - 3000m² and 3m³ for site area more than 3000m².

1.4 Information Supplied by Sydney Water

Sydney Water will specify the following information.

Maximum Permissible Site Discharge in litres per second
Minimum On-Site Detention Storage in cubic metres

Maximum Permissible Site Discharge will be estimated considering existing capacity of the connecting and downstream Sydney Water drainage system.

Sydney Water may require development sites with large areas to be analysed using a computer model.

1.5 Information Required

The applicant must submit the following information for the determination of Maximum Permissible Site Discharge (PSD) and minimum On-site Storage Detention (OSD).

- Existing and proposed Site Plans with levels
- Site area in square metres
- Existing impervious area in percentage or in square metres
- Existing stormwater drainage disposal details
- Proposed development impervious area in percentage or in square metres
- Applicant's preferred point of connection.

1.6 Approval Requirements

Details of the proposed method of stormwater disposal shall be prepared by a suitably qualified professional engineer or a surveyor and submitted to Sydney Water for approval.

Details and calculations to be submitted shall include but not limited to:

Total site catchment area, as well as sub-catchment areas where applicable, draining to Sydney Water's drainage system.

Two (2) copies of all drainage layout plans

Hydraulic calculations and details for the Permissible Site Discharge and On-site Storage Detention.

All computer data files on floppy diskette. A suitable index is to be provided relating file names to various runs and data parameters adopted, under a 'text' file named - README.TXT or other appropriate name.

Sydney Water's standard inlet conditions will apply to direct connections to Sydney Water's stormwater systems.

Rain Water Tanks

Rain water tanks can be used to offset the storage volume required in the designated OSD tank. Up to 50% of the total storage volume in the rain water tank can be allowed to offset the OSD storage. 50% of the total storage volume must be provided by the designated OSD tank.

SYDNEY WATER'S STANDARD CONDITIONS

GOVERNING STORMWATER CONNECTIONS

(For equal or more than 300mm connections)

1. All connections should comply with Sydney Water On Site Detention Policy.
2. All existing connections are to be clearly identified and stormwater systems are to be designed to utilise the existing connection points in preference to breaking open new connections. Proposals for additional new connections would need to be justified on merit.
3. Surface Water via a silt arrestor and roof water only are to be drained through the connection.
4. The owner is to supply written acceptance of responsibility for any damage that may result to his property from surcharge (backflow) through the connection. The owner should also note that he is responsible for the maintenance of any reflux valves installed.
5. If an approved silt arrestor and/or gas seal is required within the owner's property, a detailed sketch of same, and of the stormwater drain, is to be submitted with the application for approval by Sydney Water. It is the owner's responsibility to maintain any silt arrestors.
6. The inlet into the stormwater channel is to be constructed at an angle not exceeding 30° to the line of flow in the channel. –
7. The invert of the inlet into a stormwater channel shall be not more than 150mm above the toe of the wall at the point of entry. Pipe-to-pipe connections shall be made centre-to-centre.
8. Supervision of the actual inlet into the stormwater channel is to be carried out by Sydney Water's supervisor. The applicant shall carry out all excavation, backfill and restoration and supply all pipes necessary for the work.
9. Construction of the silt arrestor and/or gas seal, and the stormwater drain, from channel to arrestor and/or gas seal, and the stormwater drain, from channel to arrestor is only to be

made by, or under the direct supervision of a licensed drainer, to the satisfaction of Sydney Water's Field Services Inspector.

10. 48 hours notice of intention to commence the silt arrestor and/or gas seal, and the stormwater drain, is given to the Field Services Inspector.
11. No work is to be commenced until approval to proceed has been granted by Sydney Water.

SYDNEY WATER'S STANDARD CONDITIONS

GOVERNING STORMWATER CONNECTIONS

(For less than 300mm connections)

1. All connections should comply with Sydney Water On Site Detention Policy.
2. All existing connections are to be clearly identified and stormwater systems are to be designed to utilise the existing connection points in preference to breaking open new connections. Proposals for additional new connections would need to be justified on merit.
3. Surface Water via a silt arrestor and roof water only are to be drained through the connection.
4. The owner is to supply written acceptance of responsibility for any damage which may result to his property from surcharge (backflow) through the connection. The owner should also note that he is responsible for the maintenance of any reflux valves installed.
5. If an approved silt arrestor and/or gas seal is required within the owner's property, a detailed sketch of same, and of the stormwater drain, is to be submitted with the application for approval by Sydney Water. It is the owner's responsibility to maintain any silt arrestors.
6. The inlet into the stormwater channel is to be constructed at an angle not exceeding 90° to the line of flow in the channel.
7. The top surface of the inlet into a stormwater channel shall be not less than 300mm below the top (obvert level for the closed channel) of the channel at the point of entry. Pipe-to-pipe connections shall be made centre-to-centre.
8. Supervision of the actual inlet into the stormwater channel is to be carried out by Sydney Water's supervisor. The applicant shall carry out all excavation, backfill and restoration and supply all pipes necessary for the work.
9. Construction of the silt arrestor and/or gas seal, and the stormwater drain, from channel to arrestor and/or gas seal, and the stormwater drain, from channel to arrestor is only to be made by, or under the direct supervision of a licensed drainer, to the satisfaction of Sydney Water's Field Services Inspector.

10. 48 hours notice of intention to commence the silt arrestor and/or gas seal, and the stormwater drain, is given to the Field Services Inspector.
11. No work is to be commenced until approval to proceed has been granted by Sydney Water.

GENERAL REQUIREMENTS FOR BUILDING OVER AND COVERING STORMWATER CHANNELS

The following list has been produced as a guide only, indicating the usual requirements for building over stormwater channels. The list is not exhaustive and each situation will be assessed on its merits. In some situations additional requirements may be applicable.

Prior to make any formal application with Sydney Water, you are required to obtain the principal approval from the Council and Department of Infrastructure, Planning and Natural Resources (DIPNR) for your proposal.

Building over stormwater channels may not be permitted at all in some areas, for example:

- ⇒ Where easement conditions restrict any structure over the stormwater channel
- ⇒ Where access to the stormwater channel is difficult for maintenance purposes
- ⇒ Where the building may obstruct overland flows
- ⇒ Where the building interferes with the channel flow
- ⇒ Where flooding occurs
- ⇒ Where building over the channel may cause flooding

The following requirements will need to be addressed before approval can be given to your proposal.

Requirements:

1. Applications for building over stormwater channels must be submitted in writing to Sydney Water Corporation with engineer's drawings, a hydrologic and hydraulic report. A fee is payable for review drawings and calculations and for inspection of works. All of Sydney Water's requirements must be met prior to granting approval to build over a Sydney Water stormwater channel.
2. A detailed drainage study report will be required to determine the effects the building has on the stormwater channel's operation. This must be prepared by a suitably qualified hydraulic consultant. This report must include, but is not limited, to the following:
 - Statement of any assumptions. Sydney Water Corporation states 65-80% impervious area to be adopted for Residential Properties and 80-100 % impervious area to be adopted for industrial /commercial properties.
 - Details of the calculations and any computer modelling techniques.
 - The runoff calculations must consider the entire catchment upstream of the subject property. Consideration must be given to the catchment downstream if it has the potential to impact the subject property.
 - 100 year ARI flood levels should be determined.
 - Any overland flow paths must be identified and accounted for.

- Ways of discharge stormwater into channel.
 - The report must contain a conclusion, stating whether the building will adversely affect the channel's operation, or inhibit the flow or entry into the channel of overland flows
3. Internal inspection of the channel to determine its structural condition must be carried out by Closed Circuit Television (CCTV) by an accredited operator and process (Sewrat) or by an accredited dilapidation survey company. The inspection is to be submitted to Sydney Water for review. This inspection must be performed before and after the construction to ensure that the stability of the stormwater channel has not been affected during the construction.
 4. Piers must be located outside of any drainage easement.
 5. Any structure must be at least 1m clear of the outside face of the channel wall at coping level (ie the top of the wall). This allows workspace behind the channel wall for any future wall renewals. The Council and DECC may require additional clearance distances.
 6. The underside of the building should be 300mm – 500mm above 100 year ARI level and shall be a minimum of 2.2 metres from the invert of the stormwater channel (minimum clearance of 600mm from the top of the channel must be maintained). The Council and DECC may require additional clearance distances.
 7. Piers must be founded below the depth of the invert of the channel or on bedrock.
 8. Piering conditions may change subject to the location of water and/or sewer mains.
 9. Piers are to be bored (not to be driven). Displacement piers must not be used.
 10. No land filling should be carried out within 3m from the outside face of the stormwater channel without prior permission from the Sydney Water.
 11. Grated openings or open sections of channel are to be incorporated along the channel
 12. Footings, piers and other load bearing foundations in the vicinity of the stormwater channel are to be located so that the building loads are transferred below the zone of influence of the stormwater channel.
 13. For Occupational Health and Safety aspects, access points shall be installed at most every thirty (30) metres if the channel covering exceeds this length. The access points shall have suitable secured covers to prevent unauthorised access into the channel to Sydney Water Corporation's standards.
 14. If the channel has been identified as requiring amplification (widening) in the future, piers shall be located outside of the proposed widening, allowing clearance from the proposed channel wall as detailed in (5). The applicant may be required to amplify the channel at his / her expense prior to building.
 15. If the channel walls and floor are in need of repair, these repairs shall be carried out prior to building over the channel.

16. An overland flow path must be allowed for when designing the building over the channel and its impact on surrounding areas should be considered. This is to allow a passage for flow in excess of the channel's capacity.
17. It will also be necessary for the developer to engage a surveyor to determine the exact location of the drainage easement and location of channel if required before piercing.
18. If a stormwater connection is required, Sydney Water standard inlet conditions must be adhered to.
19. If the air space above the channel belongs to Sydney Water Corporation then the developer must arrange to purchase this from Sydney Water Corporation. Easement will also require negotiation. Lease may be an option.

GENERAL REQUIREMENTS FOR BUILDING ADJACENT TO STORMWATER CHANNELS

The following list has been produced as a guide only, indicating the usual requirements for building adjacent to stormwater channels. The list is not exhaustive and each situation will be assessed on its merits. In some situations, additional requirements may be applicable.

Prior to make any formal application with Sydney Water, you are required to obtain the principal approval from the Council and Department of Infrastructure, Planning and Natural Resources (DIPNR) for your proposal.

Building adjacent to stormwater channels may not be permitted in some areas, for example where:

- ⇒ widening of the channel has been proposed or is required
- ⇒ buildings may obstruct overland flow
- ⇒ flooding occurs
- ⇒ access to channel is restricted
- ⇒ Sydney Water easement exists

Requirements :

1. Edge of any structure shall be at least 1m from the external face of the channel wall at coping level (ie. the top of the wall) or outside face of the channel. The Council and DECC may require additional clearance distance.
2. Piers must be located outside of any drainage easement.
3. Piering conditions may change subject to the location of water and/or sewer mains.
4. Footings, piers and other load bearing foundations in the vicinity of the stormwater channel are to be located so that the building loads are transferred below the zone of influence of the stormwater channel or to bedrock.
5. If the channel has been identified as requiring amplification (widening) in the future, piers shall be located outside of the proposed widening, allowing clearance from the proposed channel wall as stated in point 1.

6. If the channel walls are in need of repair, these repairs shall be carried out prior to building construction if necessary at applicant's cost. Dilapidation survey shall be carried out at applicant's cost.
7. No land filling should be carried out within 3m from the outside face of the stormwater channel without prior permission from the Sydney Water.
8. An overland flow path must be allowed for where necessary when designing a building adjacent to stormwater channel according to council requirements. This is to allow a passage of flow in excess of the stormwater channel's capacity.

All of Sydney Water's requirements must be met prior to approval to build adjacent to a stormwater channel.

GENERAL REQUIREMENTS FOR DEVIATION/ADJUSTMENT OF STORMWATER CHANNELS

The following list has been produced as a guide only, indicating the usual requirements for deviation/adjustment of stormwater channels. The list is not exhaustive and each situation will be assessed on its merits. In some situations additional requirements may be applicable.

You are advised to approach Council and Department of Natural Resources regarding their requirements as well.

Requirements:

1. Applications for deviation/adjustment of stormwater channels must be submitted through a Water Servicing Coordinator.

Minimum Size of the Channel

Capacity of the new channel should be equal to or more than the existing capacity of the channel.

Sufficient overland flow path should be identified up to 100 year ARI. Council should be consulted regarding this requirement.

If sufficient overland flow path is not available, then the required minimum size of the channel will be reassessed.

A detailed drainage study report will be required to determine items 2 to 4. This must be prepared by a suitably qualified hydraulic consultant. This report must include, but is not limited, to the following:

- Statement of any assumptions. Sydney Water Corporation states 65-80% impervious area to be adopted for Residential Properties and 80-100 % impervious area to be adopted for industrial /commercial properties.
- Details of the calculations and any computer modelling techniques.
- The runoff calculations must consider the entire catchment upstream of the subject section of the channel. Consideration must be given to the catchment downstream if it has the potential to impact the subject section due to the backwater effect.

- 100 year ARI flood levels should be determined.
 - Any overland flow paths must be identified and accounted for.
2. Prior to commencement of any design work, the drainage report is to be forwarded to Sydney Water for review and the required minimum size of the channel should be finalised.

Change in Direction

Minimum of 6m radius should be maintained when making the change of direction.

Transition Section

Appropriate transition section must be provided at the upstream and downstream end of the proposed deviation.

If the proposed work required you to enter into the adjoining property then it is your responsibility to obtain necessary approval from the adjoining property owners.

Project Management, Design and Construction

Once the flood study is determined satisfactory, a Sydney Water accredited Water Servicing Coordinator should carry out the project management of the proposed work. Further details regarding this process can be obtained from Water Servicing Coordinators.

Dilapidation survey (or Close Circuit Television by an accredited process (sewrat)) to determine structural condition to be carried out just upstream and downstream of the channel prior to commencement of any construction work. This survey to be carried out upon completion of the work.

3. An easement is to be created over the deviated channel, if the channel is located in private property. Developer is responsible for all costs associated with this process
4. For Occupational Health and Safety aspects, access chambers shall be installed at most every fifty (50) meters of the channel. The access points shall have suitable secured covers to prevent unauthorised access into the channel to Sydney Water Corporation's standards.

Con't ...

Other Things You May Need To Do

The following items may also be a requirement of Sydney Water because of the impact of your proposed development on our assets.

Relinquishment of existing Sydney Water easements

Before Sydney Water can decide whether or not to give up an easement, one of our Group Property people will have to investigate. You will have to pay our staff member an hourly fee for this task.

We cannot agree to surrender an easement until, at the least, all of the following is done:

- (a) we decide that we will never need the easement;
 - (b) any redundant existing works within the easement are fixed so that they cannot be used anymore;
 - (c) you can create at the same time as the surrender, a new easement at no cost to Sydney Water, if necessary;
 - (d) you have paid our price for the easement;
 - (e) you have arranged to transfer all disused works to the property owner; and
 - (f) you have paid all our administration and legal costs, including a valuation.
- Further details may, again, be obtained from Sydney Water's Group Property, 5th Floor, 115-123 Bathurst Street, Sydney. 2000. Ph: (02) 9350 5670 or (02) 9350 5647.

Trade Waste Discharge Advice

Should this development generate trade wastewater, then this "Advice" letter does not guarantee the applicant that Sydney Water will accept the trade wastewater to its sewerage system. For further information please visit the Sydney Water website at, <http://www.sydneywater.com.au/OurSystemsAndOperations/Tradewaste/> or contact a Trade Waste Customer Service Representative on (02) 9551 4620.

Prospective Purchasers should be made aware of the above situation under the requirements of Vendor Disclosure.

Backflow Prevention Information

In accordance with Sydney Water's Backflow Prevention Policy, you may be required to install a backflow prevention containment device immediately downstream of each water meter servicing the property. The device must be installed as a condition of continued use of the water supply. Failure to install and maintain the device may result in disconnection of the water service. A copy of Sydney Water's Backflow Prevention Policy is available on the Sydney Water Website at, <http://www.sydneywater.com.au/BuildingDevelopingandPlumbing/BackflowPrevention>

Ancillary Matters

Entry onto Neighbouring Properties

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

Costs

Construction of additional water and/or wastewater and/or stormwater works will require you to pay project management, survey, design and construction costs **directly to your suppliers**. Additional costs payable to Sydney Water may include:

- water main shutdown and disinfection;
- connection of new water mains to Sydney Water system(s);
- design and construction audit fees;
- **contract administration, Operations Area Charge & Customer Redress prior to project finalisation;**
- creation or alteration of easements etc.; and
- water usage charges where water has been supplied for building activity purposes prior to disinfection of a newly constructed water main.

Payment for any Goods and Services (including Customer Redress) provided by Sydney Water will be required prior to the eventual issue of the Section 73 Certificate or release of the Bank Guarantee or Cash Bond

Stamping and Approval of Building Plans

You must have your building plans eventually stamped and approved **before the Certificate can be finally issued. In any case, building construction work MUST NOT commence until Sydney Water has granted approval.** Approval is needed because construction/building works may affect Sydney Water's assets (e.g. water and sewer mains).

Your Coordinator can tell you about the approval process including:

- Your provision, if required, of a "Services Protection Report" (also known as a "pegout"). This is needed to check whether the building and engineering plans show accurately where Sydney Water's assets are located in relation to your proposed building work. Your Coordinator will then either approve the plans or make requirements to protect those assets before approving the plans;
- Possible requirements;
- Costs; and
- Timeframes.

You can also find information about this process (including technical specifications) if you either:

- visit www.sydneywater.com.au ➤ Building and Developing ➤ Building and Renovating. Here you can find Sydney Water's *Guidelines for Building Over/Adjacent to Sydney Water Assets*; or
- call 13 20 92.

Notes:

- The Certificate will not be issued until the plans have been approved and, if required, Sydney Water's assets are altered or deviated;
- You can only remove, deviate or replace any of Sydney Water's pipes using temporary pipework if you have written approval from Sydney Water's Development Operations Branch. You must engage your Coordinator to arrange this approval; and
- You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

END

Appendix F

Sample Flood Evacuation Plan

Clemton Park Village Flood Emergency and Evacuation Plan

Purpose

- This plan covers the necessary measures and the conduct of response operations for Cup and Saucer Creek flooding in the vicinity of the Clemton Park Village.
- The plan covers operations for staff and residents in times of flood, and outlines protocols so that emergency response measures can be implemented, and minimise the potential for flood damage and inconvenience to staff and residents.

Objective

- To ensure that individuals within the Clemton Park Village are not left stranded during flooding.
- To ensure that potential flood damage to property and personal injury within the Clemton Park Village is minimised.

Areas Covered By the Plan

- The area covered by the plan is limited to the affected areas of Clemton Park Village.

Preparedness

Staff and Management Education:

- Management and staff are to be made aware of this Flood Emergency and Evacuation Plan (*FEEP*). The FEEP plan is to be provided to all staff and residents along with a copy of the SES's *Business FloodSafe Toolkit*.
- A permanent senior member of the management team is to be elected as Site Flood Controller and is to be entrusted with the responsibility of directing flood monitoring activities, damage minimisation measures and dissemination of evacuation warnings, as required.
- All new management and staff members are to be introduced to the FEEP as part of their induction by the Site Flood Controller and made aware of the protocols to be employed during a flood.

Activation:

- This Plan is to be activated by the Site Flood Controller on receipt or knowledge of a Bureau of Meteorology Flood Watch, or Flood Warning as conveyed on local radio, television networks or the Bureau of Meteorology's web page.
- The Site Flood Controller is to carry-out the following tasks once the FEEP is activated:

- Listen to local radio stations for SES Flood Bulletins;
- Maintain contact with the SES Headquarters to confirm flood advice as required.
- Using the information gathered, determine appropriate times for site evacuation.

Deployment

- Deployment of the Plan shall proceed when SES Flood Bulletins or in-house interpretation of data by the Site Flood Controller, indicate that the flood peak is expected to exceed an established level to be agreed with the SES.
- The Site Flood Controller is to advise all staff and residents of the time for evacuation to commence, and to update them of any changes according to revised flood height and timing predictions by SES.

Recovery

- No member of the staff should return to the precinct until it is declared safe to do so by the SES and/or Site Flood Controller.

The Site Flood Controller is to undertake a visual audit of the precinct to ensure its suitability of occupation following the flood. The Site Flood Controller is to be vested with the responsibility of arranging cleaning and disinfection of those sections of the precinct subject to inundation.

Drawing List

Drawing No.C000 – Cover Sheet and Drawing List
Drawing No.C001 – Notes and Legend
Drawing No.C002 – General Arrangement Plan
Drawing No.C003 – Site Works Details
Drawing No.C004 – Stormwater Details
Drawing No.C010 – Erosion and Sediment Control Plan and Details
Drawing No.C025 – Siteworks and Stormwater Drainage Plan - Sheet 1
Drawing No.C026 – Siteworks and Stormwater Drainage Plan - Sheet 2
Drawing No.C027 – Siteworks and Stormwater Drainage Plan - Sheet 3
Drawing No.C028 – Siteworks and Stormwater Drainage Plan - Sheet 4
Drawing No.C045 – Stormwater Longitudinal Sections - Sheet 1
Drawing No.C046 – Stormwater Longitudinal Sections - Sheet 2
Drawing No.C047 – Stormwater Longitudinal Sections - Sheet 3
Drawing No.C065 – Catchment Plan