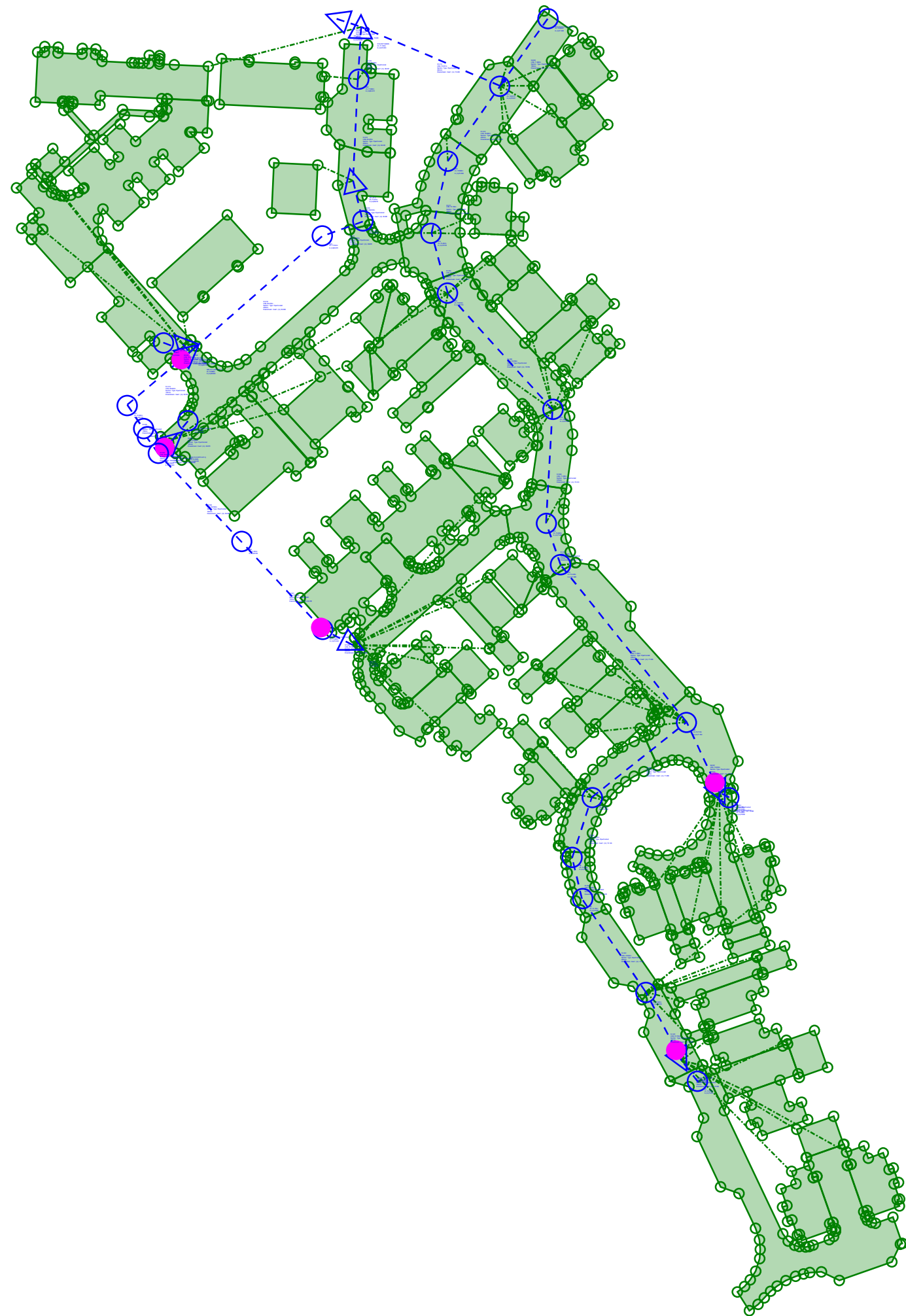




STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model											
Return Period (years)		5		Maximum Time of Concentration (mins)		30		Maximum Backdrop Height (m)		0.000	
				Foul Sewage (l/s/ha)		0.000		Min Design Depth for Optimisation (m)		1.200	
FEH Rainfall Version		2013		Volumetric Runoff Coeff.		0.750		Min Vel for Auto Design only (m/s)		1.00	
Site Location		GB 483380 168600 SU 83380 68600		PIMP (%)		100		Min Slope for Optimisation (1:X)		500	
Data Type		Point		Add Flow / Climate Change (%)		6					
Maximum Rainfall (mm/hr)		250		Minimum Backdrop Height (m)		1.000					

Designed with Level Soffits

Time Area Diagram for Storm at outfall SOUT1 (pipe S1.020)

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.244	4-8	0.558	8-12	0.085

Total Area Contributing (ha) = 0.887

Total Pipe Volume (m³) = 46.978

Time Area Diagram at outfall SOUT2 (pipe S7.003)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.209	4-8	0.086

Total Area Contributing (ha) = 0.294

Total Pipe Volume (m³) = 0.807

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	5.674	0.432	13.1	0.017	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	16.540	0.162	101.9	0.128	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	24.387	0.203	120.1	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	9.154	0.076	120.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	13.607	0.131	104.2	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	25.975	0.203	128.0	0.027	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	90.27	5.03	73.222	0.017	0.0	0.0	0.2	2.79	49.4	4.3
S1.001	88.28	5.28	72.790	0.000	2.0	0.0	0.1	1.00	17.6	2.0
S1.002	85.73	5.62	72.553	0.040	2.0	0.0	0.7	1.19	47.4	12.0
S1.003	84.83	5.75	72.350	0.040	2.0	0.0	0.7	1.19	47.4	12.0
S1.004	83.62	5.92	72.273	0.056	2.0	0.0	0.9	1.28	50.9	15.6
S1.005	81.59	6.23	72.068	0.084	2.0	0.0	1.2	1.39	98.1	21.7

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.000	2.205	0.038	58.0	0.000	5.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	16.811	0.935	18.0	0.058	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.006	43.513	0.125	348.0	0.062	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.007	9.429	0.200	47.1	0.052	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.008	24.609	0.551	44.7	0.012	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.009	33.864	0.085	396.8	0.089	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.010	13.371	0.033	401.0	0.050	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.011	15.958	0.040	401.0	0.026	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.012	19.687	0.049	401.0	0.020	0.00	0.0	0.600	o	450	Pipe/Conduit	
S3.000	17.890	0.203	88.1	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.013	32.619	0.431	75.7	0.047	0.00	0.0	0.600	o	450	Pipe/Conduit	
S4.000	5.417	0.050	108.3	0.000	5.00	0.0	0.600	oo	225	Double Pipe	
S1.014	11.348	0.028	405.3	0.033	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.015	21.793	0.054	401.4	0.044	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.016	9.046	0.023	401.4	0.024	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.017	9.340	0.023	401.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.018	37.961	0.182	208.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S5.000	2.487	0.050	49.7	0.092	5.00	0.0	0.600	o	300	Pipe/Conduit	
S6.000	6.038	0.310	19.5	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit	
S1.019	17.800	0.178	100.0	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.000	90.25	5.04	73.000	0.000	0.0	0.0	0.0	1.01	8.0	0.0
S2.001	89.56	5.12	72.950	0.000	1.5	0.0	0.1	2.39	42.2	1.5
S1.006	77.17	6.99	71.790	0.146	3.5	0.0	2.0	0.97	106.6	36.0
S1.007	76.84	7.05	71.665	0.198	3.5	0.0	2.7	2.64	292.1	47.4
S1.008	76.03	7.20	71.465	0.210	3.5	0.0	2.8	2.72	300.2	49.6
S1.009	73.20	7.75	70.839	0.299	3.5	0.0	3.8	1.01	161.3	66.5
S1.010	72.15	7.97	70.753	0.349	3.5	0.0	4.3	1.01	160.5	75.9
S1.011	70.94	8.24	70.720	0.375	3.5	0.0	4.5	1.01	160.5	80.1
S1.012	69.50	8.56	70.680	0.395	3.5	0.0	4.7	1.01	160.5	82.5
S3.000	88.27	5.28	71.962	0.021	0.0	0.0	0.3	1.07	18.9	5.3
S1.013	68.52	8.79	70.631	0.463	3.5	0.0	5.4	2.34	372.0	94.9
S4.000	89.94	5.07	70.250	0.000	0.0	0.0	0.0	1.26	99.8	0.0
S1.014	67.75	8.98	70.000	0.496	3.5	0.0	5.7	1.00	159.6	100.3
S1.015	66.33	9.34	69.972	0.541	3.5	0.0	6.0	1.01	160.4	106.7
S1.016	65.76	9.49	69.918	0.565	3.5	0.0	6.2	1.01	160.4	110.4
S1.017	65.19	9.65	69.895	0.565	3.5	0.0	6.2	1.01	160.4	110.4
S1.018	63.57	10.10	69.872	0.565	3.5	0.0	6.2	1.40	223.3	110.4
S5.000	90.40	5.02	69.740	0.092	0.0	0.0	1.4	2.23	158.0	24.0
S6.000	90.07	5.06	70.000	0.005	0.0	0.0	0.1	1.76	13.8	1.3
S1.019	88.14	5.30	69.690	0.000	7.5	0.0	0.4	1.00	17.8	7.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.020	6.118	0.062	98.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🟢
S7.000	7.305	0.060	121.8	0.161	5.00	0.0	0.600	o	225	Pipe/Conduit	🟢
S7.001	25.765	0.258	99.9	0.022	0.00	0.0	0.600	o	100	Pipe/Conduit	🟢
S7.002	26.171	0.282	92.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	🟢
S8.000	5.175	0.430	12.0	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit	🟢
S8.001	4.330	0.070	61.9	0.107	0.00	0.0	0.600	o	100	Pipe/Conduit	🔴
S7.003	4.281	0.050	85.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	🟢

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.020	87.37	5.40	69.512	0.000	7.5	0.0	0.5	1.01	17.9	8.0
S7.000	89.68	5.10	70.100	0.161	0.0	0.0	2.3	1.18	47.1	41.3
S7.001	86.17	5.56	70.040	0.000	1.5	0.0	0.1	0.77	6.0	1.5
S7.002	82.42	6.10	69.782	0.000	1.5	0.0	0.1	0.80	6.3	1.6
S8.000	90.23	5.04	70.000	0.005	0.0	0.0	0.1	2.24	17.6	1.3
S8.001	89.93	5.07	69.570	0.000	1.5	0.0	0.1	0.98	7.7	1.5
S7.003	89.83	5.09	69.500	0.000	3.0	0.0	0.2	0.83	6.5	3.0

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
	S1	483406.818	168519.658		No Entry	
S2-FC5 (WITH PP 3)	483403.313	168524.119	483403.313	168524.119	Required	
S3	483395.688	168538.797	483395.688	168538.797	Required	
S4	483382.062	168559.022	483382.062	168559.022	Required	
S5	483379.796	168567.891	483379.796	168567.891	Required	
S6	483384.136	168580.787	483384.136	168580.787	Required	
S7	483413.587	168580.793			No Entry	
S8-FC4 (WITH PP 2)	483411.621	168581.791	483411.621	168581.791	Required	
S9	483404.438	168596.990	483404.438	168596.990	Required	
S10	483377.296	168631.000	483377.296	168631.000	Required	
S11	483374.239	168639.920	483374.239	168639.920	Required	
S12	483375.674	168664.487	483375.674	168664.487	Required	
S13	483352.902	168689.552	483352.902	168689.552	Required	
S14	483349.348	168702.442	483349.348	168702.442	Required	
S15	483352.950	168717.989	483352.950	168717.989	Required	
S16-Dummy Urb Creep	483374.587	168748.710	483374.587	168748.710	Required	
S17	483364.179	168734.160	483364.179	168734.160	Required	
S18-AT 5	483329.077	168748.779	483329.077	168748.779	Required	
S19-DET BASIN	483334.195	168747.005	483334.195	168747.005	Required	

Manhole Schedules for Storm						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S20	483333.779	168735.665	483333.779	168735.665	Required	
S21-AT 4	483332.471	168713.912	483332.471	168713.912	Required	
S22	483334.685	168705.140	483334.685	168705.140	Required	
S23	483325.924	168701.902	483325.924	168701.902	Required	
S24-PP 1	483295.709	168678.679	483295.709	168678.679	Required	
S25-Dummy Urb Creep	483291.684	168678.801	483291.684	168678.801	Required	
S26-FC1 (WITH AT 1)	483297.399	168676.854	483297.399	168676.854	Required	
S27	483283.836	168665.327	483283.836	168665.327	Required	
SOUT1	483287.399	168660.354			No Entry	
S28-AT 3	483332.535	168613.769	483332.535	168613.769	Required	
S29-FC3 (With Urb Creep)	483326.003	168617.041	483326.003	168617.041	Required	
S30	483308.563	168636.005	483308.563	168636.005	Required	
S31-Dummy Urb Creep	483296.954	168662.024	483296.954	168662.024	Required	
S32-FC2 (WITH AT 2)	483293.823	168657.904	483293.823	168657.904	Required	
S33	483290.588	168655.027	483290.588	168655.027	Required	
SOUT2	483288.214	168658.590			No Entry	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S2-FC5 (WITH PP 3)	S1 74.572	73.222	1.200	Junction	
S1.001	o	150		74.080	72.790	1.140	Open Manhole	1200
S1.002	o	225		S3 74.345	72.553	1.567	Open Manhole	1200
S1.003	o	225		S4 74.118	72.350	1.543	Open Manhole	1200
S1.004	o	225		S5 74.030	72.273	1.532	Open Manhole	1200
S1.005	o	300		S6 73.891	72.068	1.523	Open Manhole	1200
S2.000	o	100	S8-FC4 (WITH PP 2)	S7 73.925	73.000	0.825	Junction	
S2.001	o	150		73.925	72.950	0.825	Open Manhole	1200
S1.006	o	375		S9 73.714	71.790	1.549	Open Manhole	1350
S1.007	o	375		S10 73.240	71.665	1.200	Open Manhole	1350
S1.008	o	375		S11 73.040	71.465	1.200	Open Manhole	1350
S1.009	o	450		S12 72.800	70.839	1.511	Open Manhole	1350
S1.010	o	450		S13 72.403	70.753	1.200	Open Manhole	1350
S1.011	o	450		S14 72.402	70.720	1.232	Open Manhole	1350
S1.012	o	450		S15 72.588	70.680	1.458	Open Manhole	1350
S3.000	o	150	S16-Dummy Urb Creep	73.262	71.962	1.150	Open Manhole	250
S1.013	o	450		S17 72.921	70.631	1.840	Open Manhole	1350
S4.000	oo	225	S18-AT 5	71.100	70.250	0.625	Open Manhole	1350
S1.014	o	450	S19-DET BASIN	71.100	70.000	0.650	Open Manhole	1350
S1.015	o	450		S20 71.366	69.972	0.944	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	5.674	13.1	S2-FC5 (WITH PP 3)	74.080	72.790	1.140	Open Manhole	1200
S1.001	16.540	101.9		S3 74.345	72.628	1.567	Open Manhole	1200
S1.002	24.387	120.1		S4 74.118	72.350	1.543	Open Manhole	1200
S1.003	9.154	120.0		S5 74.030	72.273	1.532	Open Manhole	1200
S1.004	13.607	104.2		S6 73.891	72.143	1.523	Open Manhole	1200
S1.005	25.975	128.0		S9 73.714	71.865	1.549	Open Manhole	1350
S2.000	2.205	58.0	S8-FC4 (WITH PP 2)	73.925	72.962	0.863	Open Manhole	1200
S2.001	16.811	18.0		S9 73.714	72.015	1.549	Open Manhole	1350
S1.006	43.513	348.0		S10 73.240	71.665	1.200	Open Manhole	1350
S1.007	9.429	47.1		S11 73.040	71.465	1.200	Open Manhole	1350
S1.008	24.609	44.7		S12 72.800	70.914	1.511	Open Manhole	1350
S1.009	33.864	396.8		S13 72.403	70.753	1.200	Open Manhole	1350
S1.010	13.371	401.0		S14 72.402	70.720	1.232	Open Manhole	1350
S1.011	15.958	401.0		S15 72.588	70.680	1.458	Open Manhole	1350
S1.012	19.687	401.0		S17 72.921	70.631	1.840	Open Manhole	1350
S3.000	17.890	88.1		S17 72.921	71.759	1.012	Open Manhole	1350
S1.013	32.619	75.7	S19-DET BASIN	71.100	70.200	0.450	Open Manhole	1350
S4.000	5.417	108.3	S19-DET BASIN	71.100	70.200	0.675	Open Manhole	1350
S1.014	11.348	405.3		S20 71.366	69.972	0.944	Open Manhole	1350
S1.015	21.793	401.4	S21-AT 4	71.611	69.918	1.243	Open Manhole	1350

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.016	o	450	S21-AT 4	71.611	69.918	1.243	Open Manhole	1350
S1.017	o	450	S22	71.761	69.895	1.416	Open Manhole	1350
S1.018	o	450	S23	71.534	69.872	1.212	Open Manhole	1350
S5.000	o	300	S24-PP 1	70.860	69.740	0.820	Open Manhole	1200
S6.000	o	100	S25-Dummy Urb Creep	70.860	70.000	0.760	Open Manhole	250
S1.019	o	150	S26-FC1 (WITH AT 1)	70.860	69.690	1.020	Open Manhole	1350
S1.020	o	150	S27	70.000	69.512	0.338	Open Manhole	1200
S7.000	o	225	S28-AT 3	71.511	70.100	1.186	Open Manhole	1200
S7.001	o	100	S29-FC3 (With Urb Creep)	71.500	70.040	1.360	Open Manhole	1200
S7.002	o	100	S30	71.200	69.782	1.318	Open Manhole	1200
S8.000	o	100	S31-Dummy Urb Creep	70.650	70.000	0.550	Open Manhole	250
S8.001	o	100	S32-FC2 (WITH AT 2)	70.650	69.570	0.980	Open Manhole	1200
S7.003	o	100	S33	70.000	69.500	0.400	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.016	9.046	401.4	S22	71.761	69.895	1.416	Open Manhole	1350
S1.017	9.340	401.4	S23	71.534	69.872	1.212	Open Manhole	1350
S1.018	37.961	208.6	S26-FC1 (WITH AT 1)	70.860	69.690	0.720	Open Manhole	1350
S5.000	2.487	49.7	S26-FC1 (WITH AT 1)	70.860	69.690	0.870	Open Manhole	1350
S6.000	6.038	19.5	S26-FC1 (WITH AT 1)	70.860	69.690	1.070	Open Manhole	1350
S1.019	17.800	100.0	S27	70.000	69.512	0.338	Open Manhole	1200
S1.020	6.118	98.7	SOUT1	70.000	69.450	0.400	Open Manhole	0
S7.000	7.305	121.8	S29-FC3 (With Urb Creep)	71.500	70.040	1.235	Open Manhole	1200
S7.001	25.765	99.9	S30	71.200	69.782	1.318	Open Manhole	1200
S7.002	26.171	92.8	S33	70.000	69.500	0.400	Open Manhole	1200
S8.000	5.175	12.0	S32-FC2 (WITH AT 2)	70.650	69.570	0.980	Open Manhole	1200
S8.001	4.330	61.9	S33	70.000	69.500	0.400	Open Manhole	1200
S7.003	4.281	85.6	SOUT2	70.000	69.450	0.450	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.011	0.011	0.011
	User	-	100	0.005	0.005	0.017
1.001	User	-	100	0.002	0.002	0.002
	User	-	100	0.013	0.013	0.015
	User	-	100	0.009	0.009	0.024
	User	-	100	0.009	0.009	0.033
	User	-	100	0.067	0.067	0.100
	User	-	100	0.011	0.011	0.111
	User	-	100	0.005	0.005	0.116
	User	-	100	0.011	0.011	0.128
1.002	User	-	100	0.014	0.014	0.014
	User	-	100	0.001	0.001	0.015
	User	-	100	0.007	0.007	0.022
	User	-	100	0.001	0.001	0.023
	User	-	100	0.003	0.003	0.026
	User	-	100	0.001	0.001	0.027
	User	-	100	0.003	0.003	0.030
	User	-	100	0.001	0.001	0.031
	User	-	100	0.009	0.009	0.040
1.003	-	-	100	0.000	0.000	0.000
1.004	User	-	100	0.007	0.007	0.007
	User	-	100	0.009	0.009	0.016
1.005	User	-	100	0.010	0.010	0.010
	User	-	100	0.010	0.010	0.020
	User	-	100	0.005	0.005	0.025
	User	-	100	0.003	0.003	0.027
2.000	-	-	100	0.000	0.000	0.000
2.001	User	-	100	0.028	0.028	0.028
	User	-	100	0.008	0.008	0.036
	User	-	100	0.008	0.008	0.045
	User	-	100	0.008	0.008	0.052
	User	-	100	0.001	0.001	0.054
	User	-	100	0.003	0.003	0.057
	User	-	100	0.001	0.001	0.058
1.006	User	-	100	0.024	0.024	0.024
	User	-	100	0.008	0.008	0.033
	User	-	100	0.009	0.009	0.042
	User	-	100	0.005	0.005	0.047
	User	-	100	0.008	0.008	0.055
	User	-	100	0.004	0.004	0.059
	User	-	100	0.003	0.003	0.062
1.007	User	-	100	0.033	0.033	0.033
	User	-	100	0.018	0.018	0.051
	User	-	100	0.001	0.001	0.052
1.008	User	-	100	0.012	0.012	0.012
1.009	User	-	100	0.035	0.035	0.035
	User	-	100	0.008	0.008	0.043
	User	-	100	0.008	0.008	0.051
	User	-	100	0.004	0.004	0.056
	User	-	100	0.011	0.011	0.067
	User	-	100	0.009	0.009	0.076
	User	-	100	0.008	0.008	0.084
	User	-	100	0.004	0.004	0.087
	User	-	100	0.001	0.001	0.089
1.010	User	-	100	0.016	0.016	0.016
	User	-	100	0.005	0.005	0.020
	User	-	100	0.005	0.005	0.025
	User	-	100	0.003	0.003	0.028
	User	-	100	0.004	0.004	0.032
	User	-	100	0.012	0.012	0.043
	User	-	100	0.007	0.007	0.050
1.011	User	-	100	0.009	0.009	0.009

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.016	0.016	0.025
	User	-	100	0.001	0.001	0.026
1.012	User	-	100	0.020	0.020	0.020
3.000	-	-	100	0.021	0.021	0.021
1.013	User	-	100	0.010	0.010	0.010
	User	-	100	0.008	0.008	0.019
	User	-	100	0.007	0.007	0.026
	User	-	100	0.005	0.005	0.031
	User	-	100	0.004	0.004	0.035
	User	-	100	0.013	0.013	0.047
4.000	-	-	100	0.000	0.000	0.000
1.014	User	-	100	0.033	0.033	0.033
1.015	User	-	100	0.023	0.023	0.023
	User	-	100	0.021	0.021	0.044
1.016	User	-	100	0.014	0.014	0.014
	User	-	100	0.010	0.010	0.024
1.017	-	-	100	0.000	0.000	0.000
1.018	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.001	0.001	0.001
	User	-	100	0.060	0.060	0.061
	User	-	100	0.006	0.006	0.067
	User	-	100	0.002	0.002	0.069
	User	-	100	0.023	0.023	0.092
6.000	-	-	100	0.005	0.005	0.005
1.019	User	-	100	0.021	0.021	0.021
	User	-	100	0.001	0.001	0.022
1.020	-	-	100	0.000	0.000	0.000
7.000	User	-	100	0.006	0.006	0.006
	User	-	100	0.003	0.003	0.009
	User	-	100	0.005	0.005	0.014
	User	-	100	0.008	0.008	0.023
	User	-	100	0.032	0.032	0.055
	User	-	100	0.017	0.017	0.073
	User	-	100	0.062	0.062	0.135
	User	-	100	0.004	0.004	0.139
	User	-	100	0.006	0.006	0.145
	User	-	100	0.006	0.006	0.150
	User	-	100	0.001	0.001	0.151
	User	-	100	0.009	0.009	0.161
7.001	-	-	100	0.022	0.022	0.022
7.002	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.005	0.005	0.005
8.001	User	-	100	0.042	0.042	0.042
	User	-	100	0.004	0.004	0.047
	User	-	100	0.003	0.003	0.049
	User	-	100	0.017	0.017	0.066
	User	-	100	0.041	0.041	0.107
7.003	-	-	100	0.000	0.000	0.000
	Total			1.181	1.181	1.181

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.020	SOUT1	70.000	69.450	69.450	0	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S7.003	SOUT2	70.000	69.450	69.450	0	0

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S2-FC5 (WITH PP 3), DS/PN: S1.001, Volume (m³): 1.5

Unit Reference	MD-SHE-0068-1800-0700-1800	Objective	Minimise upstream storage	Invert Level (m)	72.790
Design Head (m)	0.700	Application	Surface	Minimum Outlet Pipe Diameter (mm)	100
Design Flow (l/s)	1.8	Sump Available	Yes	Suggested Manhole Diameter (mm)	1200
Flush-Flo™	Calculated	Diameter (mm)	68		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	1.8	Flush-Flo™	0.209	1.8	Kick-Flo®	0.450	1.5	Mean Flow over Head Range	-	1.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.6	0.400	1.6	0.800	1.9	1.400	2.5	2.000	2.9	2.600	3.3	4.000	4.0	5.500	4.7	7.000	5.2	8.500	5.7
0.200	1.8	0.500	1.5	1.000	2.1	1.600	2.6	2.200	3.0	3.000	3.5	4.500	4.2	6.000	4.8	7.500	5.4	9.000	5.9
0.300	1.8	0.600	1.7	1.200	2.3	1.800	2.8	2.400	3.2	3.500	3.8	5.000	4.5	6.500	5.0	8.000	5.6	9.500	6.1

Hydro-Brake® Optimum Manhole: S8-FC4 (WITH PP 2), DS/PN: S2.001, Volume (m³): 1.1

Unit Reference	MD-SHE-0047-1000-1000-1000	Objective	Minimise upstream storage	Invert Level (m)	72.950
Design Head (m)	1.000	Application	Surface	Minimum Outlet Pipe Diameter (mm)	75
Design Flow (l/s)	1.0	Sump Available	Yes	Suggested Manhole Diameter (mm)	1200
Flush-Flo™	Calculated	Diameter (mm)	47		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	1.0	Flush-Flo™	0.205	0.8	Kick-Flo®	0.415	0.7	Mean Flow over Head Range	-	0.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	0.400	0.7	0.800	0.9	1.400	1.2	2.000	1.4	2.600	1.5	4.000	1.9	5.500	2.2	7.000	2.4	8.500	2.7
0.200	0.8	0.500	0.7	1.000	1.0	1.600	1.2	2.200	1.4	3.000	1.6	4.500	2.0	6.000	2.3	7.500	2.5	9.000	2.7
0.300	0.8	0.600	0.8	1.200	1.1	1.800	1.3	2.400	1.5	3.500	1.8	5.000	2.1	6.500	2.3	8.000	2.6	9.500	2.8

Hydro-Brake® Optimum Manhole: S26-FC1 (WITH AT 1), DS/PN: S1.019, Volume (m³): 7.6

Unit Reference	MD-SHE-0125-7500-1190-7500	Objective	Minimise upstream storage	Invert Level (m)	69.690
Design Head (m)	1.190	Application	Surface	Minimum Outlet Pipe Diameter (mm)	150
Design Flow (l/s)	7.5	Sump Available	Yes	Suggested Manhole Diameter (mm)	1200
Flush-Flo™	Calculated	Diameter (mm)	125		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.190	7.5	Flush-Flo™	0.352	7.5	Kick-Flo®	0.757	6.1	Mean Flow over Head Range	-	6.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.5	0.400	7.5	0.800	6.2	1.400	8.1	2.000	9.6	2.600	10.8	4.000	13.3	5.500	15.5	7.000	17.4	8.500	19.1
0.200	7.1	0.500	7.3	1.000	6.9	1.600	8.6	2.200	10.0	3.000	11.6	4.500	14.1	6.000	16.1	7.500	18.0	9.000	19.6
0.300	7.5	0.600	7.1	1.200	7.5	1.800	9.1	2.400	10.4	3.500	12.5	5.000	14.8	6.500	16.8	8.000	18.5	9.500	20.1

Hydro-Brake® Optimum Manhole: S29-FC3 (With Urb Creep), DS/PN: S7.001, Volume (m³): 1.9

Unit Reference	MD-SHE-0057-1500-1050-1500	Objective	Minimise upstream storage	Invert Level (m)	70.040
Design Head (m)	1.050	Application	Surface	Minimum Outlet Pipe Diameter (mm)	75
Design Flow (l/s)	1.5	Sump Available	Yes	Suggested Manhole Diameter (mm)	1200
Flush-Flo™	Calculated	Diameter (mm)	57		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.050	1.5	Flush-Flo™	0.251	1.3	Kick-Flo®	0.510	1.1	Mean Flow over Head Range	-	1.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.2	0.400	1.3	0.800	1.3	1.400	1.7	2.000	2.0	2.600	2.3	4.000	2.8	5.500	3.2	7.000	3.6	8.500	3.9
0.200	1.3	0.500	1.1	1.000	1.5	1.600	1.8	2.200	2.1	3.000	2.4	4.500	2.9	6.000	3.3	7.500	3.7	9.000	4.0
0.300	1.3	0.600	1.2	1.200	1.6	1.800	1.9	2.400	2.2	3.500	2.6	5.000	3.1	6.500	3.5	8.000	3.8	9.500	4.1

Hydro-Brake® Optimum Manhole: S32-FC2 (WITH AT 2), DS/PN: S8.001, Volume (m³): 1.3

Unit Reference	MD-SHE-0063-1500-0630-1500	Objective	Minimise upstream storage	Invert Level (m)	69.570
Design Head (m)	0.630	Application	Surface	Minimum Outlet Pipe Diameter (mm)	100
Design Flow (l/s)	1.5	Sump Available	Yes	Suggested Manhole Diameter (mm)	1200
Flush-Flo™	Calculated	Diameter (mm)	63		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.630	1.5	Flush-Flo™	0.191	1.5	Kick-Flo®	0.411	1.2	Mean Flow over Head Range	-	1.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.4	0.400	1.3	0.800	1.7	1.400	2.2	2.000	2.5	2.600	2.9	4.000	3.5	5.500	4.1	7.000	4.5	8.500	5.0
0.200	1.5	0.500	1.4	1.000	1.8	1.600	2.3	2.200	2.6	3.000	3.1	4.500	3.7	6.000	4.2	7.500	4.7	9.000	5.2
0.300	1.5	0.600	1.5	1.200	2.0	1.800	2.4	2.400	2.8	3.500	3.3	5.000	3.9	6.500	4.4	8.000	4.9	9.500	5.3

Storage Structures for Storm

Porous Car Park Manhole: S2-FC5 (WITH PP 3), DS/PN: S1.001

Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0	Width (m)	5.5	Depression Storage (mm)	5
Membrane Percolation (mm/hr)	1000	Porosity	0.30	Length (m)	72.0	Evaporation (mm/day)	3
Max Percolation (l/s)	110.0	Invert Level (m)	72.790	Slope (1:X)	186.0	Membrane Depth (mm)	260

Porous Car Park Manhole: S8-FC4 (WITH PP 2), DS/PN: S2.001

Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0	Width (m)	6.0	Depression Storage (mm)	5
Membrane Percolation (mm/hr)	1000	Porosity	0.30	Length (m)	40.0	Evaporation (mm/day)	3
Max Percolation (l/s)	66.7	Invert Level (m)	72.950	Slope (1:X)	200.0	Membrane Depth (mm)	260

Cellular Storage Manhole: S18-AT 5, DS/PN: S4.000

Invert Level (m) 70.250 Infiltration Coefficient Base (m/hr) 0.00000 Infiltration Coefficient Side (m/hr) 0.00000 Safety Factor 2.0 Porosity 0.95

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	345.0	0.0	0.400	345.0	0.0	0.401	0.0	0.0

Tank or Pond Manhole: S19-DET BASIN, DS/PN: S1.014

Invert Level (m) 70.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	100.0	1.100	420.0

Cellular Storage Manhole: S21-AT 4, DS/PN: S1.016

Invert Level (m) 70.000 Infiltration Coefficient Base (m/hr) 0.00000 Infiltration Coefficient Side (m/hr) 0.00000 Safety Factor 2.0 Porosity 0.95

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	96.0	0.0	0.400	96.0	0.0	0.401	0.0	0.0

Porous Car Park Manhole: S24-PP 1, DS/PN: S5.000

Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0	Width (m)	8.5	Depression Storage (mm)	5
Membrane Percolation (mm/hr)	1000	Porosity	0.30	Length (m)	72.0	Evaporation (mm/day)	3
Max Percolation (l/s)	170.0	Invert Level (m)	69.800	Slope (1:X)	200.0	Membrane Depth (mm)	260

Cellular Storage Manhole: S26-FC1 (WITH AT 1), DS/PN: S1.019

Invert Level (m) 69.800 Infiltration Coefficient Base (m/hr) 0.00000 Infiltration Coefficient Side (m/hr) 0.00000 Safety Factor 2.0 Porosity 0.95

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	96.0	0.0	0.800	96.0	0.0	0.801	0.0	0.0

Cellular Storage Manhole: S28-AT 3, DS/PN: S7.000

Invert Level (m) 70.100 Infiltration Coefficient Base (m/hr) 0.00000 Infiltration Coefficient Side (m/hr) 0.00000 Safety Factor 2.0 Porosity 0.95

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	200.0	0.0	0.800	200.0	0.0	0.801	0.0	0.0

Cellular Storage Manhole: S32-FC2 (WITH AT 2), DS/PN: S8.001											
Invert Level (m) 69.600 Infiltration Coefficient Base (m/hr) 0.00000 Infiltration Coefficient Side (m/hr) 0.00000 Safety Factor 2.0 Porosity 0.95											
Depth (m)			Area (m²)			Inf. Area (m²)			Depth (m)		
0.000			172.0			0.0			0.600		

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria
Areal Reduction Factor 1.000 Hot Start Level (mm) 0 Foul Sewage per hectare (l/s) 0.000 MADD Factor * 10m³/ha Storage 2.000 Flow per Person per Day (l/per/day) 0.000
Hot Start (mins) 0 Manhole Headloss Coeff (Global) 0.500 Additional Flow - % of Total Flow 6.000 Inlet Coeffiecient 0.800
Number of Input Hydrographs 0 Number of Online Controls 5 Number of Offline Controls 0 Number of Storage Structures 9 Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details
Rainfall Model FEH Site Location GB 483380 168600 SU 83380 68600 Cv (Summer) 1.000
FEH Rainfall Version 2013 Data Type Point Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0 DTS Status OFF Inertia Status ON
Analysis Timestep 2.5 Second Increment (Extended) DVD Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440, 2160, 2880
Return Period(s) (years) 2, 30, 100
Climate Change (%) 40, 40, 40

			Water Surcharged Flooded									Maximum	Half Drain	Pipe		
PN	US/MH Name	Event	US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Overflow Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Velocity (m/s)	Time (mins)	Flow (l/s)	Status	
S1.000		S1 15 minute 2 year Summer I+40%	74.572	73.257	-0.115	0.000	0.12			0.030	2.235	1.6		5.1	OK*	
S1.001	S2-FC5 (WITH PP 3)	240 minute 2 year Winter I+40%	74.080	73.256	0.316	0.000	0.11			32.978	42.166	0.6	188	1.8	SURCHARGED	
S1.002		S3 15 minute 2 year Summer I+40%	74.345	72.634	-0.144	0.000	0.28			0.087	10.640	1.0		12.1	OK	
S1.003		S4 15 minute 2 year Summer I+40%	74.118	72.436	-0.139	0.000	0.31			0.159	10.576	0.9		12.1	OK	
S1.004		S5 15 minute 2 year Summer I+40%	74.030	72.368	-0.130	0.000	0.37			0.167	12.684	1.0		16.2	OK	
S1.005		S6 15 minute 2 year Summer I+40%	73.891	72.173	-0.195	0.000	0.26			0.115	16.284	1.1		23.1	OK	
S2.000		S7 15 minute 2 year Summer I+40%	73.925	73.100	0.000	0.000	0.00			0.117	-0.085	0.0		0.0	SURCHARGED*	
S2.001	S8-FC4 (WITH PP 2)	240 minute 2 year Summer I+40%	73.925	73.213	0.113	0.000	0.02			12.070	20.071	0.9	174	0.8	SURCHARGED	
S1.006		S9 15 minute 2 year Summer I+40%	73.714	71.956	-0.208	0.000	0.39			0.342	26.963	0.8		37.8	OK	
S1.007		S10 15 minute 2 year Summer I+40%	73.240	71.802	-0.237	0.000	0.29			0.922	33.870	1.4		50.1	OK	
S1.008		S11 15 minute 2 year Summer I+40%	73.040	71.580	-0.260	0.000	0.20			0.215	35.465	1.9		53.0	OK	
S1.009		S12 15 minute 2 year Summer I+40%	72.800	71.109	-0.179	0.000	0.51			0.591	47.189	0.8		71.4	OK	
S1.010		S13 15 minute 2 year Summer I+40%	72.403	71.056	-0.147	0.000	0.77			3.418	53.587	0.7		79.4	OK	
S1.011		S14 15 minute 2 year Summer I+40%	72.402	71.014	-0.156	0.000	0.76			1.471	56.916	0.8		83.9	OK	
S1.012		S15 15 minute 2 year Summer I+40%	72.588	70.954	-0.176	0.000	0.68			1.542	59.444	0.9		87.3	OK	
S3.000	S16-Dummy Urb Creep	15 minute 2 year Summer I+40%	73.262	72.025	-0.087	0.000	0.36			0.003	2.823	0.9		6.4	OK	
S1.013		S17 15 minute 2 year Summer I+40%	72.921	70.801	-0.280	0.000	0.30			0.889	68.536	1.8		98.1	OK	
S4.000	S18-AT 5	360 minute 2 year Winter I+40%	71.100	70.298	-0.177	0.000	0.03			15.859	-1.575	0.4	89	1.7	OK	
S1.014	S19-DET BASIN	360 minute 2 year Winter I+40%	71.100	70.312	-0.138	0.000	0.23			42.063	280.838	0.5		22.7	OK	
S1.015		S20 360 minute 2 year Winter I+40%	71.366	70.310	-0.112	0.000	0.19			1.542	299.274	0.5		24.6	OK	
S1.016	S21-AT 4	360 minute 2 year Winter I+40%	71.611	70.306	-0.062	0.000	0.21			31.030	297.644	0.4	396	20.0	OK	
S1.017		S22 360 minute 2 year Winter I+40%	71.761	70.304	-0.042	0.000	0.21			1.616	296.875	0.5		19.8	OK	
S1.018		S23 360 minute 2 year Winter I+40%	71.534	70.300	-0.021	0.000	0.10			1.722	295.906	0.7		19.4	OK	
S5.000	S24-PP 1	360 minute 2 year Winter I+40%	70.860	70.289	0.249	0.000	0.04			57.337	10.009	0.1	389	2.4	SURCHARGED	
S6.000	S25-Dummy Urb Creep	360 minute 2 year Winter I+40%	70.860	70.289	0.189	0.000	0.02			0.014	2.121	0.8		0.2	SURCHARGED	
S1.019	S26-FC1 (WITH AT 1)	360 minute 2 year Winter I+40%	70.860	70.289	0.449	0.000	0.45			51.335	283.502	1.0		7.5	SURCHARGED	
S1.020		S27 960 minute 2 year Winter I+40%	70.000	69.587	-0.075	0.000	0.50			0.115	465.811	0.8		7.5	OK	
S7.000	S28-AT 3	360 minute 2 year Winter I+40%	71.511	70.387	0.062	0.000	0.04			54.909	38.952	0.4		1.2	SURCHARGED	
S7.001	S29-FC3 (With Urb Creep)	360 minute 2 year Winter I+40%	71.500	70.386	0.246	0.000	0.22			0.629	47.828	0.6		1.3	SURCHARGED	
S7.002		S30 2160 minute 2 year Winter I+40%	71.200	69.813	-0.069	0.000	0.21			0.040	115.278	0.6		1.3	OK	
S8.000	S31-Dummy Urb Creep	15 minute 2 year Summer I+40%	70.650	70.021	-0.079	0.000	0.10			0.001	0.672	1.3		1.5	OK	
S8.001	S32-FC2 (WITH AT 2)	240 minute 2 year Summer I+40%	70.650	69.765	0.095	0.000	0.23			27.109	36.292	0.8	201	1.5	SURCHARGED	
S7.003		S33 15 minute 2 year Winter I+40%	70.000	69.549	-0.051	0.000	0.49			0.073	8.617	0.7		2.7	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria
Areal Reduction Factor 1.000 Hot Start Level (mm) 0 Foul Sewage per hectare (l/s) 0.000 MADD Factor * 10m³/ha Storage 2.000 Flow per Person per Day (l/per/day) 0.000
Hot Start (mins) 0 Manhole Headloss Coeff (Global) 0.500 Additional Flow - % of Total Flow 6.000 Inlet Coeffiecient 0.800
Number of Input Hydrographs 0 Number of Online Controls 5 Number of Offline Controls 0 Number of Storage Structures 9 Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details
Rainfall Model FEH Site Location GB 483380 168600 SU 83380 68600 Cv (Summer) 1.000
FEH Rainfall Version 2013 Data Type Point Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0 DTS Status OFF Inertia Status ON
Analysis Timestep 2.5 Second Increment (Extended) DVD Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440, 2160, 2880
Return Period(s) (years) 2, 30, 100
Climate Change (%) 40, 40, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

			Water Surcharged Flooded								Maximum Half Drain Pipe				
PN	US/MH Name	Event	US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap.	Overflow (l/s)	Overflow Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Velocity (m/s)	Time (mins)	Pipe Flow (l/s)	Status
S1.000		S1 960 minute 30 year Winter I+40%	74.572	73.372	0.000	0.000	0.02			0.251	15.708	1.2		0.7	SURCHARGED*
S1.001	S2-FC5 (WITH PP 3)	240 minute 30 year Winter I+40%	74.080	73.641	0.701	0.000	0.12			79.105	49.687	0.7		2.0	SURCHARGED
S1.002		S3 15 minute 30 year Summer I+40%	74.345	72.704	-0.074	0.000	0.78			0.205	17.943	1.2		34.2	OK
S1.003		S4 15 minute 30 year Summer I+40%	74.118	72.537	-0.038	0.000	0.83			0.550	17.883	1.1		32.4	OK
S1.004		S5 15 minute 30 year Summer I+40%	74.030	72.485	-0.014	0.000	1.00			0.480	22.942	1.3		44.3	OK
S1.005		S6 15 minute 30 year Summer I+40%	73.891	72.303	-0.065	0.000	0.73			0.452	31.522	1.3		64.5	OK
S2.000		S7 15 minute 30 year Summer I+40%	73.925	73.100	0.000	0.000	0.00			0.258	-0.231	0.0		0.0	SURCHARGED*
S2.001	S8-FC4 (WITH PP 2)	240 minute 30 year Winter I+40%	73.925	73.472	0.372	0.000	0.02			30.988	19.606	0.9		0.8	SURCHARGED
S1.006		S9 15 minute 30 year Summer I+40%	73.714	72.190	0.025	0.000	1.09			1.903	53.670	1.0		106.3	SURCHARGED
S1.007		S10 15 minute 30 year Summer I+40%	73.240	72.018	-0.022	0.000	0.78			4.188	70.145	1.7		136.2	OK
S1.008		S11 15 minute 30 year Summer I+40%	73.040	71.915	0.075	0.000	0.57			1.438	73.971	2.3		146.9	SURCHARGED
S1.009		S12 15 minute 30 year Summer I+40%	72.800	71.689	0.400	0.000	1.27			3.639	101.867	1.1		178.9	SURCHARGED
S1.010		S13 15 minute 30 year Summer I+40%	72.403	71.551	0.347	0.000	2.02			6.305	117.406	1.3		209.6	SURCHARGED
S1.011		S14 15 minute 30 year Summer I+40%	72.402	71.408	0.238	0.000	2.00			2.889	125.506	1.4		222.0	SURCHARGED
S1.012		S15 15 minute 30 year Summer I+40%	72.588	71.242	0.112	0.000	1.82			3.112	131.710	1.5		234.1	SURCHARGED
S3.000	S16-Dummy Urb Creep	15 minute 30 year Summer I+40%	73.262	72.070	-0.042	0.000	0.86			0.005	6.656	1.1		15.1	OK
S1.013		S17 15 minute 30 year Summer I+40%	72.921	70.955	-0.126	0.000	0.84			2.301	153.284	2.3		271.4	OK
S4.000	S18-AT 5	480 minute 30 year Winter I+40%	71.100	70.600	0.125	0.000	0.03			115.198	-71.796	0.0		1.6	SURCHARGED
S1.014	S19-DET BASIN	480 minute 30 year Winter I+40%	71.100	70.600	0.150	0.000	0.22			104.133	409.865	0.4		21.6	SURCHARGED
S1.015		S20 480 minute 30 year Winter I+40%	71.366	70.599	0.177	0.000	0.18			2.480	444.859	0.5		23.6	SURCHARGED
S1.016	S21-AT 4	480 minute 30 year Winter I+40%	71.611	70.596	0.229	0.000	0.23			40.726	424.601	0.4		21.2	SURCHARGED
S1.017		S22 480 minute 30 year Winter I+40%	71.761	70.595	0.250	0.000	0.22			2.219	422.531	0.4		21.2	SURCHARGED
S1.018		S23 480 minute 30 year Winter I+40%	71.534	70.593	0.272	0.000	0.11			2.297	420.286	0.7		21.0	SURCHARGED
S5.000	S24-PP 1	480 minute 30 year Winter I+40%	70.860	70.591	0.551	0.000	0.02			113.078	-15.138	0.1		1.0	FLOOD RISK
S6.000	S25-Dummy Urb Creep	480 minute 30 year Winter I+40%	70.860	70.591	0.491	0.000	0.03			0.029	4.154	0.7		0.4	FLOOD RISK
S1.019	S26-FC1 (WITH AT 1)	480 minute 30 year Winter I+40%	70.860	70.591	0.751	0.000	0.45			79.333	360.561	1.0		7.5	FLOOD RISK
S1.020		S27 1440 minute 30 year Winter I+40%	70.000	69.587	-0.075	0.000	0.50			0.115	881.724	0.8		7.5	OK
S7.000	S28-AT 3	480 minute 30 year Winter I+40%	71.511	70.730	0.405	0.000	0.04			120.387	47.698	0.4		1.2	SURCHARGED
S7.001	S29-FC3 (With Urb Creep)	480 minute 30 year Winter I+40%	71.500	70.729	0.589	0.000	0.22			1.016	65.321	0.6		1.3	SURCHARGED
S7.002		S30 2880 minute 30 year Winter I+40%	71.200	69.813	-0.069	0.000	0.21			0.040	204.664	0.6		1.3	OK
S8.000	S31-Dummy Urb Creep	15 minute 30 year Summer I+40%	70.650	70.033	-0.067	0.000	0.24			0.001	1.585	1.6		3.6	OK
S8.001	S32-FC2 (WITH AT 2)	240 minute 30 year Winter I+40%	70.650	69.996	0.326	0.000	0.23			65.252	36.052	0.8		1.5	SURCHARGED
S7.003		S33 2880 minute 30 year Summer I+40%	70.000	69.549	-0.051	0.000	0.49			0.073	330.248	0.7		2.7	OK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria
Areal Reduction Factor 1.000 Hot Start Level (mm) 0 Foul Sewage per hectare (l/s) 0.000 MADD Factor * 10m³/ha Storage 2.000 Flow per Person per Day (l/per/day) 0.000
Hot Start (mins) 0 Manhole Headloss Coeff (Global) 0.500 Additional Flow - % of Total Flow 6.000 Inlet Coeffiecient 0.800
Number of Input Hydrographs 0 Number of Online Controls 5 Number of Offline Controls 0 Number of Storage Structures 9 Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details
Rainfall Model FEH Site Location GB 483380 168600 SU 83380 68600 Cv (Summer) 1.000
FEH Rainfall Version 2013 Data Type Point Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0 DTS Status OFF Inertia Status ON
Analysis Timestep 2.5 Second Increment (Extended) DVD Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440, 2160, 2880
Return Period(s) (years) 2, 30, 100
Climate Change (%) 40, 40, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

			Water Surcharged Flooded								Maximum Half Drain Pipe				
PN	US/MH Name	Event	US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Overflow Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Velocity (m/s)	Time (mins)	Pipe Flow (l/s)	Status
S1.000		S1 15 minute 100 year Summer I+40%	74.572	73.372	0.000	0.000	0.37			0.197	6.511	2.2		15.1	SURCHARGED*
S1.001	S2-FC5 (WITH PP 3)	240 minute 100 year Winter I+40%	74.080	73.846	0.906	0.000	0.13			103.641	54.265	0.7		2.2	FLOOD RISK
S1.002		S3 15 minute 100 year Summer I+40%	74.345	73.074	0.296	0.000	0.91			0.855	21.889	1.2		39.5	SURCHARGED
S1.003		S4 15 minute 100 year Summer I+40%	74.118	72.938	0.364	0.000	0.87			1.582	21.826	1.0		33.8	SURCHARGED
S1.004		S5 15 minute 100 year Summer I+40%	74.030	72.815	0.317	0.000	1.06			0.924	28.295	1.2		47.1	SURCHARGED
S1.005		S6 15 minute 100 year Summer I+40%	73.891	72.681	0.313	0.000	0.78			1.181	39.249	1.3		68.5	SURCHARGED
S2.000		S7 15 minute 100 year Summer I+40%	73.925	73.100	0.000	0.000	0.00			0.324	-0.300	0.0		0.0	SURCHARGED*
S2.001	S8-FC4 (WITH PP 2)	240 minute 100 year Winter I+40%	73.925	73.606	0.506	0.000	0.02			40.816	21.271	0.9		0.8	SURCHARGED
S1.006		S9 15 minute 100 year Summer I+40%	73.714	72.567	0.402	0.000	1.16			2.990	66.723	1.0		113.2	SURCHARGED
S1.007		S10 15 minute 100 year Summer I+40%	73.240	72.410	0.370	0.000	0.89			5.716	87.776	1.7		155.4	SURCHARGED
S1.008		S11 15 minute 100 year Summer I+40%	73.040	72.241	0.402	0.000	0.63			1.997	92.668	2.2		161.9	SURCHARGED
S1.009		S12 15 minute 100 year Summer I+40%	72.800	72.032	0.744	0.000	1.58			4.270	128.335	1.5		222.2	SURCHARGED
S1.010		S13 15 minute 100 year Summer I+40%	72.403	71.792	0.588	0.000	2.46			6.650	148.211	1.6		255.3	SURCHARGED
S1.011		S14 15 minute 100 year Summer I+40%	72.402	71.567	0.397	0.000	2.45			3.117	158.592	1.7		271.9	SURCHARGED
S1.012		S15 15 minute 100 year Summer I+40%	72.588	71.321	0.191	0.000	2.20			3.233	166.572	1.8		282.3	SURCHARGED
S3.000	S16-Dummy Urb Creep	15 minute 100 year Summer I+40%	73.262	72.151	0.039	0.000	1.09			0.009	8.492	1.1		19.2	SURCHARGED
S1.013		S17 15 minute 100 year Summer I+40%	72.921	71.054	-0.027	0.000	1.00			3.138	194.118	2.3		323.0	OK
S4.000	S18-AT 5	480 minute 100 year Winter I+40%	71.100	70.870	0.395	0.000	0.03			132.090	-120.067	0.0		1.8	FLOOD RISK
S1.014	S19-DET BASIN	480 minute 100 year Winter I+40%	71.100	70.870	0.420	0.000	0.25			185.329	440.239	0.4		25.1	FLOOD RISK
S1.015		S20 480 minute 100 year Winter I+40%	71.366	70.869	0.447	0.000	0.22			2.867	484.198	0.5		28.6	SURCHARGED
S1.016	S21-AT 4	480 minute 100 year Winter I+40%	71.611	70.866	0.499	0.000	0.31			41.113	468.696	0.4		29.5	SURCHARGED
S1.017		S22 480 minute 100 year Winter I+40%	71.761	70.865	0.520	0.000	0.31			2.605	466.410	0.4		28.9	SURCHARGED
S1.018		S23 480 minute 100 year Winter I+40%	71.534	70.863	0.541	0.000	0.14			2.683	463.905	0.7		28.0	SURCHARGED
S5.000	S24-PP 1	480 minute 100 year Winter I+40%	70.860	70.860	0.820	0.000	0.03			145.573	-22.915	0.1		1.6	FLOOD RISK
S6.000	S25-Dummy Urb Creep	480 minute 100 year Winter I+40%	70.860	70.860	0.760	0.019	0.04			0.059	5.189	0.7		0.5	FLOOD
S1.019	S26-FC1 (WITH AT 1)	480 minute 100 year Winter I+40%	70.860	70.860	1.020	0.001	0.45			80.608	388.929	1.0		7.5	FLOOD
S1.020		S27 30 minute 100 year Winter I+40%	70.000	69.587	-0.075	0.000	0.50			0.115	21.305	0.8		7.5	OK
S7.000	S28-AT 3	480 minute 100 year Winter I+40%	71.511	71.317	0.992	0.000	0.04			153.435	50.058	0.4		1.5	FLOOD RISK
S7.001	S29-FC3 (With Urb Creep)	480 minute 100 year Winter I+40%	71.500	71.316	1.176	0.000	0.28			1.680	72.026	0.7		1.6	FLOOD RISK
S7.002		S30 480 minute 100 year Winter I+40%	71.200	69.817	-0.065	0.000	0.27			0.045	71.946	0.7		1.6	OK
S8.000	S31-Dummy Urb Creep	360 minute 100 year Winter I+40%	70.650	70.118	0.018	0.000	0.04			0.006	5.030	1.0		0.6	SURCHARGED
S8.001	S32-FC2 (WITH AT 2)	360 minute 100 year Winter I+40%	70.650	70.118	0.448	0.000	0.23			85.295	54.803	0.8		1.5	SURCHARGED
S7.003		S33 480 minute 100 year Winter I+40%	70.000	69.552	-0.048	0.000	0.54			0.078	145.212	0.7		3.0	OK