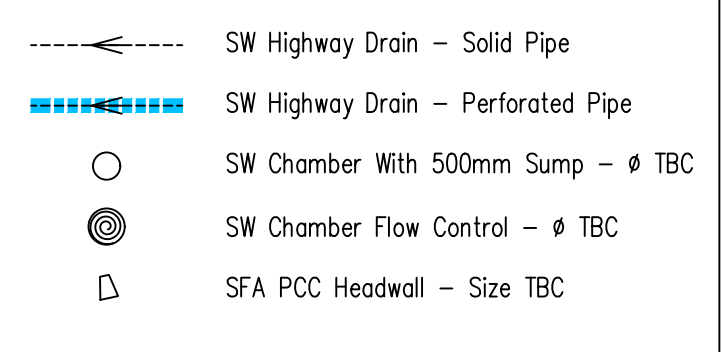
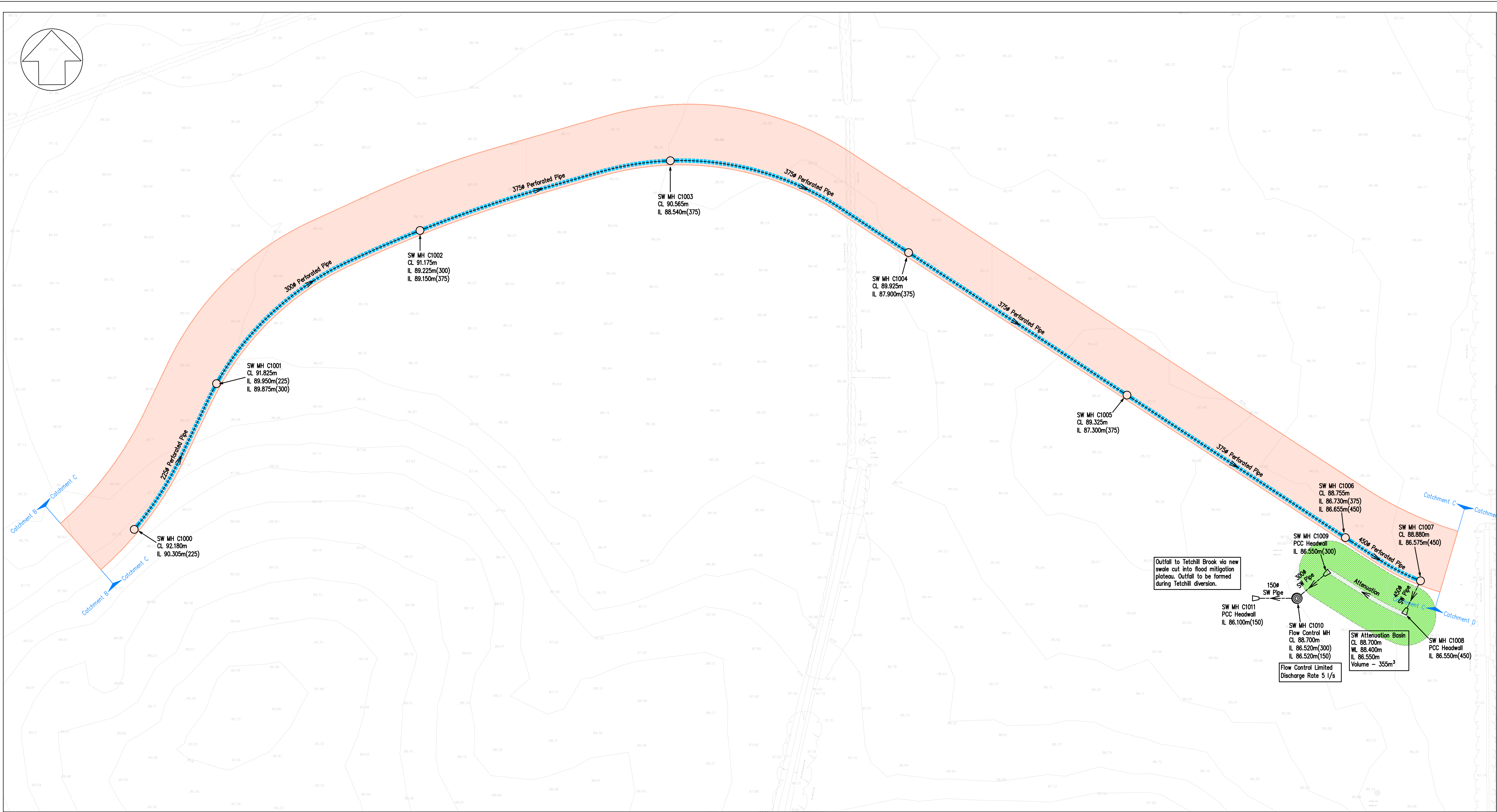
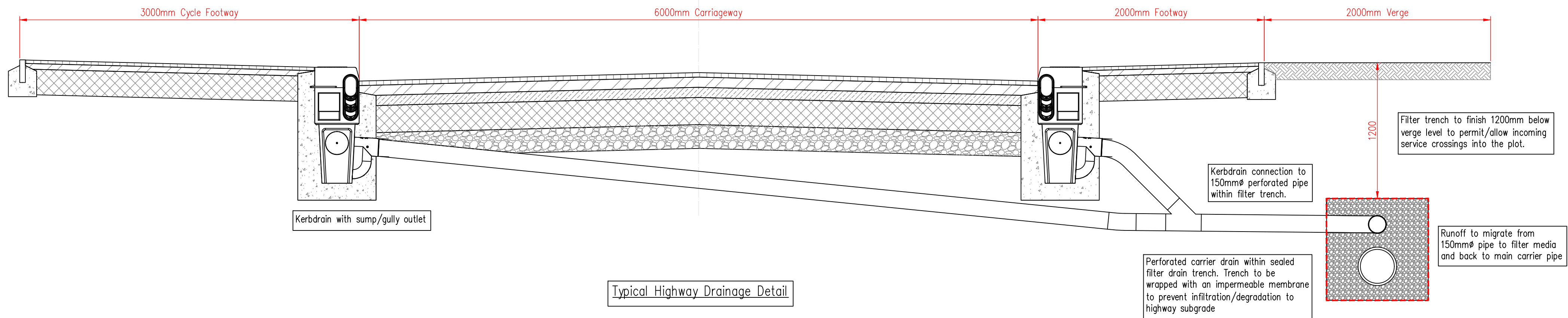
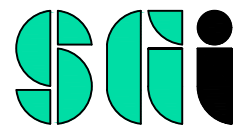


APPENDIX EI



- Drainage notes**
1. This drainage drawing is to be read in conjunction with all relevant Architect's, Engineer's drawings and specifications.
 2. Do not scale this drawing. Any ambiguities, omissions and errors on the drawings shall be brought to the Engineer's attention immediately. All dimensions must be checked and verified on site before construction commences.
 3. All external underground drainage works are to be constructed in accordance with the Civil Engineering Specification for the Water Industry 7th Edition (CSEWI) Sewers for Adoption 7th Edition (SFA), Shoprope Manual for Adoptable Roads & Transport (SMART) and any site-specific details provided on the contract drawings.
 4. The contractor must survey any retained drainage on-site and report the line, level and condition of the existing drainage to the engineer. We would recommend that the existing drainage is cleaned before any surveying and that these works are undertaken before the contractor commences on-site.
 5. Any redundant manholes are to be broken out to at least 600mm below formation level and backfilled with an approved compacted granular material.
 6. Any redundant pipes up to and including 300mm diameter are to be filled with a 10:1 PPA/cement mix or broken out and backfilled with an approved compacted granular material. Any redundant pipes over 300mm diameter are to be broken out and backfilled with an approved compacted granular material.
 7. Adoptable Drainage Pipes: Surface water pipes serving the adoptable highway are to be BBA HAPAS approved products that conform to Highways England's Standards and Specifications. Alternatively, surface water pipes up to and including 300mm diameter can be Verified Clay in accordance with BS EN 295-1. Pipes greater than 300mm diameter can be Concrete Class 120 in accordance with BS EN 1916:2002.
 8. All concrete manholes are to be in accordance with BS EN 1917. All plastic inspection chambers are to be in accordance with BS EN 13398.
 9. All solid pipes irrespective of the depth shall have a bed and surround of 150mm of concrete grade S14 concrete with sulphate resistant cement to SNI Clause 3002. In the case of hand-laid plastic pipes the Contractor shall ensure that the pipes do not float when the concrete is placed. To maintain a degree of flexibility a 13mm fibreboard (Flexcell or similar) shall be placed at each pipe joint to the full width of the surround.
 10. All perforated pipes are to be wrapped in a Nylon stocking and placed within an impermeable filter media trench. Refer to typical details for further information.
 11. All underground drainage must be protected during the construction phase where intermediate cover is less than 300mm.
 12. All cover levels shown are approximate only. All manhole covers are to be set at the proposed finished pavement level.
 13. For typical manhole construction details, pipe bedding/trench details and typical drainage details refer to SGI typical details drawing.
 14. The external gully connections and channel/verb drain connections are to be 150mm diameter unless otherwise stated. All gully and channel drain outlets to be trapped and roddable. All gully grating and frames shall be D400 with an anti-theft captive hinge and automatic lock as standard. All gully grates are to be installed to BS EN 12420:2015 with a minimum width of 450mm and a minimum wayleave of 500mm.
 15. All manhole covers located within the road areas shall be Class D400 (150mm deep) and must achieve a silence in operation performance i.e. double triangular cover system with continuous elastomer gasket.
 16. Covers within hard and soft landscaped areas with pedestrian traffic only shall be Class B125 150mm deep. Covers located within block/lab paving areas are to be recessed to suit the proposed paving and of the appropriate grade.
 17. All manhole covers shall feature visible, durable and integral markings required by BS EN 124 i.e. marked S.W. (Surface Water) or W. (Foul Water).
 18. Channels within Type 1 & 2 manholes must use pre-formed using clayware sections for pipes up to and including 300mm diameter. All manhole channels to be set at the appropriate level for the incoming and outgoing pipe gradients.
 19. All manholes connections to be formed at soffits to soffits unless otherwise stated. All internal branch connections to be made with sweep bends in the direction of flow in the main pipe.



Rev.	Description	Rev. by	Date
 Shepherd Gilmour Consulting Engineers 3rd Floor Phoenix House, 45 Cross Street, Manchester, M2 4JF T: 0161 837 1500 W: www.sginfrastructure.co.uk			
Client			
Formal Investments			
Architect			
Roberts Limbrick			
Project			
Canalside Development, Ellesmere			
Title			
Surface Water Strategy Preliminary Drainage - Highway C			
Date	22.02.2023	Drawn By	DOR
Size	A1	Checked By	DOR
Scale	1:2000	Approved By	DOR
Dwg. No.	C1581-SGI-ZZ-00-DR-C-0210		
	P2		

APPENDIX E2

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	38.517	0.355	108.5	0.054	2.50	0.0		0.075	→ ○ →		Filter Drain	🔴
1.001	59.845	0.650	92.1	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.002	59.923	0.610	98.2	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.003	59.749	0.640	93.4	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.004	60.000	0.600	100.0	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.005	60.001	0.570	105.3	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.006	19.954	0.080	249.4	0.030	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.007	9.991	0.025	399.6	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	🟡
1.008	19.654	0.001	19654.0	0.000	0.00	0.0		0.035	→_/		Pond/Tank	🔴
1.009	8.350	0.029	287.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	🟢
1.010	13.370	0.420	31.8	0.000	0.00	0.0	0.600		o	150	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)
1.000	0.00	1.00	90.305	0.054	0.0	0.0	0.0	0.21	44.2	0.0
1.001	0.00	1.00	89.875	0.126	0.0	0.0	0.0	0.25	63.0	0.0
1.002	0.00	1.00	89.150	0.198	0.0	0.0	0.0	0.26	79.2	0.0
1.003	0.00	1.00	88.540	0.270	0.0	0.0	0.0	0.27	81.3	0.0
1.004	0.00	1.00	87.900	0.342	0.0	0.0	0.0	0.26	78.5	0.0
1.005	0.00	1.00	87.300	0.414	0.0	0.0	0.0	0.26	76.5	0.0
1.006	0.00	1.00	86.655	0.444	0.0	0.0	0.0	0.18	63.8	0.0
1.007	0.00	1.00	86.575	0.444	0.0	0.0	0.0	1.01	160.8	0.0
1.008	0.00	1.00	86.550	0.444	0.0	0.0	0.0	0.13	2255.6	0.0
1.009	0.00	1.00	86.549	0.444	0.0	0.0	0.0	0.92	65.1	0.0
1.010	0.00	1.00	86.520	0.444	0.0	0.0	0.0	1.79	31.6	0.0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.054	0.054	0.054
1.001	-	-	100	0.072	0.072	0.072
1.002	-	-	100	0.072	0.072	0.072
1.003	-	-	100	0.072	0.072	0.072
1.004	-	-	100	0.072	0.072	0.072
1.005	-	-	100	0.072	0.072	0.072
1.006	-	-	100	0.030	0.030	0.030
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.444	0.444	0.444

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)
1.010	C1011	88.700	86.100	0.000	0	0

Online Controls for Storm

Hydro-Brake® Optimum Manhole: C1010, DS/PN: 1.010, Volume (m³): 3.0

Unit Reference	MD-SCU-0059-5000-1880-5000
Design Head (m)	1.880
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	86.520
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.880	5.0	Kick-Flo®	0.090	1.3
Flush-Flo™	0.090	1.3	Mean Flow over Head Range	-	3.4

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)
0.100	1.3	0.800	3.4	2.000	5.1	4.000	7.1	7.000	9.3
0.200	1.8	1.000	3.7	2.200	5.4	4.500	7.6	7.500	9.6
0.300	2.1	1.200	4.1	2.400	5.6	5.000	7.9	8.000	9.9
0.400	2.4	1.400	4.4	2.600	5.8	5.500	8.3	8.500	10.2
0.500	2.7	1.600	4.6	3.000	6.2	6.000	8.7	9.000	10.5
0.600	2.9	1.800	4.9	3.500	6.7	6.500	9.0	9.500	10.8

Filter Drain Pipe: 1.006

Manning's N	0.075	Trench Length (m)	20.0
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.450
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	249.4
Invert Level (m)	86.655	Cap Volume Depth (m)	0.900
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Tank or Pond Pipe: 1.008

Manning's N 0.035 Invert Level (m) 86.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	21.0	1.850	360.0	1.851	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	8	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013 Cv	(Summer)	1.000
Site Location	GB 339198 334094 SJ 39198 34094 Cv	(Winter)	1.000

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	C1000	15 Summer	2	+0%	100/15 Summer				90.497	-0.483	0.000
1.001	C1001	15 Summer	2	+0%	100/15 Summer				90.064	-0.561	0.000
1.002	C1002	30 Summer	2	+0%	100/30 Summer				89.330	-0.645	0.000
1.003	C1003	30 Summer	2	+0%	100/30 Summer				88.720	-0.645	0.000
1.004	C1004	120 Summer	2	+0%	100/30 Summer				88.088	-0.637	0.000
1.005	C1005	120 Summer	2	+0%	100/30 Summer				87.500	-0.625	0.000
1.006	C1006	360 Summer	2	+0%	30/60 Summer				87.197	-0.358	0.000
1.007	C1007	360 Summer	2	+0%	2/60 Summer				87.193	0.168	0.000
1.008	C1008	360 Summer	2	+0%					87.193	-1.207	0.000
1.009	C1009	360 Summer	2	+0%	2/15 Summer				87.193	0.344	0.000
1.010	C1010	360 Winter	2	+0%	2/15 Summer				87.264	0.594	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	C1000	0.25		3	11.0	OK	
1.001	C1001	0.27		6	17.0	OK	
1.002	C1002	0.23		8	18.3	OK	
1.003	C1003	0.23		9	19.0	OK	
1.004	C1004	0.26		19	20.0	OK	
1.005	C1005	0.28		24	21.7	OK	
1.006	C1006	0.24		207	15.0	OK	
1.007	C1007	0.14			13.8	SURCHARGED	
1.008	C1008	0.00			13.3	OK	
1.009	C1009	0.11			5.2	SURCHARGED	
1.010	C1010	0.11			3.1	SURCHARGED	



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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

 Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	C1000	15 Summer	5	+0%	100/15 Summer				90.564	-0.416	0.000
1.001	C1001	15 Summer	5	+0%	100/15 Summer				90.112	-0.513	0.000
1.002	C1002	30 Summer	5	+0%	100/30 Summer				89.375	-0.600	0.000
1.003	C1003	30 Summer	5	+0%	100/30 Summer				88.765	-0.600	0.000
1.004	C1004	60 Summer	5	+0%	100/30 Summer				88.133	-0.592	0.000
1.005	C1005	60 Winter	5	+0%	100/30 Summer				87.546	-0.579	0.000
1.006	C1006	240 Winter	5	+0%	30/60 Summer				87.335	-0.220	0.000
1.007	C1007	240 Winter	5	+0%	2/60 Summer				87.332	0.307	0.000
1.008	C1008	240 Winter	5	+0%					87.331	-1.069	0.000
1.009	C1009	240 Winter	5	+0%	2/15 Summer				87.331	0.482	0.000
1.010	C1010	240 Winter	5	+0%	2/15 Summer				87.399	0.729	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	C1000	0.35		3	15.4	OK	
1.001	C1001	0.38		6	23.8	OK	
1.002	C1002	0.33		8	26.2	OK	
1.003	C1003	0.34		9	27.3	OK	
1.004	C1004	0.36		14	28.4	OK	
1.005	C1005	0.39		22	30.1	OK	
1.006	C1006	0.29		216	18.7	OK	
1.007	C1007	0.18			17.5	SURCHARGED	
1.008	C1008	0.00			17.2	OK	
1.009	C1009	0.11			5.3	SURCHARGED	
1.010	C1010	0.12			3.4	SURCHARGED	

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

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Storage Structures	8
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 339198 334094 SJ 39198 34094	Cv (Winter)	1.000
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5	Second Increment (Extended)	
DTS Status			ON
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440		
Return Period(s) (years)			2, 5, 30, 100
Climate Change (%)			0, 0, 0, 45

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

									Water	Surcharged	Flooded
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	C1000	15 Summer	30	+0%	100/15 Summer				90.788	-0.192	0.000
1.001	C1001	15 Summer	30	+0%	100/15 Summer				90.319	-0.306	0.000
1.002	C1002	30 Summer	30	+0%	100/30 Summer				89.493	-0.482	0.000
1.003	C1003	60 Summer	30	+0%	100/30 Summer				88.885	-0.480	0.000
1.004	C1004	60 Winter	30	+0%	100/30 Summer				88.297	-0.428	0.000
1.005	C1005	60 Summer	30	+0%	100/30 Summer				87.741	-0.384	0.000
1.006	C1006	240 Winter	30	+0%	30/60 Summer				87.680	0.125	0.000
1.007	C1007	240 Winter	30	+0%	2/60 Summer				87.676	0.651	0.000
1.008	C1008	240 Winter	30	+0%					87.675	-0.725	0.000
1.009	C1009	240 Winter	30	+0%	2/15 Summer				87.675	0.826	0.000
1.010	C1010	240 Winter	30	+0%	2/15 Summer				87.741	1.071	0.000

		Half Drain Pipe				
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Level Exceeded
1.000	C1000	0.63		4	27.6	OK
1.001	C1001	0.68		5	43.0	OK
1.002	C1002	0.60		9	47.2	OK
1.003	C1003	0.61		13	49.8	OK
1.004	C1004	0.69		19	54.3	OK
1.005	C1005	0.75		24	57.0	OK
1.006	C1006	0.50			31.4	SURCHARGED
1.007	C1007	0.31			29.8	SURCHARGED
1.008	C1008	0.01			29.5	OK
1.009	C1009	0.12			5.9	SURCHARGED
1.010	C1010	0.14			4.0	SURCHARGED

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

Simulation Criteria

Areal Reduction Factor 1.000
Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0
MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0
Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500
Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0
Number of Offline Controls 0
Number of Time/Area Diagrams 0

Number of Online Controls 1
Number of Storage Structures 8
Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
Data Type Point

FEH Rainfall Version 2013 Cv (Summer) 1.000

Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

DVD Status OFF

Inertia Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 2, 5, 30, 100

Climate Change (%) 0, 0, 0, 45

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
									(m)	(m)	(m³)
1.000	C1000	15 Summer	100	+45%	100/15 Summer				91.343	0.363	0.000
1.001	C1001	60 Summer	100	+45%	100/15 Summer				91.074	0.449	0.000
1.002	C1002	60 Summer	100	+45%	100/30 Summer				90.812	0.837	0.000
1.003	C1003	60 Summer	100	+45%	100/30 Summer				90.368	1.003	0.000
1.004	C1004	60 Summer	100	+45%	100/30 Summer				89.658	0.933	0.000
1.005	C1005	60 Summer	100	+45%	100/30 Summer				88.742	0.617	0.000
1.006	C1006	360 Winter	100	+45%	30/60 Summer				88.307	0.752	0.000
1.007	C1007	360 Winter	100	+45%	2/60 Summer				88.301	1.276	0.000
1.008	C1008	360 Winter	100	+45%					88.300	-0.100	0.000
1.009	C1009	360 Winter	100	+45%	2/15 Summer				88.300	1.451	0.000
1.010	C1010	480 Winter	100	+45%	2/15 Summer				88.490	1.820	0.000

PN	US/MH Name	Flow / Cap.	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	C1000	1.21		53.2	SURCHARGED	
1.001	C1001	1.02		64.0	SURCHARGED	
1.002	C1002	0.98		77.2	SURCHARGED	
1.003	C1003	1.09		88.5	FLOOD RISK	
1.004	C1004	1.25		98.2	FLOOD RISK	
1.005	C1005	1.38		105.2	SURCHARGED	
1.006	C1006	0.70		44.5	SURCHARGED	
1.007	C1007	0.45		43.3	SURCHARGED	
1.008	C1008	0.01		43.1	FLOOD RISK	
1.009	C1009	0.17		8.4	FLOOD RISK	
1.010	C1010	0.17		4.9	FLOOD RISK	

APPENDIX E3

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	38.517	0.355	108.5	0.054	2.50	0.0		0.075	→ ○ →		Filter Drain	🔴
1.001	59.845	0.650	92.1	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.002	59.923	0.610	98.2	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.003	59.749	0.640	93.4	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.004	60.000	0.600	100.0	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.005	60.001	0.570	105.3	0.072	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.006	19.954	0.080	249.4	0.030	0.00	0.0		0.075	→ ○ →		Filter Drain	🔴
1.007	9.991	0.025	399.6	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	🟡
1.008	19.654	0.001	19654.0	0.000	0.00	0.0		0.035	→_/		Pond/Tank	🔴
1.009	8.350	0.029	287.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	🟢
1.010	13.370	0.420	31.8	0.000	0.00	0.0	0.600		o	150	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)
1.000	0.00	1.00	90.305	0.054	0.0	0.0	0.0	0.21	44.2	0.0
1.001	0.00	1.00	89.875	0.126	0.0	0.0	0.0	0.25	63.0	0.0
1.002	0.00	1.00	89.150	0.198	0.0	0.0	0.0	0.26	79.2	0.0
1.003	0.00	1.00	88.540	0.270	0.0	0.0	0.0	0.27	81.3	0.0
1.004	0.00	1.00	87.900	0.342	0.0	0.0	0.0	0.26	78.5	0.0
1.005	0.00	1.00	87.300	0.414	0.0	0.0	0.0	0.26	76.5	0.0
1.006	0.00	1.00	86.655	0.444	0.0	0.0	0.0	0.18	63.8	0.0
1.007	0.00	1.00	86.575	0.444	0.0	0.0	0.0	1.01	160.8	0.0
1.008	0.00	1.00	86.550	0.444	0.0	0.0	0.0	0.13	2255.6	0.0
1.009	0.00	1.00	86.549	0.444	0.0	0.0	0.0	0.92	65.1	0.0
1.010	0.00	1.00	86.520	0.444	0.0	0.0	0.0	1.79	31.6	0.0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.054	0.054	0.054
1.001	-	-	100	0.072	0.072	0.072
1.002	-	-	100	0.072	0.072	0.072
1.003	-	-	100	0.072	0.072	0.072
1.004	-	-	100	0.072	0.072	0.072
1.005	-	-	100	0.072	0.072	0.072
1.006	-	-	100	0.030	0.030	0.030
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.444	0.444	0.444

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.010	C1011	88.700	86.100	0.000	0	0
Datum (m) 86.100 Offset (mins) 0						

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.900	34	0.900	67	0.900	100	0.900	133	0.900	166	0.900	199	0.900	232	0.900
2	0.900	35	0.900	68	0.900	101	0.900	134	0.900	167	0.900	200	0.900	233	0.900
3	0.900	36	0.900	69	0.900	102	0.900	135	0.900	168	0.900	201	0.900	234	0.900
4	0.900	37	0.900	70	0.900	103	0.900	136	0.900	169	0.900	202	0.900	235	0.900
5	0.900	38	0.900	71	0.900	104	0.900	137	0.900	170	0.900	203	0.900	236	0.900
6	0.900	39	0.900	72	0.900	105	0.900	138	0.900	171	0.900	204	0.900	237	0.900
7	0.900	40	0.900	73	0.900	106	0.900	139	0.900	172	0.900	205	0.900	238	0.900
8	0.900	41	0.900	74	0.900	107	0.900	140	0.900	173	0.900	206	0.900	239	0.900
9	0.900	42	0.900	75	0.900	108	0.900	141	0.900	174	0.900	207	0.900	240	0.900
10	0.900	43	0.900	76	0.900	109	0.900	142	0.900	175	0.900	208	0.900	241	0.900
11	0.900	44	0.900	77	0.900	110	0.900	143	0.900	176	0.900	209	0.900	242	0.900
12	0.900	45	0.900	78	0.900	111	0.900	144	0.900	177	0.900	210	0.900	243	0.900
13	0.900	46	0.900	79	0.900	112	0.900	145	0.900	178	0.900	211	0.900	244	0.900
14	0.900	47	0.900	80	0.900	113	0.900	146	0.900	179	0.900	212	0.900	245	0.900
15	0.900	48	0.900	81	0.900	114	0.900	147	0.900	180	0.900	213	0.900	246	0.900
16	0.900	49	0.900	82	0.900	115	0.900	148	0.900	181	0.900	214	0.900	247	0.900
17	0.900	50	0.900	83	0.900	116	0.900	149	0.900	182	0.900	215	0.900	248	0.900
18	0.900	51	0.900	84	0.900	117	0.900	150	0.900	183	0.900	216	0.900	249	0.900
19	0.900	52	0.900	85	0.900	118	0.900	151	0.900	184	0.900	217	0.900	250	0.900
20	0.900	53	0.900	86	0.900	119	0.900	152	0.900	185	0.900	218	0.900	251	0.900
21	0.900	54	0.900	87	0.900	120	0.900	153	0.900	186	0.900	219	0.900	252	0.900
22	0.900	55	0.900	88	0.900	121	0.900	154	0.900	187	0.900	220	0.900	253	0.900
23	0.900	56	0.900	89	0.900	122	0.900	155	0.900	188	0.900	221	0.900	254	0.900
24	0.900	57	0.900	90	0.900	123	0.900	156	0.900	189	0.900	222	0.900	255	0.900
25	0.900	58	0.900	91	0.900	124	0.900	157	0.900	190	0.900	223	0.900	256	0.900
26	0.900	59	0.900	92	0.900	125	0.900	158	0.900	191	0.900	224	0.900	257	0.900
27	0.900	60	0.900	93	0.900	126	0.900	159	0.900	192	0.900	225	0.900	258	0.900
28	0.900	61	0.900	94	0.900	127	0.900	160	0.900	193	0.900	226	0.900	259	0.900
29	0.900	62	0.900	95	0.900	128	0.900	161	0.900	194	0.900	227	0.900	260	0.900
30	0.900	63	0.900	96	0.900	129	0.900	162	0.900	195	0.900	228	0.900	261	0.900
31	0.900	64	0.900	97	0.900	130	0.900	163	0.900	196	0.900	229	0.900	262	0.900
32	0.900	65	0.900	98	0.900	131	0.900	164	0.900	197	0.900	230	0.900	263	0.900
33	0.900	66	0.900	99	0.900	132	0.900	165	0.900	198	0.900	231	0.900	264	0.900

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
265	0.900	326	0.900	387	0.900	448	0.900	509	0.900	570	0.900	631	0.900	692	0.900
266	0.900	327	0.900	388	0.900	449	0.900	510	0.900	571	0.900	632	0.900	693	0.900
267	0.900	328	0.900	389	0.900	450	0.900	511	0.900	572	0.900	633	0.900	694	0.900
268	0.900	329	0.900	390	0.900	451	0.900	512	0.900	573	0.900	634	0.900	695	0.900
269	0.900	330	0.900	391	0.900	452	0.900	513	0.900	574	0.900	635	0.900	696	0.900
270	0.900	331	0.900	392	0.900	453	0.900	514	0.900	575	0.900	636	0.900	697	0.900
271	0.900	332	0.900	393	0.900	454	0.900	515	0.900	576	0.900	637	0.900	698	0.900
272	0.900	333	0.900	394	0.900	455	0.900	516	0.900	577	0.900	638	0.900	699	0.900
273	0.900	334	0.900	395	0.900	456	0.900	517	0.900	578	0.900	639	0.900	700	0.900
274	0.900	335	0.900	396	0.900	457	0.900	518	0.900	579	0.900	640	0.900	701	0.900
275	0.900	336	0.900	397	0.900	458	0.900	519	0.900	580	0.900	641	0.900	702	0.900
276	0.900	337	0.900	398	0.900	459	0.900	520	0.900	581	0.900	642	0.900	703	0.900
277	0.900	338	0.900	399	0.900	460	0.900	521	0.900	582	0.900	643	0.900	704	0.900
278	0.900	339	0.900	400	0.900	461	0.900	522	0.900	583	0.900	644	0.900	705	0.900
279	0.900	340	0.900	401	0.900	462	0.900	523	0.900	584	0.900	645	0.900	706	0.900
280	0.900	341	0.900	402	0.900	463	0.900	524	0.900	585	0.900	646	0.900	707	0.900
281	0.900	342	0.900	403	0.900	464	0.900	525	0.900	586	0.900	647	0.900	708	0.900
282	0.900	343	0.900	404	0.900	465	0.900	526	0.900	587	0.900	648	0.900	709	0.900
283	0.900	344	0.900	405	0.900	466	0.900	527	0.900	588	0.900	649	0.900	710	0.900
284	0.900	345	0.900	406	0.900	467	0.900	528	0.900	589	0.900	650	0.900	711	0.900
285	0.900	346	0.900	407	0.900	468	0.900	529	0.900	590	0.900	651	0.900	712	0.900
286	0.900	347	0.900	408	0.900	469	0.900	530	0.900	591	0.900	652	0.900	713	0.900
287	0.900	348	0.900	409	0.900	470	0.900	531	0.900	592	0.900	653	0.900	714	0.900
288	0.900	349	0.900	410	0.900	471	0.900	532	0.900	593	0.900	654	0.900	715	0.900
289	0.900	350	0.900	411	0.900	472	0.900	533	0.900	594	0.900	655	0.900	716	0.900
290	0.900	351	0.900	412	0.900	473	0.900	534	0.900	595	0.900	656	0.900	717	0.900
291	0.900	352	0.900	413	0.900	474	0.900	535	0.900	596	0.900	657	0.900	718	0.900
292	0.900	353	0.900	414	0.900	475	0.900	536	0.900	597	0.900	658	0.900	719	0.900
293	0.900	354	0.900	415	0.900	476	0.900	537	0.900	598	0.900	659	0.900	720	0.900
294	0.900	355	0.900	416	0.900	477	0.900	538	0.900	599	0.900	660	0.900	721	0.900
295	0.900	356	0.900	417	0.900	478	0.900	539	0.900	600	0.900	661	0.900	722	0.900
296	0.900	357	0.900	418	0.900	479	0.900	540	0.900	601	0.900	662	0.900	723	0.900
297	0.900	358	0.900	419	0.900	480	0.900	541	0.900	602	0.900	663	0.900	724	0.900
298	0.900	359	0.900	420	0.900	481	0.900	542	0.900	603	0.900	664	0.900	725	0.900
299	0.900	360	0.900	421	0.900	482	0.900	543	0.900	604	0.900	665	0.900	726	0.900
300	0.900	361	0.900	422	0.900	483	0.900	544	0.900	605	0.900	666	0.900	727	0.900
301	0.900	362	0.900	423	0.900	484	0.900	545	0.900	606	0.900	667	0.900	728	0.900
302	0.900	363	0.900	424	0.900	485	0.900	546	0.900	607	0.900	668	0.900	729	0.900
303	0.900	364	0.900	425	0.900	486	0.900	547	0.900	608	0.900	669	0.900	730	0.900
304	0.900	365	0.900	426	0.900	487	0.900	548	0.900	609	0.900	670	0.900	731	0.900
305	0.900	366	0.900	427	0.900	488	0.900	549	0.900	610	0.900	671	0.900	732	0.900
306	0.900	367	0.900	428	0.900	489	0.900	550	0.900	611	0.900	672	0.900	733	0.900
307	0.900	368	0.900	429	0.900	490	0.900	551	0.900	612	0.900	673	0.900	734	0.900
308	0.900	369	0.900	430	0.900	491	0.900	552	0.900	613	0.900	674	0.900	735	0.900
309	0.900	370	0.900	431	0.900	492	0.900	553	0.900	614	0.900	675	0.900	736	0.900
310	0.900	371	0.900	432	0.900	493	0.900	554	0.900	615	0.900	676	0.900	737	0.900
311	0.900	372	0.900	433	0.900	494	0.900	555	0.900	616	0.900	677	0.900	738	0.900
312	0.900	373	0.900	434	0.900	495	0.900	556	0.900	617	0.900	678	0.900	739	0.900
313	0.900	374	0.900	435	0.900	496	0.900	557	0.900	618	0.900	679	0.900	740	0.900
314	0.900	375	0.900	436	0.900	497	0.900	558	0.900	619	0.900	680	0.900	741	0.900
315	0.900	376	0.900	437	0.900	498	0.900	559	0.900	620	0.900	681	0.900	742	0.900
316	0.900	377	0.900	438	0.900	499	0.900	560	0.900	621	0.900	682	0.900	743	0.900
317	0.900	378	0.900	439	0.900	500	0.900	561	0.900	622	0.900	683	0.900	744	0.900
318	0.900	379	0.900	440	0.900	501	0.900	562	0.900	623	0.900	684	0.900	745	0.900
319	0.900	380	0.900	441	0.900	502	0.900	563	0.900	624	0.900	685	0.900	746	0.900
320	0.900	381	0.900	442	0.900	503	0.900	564	0.900	625	0.900	686	0.900	747	0.900
321	0.900	382	0.900	443	0.900	504	0.900	565	0.900	626	0.900	687	0.900	748	0.900
322	0.900	383	0.900	444	0.900	505	0.900	566	0.900	627	0.900	688	0.900	749	0.900
323	0.900	384	0.900	445	0.900	506	0.900	567	0.900	628	0.900	689	0.900	750	0.900
324	0.900	385	0.900	446	0.900	507	0.900	568	0.900	629	0.900	690	0.900	751	0.900
325	0.900	386	0.900	447	0.900	508	0.900	569	0.900	630	0.900	691	0.900	752	0.900

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
753	0.900	814	0.900	875	0.900	936	0.900	997	0.900	1058	0.900	1119	0.900	1180	0.900
754	0.900	815	0.900	876	0.900	937	0.900	998	0.900	1059	0.900	1120	0.900	1181	0.900
755	0.900	816	0.900	877	0.900	938	0.900	999	0.900	1060	0.900	1121	0.900	1182	0.900
756	0.900	817	0.900	878	0.900	939	0.900	1000	0.900	1061	0.900	1122	0.900	1183	0.900
757	0.900	818	0.900	879	0.900	940	0.900	1001	0.900	1062	0.900	1123	0.900	1184	0.900
758	0.900	819	0.900	880	0.900	941	0.900	1002	0.900	1063	0.900	1124	0.900	1185	0.900
759	0.900	820	0.900	881	0.900	942	0.900	1003	0.900	1064	0.900	1125	0.900	1186	0.900
760	0.900	821	0.900	882	0.900	943	0.900	1004	0.900	1065	0.900	1126	0.900	1187	0.900
761	0.900	822	0.900	883	0.900	944	0.900	1005	0.900	1066	0.900	1127	0.900	1188	0.900
762	0.900	823	0.900	884	0.900	945	0.900	1006	0.900	1067	0.900	1128	0.900	1189	0.900
763	0.900	824	0.900	885	0.900	946	0.900	1007	0.900	1068	0.900	1129	0.900	1190	0.900
764	0.900	825	0.900	886	0.900	947	0.900	1008	0.900	1069	0.900	1130	0.900	1191	0.900
765	0.900	826	0.900	887	0.900	948	0.900	1009	0.900	1070	0.900	1131	0.900	1192	0.900
766	0.900	827	0.900	888	0.900	949	0.900	1010	0.900	1071	0.900	1132	0.900	1193	0.900
767	0.900	828	0.900	889	0.900	950	0.900	1011	0.900	1072	0.900	1133	0.900	1194	0.900
768	0.900	829	0.900	890	0.900	951	0.900	1012	0.900	1073	0.900	1134	0.900	1195	0.900
769	0.900	830	0.900	891	0.900	952	0.900	1013	0.900	1074	0.900	1135	0.900	1196	0.900
770	0.900	831	0.900	892	0.900	953	0.900	1014	0.900	1075	0.900	1136	0.900	1197	0.900
771	0.900	832	0.900	893	0.900	954	0.900	1015	0.900	1076	0.900	1137	0.900	1198	0.900
772	0.900	833	0.900	894	0.900	955	0.900	1016	0.900	1077	0.900	1138	0.900	1199	0.900
773	0.900	834	0.900	895	0.900	956	0.900	1017	0.900	1078	0.900	1139	0.900	1200	0.900
774	0.900	835	0.900	896	0.900	957	0.900	1018	0.900	1079	0.900	1140	0.900	1201	0.900
775	0.900	836	0.900	897	0.900	958	0.900	1019	0.900	1080	0.900	1141	0.900	1202	0.900
776	0.900	837	0.900	898	0.900	959	0.900	1020	0.900	1081	0.900	1142	0.900	1203	0.900
777	0.900	838	0.900	899	0.900	960	0.900	1021	0.900	1082	0.900	1143	0.900	1204	0.900
778	0.900	839	0.900	900	0.900	961	0.900	1022	0.900	1083	0.900	1144	0.900	1205	0.900
779	0.900	840	0.900	901	0.900	962	0.900	1023	0.900	1084	0.900	1145	0.900	1206	0.900
780	0.900	841	0.900	902	0.900	963	0.900	1024	0.900	1085	0.900	1146	0.900	1207	0.900
781	0.900	842	0.900	903	0.900	964	0.900	1025	0.900	1086	0.900	1147	0.900	1208	0.900
782	0.900	843	0.900	904	0.900	965	0.900	1026	0.900	1087	0.900	1148	0.900	1209	0.900
783	0.900	844	0.900	905	0.900	966	0.900	1027	0.900	1088	0.900	1149	0.900	1210	0.900
784	0.900	845	0.900	906	0.900	967	0.900	1028	0.900	1089	0.900	1150	0.900	1211	0.900
785	0.900	846	0.900	907	0.900	968	0.900	1029	0.900	1090	0.900	1151	0.900	1212	0.900
786	0.900	847	0.900	908	0.900	969	0.900	1030	0.900	1091	0.900	1152	0.900	1213	0.900
787	0.900	848	0.900	909	0.900	970	0.900	1031	0.900	1092	0.900	1153	0.900	1214	0.900
788	0.900	849	0.900	910	0.900	971	0.900	1032	0.900	1093	0.900	1154	0.900	1215	0.900
789	0.900	850	0.900	911	0.900	972	0.900	1033	0.900	1094	0.900	1155	0.900	1216	0.900
790	0.900	851	0.900	912	0.900	973	0.900	1034	0.900	1095	0.900	1156	0.900	1217	0.900
791	0.900	852	0.900	913	0.900	974	0.900	1035	0.900	1096	0.900	1157	0.900	1218	0.900
792	0.900	853	0.900	914	0.900	975	0.900	1036	0.900	1097	0.900	1158	0.900	1219	0.900
793	0.900	854	0.900	915	0.900	976	0.900	1037	0.900	1098	0.900	1159	0.900	1220	0.900
794	0.900	855	0.900	916	0.900	977	0.900	1038	0.900	1099	0.900	1160	0.900	1221	0.900
795	0.900	856	0.900	917	0.900	978	0.900	1039	0.900	1100	0.900	1161	0.900	1222	0.900
796	0.900	857	0.900	918	0.900	979	0.900	1040	0.900	1101	0.900	1162	0.900	1223	0.900
797	0.900	858	0.900	919	0.900	980	0.900	1041	0.900	1102	0.900	1163	0.900	1224	0.900
798	0.900	859	0.900	920	0.900	981	0.900	1042	0.900	1103	0.900	1164	0.900	1225	0.900
799	0.900	860	0.900	921	0.900	982	0.900	1043	0.900	1104	0.900	1165	0.900	1226	0.900
800	0.900	861	0.900	922	0.900	983	0.900	1044	0.900	1105	0.900	1166	0.900	1227	0.900
801	0.900	862	0.900	923	0.900	984	0.900	1045	0.900	1106	0.900	1167	0.900	1228	0.900
802	0.900	863	0.900	924	0.900	985	0.900	1046	0.900	1107	0.900	1168	0.900	1229	0.900
803	0.900	864	0.900	925	0.900	986	0.900	1047	0.900	1108	0.900	1169	0.900	1230	0.900
804	0.900	865	0.900	926	0.900	987	0.900	1048	0.900	1109	0.900	1170	0.900	1231	0.900
805	0.900	866	0.900	927	0.900	988	0.900	1049	0.900	1110	0.900	1171	0.900	1232	0.900
806	0.900	867	0.900	928	0.900	989	0.900	1050	0.900	1111	0.900	1172	0.900	1233	0.900
807	0.900	868	0.900	929	0.900	990	0.900	1051	0.900	1112	0.900	1173	0.900	1234	0.900
808	0.900	869	0.900	930	0.900	991	0.900	1052	0.900	1113	0.900	1174	0.900	1235	0.900
809	0.900	870	0.900	931	0.900	992	0.900	1053	0.900	1114	0.900	1175	0.900	1236	0.900
810	0.900	871	0.900	932	0.900	993	0.900	1054	0.900	1115	0.900	1176	0.900	1237	0.900
811	0.900	872	0.900	933	0.900	994	0.900	1055	0.900	1116	0.900	1177	0.900	1238	0.900
812	0.900	873	0.900	934	0.900	995	0.900	1056	0.900	1117	0.900	1178	0.900	1239	0.900
813	0.900	874	0.900	935	0.900	996	0.900	1057	0.900	1118	0.900	1179	0.900	1240	0.900

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1241	0.900	1266	0.900	1291	0.900	1316	0.900	1341	0.900	1366	0.900	1391	0.900	1416	0.900
1242	0.900	1267	0.900	1292	0.900	1317	0.900	1342	0.900	1367	0.900	1392	0.900	1417	0.900
1243	0.900	1268	0.900	1293	0.900	1318	0.900	1343	0.900	1368	0.900	1393	0.900	1418	0.900
1244	0.900	1269	0.900	1294	0.900	1319	0.900	1344	0.900	1369	0.900	1394	0.900	1419	0.900
1245	0.900	1270	0.900	1295	0.900	1320	0.900	1345	0.900	1370	0.900	1395	0.900	1420	0.900
1246	0.900	1271	0.900	1296	0.900	1321	0.900	1346	0.900	1371	0.900	1396	0.900	1421	0.900
1247	0.900	1272	0.900	1297	0.900	1322	0.900	1347	0.900	1372	0.900	1397	0.900	1422	0.900
1248	0.900	1273	0.900	1298	0.900	1323	0.900	1348	0.900	1373	0.900	1398	0.900	1423	0.900
1249	0.900	1274	0.900	1299	0.900	1324	0.900	1349	0.900	1374	0.900	1399	0.900	1424	0.900
1250	0.900	1275	0.900	1300	0.900	1325	0.900	1350	0.900	1375	0.900	1400	0.900	1425	0.900
1251	0.900	1276	0.900	1301	0.900	1326	0.900	1351	0.900	1376	0.900	1401	0.900	1426	0.900
1252	0.900	1277	0.900	1302	0.900	1327	0.900	1352	0.900	1377	0.900	1402	0.900	1427	0.900
1253	0.900	1278	0.900	1303	0.900	1328	0.900	1353	0.900	1378	0.900	1403	0.900	1428	0.900
1254	0.900	1279	0.900	1304	0.900	1329	0.900	1354	0.900	1379	0.900	1404	0.900	1429	0.900
1255	0.900	1280	0.900	1305	0.900	1330	0.900	1355	0.900	1380	0.900	1405	0.900	1430	0.900
1256	0.900	1281	0.900	1306	0.900	1331	0.900	1356	0.900	1381	0.900	1406	0.900	1431	0.900
1257	0.900	1282	0.900	1307	0.900	1332	0.900	1357	0.900	1382	0.900	1407	0.900	1432	0.900
1258	0.900	1283	0.900	1308	0.900	1333	0.900	1358	0.900	1383	0.900	1408	0.900	1433	0.900
1259	0.900	1284	0.900	1309	0.900	1334	0.900	1359	0.900	1384	0.900	1409	0.900	1434	0.900
1260	0.900	1285	0.900	1310	0.900	1335	0.900	1360	0.900	1385	0.900	1410	0.900	1435	0.900
1261	0.900	1286	0.900	1311	0.900	1336	0.900	1361	0.900	1386	0.900	1411	0.900	1436	0.900
1262	0.900	1287	0.900	1312	0.900	1337	0.900	1362	0.900	1387	0.900	1412	0.900	1437	0.900
1263	0.900	1288	0.900	1313	0.900	1338	0.900	1363	0.900	1388	0.900	1413	0.900	1438	0.900
1264	0.900	1289	0.900	1314	0.900	1339	0.900	1364	0.900	1389	0.900	1414	0.900	1439	0.900
1265	0.900	1290	0.900	1315	0.900	1340	0.900	1365	0.900	1390	0.900	1415	0.900	1440	0.900

Online Controls for Storm

Hydro-Brake® Optimum Manhole: C1010, DS/PN: 1.010, Volume (m³): 3.0

Unit Reference	MD-SCU-0059-5000-1880-5000
Design Head (m)	1.880
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	86.520
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.880	5.0	Kick-Flo®	0.090	1.3
Flush-Flo™	0.090	1.3	Mean Flow over Head Range	-	3.4

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)
0.100	1.3	0.800	3.4	2.000	5.1	4.000	7.1	7.000	9.3
0.200	1.8	1.000	3.7	2.200	5.4	4.500	7.6	7.500	9.6
0.300	2.1	1.200	4.1	2.400	5.6	5.000	7.9	8.000	9.9
0.400	2.4	1.400	4.4	2.600	5.8	5.500	8.3	8.500	10.2
0.500	2.7	1.600	4.6	3.000	6.2	6.000	8.7	9.000	10.5
0.600	2.9	1.800	4.9	3.500	6.7	6.500	9.0	9.500	10.8



Micro
Drainage

Designed by sgicivils

Checked by

Network	2020.1.3
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Filter Drain Pipe: 1.000

Manning's N	0.075	Trench Length (m)	38.5
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	108.5
Invert Level (m)	90.305	Cap Volume Depth (m)	0.675
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Manning's N	0.075	Trench Length (m)	59.8
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	92.1
Invert Level (m)	89.875	Cap Volume Depth (m)	0.750
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Manning's N	0.075	Trench Length (m)	59.9
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.375
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	98.2
Invert Level (m)	89.150	Cap Volume Depth (m)	0.825
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Manning's N	0.075	Trench Length (m)	59.7
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.375
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	93.4
Invert Level (m)	88.540	Cap Volume Depth (m)	0.825
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Manning's N	0.075	Trench Length (m)	60.0
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.375
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	100.0
Invert Level (m)	87.900	Cap Volume Depth (m)	0.825
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Manning's N	0.075	Trench Length (m)	60.0
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.375
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	105.3
Invert Level (m)	87.300	Cap Volume Depth (m)	0.825
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: 1.006

Manning's N	0.075	Trench Length (m)	20.0
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.450
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	249.4
Invert Level (m)	86.655	Cap Volume Depth (m)	0.900
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Tank or Pond Pipe: 1.008

Manning's N 0.035 Invert Level (m) 86.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	21.0	1.850	360.0	1.851	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000
Hot Start (mins) 0
Hot Start Level (mm) 0
Manhole Headloss Coeff (Global) 0.500
Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000
MADD Factor * 10m³/ha Storage 2.000
Inlet Coeffiecient 0.800
Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0
Number of Offline Controls 0
Number of Time/Area Diagrams 0
Number of Online Controls 1
Number of Storage Structures 8
Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 1.000
Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	C1000	15 Summer	5	+0%	100/15 Summer				90.564	-0.416	0.000
1.001	C1001	15 Summer	5	+0%	100/15 Summer				90.112	-0.513	0.000
1.002	C1002	30 Summer	5	+0%	100/30 Summer				89.375	-0.600	0.000
1.003	C1003	30 Summer	5	+0%	100/30 Summer				88.765	-0.600	0.000
1.004	C1004	60 Summer	5	+0%	100/30 Summer				88.133	-0.592	0.000
1.005	C1005	60 Winter	5	+0%	100/30 Summer				87.546	-0.579	0.000
1.006	C1006	960 Summer	5	+0%	30/60 Summer				87.470	-0.085	0.000
1.007	C1007	960 Summer	5	+0%	2/60 Summer				87.467	0.442	0.000
1.008	C1008	960 Summer	5	+0%					87.467	-0.933	0.000
1.009	C1009	960 Summer	5	+0%	2/15 Summer				87.467	0.618	0.000
1.010	C1010	240 Winter	5	+0%	2/15 Summer				87.599	0.929	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	C1000	0.35		3	15.4	OK	
1.001	C1001	0.38		6	23.8	OK	
1.002	C1002	0.33		8	26.2	OK	
1.003	C1003	0.34		9	27.3	OK	
1.004	C1004	0.36		14	28.4	OK	
1.005	C1005	0.39		22	30.1	OK	
1.006	C1006	0.17		575	10.5	OK	
1.007	C1007	0.10			10.0	SURCHARGED	
1.008	C1008	0.00			9.9	OK	
1.009	C1009	0.12			6.0	SURCHARGED	
1.010	C1010	0.09			2.5	SURCHARGED	

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

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Storage Structures	8
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 339198 334094 SJ 39198 34094	Cv (Winter)	1.000
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5	Second Increment (Extended)	
DTS Status			ON
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440		
Return Period(s) (years)			2, 5, 30, 100
Climate Change (%)			0, 0, 0, 45

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

US/MH		Return Climate		First (X)		First (Y)		First (Z)		Overflow	Water Level	Surcharged Depth	Flooded Volume
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.			(m)	(m)	(m³)
1.000	C1000	15 Summer	30	+0%	100/15 Summer						90.788	-0.192	0.000
1.001	C1001	15 Summer	30	+0%	100/15 Summer						90.319	-0.306	0.000
1.002	C1002	30 Summer	30	+0%	100/30 Summer						89.493	-0.482	0.000
1.003	C1003	60 Summer	30	+0%	100/30 Summer						88.885	-0.480	0.000
1.004	C1004	60 Winter	30	+0%	100/30 Summer						88.297	-0.428	0.000
1.005	C1005	360 Winter	30	+0%	100/30 Summer						87.775	-0.350	0.000
1.006	C1006	360 Winter	30	+0%	30/60 Summer						87.759	0.204	0.000
1.007	C1007	360 Winter	30	+0%	2/60 Summer						87.755	0.730	0.000
1.008	C1008	360 Winter	30	+0%							87.754	-0.646	0.000
1.009	C1009	360 Winter	30	+0%	2/15 Summer						87.754	0.905	0.000
1.010	C1010	360 Winter	30	+0%	2/15 Summer						87.826	1.156	0.000

US/MH		Half Drain		Pipe		Level	
PN	Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded
1.000	C1000	0.63		4	27.6	OK	
1.001	C1001	0.68		5	43.0	OK	
1.002	C1002	0.60		9	47.2	OK	
1.003	C1003	0.61		13	49.8	OK	
1.004	C1004	0.69		19	54.3	OK	
1.005	C1005	0.29		239	22.2	OK	
1.006	C1006	0.36			23.1	SURCHARGED	
1.007	C1007	0.23			21.9	SURCHARGED	
1.008	C1008	0.00			21.7	OK	
1.009	C1009	0.11			5.3	SURCHARGED	
1.010	C1010	0.11			3.3	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 8

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH

Data Type Point

FEH Rainfall Version 2013 Cv (Summer) 1.000

Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

DVD Status OFF

Inertia Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 2, 5, 30, 100

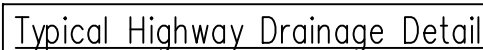
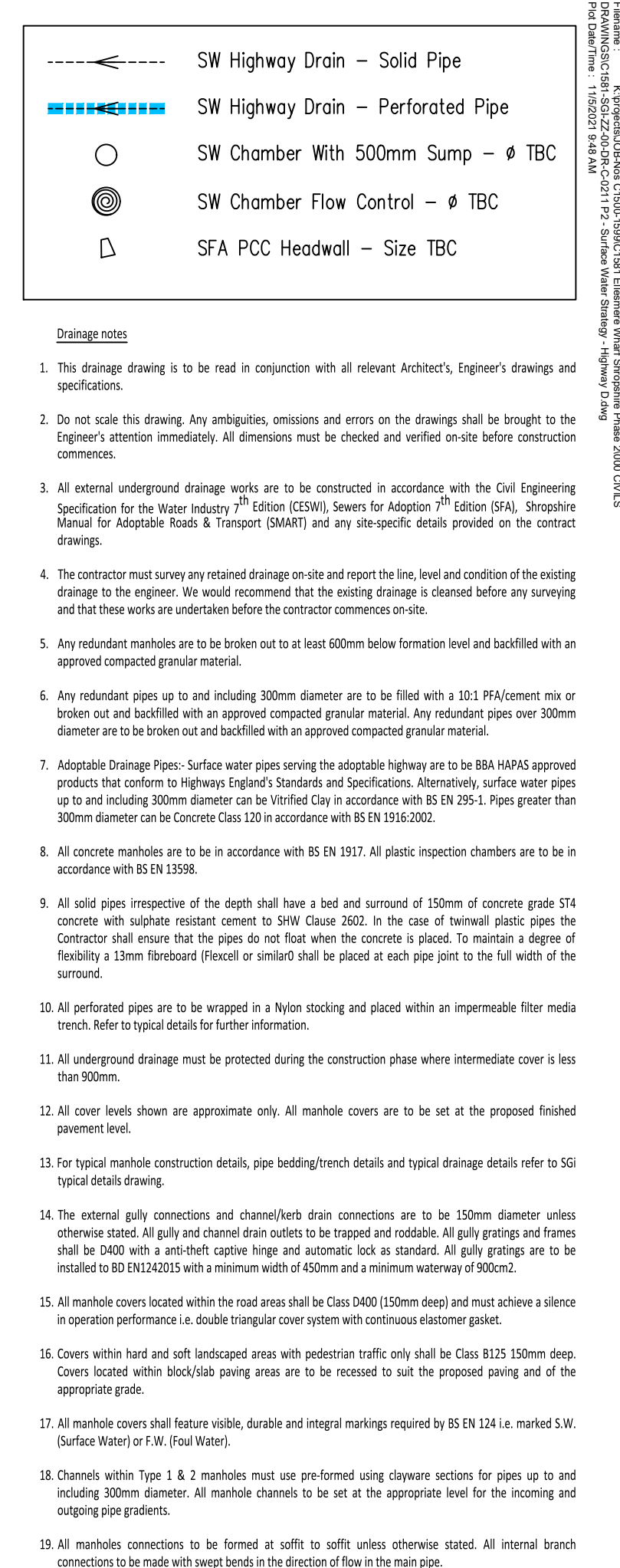
Climate Change (%) 0, 0, 0, 45

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

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	C1000	15 Summer	100	+45%	100/15 Summer				91.343	0.363	0.000
1.001	C1001	60 Summer	100	+45%	100/15 Summer				91.074	0.449	0.000
1.002	C1002	60 Summer	100	+45%	100/30 Summer				90.812	0.837	0.000
1.003	C1003	60 Summer	100	+45%	100/30 Summer				90.368	1.003	0.000
1.004	C1004	60 Summer	100	+45%	100/30 Summer				89.658	0.933	0.000
1.005	C1005	60 Summer	100	+45%	100/30 Summer				88.748	0.623	0.000
1.006	C1006	480 Winter	100	+45%	30/60 Summer				88.378	0.823	0.000
1.007	C1007	480 Winter	100	+45%	2/60 Summer				88.373	1.348	0.000
1.008	C1008	480 Winter	100	+45%					88.373	-0.027	0.000
1.009	C1009	480 Winter	100	+45%	2/15 Summer				88.373	1.524	0.000
1.010	C1010	600 Summer	100	+45%	2/15 Summer				88.551	1.881	0.000

				Half Drain	Pipe			Level
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded	
1.000	C1000	1.21		5	53.2	SURCHARGED		
1.001	C1001	1.02		10	64.0	SURCHARGED		
1.002	C1002	0.98		14	77.2	SURCHARGED		
1.003	C1003	1.09		23	88.5	FLOOD RISK		
1.004	C1004	1.25		32	98.2	FLOOD RISK		
1.005	C1005	1.38			105.2	SURCHARGED		
1.006	C1006	0.56			35.6	SURCHARGED		
1.007	C1007	0.36			34.7	SURCHARGED		
1.008	C1008	0.01			34.5	FLOOD RISK		
1.009	C1009	0.15			7.5	FLOOD RISK		
1.010	C1010	0.15			4.3	FLOOD RISK		

APPENDIX FI



Rev.	Description	Rev. by	Date
 Shepherd Gilmour Consulting Engineers 3rd Floor Phoenix House, 45 Cross Street, Manchester, M2 4JF T: 0161 837 1500 W: www.sginfrastructure.co.uk			
Client			
Formal Investments			
Architect			
Roberts Limbrick			
Project			
Canalside Development, Ellesmere			
Title			
Surface Water Strategy Preliminary Drainage - Highway D			
Date	22.02.2023	Drawn By	DOR
Size	A1	Checked By	DOR
Scale	1:2000	Approved By	DOR
Dwg. No.			Rev.
C1581-SGI-ZZ-00-DR-C-0211			P2

APPENDIX F2

SGi Consulting		Page 1
4th Floor, Colchester House 40 Peter Street Manchester, M2 5GP		
Date 22/03/2023 14:14	Designed by sgicivils	
File Highway - Catchment D 001 FEH.MDX	Checked by	
Micro Drainage	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	42.396	0.205	206.8	0.072	2.50	0.0		0.075	→ ○ →		Filter Drain	
1.001	61.396	0.210	292.4	0.075	0.00	0.0		0.075	→ ○ →		Filter Drain	
1.002	56.352	0.205	274.9	0.075	0.00	0.0		0.075	→ ○ →		Filter Drain	
2.000	58.410	0.460	127.0	0.075	2.50	0.0		0.075	→ ○ →		Filter Drain	
1.003	11.180	0.450	24.8	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.004	15.888	0.001	15888.0	0.000	0.00	0.0		0.035	→_/		Pond/Tank	
1.005	11.296	0.049	230.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.006	19.989	0.200	99.9	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
1.007	24.200	0.245	98.8	0.000	0.00	0.0	0.600		o	150	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)
1.000	0.00	1.00	86.490	0.072	0.0	0.0	0.0	0.17	42.0	0.0
1.001	0.00	1.00	86.210	0.147	0.0	0.0	0.0	0.15	45.9	0.0
1.002	0.00	1.00	86.000	0.222	0.0	0.0	0.0	0.16	47.4	0.0
2.000	0.00	1.00	86.895	0.075	0.0	0.0	0.0	0.21	53.7	0.0
1.003	0.00	1.00	85.795	0.297	0.0	0.0	0.0	3.65	402.9	0.0
1.004	0.00	1.00	85.420	0.297	0.0	0.0	0.0	0.17	7956.8	0.0
1.005	0.00	1.00	85.419	0.297	0.0	0.0	0.0	1.03	72.9	0.0
1.006	0.00	1.00	85.370	0.297	0.0	0.0	0.0	1.01	17.8	0.0
1.007	0.00	1.00	85.170	0.297	0.0	0.0	0.0	1.01	17.9	0.0

SGi Consulting		Page 2
4th Floor, Colchester House 40 Peter Street Manchester, M2 5GP		
Date 22/03/2023 14:14	Designed by sgicivils	
File Highway - Catchment D 001 FEH.MDX	Checked by	
Micro Drainage	Network 2020.1.3	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.072	0.072	0.072
1.001	-	-	100	0.075	0.075	0.075
1.002	-	-	100	0.075	0.075	0.075
2.000	-	-	100	0.075	0.075	0.075
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.297	0.297	0.297

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)
1.007	D1007	87.000	84.925	0.000	0	0

Online Controls for Storm

Hydro-Brake® Optimum Manhole: D1006, DS/PN: 1.006, Volume (m³): 3.9

Unit Reference	MD-SCU-0055-5000-2530-5000
Design Head (m)	2.530
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	55
Invert Level (m)	85.370
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.530	5.0	Kick-Flo®	0.084	1.1
Flush-Flo™	0.084	1.1	Mean Flow over Head Range	-	3.4

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)
0.100	1.1	0.800	2.9	2.000	4.5	4.000	6.2	7.000	8.1
0.200	1.6	1.000	3.2	2.200	4.7	4.500	6.6	7.500	8.4
0.300	1.9	1.200	3.5	2.400	4.9	5.000	6.9	8.000	8.6
0.400	2.1	1.400	3.8	2.600	5.1	5.500	7.2	8.500	8.9
0.500	2.4	1.600	4.0	3.000	5.4	6.000	7.5	9.000	9.1
0.600	2.6	1.800	4.3	3.500	5.8	6.500	7.8	9.500	9.4

Storage Structures for Storm

Filter Drain Pipe: 1.000

Manning's N	0.075	Trench Length (m)	42.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	206.8
Invert Level (m)	86.490	Cap Volume Depth (m)	0.750
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: 1.001

Manning's N	0.075	Trench Length (m)	61.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.375
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	292.4
Invert Level (m)	86.210	Cap Volume Depth (m)	0.825
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: 1.002

Manning's N	0.075	Trench Length (m)	56.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.375
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	274.9
Invert Level (m)	86.000	Cap Volume Depth (m)	0.825
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: 2.000

Manning's N	0.075	Trench Length (m)	58.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	127.0
Invert Level (m)	86.895	Cap Volume Depth (m)	0.750
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Tank or Pond Pipe: 1.004

Manning's N 0.035 Invert Level (m) 85.420

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	47.0	2.480	540.0	2.481	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	D1000	15 Summer	2	+0%	100/15 Summer				86.751	-0.489	0.000
1.001	D1001	30 Summer	2	+0%	100/15 Summer				86.445	-0.590	0.000
1.002	D1002	30 Summer	2	+0%	100/15 Summer				86.215	-0.610	0.000
2.000	D1100	15 Summer	2	+0%	100/15 Summer				87.102	-0.543	0.000
1.003	D1003	30 Summer	2	+0%	30/120 Summer				85.857	-0.313	0.000
1.004	D1004	360 Summer	2	+0%					85.853	-2.047	0.000
1.005	D1005	360 Summer	2	+0%	2/60 Summer				85.853	0.134	0.000
1.006	D1006	360 Winter	2	+0%	2/15 Summer				86.042	0.522	0.000
1.007	D1007	240 Winter	2	+0%					85.207	-0.113	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	D1000	0.27		5	11.5	OK	
1.001	D1001	0.31		12	14.1	OK	
1.002	D1002	0.29		15	13.7	OK	
2.000	D1100	0.24		5	12.7	OK	
1.003	D1003	0.07			17.2	OK	
1.004	D1004	0.00			11.3	OK	
1.005	D1005	0.13			7.4	SURCHARGED	
1.006	D1006	0.14			2.3	SURCHARGED	
1.007	D1007	0.14			2.3	OK	

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

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Synthetic Rainfall Details

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

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m ³)
1.000	D1000	15	Summer	5	+0%	100/15	Summer			86.854	-0.386	0.000
1.001	D1001	30	Summer	5	+0%	100/15	Summer			86.514	-0.521	0.000
1.002	D1002	30	Summer	5	+0%	100/15	Summer			86.272	-0.553	0.000
2.000	D1100	15	Summer	5	+0%	100/15	Summer			87.161	-0.484	0.000
1.003	D1003	240	Winter	5	+0%	30/120	Summer			85.957	-0.213	0.000
1.004	D1004	240	Winter	5	+0%					85.956	-1.944	0.000
1.005	D1005	240	Winter	5	+0%	2/60	Summer			85.956	0.237	0.000
1.006	D1006	60	Summer	5	+0%	2/15	Summer			86.083	0.563	0.000
1.007	D1007	240	Summer	5	+0%					85.209	-0.111	0.000

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	D1000	15 Summer	30	+0%	100/15 Summer				87.240	0.000	0.000
1.001	D1001	30 Summer	30	+0%	100/15 Summer				86.760	-0.275	0.000
1.002	D1002	60 Summer	30	+0%	100/15 Summer				86.469	-0.356	0.000
2.000	D1100	15 Summer	30	+0%	100/15 Summer				87.376	-0.269	0.000
1.003	D1003	240 Winter	30	+0%	30/120 Summer				86.223	0.053	0.000
1.004	D1004	240 Winter	30	+0%					86.222	-1.678	0.000
1.005	D1005	240 Winter	30	+0%	2/60 Summer				86.222	0.503	0.000
1.006	D1006	240 Summer	30	+0%	2/15 Summer				86.396	0.876	0.000
1.007	D1007	240 Summer	30	+0%					85.213	-0.107	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	D1000	0.69		5	29.0	OK	
1.001	D1001	0.72		12	33.2	OK	
1.002	D1002	0.75		20	35.6	OK	
2.000	D1100	0.58		5	31.3	OK	
1.003	D1003	0.09			22.6	SURCHARGED	
1.004	D1004	0.00			22.2	OK	
1.005	D1005	0.08			4.5	SURCHARGED	
1.006	D1006	0.18			3.0	SURCHARGED	
1.007	D1007	0.18			3.0	OK	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

					Water Surcharged Flooded						
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	D1000	15 Summer	100	+45%	100/15 Summer				87.599	0.359	0.000
1.001	D1001	60 Summer	100	+45%	100/15 Summer				87.469	0.434	0.000
1.002	D1002	30 Summer	100	+45%	100/15 Summer				87.152	0.327	0.000
2.000	D1100	15 Summer	100	+45%	100/15 Summer				87.811	0.166	0.000
1.003	D1003	240 Winter	100	+45%	30/120 Summer				86.654	0.484	0.000
1.004	D1004	240 Winter	100	+45%					86.652	-1.248	0.000
1.005	D1005	240 Winter	100	+45%	2/60 Summer				86.652	0.933	0.000
1.006	D1006	240 Summer	100	+45%	2/15 Summer				86.816	1.296	0.000
1.007	D1007	240 Winter	100	+45%					85.217	-0.103	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	D1000	1.48		13	62.2	SURCHARGED	
1.001	D1001	1.47		20	67.3	SURCHARGED	
1.002	D1002	1.67		29	79.2	SURCHARGED	
2.000	D1100	1.00		7	53.7	SURCHARGED	
1.003	D1003	0.16			43.0	SURCHARGED	
1.004	D1004	0.00			42.8	OK	
1.005	D1005	0.09			5.1	SURCHARGED	
1.006	D1006	0.22			3.6	SURCHARGED	
1.007	D1007	0.21			3.6	OK	

APPENDIX F3

SGi Consulting		Page 1
4th Floor, Colchester House 40 Peter Street Manchester, M2 5GP		
Date 22/03/2023 14:04	Designed by sgicivils	
File Highway - Catchment D 001 FEH.MDX	Checked by	
Micro Drainage	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	42.396	0.205	206.8	0.072	2.50	0.0		0.075	→ ○ →		Filter Drain	
1.001	61.396	0.210	292.4	0.075	0.00	0.0		0.075	→ ○ →		Filter Drain	
1.002	56.352	0.205	274.9	0.075	0.00	0.0		0.075	→ ○ →		Filter Drain	
2.000	58.410	0.460	127.0	0.075	2.50	0.0		0.075	→ ○ →		Filter Drain	
1.003	11.180	0.450	24.8	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.004	15.888	0.001	15888.0	0.000	0.00	0.0		0.035	→_/		Pond/Tank	
1.005	11.296	0.049	230.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.006	19.989	0.200	99.9	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
1.007	24.200	0.245	98.8	0.000	0.00	0.0	0.600		o	150	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)
1.000	0.00	1.00	86.490	0.072	0.0	0.0	0.0	0.17	42.0	0.0
1.001	0.00	1.00	86.210	0.147	0.0	0.0	0.0	0.15	45.9	0.0
1.002	0.00	1.00	86.000	0.222	0.0	0.0	0.0	0.16	47.4	0.0
2.000	0.00	1.00	86.895	0.075	0.0	0.0	0.0	0.21	53.7	0.0
1.003	0.00	1.00	85.795	0.297	0.0	0.0	0.0	3.65	402.9	0.0
1.004	0.00	1.00	85.420	0.297	0.0	0.0	0.0	0.17	7956.8	0.0
1.005	0.00	1.00	85.419	0.297	0.0	0.0	0.0	1.03	72.9	0.0
1.006	0.00	1.00	85.370	0.297	0.0	0.0	0.0	1.01	17.8	0.0
1.007	0.00	1.00	85.170	0.297	0.0	0.0	0.0	1.01	17.9	0.0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.072	0.072	0.072
1.001	-	-	100	0.075	0.075	0.075
1.002	-	-	100	0.075	0.075	0.075
2.000	-	-	100	0.075	0.075	0.075
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.297	0.297	0.297

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007	D1007	87.000	84.925	0.000	0	0
Datum (m) 84.925 Offset (mins) 0						

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	2.105	36	2.105	71	2.105	106	2.105	141	2.105	176	2.105	211	2.105	246	2.105
2	2.105	37	2.105	72	2.105	107	2.105	142	2.105	177	2.105	212	2.105	247	2.105
3	2.105	38	2.105	73	2.105	108	2.105	143	2.105	178	2.105	213	2.105	248	2.105
4	2.105	39	2.105	74	2.105	109	2.105	144	2.105	179	2.105	214	2.105	249	2.105
5	2.105	40	2.105	75	2.105	110	2.105	145	2.105	180	2.105	215	2.105	250	2.105
6	2.105	41	2.105	76	2.105	111	2.105	146	2.105	181	2.105	216	2.105	251	2.105
7	2.105	42	2.105	77	2.105	112	2.105	147	2.105	182	2.105	217	2.105	252	2.105
8	2.105	43	2.105	78	2.105	113	2.105	148	2.105	183	2.105	218	2.105	253	2.105
9	2.105	44	2.105	79	2.105	114	2.105	149	2.105	184	2.105	219	2.105	254	2.105
10	2.105	45	2.105	80	2.105	115	2.105	150	2.105	185	2.105	220	2.105	255	2.105
11	2.105	46	2.105	81	2.105	116	2.105	151	2.105	186	2.105	221	2.105	256	2.105
12	2.105	47	2.105	82	2.105	117	2.105	152	2.105	187	2.105	222	2.105	257	2.105
13	2.105	48	2.105	83	2.105	118	2.105	153	2.105	188	2.105	223	2.105	258	2.105
14	2.105	49	2.105	84	2.105	119	2.105	154	2.105	189	2.105	224	2.105	259	2.105
15	2.105	50	2.105	85	2.105	120	2.105	155	2.105	190	2.105	225	2.105	260	2.105
16	2.105	51	2.105	86	2.105	121	2.105	156	2.105	191	2.105	226	2.105	261	2.105
17	2.105	52	2.105	87	2.105	122	2.105	157	2.105	192	2.105	227	2.105	262	2.105
18	2.105	53	2.105	88	2.105	123	2.105	158	2.105	193	2.105	228	2.105	263	2.105
19	2.105	54	2.105	89	2.105	124	2.105	159	2.105	194	2.105	229	2.105	264	2.105
20	2.105	55	2.105	90	2.105	125	2.105	160	2.105	195	2.105	230	2.105	265	2.105
21	2.105	56	2.105	91	2.105	126	2.105	161	2.105	196	2.105	231	2.105	266	2.105
22	2.105	57	2.105	92	2.105	127	2.105	162	2.105	197	2.105	232	2.105	267	2.105
23	2.105	58	2.105	93	2.105	128	2.105	163	2.105	198	2.105	233	2.105	268	2.105
24	2.105	59	2.105	94	2.105	129	2.105	164	2.105	199	2.105	234	2.105	269	2.105
25	2.105	60	2.105	95	2.105	130	2.105	165	2.105	200	2.105	235	2.105	270	2.105
26	2.105	61	2.105	96	2.105	131	2.105	166	2.105	201	2.105	236	2.105	271	2.105
27	2.105	62	2.105	97	2.105	132	2.105	167	2.105	202	2.105	237	2.105	272	2.105
28	2.105	63	2.105	98	2.105	133	2.105	168	2.105	203	2.105	238	2.105	273	2.105
29	2.105	64	2.105	99	2.105	134	2.105	169	2.105	204	2.105	239	2.105	274	2.105
30	2.105	65	2.105	100	2.105	135	2.105	170	2.105	205	2.105	240	2.105	275	2.105
31	2.105	66	2.105	101	2.105	136	2.105	171	2.105	206	2.105	241	2.105	276	2.105
32	2.105	67	2.105	102	2.105	137	2.105	172	2.105	207	2.105	242	2.105	277	2.105
33	2.105	68	2.105	103	2.105	138	2.105	173	2.105	208	2.105	243	2.105	278	2.105
34	2.105	69	2.105	104	2.105	139	2.105	174	2.105	209	2.105	244	2.105	279	2.105
35	2.105	70	2.105	105	2.105	140	2.105	175	2.105	210	2.105	245	2.105	280	2.105

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
281	2.105	342	2.105	403	2.105	464	2.105	525	2.105	586	2.105	647	2.105	708	2.105
282	2.105	343	2.105	404	2.105	465	2.105	526	2.105	587	2.105	648	2.105	709	2.105
283	2.105	344	2.105	405	2.105	466	2.105	527	2.105	588	2.105	649	2.105	710	2.105
284	2.105	345	2.105	406	2.105	467	2.105	528	2.105	589	2.105	650	2.105	711	2.105
285	2.105	346	2.105	407	2.105	468	2.105	529	2.105	590	2.105	651	2.105	712	2.105
286	2.105	347	2.105	408	2.105	469	2.105	530	2.105	591	2.105	652	2.105	713	2.105
287	2.105	348	2.105	409	2.105	470	2.105	531	2.105	592	2.105	653	2.105	714	2.105
288	2.105	349	2.105	410	2.105	471	2.105	532	2.105	593	2.105	654	2.105	715	2.105
289	2.105	350	2.105	411	2.105	472	2.105	533	2.105	594	2.105	655	2.105	716	2.105
290	2.105	351	2.105	412	2.105	473	2.105	534	2.105	595	2.105	656	2.105	717	2.105
291	2.105	352	2.105	413	2.105	474	2.105	535	2.105	596	2.105	657	2.105	718	2.105
292	2.105	353	2.105	414	2.105	475	2.105	536	2.105	597	2.105	658	2.105	719	2.105
293	2.105	354	2.105	415	2.105	476	2.105	537	2.105	598	2.105	659	2.105	720	2.105
294	2.105	355	2.105	416	2.105	477	2.105	538	2.105	599	2.105	660	2.105	721	2.105
295	2.105	356	2.105	417	2.105	478	2.105	539	2.105	600	2.105	661	2.105	722	2.105
296	2.105	357	2.105	418	2.105	479	2.105	540	2.105	601	2.105	662	2.105	723	2.105
297	2.105	358	2.105	419	2.105	480	2.105	541	2.105	602	2.105	663	2.105	724	2.105
298	2.105	359	2.105	420	2.105	481	2.105	542	2.105	603	2.105	664	2.105	725	2.105
299	2.105	360	2.105	421	2.105	482	2.105	543	2.105	604	2.105	665	2.105	726	2.105
300	2.105	361	2.105	422	2.105	483	2.105	544	2.105	605	2.105	666	2.105	727	2.105
301	2.105	362	2.105	423	2.105	484	2.105	545	2.105	606	2.105	667	2.105	728	2.105
302	2.105	363	2.105	424	2.105	485	2.105	546	2.105	607	2.105	668	2.105	729	2.105
303	2.105	364	2.105	425	2.105	486	2.105	547	2.105	608	2.105	669	2.105	730	2.105
304	2.105	365	2.105	426	2.105	487	2.105	548	2.105	609	2.105	670	2.105	731	2.105
305	2.105	366	2.105	427	2.105	488	2.105	549	2.105	610	2.105	671	2.105	732	2.105
306	2.105	367	2.105	428	2.105	489	2.105	550	2.105	611	2.105	672	2.105	733	2.105
307	2.105	368	2.105	429	2.105	490	2.105	551	2.105	612	2.105	673	2.105	734	2.105
308	2.105	369	2.105	430	2.105	491	2.105	552	2.105	613	2.105	674	2.105	735	2.105
309	2.105	370	2.105	431	2.105	492	2.105	553	2.105	614	2.105	675	2.105	736	2.105
310	2.105	371	2.105	432	2.105	493	2.105	554	2.105	615	2.105	676	2.105	737	2.105
311	2.105	372	2.105	433	2.105	494	2.105	555	2.105	616	2.105	677	2.105	738	2.105
312	2.105	373	2.105	434	2.105	495	2.105	556	2.105	617	2.105	678	2.105	739	2.105
313	2.105	374	2.105	435	2.105	496	2.105	557	2.105	618	2.105	679	2.105	740	2.105
314	2.105	375	2.105	436	2.105	497	2.105	558	2.105	619	2.105	680	2.105	741	2.105
315	2.105	376	2.105	437	2.105	498	2.105	559	2.105	620	2.105	681	2.105	742	2.105
316	2.105	377	2.105	438	2.105	499	2.105	560	2.105	621	2.105	682	2.105	743	2.105
317	2.105	378	2.105	439	2.105	500	2.105	561	2.105	622	2.105	683	2.105	744	2.105
318	2.105	379	2.105	440	2.105	501	2.105	562	2.105	623	2.105	684	2.105	745	2.105
319	2.105	380	2.105	441	2.105	502	2.105	563	2.105	624	2.105	685	2.105	746	2.105
320	2.105	381	2.105	442	2.105	503	2.105	564	2.105	625	2.105	686	2.105	747	2.105
321	2.105	382	2.105	443	2.105	504	2.105	565	2.105	626	2.105	687	2.105	748	2.105
322	2.105	383	2.105	444	2.105	505	2.105	566	2.105	627	2.105	688	2.105	749	2.105
323	2.105	384	2.105	445	2.105	506	2.105	567	2.105	628	2.105	689	2.105	750	2.105
324	2.105	385	2.105	446	2.105	507	2.105	568	2.105	629	2.105	690	2.105	751	2.105
325	2.105	386	2.105	447	2.105	508	2.105	569	2.105	630	2.105	691	2.105	752	2.105
326	2.105	387	2.105	448	2.105	509	2.105	570	2.105	631	2.105	692	2.105	753	2.105
327	2.105	388	2.105	449	2.105	510	2.105	571	2.105	632	2.105	693	2.105	754	2.105
328	2.105	389	2.105	450	2.105	511	2.105	572	2.105	633	2.105	694	2.105	755	2.105
329	2.105	390	2.105	451	2.105	512	2.105	573	2.105	634	2.105	695	2.105	756	2.105
330	2.105	391	2.105	452	2.105	513	2.105	574	2.105	635	2.105	696	2.105	757	2.105
331	2.105	392	2.105	453	2.105	514	2.105	575	2.105	636	2.105	697	2.105	758	2.105
332	2.105	393	2.105	454	2.105	515	2.105	576	2.105	637	2.105	698	2.105	759	2.105
333	2.105	394	2.105	455	2.105	516	2.105	577	2.105	638	2.105	699	2.105	760	2.105
334	2.105	395	2.105	456	2.105	517	2.105	578	2.105	639	2.105	700	2.105	761	2.105
335	2.105	396	2.105	457	2.105	518	2.105	579	2.105	640	2.105	701	2.105	762	2.105
336	2.105	397	2.105	458	2.105	519	2.105	580	2.105	641	2.105	702	2.105	763	2.105
337	2.105	398	2.105	459	2.105	520	2.105	581	2.105	642	2.105	703	2.105	764	2.105
338	2.105	399	2.105	460	2.105	521	2.105	582	2.105	643	2.105	704	2.105	765	2.105
339	2.105	400	2.105	461	2.105	522	2.105	583	2.105	644	2.105	705	2.105	766	2.105
340	2.105	401	2.105	462	2.105	523	2.105	584	2.105	645	2.105	706	2.105	767	2.105
341	2.105	402	2.105	463	2.105	524	2.105	585	2.105	646	2.105	707	2.105	768	2.105

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
769	2.105	830	2.105	891	2.105	952	2.105	1013	2.105	1074	2.105	1135	2.105	1196	2.105
770	2.105	831	2.105	892	2.105	953	2.105	1014	2.105	1075	2.105	1136	2.105	1197	2.105
771	2.105	832	2.105	893	2.105	954	2.105	1015	2.105	1076	2.105	1137	2.105	1198	2.105
772	2.105	833	2.105	894	2.105	955	2.105	1016	2.105	1077	2.105	1138	2.105	1199	2.105
773	2.105	834	2.105	895	2.105	956	2.105	1017	2.105	1078	2.105	1139	2.105	1200	2.105
774	2.105	835	2.105	896	2.105	957	2.105	1018	2.105	1079	2.105	1140	2.105	1201	2.105
775	2.105	836	2.105	897	2.105	958	2.105	1019	2.105	1080	2.105	1141	2.105	1202	2.105
776	2.105	837	2.105	898	2.105	959	2.105	1020	2.105	1081	2.105	1142	2.105	1203	2.105
777	2.105	838	2.105	899	2.105	960	2.105	1021	2.105	1082	2.105	1143	2.105	1204	2.105
778	2.105	839	2.105	900	2.105	961	2.105	1022	2.105	1083	2.105	1144	2.105	1205	2.105
779	2.105	840	2.105	901	2.105	962	2.105	1023	2.105	1084	2.105	1145	2.105	1206	2.105
780	2.105	841	2.105	902	2.105	963	2.105	1024	2.105	1085	2.105	1146	2.105	1207	2.105
781	2.105	842	2.105	903	2.105	964	2.105	1025	2.105	1086	2.105	1147	2.105	1208	2.105
782	2.105	843	2.105	904	2.105	965	2.105	1026	2.105	1087	2.105	1148	2.105	1209	2.105
783	2.105	844	2.105	905	2.105	966	2.105	1027	2.105	1088	2.105	1149	2.105	1210	2.105
784	2.105	845	2.105	906	2.105	967	2.105	1028	2.105	1089	2.105	1150	2.105	1211	2.105
785	2.105	846	2.105	907	2.105	968	2.105	1029	2.105	1090	2.105	1151	2.105	1212	2.105
786	2.105	847	2.105	908	2.105	969	2.105	1030	2.105	1091	2.105	1152	2.105	1213	2.105
787	2.105	848	2.105	909	2.105	970	2.105	1031	2.105	1092	2.105	1153	2.105	1214	2.105
788	2.105	849	2.105	910	2.105	971	2.105	1032	2.105	1093	2.105	1154	2.105	1215	2.105
789	2.105	850	2.105	911	2.105	972	2.105	1033	2.105	1094	2.105	1155	2.105	1216	2.105
790	2.105	851	2.105	912	2.105	973	2.105	1034	2.105	1095	2.105	1156	2.105	1217	2.105
791	2.105	852	2.105	913	2.105	974	2.105	1035	2.105	1096	2.105	1157	2.105	1218	2.105
792	2.105	853	2.105	914	2.105	975	2.105	1036	2.105	1097	2.105	1158	2.105	1219	2.105
793	2.105	854	2.105	915	2.105	976	2.105	1037	2.105	1098	2.105	1159	2.105	1220	2.105
794	2.105	855	2.105	916	2.105	977	2.105	1038	2.105	1099	2.105	1160	2.105	1221	2.105
795	2.105	856	2.105	917	2.105	978	2.105	1039	2.105	1100	2.105	1161	2.105	1222	2.105
796	2.105	857	2.105	918	2.105	979	2.105	1040	2.105	1101	2.105	1162	2.105	1223	2.105
797	2.105	858	2.105	919	2.105	980	2.105	1041	2.105	1102	2.105	1163	2.105	1224	2.105
798	2.105	859	2.105	920	2.105	981	2.105	1042	2.105	1103	2.105	1164	2.105	1225	2.105
799	2.105	860	2.105	921	2.105	982	2.105	1043	2.105	1104	2.105	1165	2.105	1226	2.105
800	2.105	861	2.105	922	2.105	983	2.105	1044	2.105	1105	2.105	1166	2.105	1227	2.105
801	2.105	862	2.105	923	2.105	984	2.105	1045	2.105	1106	2.105	1167	2.105	1228	2.105
802	2.105	863	2.105	924	2.105	985	2.105	1046	2.105	1107	2.105	1168	2.105	1229	2.105
803	2.105	864	2.105	925	2.105	986	2.105	1047	2.105	1108	2.105	1169	2.105	1230	2.105
804	2.105	865	2.105	926	2.105	987	2.105	1048	2.105	1109	2.105	1170	2.105	1231	2.105
805	2.105	866	2.105	927	2.105	988	2.105	1049	2.105	1110	2.105	1171	2.105	1232	2.105
806	2.105	867	2.105	928	2.105	989	2.105	1050	2.105	1111	2.105	1172	2.105	1233	2.105
807	2.105	868	2.105	929	2.105	990	2.105	1051	2.105	1112	2.105	1173	2.105	1234	2.105
808	2.105	869	2.105	930	2.105	991	2.105	1052	2.105	1113	2.105	1174	2.105	1235	2.105
809	2.105	870	2.105	931	2.105	992	2.105	1053	2.105	1114	2.105	1175	2.105	1236	2.105
810	2.105	871	2.105	932	2.105	993	2.105	1054	2.105	1115	2.105	1176	2.105	1237	2.105
811	2.105	872	2.105	933	2.105	994	2.105	1055	2.105	1116	2.105	1177	2.105	1238	2.105
812	2.105	873	2.105	934	2.105	995	2.105	1056	2.105	1117	2.105	1178	2.105	1239	2.105
813	2.105	874	2.105	935	2.105	996	2.105	1057	2.105	1118	2.105	1179	2.105	1240	2.105
814	2.105	875	2.105	936	2.105	997	2.105	1058	2.105	1119	2.105	1180	2.105	1241	2.105
815	2.105	876	2.105	937	2.105	998	2.105	1059	2.105	1120	2.105	1181	2.105	1242	2.105
816	2.105	877	2.105	938	2.105	999	2.105	1060	2.105	1121	2.105	1182	2.105	1243	2.105
817	2.105	878	2.105	939	2.105	1000	2.105	1061	2.105	1122	2.105	1183	2.105	1244	2.105
818	2.105	879	2.105	940	2.105	1001	2.105	1062	2.105	1123	2.105	1184	2.105	1245	2.105
819	2.105	880	2.105	941	2.105	1002	2.105	1063	2.105	1124	2.105	1185	2.105	1246	2.105
820	2.105	881	2.105	942	2.105	1003	2.105	1064	2.105	1125	2.105	1186	2.105	1247	2.105
821	2.105	882	2.105	943	2.105	1004	2.105	1065	2.105	1126	2.105	1187	2.105	1248	2.105
822	2.105	883	2.105	944	2.105	1005	2.105	1066	2.105	1127	2.105	1188	2.105	1249	2.105
823	2.105	884	2.105	945	2.105	1006	2.105	1067	2.105	1128	2.105	1189	2.105	1250	2.105
824	2.105	885	2.105	946	2.105	1007	2.105	1068	2.105	1129	2.105	1190	2.105	1251	2.105
825	2.105	886	2.105	947	2.105	1008	2.105	1069	2.105	1130	2.105	1191	2.105	1252	2.105
826	2.105	887	2.105	948	2.105	1009	2.105	1070	2.105	1131	2.105	1192	2.105	1253	2.105
827	2.105	888	2.105	949	2.105	1010	2.105	1071	2.105	1132	2.105	1193	2.105	1254	2.105
828	2.105	889	2.105	950	2.105	1011	2.105	1072	2.105	1133	2.105	1194	2.105	1255	2.105
829	2.105	890	2.105	951	2.105	1012	2.105	1073	2.105	1134	2.105	1195	2.105	1256	2.105

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1257	2.105	1280	2.105	1303	2.105	1326	2.105	1349	2.105	1372	2.105	1395	2.105	1418	2.105
1258	2.105	1281	2.105	1304	2.105	1327	2.105	1350	2.105	1373	2.105	1396	2.105	1419	2.105
1259	2.105	1282	2.105	1305	2.105	1328	2.105	1351	2.105	1374	2.105	1397	2.105	1420	2.105
1260	2.105	1283	2.105	1306	2.105	1329	2.105	1352	2.105	1375	2.105	1398	2.105	1421	2.105
1261	2.105	1284	2.105	1307	2.105	1330	2.105	1353	2.105	1376	2.105	1399	2.105	1422	2.105
1262	2.105	1285	2.105	1308	2.105	1331	2.105	1354	2.105	1377	2.105	1400	2.105	1423	2.105
1263	2.105	1286	2.105	1309	2.105	1332	2.105	1355	2.105	1378	2.105	1401	2.105	1424	2.105
1264	2.105	1287	2.105	1310	2.105	1333	2.105	1356	2.105	1379	2.105	1402	2.105	1425	2.105
1265	2.105	1288	2.105	1311	2.105	1334	2.105	1357	2.105	1380	2.105	1403	2.105	1426	2.105
1266	2.105	1289	2.105	1312	2.105	1335	2.105	1358	2.105	1381	2.105	1404	2.105	1427	2.105
1267	2.105	1290	2.105	1313	2.105	1336	2.105	1359	2.105	1382	2.105	1405	2.105	1428	2.105
1268	2.105	1291	2.105	1314	2.105	1337	2.105	1360	2.105	1383	2.105	1406	2.105	1429	2.105
1269	2.105	1292	2.105	1315	2.105	1338	2.105	1361	2.105	1384	2.105	1407	2.105	1430	2.105
1270	2.105	1293	2.105	1316	2.105	1339	2.105	1362	2.105	1385	2.105	1408	2.105	1431	2.105
1271	2.105	1294	2.105	1317	2.105	1340	2.105	1363	2.105	1386	2.105	1409	2.105	1432	2.105
1272	2.105	1295	2.105	1318	2.105	1341	2.105	1364	2.105	1387	2.105	1410	2.105	1433	2.105
1273	2.105	1296	2.105	1319	2.105	1342	2.105	1365	2.105	1388	2.105	1411	2.105	1434	2.105
1274	2.105	1297	2.105	1320	2.105	1343	2.105	1366	2.105	1389	2.105	1412	2.105	1435	2.105
1275	2.105	1298	2.105	1321	2.105	1344	2.105	1367	2.105	1390	2.105	1413	2.105	1436	2.105
1276	2.105	1299	2.105	1322	2.105	1345	2.105	1368	2.105	1391	2.105	1414	2.105	1437	2.105
1277	2.105	1300	2.105	1323	2.105	1346	2.105	1369	2.105	1392	2.105	1415	2.105	1438	2.105
1278	2.105	1301	2.105	1324	2.105	1347	2.105	1370	2.105	1393	2.105	1416	2.105	1439	2.105
1279	2.105	1302	2.105	1325	2.105	1348	2.105	1371	2.105	1394	2.105	1417	2.105	1440	2.105

Online Controls for Storm

Hydro-Brake® Optimum Manhole: D1006, DS/PN: 1.006, Volume (m³): 3.9

Unit Reference	MD-SCU-0055-5000-2530-5000
Design Head (m)	2.530
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	55
Invert Level (m)	85.370
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.530	5.0	Kick-Flo®	0.084	1.1
Flush-Flo™	0.084	1.1	Mean Flow over Head Range	-	3.4

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)
0.100	1.1	0.800	2.9	2.000	4.5	4.000	6.2	7.000	8.1
0.200	1.6	1.000	3.2	2.200	4.7	4.500	6.6	7.500	8.4
0.300	1.9	1.200	3.5	2.400	4.9	5.000	6.9	8.000	8.6
0.400	2.1	1.400	3.8	2.600	5.1	5.500	7.2	8.500	8.9
0.500	2.4	1.600	4.0	3.000	5.4	6.000	7.5	9.000	9.1
0.600	2.6	1.800	4.3	3.500	5.8	6.500	7.8	9.500	9.4

Storage Structures for Storm

Filter Drain Pipe: 1.000

Manning's N	0.075	Trench Length (m)	42.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	206.8
Invert Level (m)	86.490	Cap Volume Depth (m)	0.750
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: 1.001

Manning's N	0.075	Trench Length (m)	61.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.375
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	292.4
Invert Level (m)	86.210	Cap Volume Depth (m)	0.825
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: 1.002

Manning's N	0.075	Trench Length (m)	56.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.375
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	274.9
Invert Level (m)	86.000	Cap Volume Depth (m)	0.825
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: 2.000

Manning's N	0.075	Trench Length (m)	58.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	1.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	127.0
Invert Level (m)	86.895	Cap Volume Depth (m)	0.750
Trench Width (m)	0.9	Cap Infiltration Depth (m)	0.000

Tank or Pond Pipe: 1.004

Manning's N 0.035 Invert Level (m) 85.420

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	47.0	2.480	540.0	2.481	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	D1000	15 Summer		2	+0%	100/15 Summer				86.751	-0.489	0.000
1.001	D1001	30 Summer		2	+0%	100/15 Summer				86.445	-0.590	0.000
1.002	D1002	30 Summer		2	+0%	100/15 Summer				86.215	-0.610	0.000
2.000	D1100	15 Summer		2	+0%	100/15 Summer				87.102	-0.543	0.000
1.003	D1003	1440 Summer		2	+0%	2/1440 Summer				86.183	0.013	0.000
1.004	D1004	1440 Summer		2	+0%					86.183	-1.717	0.000
1.005	D1005	1440 Summer		2	+0%	2/30 Summer				86.183	0.464	0.000
1.006	D1006	480 Summer		2	+0%	2/15 Summer				86.454	0.934	0.000
1.007	D1007	240 Summer		2	+0%	2/15 Summer				86.558	1.238	0.000

			Half Drain		Pipe			Level
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded	
1.000	D1000	0.27		5	11.5	OK		
1.001	D1001	0.31		12	14.1	OK		
1.002	D1002	0.29		15	13.7	OK		
2.000	D1100	0.24		5	12.7	OK		
1.003	D1003	0.02			4.9	SURCHARGED		
1.004	D1004	0.00			8.1	OK		
1.005	D1005	0.22			12.9	SURCHARGED		
1.006	D1006	0.02			0.4	SURCHARGED		
1.007	D1007	0.00			0.0	SURCHARGED		

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	D1000	15 Summer		30	+0%	100/15 Summer				87.240	0.000	0.000
1.001	D1001	30 Summer		30	+0%	100/15 Summer				86.760	-0.275	0.000
1.002	D1002	1440 Summer		30	+0%	100/15 Summer				86.504	-0.321	0.000
2.000	D1100	15 Summer		30	+0%	100/15 Summer				87.376	-0.269	0.000
1.003	D1003	1440 Summer		30	+0%	2/1440 Summer				86.502	0.332	0.000
1.004	D1004	1440 Summer		30	+0%					86.502	-1.398	0.000
1.005	D1005	1440 Summer		30	+0%	2/30 Summer				86.502	0.783	0.000
1.006	D1006	480 Winter		30	+0%	2/15 Summer				86.621	1.101	0.000
1.007	D1007	1440 Winter		30	+0%	2/15 Summer				87.052	1.732	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	D1000	0.69		5	29.0	OK	
1.001	D1001	0.72		12	33.2	OK	
1.002	D1002	0.12		316	5.4	OK	
2.000	D1100	0.58		5	31.3	OK	
1.003	D1003	0.03			7.6	SURCHARGED	
1.004	D1004	0.00			7.8	OK	
1.005	D1005	0.25			14.3	SURCHARGED	
1.006	D1006	0.05			0.8	SURCHARGED	
1.007	D1007	1.08			18.3	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000
Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0
MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0
Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500
Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0
Number of Offline Controls 0
Number of Time/Area Diagrams 0

Number of Online Controls 1
Number of Storage Structures 5
Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
Data Type Point

FEH Rainfall Version 2013 Cv (Summer) 1.000

Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

DVD Status OFF

Inertia Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

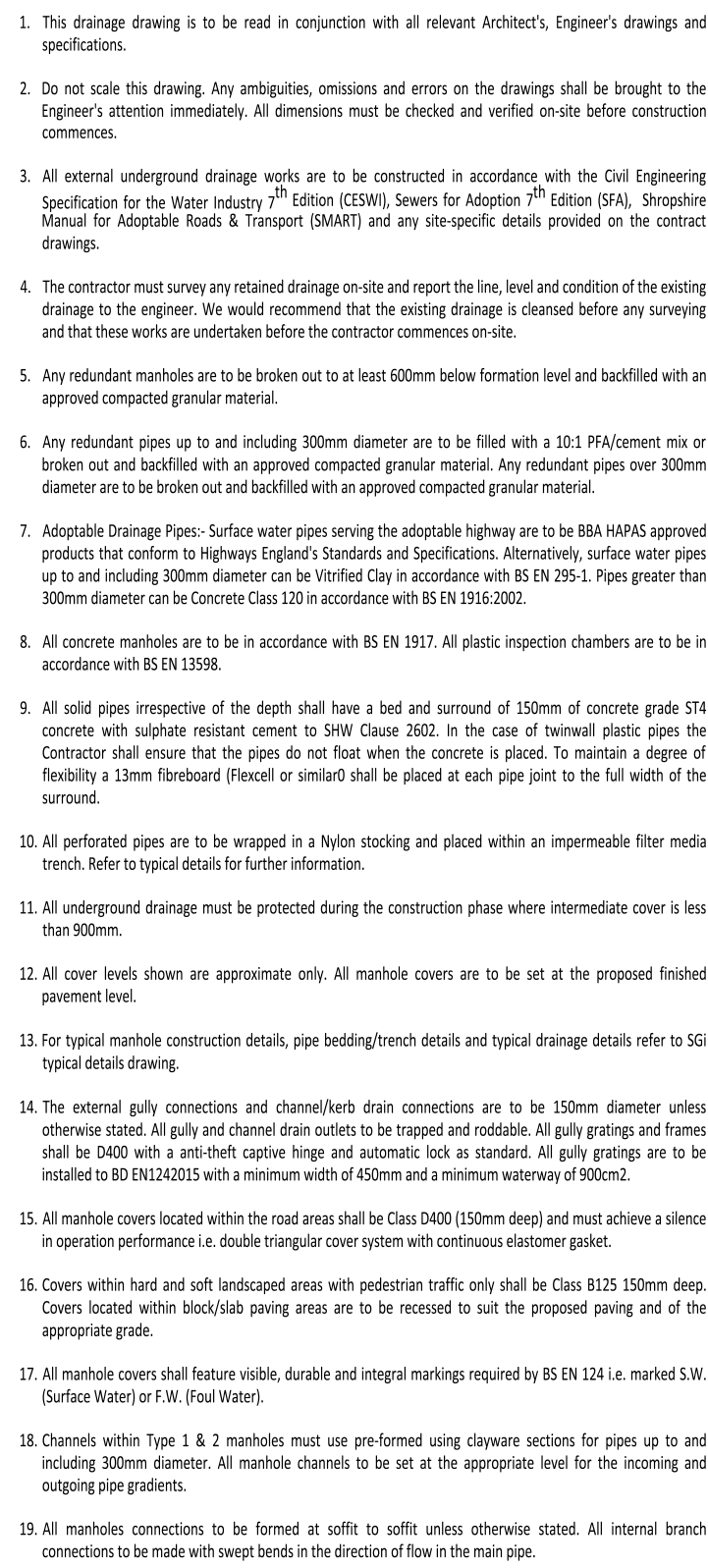
Return Period(s) (years) 2, 5, 30, 100

Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	D1000	15 Summer	100	+45%	100/15 Summer				87.599	0.359	0.000
1.001	D1001	60 Summer	100	+45%	100/15 Summer				87.469	0.434	0.000
1.002	D1002	30 Summer	100	+45%	100/15 Summer				87.152	0.327	0.000
2.000	D1100	15 Summer	100	+45%	100/15 Summer				87.811	0.166	0.000
1.003	D1003	1440 Summer	100	+45%	2/1440 Summer				86.968	0.798	0.000
1.004	D1004	1440 Summer	100	+45%					86.967	-0.933	0.000
1.005	D1005	1440 Summer	100	+45%	2/30 Summer				86.968	1.249	0.000
1.006	D1006	1440 Summer	100	+45%	2/15 Summer				87.136	1.616	0.000
1.007	D1007	480 Summer	100	+45%	2/15 Summer				87.031	1.711	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status	Level
							Exceeded
1.000	D1000	1.48		13	62.2	SURCHARGED	
1.001	D1001	1.47		20	67.3	SURCHARGED	
1.002	D1002	1.67		33	79.2	SURCHARGED	
2.000	D1100	1.00		7	53.7	SURCHARGED	
1.003	D1003	0.05			13.1	SURCHARGED	
1.004	D1004	0.00			13.0	OK	
1.005	D1005	0.26			15.0	SURCHARGED	
1.006	D1006	0.24			4.0	SURCHARGED	
1.007	D1007	0.04			0.7	SURCHARGED	

APPENDIX G I



APPENDIX G2

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	50.714	0.435	116.6	0.072	2.50	0.0		0.075	→ ○ →		Filter Drain	
1.001	84.333	0.355	237.6	0.102	0.00	0.0		0.075	→ ○ →		Filter Drain	
1.002	14.695	0.065	226.1	0.018	0.00	0.0		0.075	→ ○ →		Filter Drain	
1.003	12.878	0.055	234.1	0.018	0.00	0.0		0.075	→ ○ →		Filter Drain	
2.000	17.418	0.320	54.4	0.080	2.50	0.0		0.075	→ ○ →		Filter Drain	
1.004	12.035	0.050	240.7	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.005	13.819	0.001	13819.0	0.000	0.00	0.0		0.035	→_/		Pond/Tank	
1.006	7.925	0.049	161.7	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.007	7.925	0.100	79.3	0.000	0.00	0.0	0.600		o	150	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)
1.000	0.00	1.00	86.750	0.072	0.0	0.0	0.0	0.20	42.7	0.0
1.001	0.00	1.00	86.240	0.174	0.0	0.0	0.0	0.16	39.2	0.0
1.002	0.00	1.00	85.810	0.192	0.0	0.0	0.0	0.17	52.2	0.0
1.003	0.00	1.00	85.745	0.210	0.0	0.0	0.0	0.17	51.3	0.0
2.000	0.00	1.00	86.010	0.080	0.0	0.0	0.0	0.35	106.5	0.0
1.004	0.00	1.00	85.690	0.290	0.0	0.0	0.0	1.16	128.5	0.0
1.005	0.00	1.00	85.640	0.290	0.0	0.0	0.0	0.15	2934.3	0.0
1.006	0.00	1.00	85.639	0.290	0.0	0.0	0.0	1.23	87.2	0.0
1.007	0.00	1.00	85.590	0.290	0.0	0.0	0.0	1.13	20.0	0.0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.072	0.072	0.072
1.001	-	-	100	0.102	0.102	0.102
1.002	-	-	100	0.018	0.018	0.018
1.003	-	-	100	0.018	0.018	0.018
2.000	-	-	100	0.080	0.080	0.080
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.290	0.290	0.290

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)
1.007	E1008	87.000	85.490	0.000	0	0

Online Controls for Storm

Hydro-Brake® Optimum Manhole: E1007, DS/PN: 1.007, Volume (m³): 3.0

Unit Reference	MD-SCU-0059-5000-1910-5000
Design Head (m)	1.910
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	85.590
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.910	5.0	Kick-Flo®	0.089	1.2
Flush-Flo™	0.080	1.2	Mean Flow over Head Range	-	3.4

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)
0.100	1.3	0.800	3.3	2.000	5.1	4.000	7.1	7.000	9.3
0.200	1.8	1.000	3.7	2.200	5.3	4.500	7.5	7.500	9.6
0.300	2.1	1.200	4.0	2.400	5.6	5.000	7.9	8.000	9.9
0.400	2.4	1.400	4.3	2.600	5.8	5.500	8.2	8.500	10.2
0.500	2.7	1.600	4.6	3.000	6.2	6.000	8.6	9.000	10.4
0.600	2.9	1.800	4.9	3.500	6.7	6.500	8.9	9.500	10.7

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	E1000	15 Summer		2	+0%	100/15 Summer				87.004	-0.421	0.000
1.001	E1001	15 Summer		2	+0%	30/30 Summer				86.520	-0.470	0.000
1.002	E1002	240 Summer		2	+0%	100/15 Summer				86.114	-0.521	0.000
1.003	E1003	240 Summer		2	+0%	100/15 Summer				86.112	-0.458	0.000
2.000	E1100	15 Summer		2	+0%	100/60 Summer				86.172	-0.663	0.000
1.004	E1004	240 Summer		2	+0%	2/120 Summer				86.110	0.045	0.000
1.005	E1005	240 Summer		2	+0%					86.110	-1.390	0.000
1.006	E1006	240 Summer		2	+0%	2/30 Summer				86.110	0.171	0.000
1.007	E1007	240 Summer		2	+0%	2/15 Summer				86.169	0.429	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	E1000	0.31		3	13.4	OK	
1.001	E1001	0.39		9	15.5	OK	
1.002	E1002	0.18		122	9.6	OK	
1.003	E1003	0.17		183	8.7	OK	
2.000	E1100	0.18		4	18.9	OK	
1.004	E1004	0.10			9.5	SURCHARGED	
1.005	E1005	0.00			9.1	OK	
1.006	E1006	0.08			4.7	SURCHARGED	
1.007	E1007	0.16			2.8	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

 Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	E1000	15 Summer	5	+0%	100/15 Summer				87.108	-0.317	0.000
1.001	E1001	30 Summer	5	+0%	30/30 Summer				86.636	-0.354	0.000
1.002	E1002	180 Winter	5	+0%	100/15 Summer				86.224	-0.411	0.000
1.003	E1003	180 Winter	5	+0%	100/15 Summer				86.222	-0.348	0.000
2.000	E1100	180 Winter	5	+0%	100/60 Summer				86.220	-0.615	0.000
1.004	E1004	180 Winter	5	+0%	2/120 Summer				86.220	0.155	0.000
1.005	E1005	240 Winter	5	+0%					86.219	-1.281	0.000
1.006	E1006	240 Winter	5	+0%	2/30 Summer				86.219	0.280	0.000
1.007	E1007	240 Summer	5	+0%	2/15 Summer				86.287	0.547	0.000

			Half Drain		Pipe		
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	E1000	0.42		3	17.7	OK	
1.001	E1001	0.58		11	22.6	OK	
1.002	E1002	0.20		101	10.4	OK	
1.003	E1003	0.19			9.6	OK	
2.000	E1100	0.05		107	5.0	OK	
1.004	E1004	0.12			11.5	SURCHARGED	
1.005	E1005	0.00			9.4	OK	
1.006	E1006	0.08			5.2	SURCHARGED	
1.007	E1007	0.17			3.0	SURCHARGED	

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

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Storage Structures	6
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 339198 334094 SJ 39198 34094	Cv (Winter)	1.000
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5	Second Increment (Extended)	
DTS Status			ON
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440		
Return Period(s) (years)			2, 5, 30, 100
Climate Change (%)			0, 0, 0, 45

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

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	E1000	15 Summer	30	+0%	100/15 Summer				87.425	0.000	0.000
1.001	E1001	30 Summer	30	+0%	30/30 Summer				86.999	0.009	0.000
1.002	E1002	180 Winter	30	+0%	100/15 Summer				86.506	-0.129	0.000
1.003	E1003	180 Winter	30	+0%	100/15 Summer				86.503	-0.067	0.000
2.000	E1100	180 Winter	30	+0%	100/60 Summer				86.500	-0.335	0.000
1.004	E1004	180 Winter	30	+0%	2/120 Summer				86.500	0.435	0.000
1.005	E1005	180 Winter	30	+0%					86.499	-1.001	0.000
1.006	E1006	180 Winter	30	+0%	2/30 Summer				86.499	0.560	0.000
1.007	E1007	180 Winter	30	+0%	2/15 Summer				86.568	0.828	0.000

Half Drain Pipe							
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	E1000	0.73		4	31.1	OK	
1.001	E1001	0.94		12	36.8	SURCHARGED	
1.002	E1002	0.32			16.7	OK	
1.003	E1003	0.32			16.6	OK	
2.000	E1100	0.07			7.8	OK	
1.004	E1004	0.20			20.1	SURCHARGED	
1.005	E1005	0.00			19.9	OK	
1.006	E1006	0.09			5.7	SURCHARGED	
1.007	E1007	0.21			3.6	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 6

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH

Data Type Point

FEH Rainfall Version 2013 Cv (Summer) 1.000

Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

DVD Status OFF

Inertia Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 2, 5, 30, 100

Climate Change (%) 0, 0, 0, 45

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

										Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)	
1.000	E1000	30 Summer	100	+45%	100/15 Summer				88.336	0.911	0.000	
1.001	E1001	30 Summer	100	+45%	30/30 Summer				87.940	0.950	0.000	
1.002	E1002	240 Winter	100	+45%	100/15 Summer				87.064	0.429	0.000	
1.003	E1003	240 Winter	100	+45%	100/15 Summer				87.059	0.489	0.000	
2.000	E1100	240 Winter	100	+45%	100/60 Summer				87.055	0.220	0.000	
1.004	E1004	240 Winter	100	+45%	2/120 Summer				87.055	0.990	0.000	
1.005	E1005	240 Winter	100	+45%					87.053	-0.447	0.000	
1.006	E1006	240 Winter	100	+45%	2/30 Summer				87.053	1.114	0.000	
1.007	E1007	240 Summer	100	+45%	2/15 Summer				87.216	1.476	0.000	

				Half Drain	Pipe		
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	E1000	1.39		11	59.2	FLOOD RISK	
1.001	E1001	2.15		17	84.4	SURCHARGED	
1.002	E1002	0.44			23.0	SURCHARGED	
1.003	E1003	0.47			24.2	SURCHARGED	
2.000	E1100	0.10			11.1	SURCHARGED	
1.004	E1004	0.33			32.6	SURCHARGED	
1.005	E1005	0.00			32.3	OK	
1.006	E1006	0.12			7.6	SURCHARGED	
1.007	E1007	0.26			4.4	SURCHARGED	

APPENDIX G3

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	50.714	0.435	116.6	0.072	2.50	0.0		0.075	→ ○ →		Filter Drain	
1.001	84.333	0.355	237.6	0.102	0.00	0.0		0.075	→ ○ →		Filter Drain	
1.002	14.695	0.065	226.1	0.018	0.00	0.0		0.075	→ ○ →		Filter Drain	
1.003	12.878	0.055	234.1	0.018	0.00	0.0		0.075	→ ○ →		Filter Drain	
2.000	17.418	0.320	54.4	0.080	2.50	0.0		0.075	→ ○ →		Filter Drain	
1.004	12.035	0.050	240.7	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.005	13.819	0.001	13819.0	0.000	0.00	0.0		0.035	→_/		Pond/Tank	
1.006	7.925	0.049	161.7	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.007	7.925	0.100	79.3	0.000	0.00	0.0	0.600		o	150	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)
1.000	0.00	1.00	86.750	0.072	0.0	0.0	0.0	0.20	42.7	0.0
1.001	0.00	1.00	86.240	0.174	0.0	0.0	0.0	0.16	39.2	0.0
1.002	0.00	1.00	85.810	0.192	0.0	0.0	0.0	0.17	52.2	0.0
1.003	0.00	1.00	85.745	0.210	0.0	0.0	0.0	0.17	51.3	0.0
2.000	0.00	1.00	86.010	0.080	0.0	0.0	0.0	0.35	106.5	0.0
1.004	0.00	1.00	85.690	0.290	0.0	0.0	0.0	1.16	128.5	0.0
1.005	0.00	1.00	85.640	0.290	0.0	0.0	0.0	0.15	2934.3	0.0
1.006	0.00	1.00	85.639	0.290	0.0	0.0	0.0	1.23	87.2	0.0
1.007	0.00	1.00	85.590	0.290	0.0	0.0	0.0	1.13	20.0	0.0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.072	0.072	0.072
1.001	-	-	100	0.102	0.102	0.102
1.002	-	-	100	0.018	0.018	0.018
1.003	-	-	100	0.018	0.018	0.018
2.000	-	-	100	0.080	0.080	0.080
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.290	0.290	0.290

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007	E1008	87.000	85.490	0.000	0	0
Datum (m) 85.490 Offset (mins) 0						

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	1.540	36	1.540	71	1.540	106	1.540	141	1.540	176	1.540	211	1.540
2	1.540	37	1.540	72	1.540	107	1.540	142	1.540	177	1.540	212	1.540
3	1.540	38	1.540	73	1.540	108	1.540	143	1.540	178	1.540	213	1.540
4	1.540	39	1.540	74	1.540	109	1.540	144	1.540	179	1.540	214	1.540
5	1.540	40	1.540	75	1.540	110	1.540	145	1.540	180	1.540	215	1.540
6	1.540	41	1.540	76	1.540	111	1.540	146	1.540	181	1.540	216	1.540
7	1.540	42	1.540	77	1.540	112	1.540	147	1.540	182	1.540	217	1.540
8	1.540	43	1.540	78	1.540	113	1.540	148	1.540	183	1.540	218	1.540
9	1.540	44	1.540	79	1.540	114	1.540	149	1.540	184	1.540	219	1.540
10	1.540	45	1.540	80	1.540	115	1.540	150	1.540	185	1.540	220	1.540
11	1.540	46	1.540	81	1.540	116	1.540	151	1.540	186	1.540	221	1.540
12	1.540	47	1.540	82	1.540	117	1.540	152	1.540	187	1.540	222	1.540
13	1.540	48	1.540	83	1.540	118	1.540	153	1.540	188	1.540	223	1.540
14	1.540	49	1.540	84	1.540	119	1.540	154	1.540	189	1.540	224	1.540
15	1.540	50	1.540	85	1.540	120	1.540	155	1.540	190	1.540	225	1.540
16	1.540	51	1.540	86	1.540	121	1.540	156	1.540	191	1.540	226	1.540
17	1.540	52	1.540	87	1.540	122	1.540	157	1.540	192	1.540	227	1.540
18	1.540	53	1.540	88	1.540	123	1.540	158	1.540	193	1.540	228	1.540
19	1.540	54	1.540	89	1.540	124	1.540	159	1.540	194	1.540	229	1.540
20	1.540	55	1.540	90	1.540	125	1.540	160	1.540	195	1.540	230	1.540
21	1.540	56	1.540	91	1.540	126	1.540	161	1.540	196	1.540	231	1.540
22	1.540	57	1.540	92	1.540	127	1.540	162	1.540	197	1.540	232	1.540
23	1.540	58	1.540	93	1.540	128	1.540	163	1.540	198	1.540	233	1.540
24	1.540	59	1.540	94	1.540	129	1.540	164	1.540	199	1.540	234	1.540
25	1.540	60	1.540	95	1.540	130	1.540	165	1.540	200	1.540	235	1.540
26	1.540	61	1.540	96	1.540	131	1.540	166	1.540	201	1.540	236	1.540
27	1.540	62	1.540	97	1.540	132	1.540	167	1.540	202	1.540	237	1.540
28	1.540	63	1.540	98	1.540	133	1.540	168	1.540	203	1.540	238	1.540
29	1.540	64	1.540	99	1.540	134	1.540	169	1.540	204	1.540	239	1.540
30	1.540	65	1.540	100	1.540	135	1.540	170	1.540	205	1.540	240	1.540
31	1.540	66	1.540	101	1.540	136	1.540	171	1.540	206	1.540	241	1.540
32	1.540	67	1.540	102	1.540	137	1.540	172	1.540	207	1.540	242	1.540
33	1.540	68	1.540	103	1.540	138	1.540	173	1.540	208	1.540	243	1.540
34	1.540	69	1.540	104	1.540	139	1.540	174	1.540	209	1.540	244	1.540
35	1.540	70	1.540	105	1.540	140	1.540	175	1.540	210	1.540	245	1.540

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
281	1.540	342	1.540	403	1.540	464	1.540	525	1.540	586	1.540	647	1.540	708	1.540
282	1.540	343	1.540	404	1.540	465	1.540	526	1.540	587	1.540	648	1.540	709	1.540
283	1.540	344	1.540	405	1.540	466	1.540	527	1.540	588	1.540	649	1.540	710	1.540
284	1.540	345	1.540	406	1.540	467	1.540	528	1.540	589	1.540	650	1.540	711	1.540
285	1.540	346	1.540	407	1.540	468	1.540	529	1.540	590	1.540	651	1.540	712	1.540
286	1.540	347	1.540	408	1.540	469	1.540	530	1.540	591	1.540	652	1.540	713	1.540
287	1.540	348	1.540	409	1.540	470	1.540	531	1.540	592	1.540	653	1.540	714	1.540
288	1.540	349	1.540	410	1.540	471	1.540	532	1.540	593	1.540	654	1.540	715	1.540
289	1.540	350	1.540	411	1.540	472	1.540	533	1.540	594	1.540	655	1.540	716	1.540
290	1.540	351	1.540	412	1.540	473	1.540	534	1.540	595	1.540	656	1.540	717	1.540
291	1.540	352	1.540	413	1.540	474	1.540	535	1.540	596	1.540	657	1.540	718	1.540
292	1.540	353	1.540	414	1.540	475	1.540	536	1.540	597	1.540	658	1.540	719	1.540
293	1.540	354	1.540	415	1.540	476	1.540	537	1.540	598	1.540	659	1.540	720	1.540
294	1.540	355	1.540	416	1.540	477	1.540	538	1.540	599	1.540	660	1.540	721	1.540
295	1.540	356	1.540	417	1.540	478	1.540	539	1.540	600	1.540	661	1.540	722	1.540
296	1.540	357	1.540	418	1.540	479	1.540	540	1.540	601	1.540	662	1.540	723	1.540
297	1.540	358	1.540	419	1.540	480	1.540	541	1.540	602	1.540	663	1.540	724	1.540
298	1.540	359	1.540	420	1.540	481	1.540	542	1.540	603	1.540	664	1.540	725	1.540
299	1.540	360	1.540	421	1.540	482	1.540	543	1.540	604	1.540	665	1.540	726	1.540
300	1.540	361	1.540	422	1.540	483	1.540	544	1.540	605	1.540	666	1.540	727	1.540
301	1.540	362	1.540	423	1.540	484	1.540	545	1.540	606	1.540	667	1.540	728	1.540
302	1.540	363	1.540	424	1.540	485	1.540	546	1.540	607	1.540	668	1.540	729	1.540
303	1.540	364	1.540	425	1.540	486	1.540	547	1.540	608	1.540	669	1.540	730	1.540
304	1.540	365	1.540	426	1.540	487	1.540	548	1.540	609	1.540	670	1.540	731	1.540
305	1.540	366	1.540	427	1.540	488	1.540	549	1.540	610	1.540	671	1.540	732	1.540
306	1.540	367	1.540	428	1.540	489	1.540	550	1.540	611	1.540	672	1.540	733	1.540
307	1.540	368	1.540	429	1.540	490	1.540	551	1.540	612	1.540	673	1.540	734	1.540
308	1.540	369	1.540	430	1.540	491	1.540	552	1.540	613	1.540	674	1.540	735	1.540
309	1.540	370	1.540	431	1.540	492	1.540	553	1.540	614	1.540	675	1.540	736	1.540
310	1.540	371	1.540	432	1.540	493	1.540	554	1.540	615	1.540	676	1.540	737	1.540
311	1.540	372	1.540	433	1.540	494	1.540	555	1.540	616	1.540	677	1.540	738	1.540
312	1.540	373	1.540	434	1.540	495	1.540	556	1.540	617	1.540	678	1.540	739	1.540
313	1.540	374	1.540	435	1.540	496	1.540	557	1.540	618	1.540	679	1.540	740	1.540
314	1.540	375	1.540	436	1.540	497	1.540	558	1.540	619	1.540	680	1.540	741	1.540
315	1.540	376	1.540	437	1.540	498	1.540	559	1.540	620	1.540	681	1.540	742	1.540
316	1.540	377	1.540	438	1.540	499	1.540	560	1.540	621	1.540	682	1.540	743	1.540
317	1.540	378	1.540	439	1.540	500	1.540	561	1.540	622	1.540	683	1.540	744	1.540
318	1.540	379	1.540	440	1.540	501	1.540	562	1.540	623	1.540	684	1.540	745	1.540
319	1.540	380	1.540	441	1.540	502	1.540	563	1.540	624	1.540	685	1.540	746	1.540
320	1.540	381	1.540	442	1.540	503	1.540	564	1.540	625	1.540	686	1.540	747	1.540
321	1.540	382	1.540	443	1.540	504	1.540	565	1.540	626	1.540	687	1.540	748	1.540
322	1.540	383	1.540	444	1.540	505	1.540	566	1.540	627	1.540	688	1.540	749	1.540
323	1.540	384	1.540	445	1.540	506	1.540	567	1.540	628	1.540	689	1.540	750	1.540
324	1.540	385	1.540	446	1.540	507	1.540	568	1.540	629	1.540	690	1.540	751	1.540
325	1.540	386	1.540	447	1.540	508	1.540	569	1.540	630	1.540	691	1.540	752	1.540
326	1.540	387	1.540	448	1.540	509	1.540	570	1.540	631	1.540	692	1.540	753	1.540
327	1.540	388	1.540	449	1.540	510	1.540	571	1.540	632	1.540	693	1.540	754	1.540
328	1.540	389	1.540	450	1.540	511	1.540	572	1.540	633	1.540	694	1.540	755	1.540
329	1.540	390	1.540	451	1.540	512	1.540	573	1.540	634	1.540	695	1.540	756	1.540
330	1.540	391	1.540	452	1.540	513	1.540	574	1.540	635	1.540	696	1.540	757	1.540
331	1.540	392	1.540	453	1.540	514	1.540	575	1.540	636	1.540	697	1.540	758	1.540
332	1.540	393	1.540	454	1.540	515	1.540	576	1.540	637	1.540	698	1.540	759	1.540
333	1.540	394	1.540	455	1.540	516	1.540	577	1.540	638	1.540	699	1.540	760	1.540
334	1.540	395	1.540	456	1.540	517	1.540	578	1.540	639	1.540	700	1.540	761	1.540
335	1.540	396	1.540	457	1.540	518	1.540	579	1.540	640	1.540	701	1.540	762	1.540
336	1.540	397	1.540	458	1.540	519	1.540	580	1.540	641	1.540	702	1.540	763	1.540
337	1.540	398	1.540	459	1.540	520	1.540	581	1.540	642	1.540	703	1.540	764	1.540
338	1.540	399	1.540	460	1.540	521	1.540	582	1.540	643	1.540	704	1.540	765	1.540
339	1.540	400	1.540	461	1.540	522	1.540	583	1.540	644	1.540	705	1.540	766	1.540
340	1.540	401	1.540	462	1.540	523	1.540	584	1.540	645	1.540	706	1.540	767	1.540
341	1.540	402	1.540	463	1.540	524	1.540	585	1.540	646	1.540	707	1.540	768	1.540

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
769	1.540	830	1.540	891	1.540	952	1.540	1013	1.540	1074	1.540	1135	1.540	1196	1.540
770	1.540	831	1.540	892	1.540	953	1.540	1014	1.540	1075	1.540	1136	1.540	1197	1.540
771	1.540	832	1.540	893	1.540	954	1.540	1015	1.540	1076	1.540	1137	1.540	1198	1.540
772	1.540	833	1.540	894	1.540	955	1.540	1016	1.540	1077	1.540	1138	1.540	1199	1.540
773	1.540	834	1.540	895	1.540	956	1.540	1017	1.540	1078	1.540	1139	1.540	1200	1.540
774	1.540	835	1.540	896	1.540	957	1.540	1018	1.540	1079	1.540	1140	1.540	1201	1.540
775	1.540	836	1.540	897	1.540	958	1.540	1019	1.540	1080	1.540	1141	1.540	1202	1.540
776	1.540	837	1.540	898	1.540	959	1.540	1020	1.540	1081	1.540	1142	1.540	1203	1.540
777	1.540	838	1.540	899	1.540	960	1.540	1021	1.540	1082	1.540	1143	1.540	1204	1.540
778	1.540	839	1.540	900	1.540	961	1.540	1022	1.540	1083	1.540	1144	1.540	1205	1.540
779	1.540	840	1.540	901	1.540	962	1.540	1023	1.540	1084	1.540	1145	1.540	1206	1.540
780	1.540	841	1.540	902	1.540	963	1.540	1024	1.540	1085	1.540	1146	1.540	1207	1.540
781	1.540	842	1.540	903	1.540	964	1.540	1025	1.540	1086	1.540	1147	1.540	1208	1.540
782	1.540	843	1.540	904	1.540	965	1.540	1026	1.540	1087	1.540	1148	1.540	1209	1.540
783	1.540	844	1.540	905	1.540	966	1.540	1027	1.540	1088	1.540	1149	1.540	1210	1.540
784	1.540	845	1.540	906	1.540	967	1.540	1028	1.540	1089	1.540	1150	1.540	1211	1.540
785	1.540	846	1.540	907	1.540	968	1.540	1029	1.540	1090	1.540	1151	1.540	1212	1.540
786	1.540	847	1.540	908	1.540	969	1.540	1030	1.540	1091	1.540	1152	1.540	1213	1.540
787	1.540	848	1.540	909	1.540	970	1.540	1031	1.540	1092	1.540	1153	1.540	1214	1.540
788	1.540	849	1.540	910	1.540	971	1.540	1032	1.540	1093	1.540	1154	1.540	1215	1.540
789	1.540	850	1.540	911	1.540	972	1.540	1033	1.540	1094	1.540	1155	1.540	1216	1.540
790	1.540	851	1.540	912	1.540	973	1.540	1034	1.540	1095	1.540	1156	1.540	1217	1.540
791	1.540	852	1.540	913	1.540	974	1.540	1035	1.540	1096	1.540	1157	1.540	1218	1.540
792	1.540	853	1.540	914	1.540	975	1.540	1036	1.540	1097	1.540	1158	1.540	1219	1.540
793	1.540	854	1.540	915	1.540	976	1.540	1037	1.540	1098	1.540	1159	1.540	1220	1.540
794	1.540	855	1.540	916	1.540	977	1.540	1038	1.540	1099	1.540	1160	1.540	1221	1.540
795	1.540	856	1.540	917	1.540	978	1.540	1039	1.540	1100	1.540	1161	1.540	1222	1.540
796	1.540	857	1.540	918	1.540	979	1.540	1040	1.540	1101	1.540	1162	1.540	1223	1.540
797	1.540	858	1.540	919	1.540	980	1.540	1041	1.540	1102	1.540	1163	1.540	1224	1.540
798	1.540	859	1.540	920	1.540	981	1.540	1042	1.540	1103	1.540	1164	1.540	1225	1.540
799	1.540	860	1.540	921	1.540	982	1.540	1043	1.540	1104	1.540	1165	1.540	1226	1.540
800	1.540	861	1.540	922	1.540	983	1.540	1044	1.540	1105	1.540	1166	1.540	1227	1.540
801	1.540	862	1.540	923	1.540	984	1.540	1045	1.540	1106	1.540	1167	1.540	1228	1.540
802	1.540	863	1.540	924	1.540	985	1.540	1046	1.540	1107	1.540	1168	1.540	1229	1.540
803	1.540	864	1.540	925	1.540	986	1.540	1047	1.540	1108	1.540	1169	1.540	1230	1.540
804	1.540	865	1.540	926	1.540	987	1.540	1048	1.540	1109	1.540	1170	1.540	1231	1.540
805	1.540	866	1.540	927	1.540	988	1.540	1049	1.540	1110	1.540	1171	1.540	1232	1.540
806	1.540	867	1.540	928	1.540	989	1.540	1050	1.540	1111	1.540	1172	1.540	1233	1.540
807	1.540	868	1.540	929	1.540	990	1.540	1051	1.540	1112	1.540	1173	1.540	1234	1.540
808	1.540	869	1.540	930	1.540	991	1.540	1052	1.540	1113	1.540	1174	1.540	1235	1.540
809	1.540	870	1.540	931	1.540	992	1.540	1053	1.540	1114	1.540	1175	1.540	1236	1.540
810	1.540	871	1.540	932	1.540	993	1.540	1054	1.540	1115	1.540	1176	1.540	1237	1.540
811	1.540	872	1.540	933	1.540	994	1.540	1055	1.540	1116	1.540	1177	1.540	1238	1.540
812	1.540	873	1.540	934	1.540	995	1.540	1056	1.540	1117	1.540	1178	1.540	1239	1.540
813	1.540	874	1.540	935	1.540	996	1.540	1057	1.540	1118	1.540	1179	1.540	1240	1.540
814	1.540	875	1.540	936	1.540	997	1.540	1058	1.540	1119	1.540	1180	1.540	1241	1.540
815	1.540	876	1.540	937	1.540	998	1.540	1059	1.540	1120	1.540	1181	1.540	1242	1.540
816	1.540	877	1.540	938	1.540	999	1.540	1060	1.540	1121	1.540	1182	1.540	1243	1.540
817	1.540	878	1.540	939	1.540	1000	1.540	1061	1.540	1122	1.540	1183	1.540	1244	1.540
818	1.540	879	1.540	940	1.540	1001	1.540	1062	1.540	1123	1.540	1184	1.540	1245	1.540
819	1.540	880	1.540	941	1.540	1002	1.540	1063	1.540	1124	1.540	1185	1.540	1246	1.540
820	1.540	881	1.540	942	1.540	1003	1.540	1064	1.540	1125	1.540	1186	1.540	1247	1.540
821	1.540	882	1.540	943	1.540	1004	1.540	1065	1.540	1126	1.540	1187	1.540	1248	1.540
822	1.540	883	1.540	944	1.540	1005	1.540	1066	1.540	1127	1.540	1188	1.540	1249	1.540
823	1.540	884	1.540	945	1.540	1006	1.540	1067	1.540	1128	1.540	1189	1.540	1250	1.540
824	1.540	885	1.540	946	1.540	1007	1.540	1068	1.540	1129	1.540	1190	1.540	1251	1.540
825	1.540	886	1.540	947	1.540	1008	1.540	1069	1.540	1130	1.540	1191	1.540	1252	1.540
826	1.540	887	1.540	948	1.540	1009	1.540	1070	1.540	1131	1.540	1192	1.540	1253	1.540
827	1.540	888	1.540	949	1.540	1010	1.540	1071	1.540	1132	1.540	1193	1.540	1254	1.540
828	1.540	889	1.540	950	1.540	1011	1.540	1072	1.540	1133	1.540	1194	1.540	1255	1.540
829	1.540	890	1.540	951	1.540	1012	1.540	1073	1.540	1134	1.540	1195	1.540	1256	1.540

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1257	1.540	1280	1.540	1303	1.540	1326	1.540	1349	1.540	1372	1.540	1395	1.540	1418	1.540
1258	1.540	1281	1.540	1304	1.540	1327	1.540	1350	1.540	1373	1.540	1396	1.540	1419	1.540
1259	1.540	1282	1.540	1305	1.540	1328	1.540	1351	1.540	1374	1.540	1397	1.540	1420	1.540
1260	1.540	1283	1.540	1306	1.540	1329	1.540	1352	1.540	1375	1.540	1398	1.540	1421	1.540
1261	1.540	1284	1.540	1307	1.540	1330	1.540	1353	1.540	1376	1.540	1399	1.540	1422	1.540
1262	1.540	1285	1.540	1308	1.540	1331	1.540	1354	1.540	1377	1.540	1400	1.540	1423	1.540
1263	1.540	1286	1.540	1309	1.540	1332	1.540	1355	1.540	1378	1.540	1401	1.540	1424	1.540
1264	1.540	1287	1.540	1310	1.540	1333	1.540	1356	1.540	1379	1.540	1402	1.540	1425	1.540
1265	1.540	1288	1.540	1311	1.540	1334	1.540	1357	1.540	1380	1.540	1403	1.540	1426	1.540
1266	1.540	1289	1.540	1312	1.540	1335	1.540	1358	1.540	1381	1.540	1404	1.540	1427	1.540
1267	1.540	1290	1.540	1313	1.540	1336	1.540	1359	1.540	1382	1.540	1405	1.540	1428	1.540
1268	1.540	1291	1.540	1314	1.540	1337	1.540	1360	1.540	1383	1.540	1406	1.540	1429	1.540
1269	1.540	1292	1.540	1315	1.540	1338	1.540	1361	1.540	1384	1.540	1407	1.540	1430	1.540
1270	1.540	1293	1.540	1316	1.540	1339	1.540	1362	1.540	1385	1.540	1408	1.540	1431	1.540
1271	1.540	1294	1.540	1317	1.540	1340	1.540	1363	1.540	1386	1.540	1409	1.540	1432	1.540
1272	1.540	1295	1.540	1318	1.540	1341	1.540	1364	1.540	1387	1.540	1410	1.540	1433	1.540
1273	1.540	1296	1.540	1319	1.540	1342	1.540	1365	1.540	1388	1.540	1411	1.540	1434	1.540
1274	1.540	1297	1.540	1320	1.540	1343	1.540	1366	1.540	1389	1.540	1412	1.540	1435	1.540
1275	1.540	1298	1.540	1321	1.540	1344	1.540	1367	1.540	1390	1.540	1413	1.540	1436	1.540
1276	1.540	1299	1.540	1322	1.540	1345	1.540	1368	1.540	1391	1.540	1414	1.540	1437	1.540
1277	1.540	1300	1.540	1323	1.540	1346	1.540	1369	1.540	1392	1.540	1415	1.540	1438	1.540
1278	1.540	1301	1.540	1324	1.540	1347	1.540	1370	1.540	1393	1.540	1416	1.540	1439	1.540
1279	1.540	1302	1.540	1325	1.540	1348	1.540	1371	1.540	1394	1.540	1417	1.540	1440	1.540

Online Controls for Storm

Hydro-Brake® Optimum Manhole: E1007, DS/PN: 1.007, Volume (m³): 3.0

Unit Reference	MD-SCU-0059-5000-1910-5000
Design Head (m)	1.910
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	85.590
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.910	5.0	Kick-Flo®	0.089	1.2
Flush-Flo™	0.080	1.2	Mean Flow over Head Range	-	3.4

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)
0.100	1.3	0.800	3.3	2.000	5.1	4.000	7.1	7.000	9.3
0.200	1.8	1.000	3.7	2.200	5.3	4.500	7.5	7.500	9.6
0.300	2.1	1.200	4.0	2.400	5.6	5.000	7.9	8.000	9.9
0.400	2.4	1.400	4.3	2.600	5.8	5.500	8.2	8.500	10.2
0.500	2.7	1.600	4.6	3.000	6.2	6.000	8.6	9.000	10.4
0.600	2.9	1.800	4.9	3.500	6.7	6.500	8.9	9.500	10.7

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	E1000	15	Summer	2	+0%	100/15	Summer			87.004	-0.421	0.000
1.001	E1001	15	Summer	2	+0%	30/30	Summer			86.520	-0.470	0.000
1.002	E1002	1440	Summer	2	+0%	30/180	Summer			86.503	-0.132	0.000
1.003	E1003	1440	Summer	2	+0%	5/1440	Summer			86.503	-0.067	0.000
2.000	E1100	1440	Summer	2	+0%	30/960	Summer			86.503	-0.332	0.000
1.004	E1004	1440	Summer	2	+0%	2/60	Summer			86.504	0.439	0.000
1.005	E1005	1440	Summer	2	+0%					86.505	-0.995	0.000
1.006	E1006	1440	Summer	2	+0%	2/15	Summer			86.505	0.566	0.000
1.007	E1007	1440	Summer	2	+0%	2/15	Summer			86.584	0.844	0.000

			Half Drain		Pipe			Level
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded	
1.000	E1000	0.31		3	13.4	OK		
1.001	E1001	0.39		9	15.5	OK		
1.002	E1002	0.04		233	2.2	OK		
1.003	E1003	0.04		367	2.2	OK		
2.000	E1100	0.01		229	1.0	OK		
1.004	E1004	0.03			2.8	SURCHARGED		
1.005	E1005	0.00			2.7	OK		
1.006	E1006	0.22			13.3	SURCHARGED		
1.007	E1007	0.21			3.6	SURCHARGED		

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded
US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	E1000	15 Summer	30	+0%	100/15 Summer				87.425	0.000	0.000
1.001	E1001	30 Summer	30	+0%	30/30 Summer				86.999	0.009	0.000
1.002	E1002	1440 Summer	30	+0%	30/180 Summer				86.913	0.278	0.000
1.003	E1003	1440 Summer	30	+0%	5/1440 Summer				86.912	0.342	0.000
2.000	E1100	1440 Summer	30	+0%	30/960 Summer				86.912	0.077	0.000
1.004	E1004	1440 Summer	30	+0%	2/60 Summer				86.912	0.847	0.000
1.005	E1005	1440 Summer	30	+0%					86.912	-0.588	0.000
1.006	E1006	1440 Summer	30	+0%	2/15 Summer				86.912	0.973	0.000
1.007	E1007	1440 Summer	30	+0%	2/15 Summer				86.992	1.252	0.000

			Half Drain	Pipe			
US/MH		Flow / Overflow	Time	Flow	Level		
PN	Name	Cap.	(l/s)	(mins)	(l/s)	Status	Exceeded
1.000	E1000	0.73		4	31.1	OK	
1.001	E1001	0.94		12	36.8	SURCHARGED	
1.002	E1002	0.08		512	3.9	SURCHARGED	
1.003	E1003	0.08		633	4.0	SURCHARGED	
2.000	E1100	0.02		422	2.0	SURCHARGED	
1.004	E1004	0.06			5.5	SURCHARGED	
1.005	E1005	0.00			5.4	OK	
1.006	E1006	0.17			10.7	SURCHARGED	
1.007	E1007	0.24			4.2	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000
Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0
MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0
Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500
Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0
Number of Offline Controls 0
Number of Time/Area Diagrams 0

Number of Online Controls 1
Number of Storage Structures 6
Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
Data Type Point

FEH Rainfall Version 2013 Cv (Summer) 1.000

Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

DVD Status OFF

Inertia Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 2, 5, 30, 100

Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	E1000	30	Summer	100	+45%	100/15	Summer			88.336	0.911	0.000
1.001	E1001	30	Summer	100	+45%	30/30	Summer			87.940	0.950	0.000
1.002	E1002	1440	Winter	100	+45%	30/180	Summer			87.314	0.679	0.000
1.003	E1003	1440	Winter	100	+45%	5/1440	Summer			87.313	0.743	0.000
2.000	E1100	1440	Winter	100	+45%	30/960	Summer			87.312	0.477	0.000
1.004	E1004	1440	Winter	100	+45%	2/60	Summer			87.311	1.246	0.000
1.005	E1005	1440	Winter	100	+45%					87.311	-0.189	0.000
1.006	E1006	1440	Winter	100	+45%	2/15	Summer			87.311	1.372	0.000
1.007	E1007	480	Winter	100	+45%	2/15	Summer			87.432	1.692	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	E1000	1.39		11	59.2	FLOOD RISK	
1.001	E1001	2.15		18	84.4	SURCHARGED	
1.002	E1002	0.11		1135	5.6	SURCHARGED	
1.003	E1003	0.12		1136	5.9	SURCHARGED	
2.000	E1100	0.02		867	2.5	SURCHARGED	
1.004	E1004	0.08			8.1	SURCHARGED	
1.005	E1005	0.00			8.0	FLOOD RISK	
1.006	E1006	0.12			7.6	FLOOD RISK	
1.007	E1007	0.11			2.0	SURCHARGED	

APPENDIX HI

APPENDIX H2

SGi Consulting		Page 1
4th Floor, Colchester House		
40 Peter Street		
Manchester, M2 5GP		
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Micro Drainage	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	45.000	0.610	73.8	0.214	2.50	0.0	0.600		o	450	Pipe/Conduit	
1.001	45.000	0.510	88.2	0.214	0.00	0.0	0.600		o	525	Pipe/Conduit	
1.002	45.021	0.300	150.1	0.214	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.003	60.000	0.250	240.0	0.214	0.00	0.0	0.600		o	675	Pipe/Conduit	
1.004	76.617	0.595	128.8	0.214	0.00	0.0	0.600		o	750	Pipe/Conduit	
2.000	45.000	0.525	85.7	0.210	2.50	0.0	0.600		o	375	Pipe/Conduit	
2.001	45.000	0.295	152.5	0.210	0.00	0.0	0.600		o	450	Pipe/Conduit	
2.002	90.000	0.395	227.8	0.210	0.00	0.0	0.600		o	600	Pipe/Conduit	
2.003	20.000	0.955	20.9	0.210	0.00	0.0	0.600		o	600	Pipe/Conduit	
3.000	20.000	0.050	400.0	0.210	2.50	0.0	0.600		o	600	Pipe/Conduit	
3.001	20.000	0.050	400.0	0.210	0.00	0.0	0.600		o	750	Pipe/Conduit	
3.002	20.000	0.050	400.0	0.210	0.00	0.0	0.600		o	750	Pipe/Conduit	
2.004	57.987	0.955	60.7	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
1.005	27.659	0.405	68.3	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
4.000	45.304	0.690	65.7	0.104	2.50	0.0	0.600		o	450	Pipe/Conduit	
4.001	21.453	0.200	107.3	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.006	23.727	0.001	23726.8	0.000	0.00	0.0		0.035 → _ /			Pond/Tank	
1.007	12.756	0.054	236.2	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.008	10.446	0.105	99.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.009	18.416	0.190	96.9	0.000	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)
1.000	0.00	1.00	88.370	0.214	0.0	0.0	0.0	2.37	376.8	0.0
1.001	0.00	1.00	87.685	0.428	0.0	0.0	0.0	2.39	516.4	0.0
1.002	0.00	1.00	87.100	0.642	0.0	0.0	0.0	1.99	561.4	0.0
1.003	0.00	1.00	86.725	0.856	0.0	0.0	0.0	1.69	603.8	0.0
1.004	0.00	1.00	86.400	1.070	0.0	0.0	0.0	2.46	1088.9	0.0
2.000	0.00	1.00	89.305	0.210	0.0	0.0	0.0	1.96	216.3	0.0
2.001	0.00	1.00	88.705	0.420	0.0	0.0	0.0	1.64	261.4	0.0
2.002	0.00	1.00	88.260	0.630	0.0	0.0	0.0	1.61	455.0	0.0
2.003	0.00	1.00	87.865	0.840	0.0	0.0	0.0	5.34	1509.0	0.0
3.000	0.00	1.00	87.060	0.210	0.0	0.0	0.0	1.21	342.5	0.0
3.001	0.00	1.00	86.860	0.420	0.0	0.0	0.0	1.39	615.4	0.0
3.002	0.00	1.00	86.810	0.630	0.0	0.0	0.0	1.39	615.4	0.0
2.004	0.00	1.00	86.760	1.470	0.0	0.0	0.0	3.60	1588.4	0.0
1.005	0.00	1.00	85.655	2.540	0.0	0.0	0.0	3.79	2414.0	0.0
4.000	0.00	1.00	86.590	0.104	0.0	0.0	0.0	2.51	399.5	0.0
4.001	0.00	1.00	85.900	0.104	0.0	0.0	0.0	1.96	312.1	0.0
1.006	0.00	1.00	85.250	2.644	0.0	0.0	0.0	0.17	21541.3	0.0
1.007	0.00	1.00	85.249	2.644	0.0	0.0	0.0	1.02	72.0	0.0
1.008	0.00	1.00	85.195	2.644	0.0	0.0	0.0	1.58	111.4	0.0
1.009	0.00	1.00	85.090	2.644	0.0	0.0	0.0	1.60	112.9	0.0

SGi Consulting		Page 2
4th Floor, Colchester House 40 Peter Street Manchester, M2 5GP		
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File Resi - Catchment 1 001 FEH.MDX	Checked by	
Micro Drainage		Network 2020.1.3

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.010	15.952	0.225	70.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.011	9.194	0.095	96.8	0.000	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)
1.010	0.00	1.00	84.900	2.644	0.0	0.0	0.0	1.87	132.2	0.0
1.011	0.00	1.00	84.675	2.644	0.0	0.0	0.0	1.60	113.0	0.0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.214	0.214	0.214
1.001	-	-	100	0.214	0.214	0.214
1.002	-	-	100	0.214	0.214	0.214
1.003	-	-	100	0.214	0.214	0.214
1.004	-	-	100	0.214	0.214	0.214
2.000	-	-	100	0.210	0.210	0.210
2.001	-	-	100	0.210	0.210	0.210
2.002	-	-	100	0.210	0.210	0.210
2.003	-	-	100	0.210	0.210	0.210
3.000	-	-	100	0.210	0.210	0.210
3.001	-	-	100	0.210	0.210	0.210
3.002	-	-	100	0.210	0.210	0.210
2.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.104	0.104	0.104
4.001	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.644	2.644	2.644

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)
1.011	CULVERT	87.810	84.580	0.000	0	0

Online Controls for Storm

Hydro-Brake® Optimum Manhole: RC1008, DS/PN: 1.008, Volume (m³): 4.1

Unit Reference	MD-SCU-0112-2000-2600-2000
Design Head (m)	2.600
Design Flow (l/s)	20.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	112
Invert Level (m)	85.195
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.600	20.0	Kick-Flo®	0.169	5.5
Flush-Flo™	0.140	5.6	Mean Flow over Head Range	-	13.5

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)
0.100	4.3	0.800	11.4	2.000	17.6	4.000	24.6	7.000	32.2
0.200	6.0	1.000	12.7	2.200	18.5	4.500	26.0	7.500	33.3
0.300	7.2	1.200	13.8	2.400	19.2	5.000	27.4	8.000	34.4
0.400	8.2	1.400	14.9	2.600	20.0	5.500	28.7	8.500	35.4
0.500	9.1	1.600	15.9	3.000	21.4	6.000	29.9	9.000	36.4
0.600	10.0	1.800	16.8	3.500	23.1	6.500	31.1	9.500	37.4

Storage Structures for Storm

Tank or Pond Pipe: 1.006

Manning's N 0.035 Invert Level (m) 85.250

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	655.0	2.600	1593.0	2.601	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

										Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)	
1.000	RC1000	15 Summer	2	+0%	100/15 Summer				88.495	-0.325	0.000	
1.001	RC1001	15 Summer	2	+0%	100/15 Summer				87.844	-0.366	0.000	
1.002	RC1002	15 Summer	2	+0%	100/15 Summer				87.303	-0.397	0.000	
1.003	RC1003	15 Summer	2	+0%	100/15 Summer				86.973	-0.427	0.000	
1.004	RC1004	15 Summer	2	+0%	100/15 Summer				86.616	-0.534	0.000	
2.000	RC1100	15 Summer	2	+0%	100/15 Summer				89.443	-0.237	0.000	
2.001	RC1101	15 Summer	2	+0%	30/15 Summer				88.897	-0.258	0.000	
2.002	RC1102	15 Summer	2	+0%	100/15 Summer				88.474	-0.386	0.000	
2.003	RC1103	15 Summer	2	+0%					88.017	-0.448	0.000	
3.000	RC1200	15 Summer	2	+0%	100/15 Summer				87.251	-0.409	0.000	
3.001	RC1201	15 Summer	2	+0%	100/15 Summer				87.112	-0.498	0.000	
3.002	RC1202	15 Summer	2	+0%	100/15 Summer				87.070	-0.490	0.000	
2.004	RC1104	15 Summer	2	+0%	100/15 Summer				86.978	-0.532	0.000	
1.005	RC1005	15 Summer	2	+0%	30/240 Summer				85.990	-0.565	0.000	
4.000	RC1300	15 Summer	2	+0%	100/60 Summer				86.674	-0.366	0.000	
4.001	RC1301	15 Summer	2	+0%	30/60 Summer				86.000	-0.350	0.000	
1.006	RC1006	720 Summer	2	+0%					85.942	-1.908	0.000	
1.007	RC1007	720 Summer	2	+0%	2/15 Summer				85.942	0.393	0.000	
1.008	RC1008	480 Winter	2	+0%	2/15 Summer				86.088	0.593	0.000	
1.009	RC1009	720 Winter	2	+0%					85.157	-0.233	0.000	
1.010	RC1010	480 Winter	2	+0%					84.963	-0.237	0.000	
1.011	RC1011	720 Summer	2	+0%					84.750	-0.225	0.000	

									Half Drain	Pipe
PN	US/MH Name	Flow Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded			
1.000	RC1000	0.17			56.8	OK				
1.001	RC1001	0.19			85.8	OK				
1.002	RC1002	0.25			120.1	OK				
1.003	RC1003	0.28			147.4	OK				

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

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.004	RC1004	0.18			173.6	OK	
2.000	RC1100	0.28			54.9	OK	
2.001	RC1101	0.36			84.9	OK	
2.002	RC1102	0.26			108.9	OK	
2.003	RC1103	0.14			141.7	OK	
3.000	RC1200	0.22			55.6	OK	
3.001	RC1201	0.19			83.5	OK	
3.002	RC1202	0.26			113.9	OK	
2.004	RC1104	0.19			253.4	OK	
1.005	RC1005	0.29			419.8	OK	
4.000	RC1300	0.08			27.6	OK	
4.001	RC1301	0.11			27.0	OK	
1.006	RC1006	0.00			71.8	OK	
1.007	RC1007	0.24			14.4	SURCHARGED	
1.008	RC1008	0.14			11.0	SURCHARGED	
1.009	RC1009	0.11			11.0	OK	
1.010	RC1010	0.10			11.0	OK	
1.011	RC1011	0.14			11.0	OK	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	RC1000	15 Summer		5	+0%	100/15 Summer				88.520	-0.300	0.000
1.001	RC1001	15 Summer		5	+0%	100/15 Summer				87.874	-0.336	0.000
1.002	RC1002	15 Summer		5	+0%	100/15 Summer				87.345	-0.355	0.000
1.003	RC1003	15 Summer		5	+0%	100/15 Summer				87.024	-0.376	0.000
1.004	RC1004	15 Summer		5	+0%	100/15 Summer				86.657	-0.493	0.000
2.000	RC1100	15 Summer		5	+0%	100/15 Summer				89.471	-0.209	0.000
2.001	RC1101	15 Summer		5	+0%	30/15 Summer				88.939	-0.216	0.000
2.002	RC1102	15 Summer		5	+0%	100/15 Summer				88.518	-0.342	0.000
2.003	RC1103	15 Summer		5	+0%					88.049	-0.416	0.000
3.000	RC1200	15 Summer		5	+0%	100/15 Summer				87.290	-0.370	0.000
3.001	RC1201	15 Summer		5	+0%	100/15 Summer				87.166	-0.444	0.000
3.002	RC1202	15 Summer		5	+0%	100/15 Summer				87.123	-0.437	0.000
2.004	RC1104	15 Summer		5	+0%	100/15 Summer				87.019	-0.491	0.000
1.005	RC1005	480 Winter		5	+0%	30/240 Summer				86.122	-0.433	0.000
4.000	RC1300	15 Summer		5	+0%	100/60 Summer				86.690	-0.350	0.000
4.001	RC1301	480 Winter		5	+0%	30/60 Summer				86.121	-0.229	0.000
1.006	RC1006	480 Winter		5	+0%					86.121	-1.729	0.000
1.007	RC1007	480 Winter		5	+0%	2/15 Summer				86.121	0.572	0.000
1.008	RC1008	480 Winter		5	+0%	2/15 Summer				86.269	0.774	0.000
1.009	RC1009	360 Summer		5	+0%					85.161	-0.229	0.000
1.010	RC1010	480 Winter		5	+0%					84.966	-0.234	0.000
1.011	RC1011	480 Winter		5	+0%					84.754	-0.221	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	RC1000	0.24			79.8	OK	
1.001	RC1001	0.26			119.8	OK	
1.002	RC1002	0.35			168.3	OK	
1.003	RC1003	0.39			206.6	OK	

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

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.004	RC1004	0.25			242.7	OK	
2.000	RC1100	0.39			77.1	OK	
2.001	RC1101	0.51			118.9	OK	
2.002	RC1102	0.36			152.5	OK	
2.003	RC1103	0.20			198.1	OK	
3.000	RC1200	0.30			77.4	OK	
3.001	RC1201	0.27			116.4	OK	
3.002	RC1202	0.37			159.5	OK	
2.004	RC1104	0.26			354.0	OK	
1.005	RC1005	0.05			77.4	OK	
4.000	RC1300	0.11			38.8	OK	
4.001	RC1301	0.01			3.2	OK	
1.006	RC1006	0.00			78.3	OK	
1.007	RC1007	0.25			14.5	SURCHARGED	
1.008	RC1008	0.15			12.2	SURCHARGED	
1.009	RC1009	0.12			12.1	OK	
1.010	RC1010	0.11			12.2	OK	
1.011	RC1011	0.16			12.2	OK	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm	Period	Change		Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	RC1000	15 Summer	30	+0%	100/15 Summer					88.582	-0.238	0.000
1.001	RC1001	15 Summer	30	+0%	100/15 Summer					87.976	-0.234	0.000
1.002	RC1002	15 Summer	30	+0%	100/15 Summer					87.499	-0.201	0.000
1.003	RC1003	15 Summer	30	+0%	100/15 Summer					87.232	-0.168	0.000
1.004	RC1004	15 Summer	30	+0%	100/15 Summer					86.807	-0.343	0.000
2.000	RC1100	15 Summer	30	+0%	100/15 Summer					89.551	-0.129	0.000
2.001	RC1101	15 Summer	30	+0%	30/15 Summer					89.163	0.008	0.000
2.002	RC1102	15 Summer	30	+0%	100/15 Summer					88.684	-0.176	0.000
2.003	RC1103	15 Summer	30	+0%						88.146	-0.319	0.000
3.000	RC1200	15 Summer	30	+0%	100/15 Summer					87.410	-0.250	0.000
3.001	RC1201	15 Summer	30	+0%	100/15 Summer					87.356	-0.254	0.000
3.002	RC1202	15 Summer	30	+0%	100/15 Summer					87.319	-0.241	0.000
2.004	RC1104	15 Summer	30	+0%	100/15 Summer					87.165	-0.345	0.000
1.005	RC1005	480 Winter	30	+0%	30/240 Summer					86.591	0.036	0.000
4.000	RC1300	15 Summer	30	+0%	100/60 Summer					86.728	-0.312	0.000
4.001	RC1301	480 Winter	30	+0%	30/60 Summer					86.590	0.240	0.000
1.006	RC1006	480 Winter	30	+0%						86.590	-1.260	0.000
1.007	RC1007	480 Winter	30	+0%	2/15 Summer					86.590	1.041	0.000
1.008	RC1008	180 Summer	30	+0%	2/15 Summer					86.643	1.148	0.000
1.009	RC1009	480 Winter	30	+0%						85.168	-0.222	0.000
1.010	RC1010	480 Winter	30	+0%						84.972	-0.228	0.000
1.011	RC1011	480 Winter	30	+0%						84.764	-0.211	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	RC1000	0.44			148.5	OK	
1.001	RC1001	0.55			252.2	OK	
1.002	RC1002	0.76			370.7	OK	
1.003	RC1003	0.87			460.6	OK	

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

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.004	RC1004	0.55			531.2	OK	
2.000	RC1100	0.72			143.5	OK	
2.001	RC1101	1.02			240.5	SURCHARGED	
2.002	RC1102	0.79			331.4	OK	
2.003	RC1103	0.44			429.5	OK	
3.000	RC1200	0.56			143.5	OK	
3.001	RC1201	0.55			237.9	OK	
3.002	RC1202	0.80			347.2	OK	
2.004	RC1104	0.56			767.0	OK	
1.005	RC1005	0.08			120.7	SURCHARGED	
4.000	RC1300	0.20			72.3	OK	
4.001	RC1301	0.02			4.7	SURCHARGED	
1.006	RC1006	0.00			121.7	OK	
1.007	RC1007	0.28			16.6	SURCHARGED	
1.008	RC1008	0.18			14.5	SURCHARGED	
1.009	RC1009	0.15			14.8	OK	
1.010	RC1010	0.13			14.8	OK	
1.011	RC1011	0.19			14.8	OK	

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

Simulation Criteria

Areal Reduction Factor 1.000
Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0
MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0
Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500
Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0
Number of Offline Controls 0
Number of Time/Area Diagrams 0

Number of Online Controls 1
Number of Storage Structures 1
Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
Data Type Point

FEH Rainfall Version 2013 Cv (Summer) 1.000

Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

DVD Status OFF

Inertia Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 2, 5, 30, 100

Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	RC1000	15 Summer		100	+45%	100/15 Summer				89.000	0.180	0.000
1.001	RC1001	15 Summer		100	+45%	100/15 Summer				88.825	0.615	0.000
1.002	RC1002	15 Summer		100	+45%	100/15 Summer				88.507	0.807	0.000
1.003	RC1003	15 Summer		100	+45%	100/15 Summer				88.152	0.752	0.000
1.004	RC1004	15 Summer		100	+45%	100/15 Summer				87.647	0.497	0.000
2.000	RC1100	15 Summer		100	+45%	100/15 Summer				91.177	1.497	0.000
2.001	RC1101	15 Summer		100	+45%	30/15 Summer				90.463	1.308	0.000
2.002	RC1102	15 Summer		100	+45%	100/15 Summer				89.448	0.588	0.000
2.003	RC1103	15 Summer		100	+45%					88.389	-0.076	0.000
3.000	RC1200	15 Summer		100	+45%	100/15 Summer				88.020	0.360	0.000
3.001	RC1201	15 Summer		100	+45%	100/15 Summer				87.986	0.376	0.000
3.002	RC1202	15 Summer		100	+45%	100/15 Summer				87.940	0.380	0.000
2.004	RC1104	15 Summer		100	+45%	100/15 Summer				87.844	0.334	0.000
1.005	RC1005	480 Winter		100	+45%	30/240 Summer				87.517	0.962	0.000
4.000	RC1300	480 Winter		100	+45%	100/60 Summer				87.516	0.476	0.000
4.001	RC1301	480 Winter		100	+45%	30/60 Summer				87.516	1.166	0.000
1.006	RC1006	480 Winter		100	+45%					87.516	-0.334	0.000
1.007	RC1007	480 Winter		100	+45%	2/15 Summer				87.516	1.967	0.000
1.008	RC1008	480 Summer		100	+45%	2/15 Summer				87.638	2.143	0.000
1.009	RC1009	480 Winter		100	+45%					85.180	-0.210	0.000
1.010	RC1010	480 Winter		100	+45%					84.982	-0.218	0.000
1.011	RC1011	480 Winter		100	+45%					84.775	-0.200	0.000

		Half Drain		Pipe			Level
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded
1.000	RC1000	0.85			288.6	SURCHARGED	
1.001	RC1001	0.95			431.1	SURCHARGED	
1.002	RC1002	1.28			619.3	SURCHARGED	
1.003	RC1003	1.50			797.8	SURCHARGED	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	RC1004	0.94			913.5	SURCHARGED	
2.000	RC1100	1.21			239.4	FLOOD RISK	
2.001	RC1101	1.84			433.2	FLOOD RISK	
2.002	RC1102	1.45			611.7	SURCHARGED	
2.003	RC1103	0.77			757.1	OK	
3.000	RC1200	1.10			283.2	SURCHARGED	
3.001	RC1201	1.08			468.1	SURCHARGED	
3.002	RC1202	1.61			701.2	SURCHARGED	
2.004	RC1104	0.97			1321.7	SURCHARGED	
1.005	RC1005	0.15			221.6	SURCHARGED	
4.000	RC1300	0.03			9.5	SURCHARGED	
4.001	RC1301	0.03			7.7	SURCHARGED	
1.006	RC1006	0.00			226.9	OK	
1.007	RC1007	0.36			20.9	SURCHARGED	
1.008	RC1008	0.23			18.9	SURCHARGED	
1.009	RC1009	0.19			18.9	OK	
1.010	RC1010	0.17			18.9	OK	
1.011	RC1011	0.24			18.9	OK	

APPENDIX H3

SGi Consulting		Page 1
4th Floor, Colchester House 40 Peter Street Manchester, M2 5GP		
Date 23/03/2023 17:11	Designed by sgicivils	
File Resi - Catchment 1 001 FEH.MDX	Checked by	
Micro Drainage	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	45.000	0.610	73.8	0.214	2.50	0.0	0.600		o	450	Pipe/Conduit	
1.001	45.000	0.510	88.2	0.214	0.00	0.0	0.600		o	525	Pipe/Conduit	
1.002	45.021	0.300	150.1	0.214	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.003	60.000	0.250	240.0	0.214	0.00	0.0	0.600		o	675	Pipe/Conduit	
1.004	76.617	0.595	128.8	0.214	0.00	0.0	0.600		o	750	Pipe/Conduit	
2.000	45.000	0.525	85.7	0.210	2.50	0.0	0.600		o	375	Pipe/Conduit	
2.001	45.000	0.295	152.5	0.210	0.00	0.0	0.600		o	450	Pipe/Conduit	
2.002	90.000	0.395	227.8	0.210	0.00	0.0	0.600		o	600	Pipe/Conduit	
2.003	20.000	0.955	20.9	0.210	0.00	0.0	0.600		o	600	Pipe/Conduit	
3.000	20.000	0.050	400.0	0.210	2.50	0.0	0.600		o	600	Pipe/Conduit	
3.001	20.000	0.050	400.0	0.210	0.00	0.0	0.600		o	750	Pipe/Conduit	
3.002	20.000	0.050	400.0	0.210	0.00	0.0	0.600		o	750	Pipe/Conduit	
2.004	57.987	0.955	60.7	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
1.005	27.659	0.405	68.3	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
4.000	45.304	0.690	65.7	0.104	2.50	0.0	0.600		o	450	Pipe/Conduit	
4.001	21.453	0.200	107.3	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.006	23.727	0.001	23726.8	0.000	0.00	0.0		0.035 → _ /			Pond/Tank	
1.007	12.756	0.054	236.2	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.008	10.446	0.105	99.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.009	18.416	0.190	96.9	0.000	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)
1.000	0.00	1.00	88.370	0.214	0.0	0.0	0.0	2.37	376.8	0.0
1.001	0.00	1.00	87.685	0.428	0.0	0.0	0.0	2.39	516.4	0.0
1.002	0.00	1.00	87.100	0.642	0.0	0.0	0.0	1.99	561.4	0.0
1.003	0.00	1.00	86.725	0.856	0.0	0.0	0.0	1.69	603.8	0.0
1.004	0.00	1.00	86.400	1.070	0.0	0.0	0.0	2.46	1088.9	0.0
2.000	0.00	1.00	89.305	0.210	0.0	0.0	0.0	1.96	216.3	0.0
2.001	0.00	1.00	88.705	0.420	0.0	0.0	0.0	1.64	261.4	0.0
2.002	0.00	1.00	88.260	0.630	0.0	0.0	0.0	1.61	455.0	0.0
2.003	0.00	1.00	87.865	0.840	0.0	0.0	0.0	5.34	1509.0	0.0
3.000	0.00	1.00	87.060	0.210	0.0	0.0	0.0	1.21	342.5	0.0
3.001	0.00	1.00	86.860	0.420	0.0	0.0	0.0	1.39	615.4	0.0
3.002	0.00	1.00	86.810	0.630	0.0	0.0	0.0	1.39	615.4	0.0
2.004	0.00	1.00	86.760	1.470	0.0	0.0	0.0	3.60	1588.4	0.0
1.005	0.00	1.00	85.655	2.540	0.0	0.0	0.0	3.79	2414.0	0.0
4.000	0.00	1.00	86.590	0.104	0.0	0.0	0.0	2.51	399.5	0.0
4.001	0.00	1.00	85.900	0.104	0.0	0.0	0.0	1.96	312.1	0.0
1.006	0.00	1.00	85.250	2.644	0.0	0.0	0.0	0.17	21541.3	0.0
1.007	0.00	1.00	85.249	2.644	0.0	0.0	0.0	1.02	72.0	0.0
1.008	0.00	1.00	85.195	2.644	0.0	0.0	0.0	1.58	111.4	0.0
1.009	0.00	1.00	85.090	2.644	0.0	0.0	0.0	1.60	112.9	0.0

SGi Consulting		Page 2
4th Floor, Colchester House 40 Peter Street Manchester, M2 5GP		
Date 23/03/2023 17:11	Designed by sgicivils	
File Resi - Catchment 1 001 FEH.MDX	Checked by	
Micro Drainage		Network 2020.1.3

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.010	15.952	0.225	70.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.011	9.194	0.095	96.8	0.000	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)
1.010	0.00	1.00	84.900	2.644	0.0	0.0	0.0	1.87	132.2	0.0
1.011	0.00	1.00	84.675	2.644	0.0	0.0	0.0	1.60	113.0	0.0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.214	0.214	0.214
1.001	-	-	100	0.214	0.214	0.214
1.002	-	-	100	0.214	0.214	0.214
1.003	-	-	100	0.214	0.214	0.214
1.004	-	-	100	0.214	0.214	0.214
2.000	-	-	100	0.210	0.210	0.210
2.001	-	-	100	0.210	0.210	0.210
2.002	-	-	100	0.210	0.210	0.210
2.003	-	-	100	0.210	0.210	0.210
3.000	-	-	100	0.210	0.210	0.210
3.001	-	-	100	0.210	0.210	0.210
3.002	-	-	100	0.210	0.210	0.210
2.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.104	0.104	0.104
4.001	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.644	2.644	2.644

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.011 CULVERT 87.810 84.580 0.000 0 0

Datum (m) 84.580 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	2.420	23	2.420	45	2.420	67	2.420	89	2.420	111	2.420	133	2.420	155	2.420
2	2.420	24	2.420	46	2.420	68	2.420	90	2.420	112	2.420	134	2.420	156	2.420
3	2.420	25	2.420	47	2.420	69	2.420	91	2.420	113	2.420	135	2.420	157	2.420
4	2.420	26	2.420	48	2.420	70	2.420	92	2.420	114	2.420	136	2.420	158	2.420
5	2.420	27	2.420	49	2.420	71	2.420	93	2.420	115	2.420	137	2.420	159	2.420
6	2.420	28	2.420	50	2.420	72	2.420	94	2.420	116	2.420	138	2.420	160	2.420
7	2.420	29	2.420	51	2.420	73	2.420	95	2.420	117	2.420	139	2.420	161	2.420
8	2.420	30	2.420	52	2.420	74	2.420	96	2.420	118	2.420	140	2.420	162	2.420
9	2.420	31	2.420	53	2.420	75	2.420	97	2.420	119	2.420	141	2.420	163	2.420
10	2.420	32	2.420	54	2.420	76	2.420	98	2.420	120	2.420	142	2.420	164	2.420
11	2.420	33	2.420	55	2.420	77	2.420	99	2.420	121	2.420	143	2.420	165	2.420
12	2.420	34	2.420	56	2.420	78	2.420	100	2.420	122	2.420	144	2.420	166	2.420
13	2.420	35	2.420	57	2.420	79	2.420	101	2.420	123	2.420	145	2.420	167	2.420
14	2.420	36	2.420	58	2.420	80	2.420	102	2.420	124	2.420	146	2.420	168	2.420
15	2.420	37	2.420	59	2.420	81	2.420	103	2.420	125	2.420	147	2.420	169	2.420
16	2.420	38	2.420	60	2.420	82	2.420	104	2.420	126	2.420	148	2.420	170	2.420
17	2.420	39	2.420	61	2.420	83	2.420	105	2.420	127	2.420	149	2.420	171	2.420
18	2.420	40	2.420	62	2.420	84	2.420	106	2.420	128	2.420	150	2.420	172	2.420
19	2.420	41	2.420	63	2.420	85	2.420	107	2.420	129	2.420	151	2.420	173	2.420
20	2.420	42	2.420	64	2.420	86	2.420	108	2.420	130	2.420	152	2.420	174	2.420
21	2.420	43	2.420	65	2.420	87	2.420	109	2.420	131	2.420	153	2.420	175	2.420
22	2.420	44	2.420	66	2.420	88	2.420	110	2.420	132	2.420	154	2.420	176	2.420

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
177	2.420	238	2.420	299	2.420	360	2.420	421	2.420	482	2.420	543	2.420	604	2.420
178	2.420	239	2.420	300	2.420	361	2.420	422	2.420	483	2.420	544	2.420	605	2.420
179	2.420	240	2.420	301	2.420	362	2.420	423	2.420	484	2.420	545	2.420	606	2.420
180	2.420	241	2.420	302	2.420	363	2.420	424	2.420	485	2.420	546	2.420	607	2.420
181	2.420	242	2.420	303	2.420	364	2.420	425	2.420	486	2.420	547	2.420	608	2.420
182	2.420	243	2.420	304	2.420	365	2.420	426	2.420	487	2.420	548	2.420	609	2.420
183	2.420	244	2.420	305	2.420	366	2.420	427	2.420	488	2.420	549	2.420	610	2.420
184	2.420	245	2.420	306	2.420	367	2.420	428	2.420	489	2.420	550	2.420	611	2.420
185	2.420	246	2.420	307	2.420	368	2.420	429	2.420	490	2.420	551	2.420	612	2.420
186	2.420	247	2.420	308	2.420	369	2.420	430	2.420	491	2.420	552	2.420	613	2.420
187	2.420	248	2.420	309	2.420	370	2.420	431	2.420	492	2.420	553	2.420	614	2.420
188	2.420	249	2.420	310	2.420	371	2.420	432	2.420	493	2.420	554	2.420	615	2.420
189	2.420	250	2.420	311	2.420	372	2.420	433	2.420	494	2.420	555	2.420	616	2.420
190	2.420	251	2.420	312	2.420	373	2.420	434	2.420	495	2.420	556	2.420	617	2.420
191	2.420	252	2.420	313	2.420	374	2.420	435	2.420	496	2.420	557	2.420	618	2.420
192	2.420	253	2.420	314	2.420	375	2.420	436	2.420	497	2.420	558	2.420	619	2.420
193	2.420	254	2.420	315	2.420	376	2.420	437	2.420	498	2.420	559	2.420	620	2.420
194	2.420	255	2.420	316	2.420	377	2.420	438	2.420	499	2.420	560	2.420	621	2.420
195	2.420	256	2.420	317	2.420	378	2.420	439	2.420	500	2.420	561	2.420	622	2.420
196	2.420	257	2.420	318	2.420	379	2.420	440	2.420	501	2.420	562	2.420	623	2.420
197	2.420	258	2.420	319	2.420	380	2.420	441	2.420	502	2.420	563	2.420	624	2.420
198	2.420	259	2.420	320	2.420	381	2.420	442	2.420	503	2.420	564	2.420	625	2.420
199	2.420	260	2.420	321	2.420	382	2.420	443	2.420	504	2.420	565	2.420	626	2.420
200	2.420	261	2.420	322	2.420	383	2.420	444	2.420	505	2.420	566	2.420	627	2.420
201	2.420	262	2.420	323	2.420	384	2.420	445	2.420	506	2.420	567	2.420	628	2.420
202	2.420	263	2.420	324	2.420	385	2.420	446	2.420	507	2.420	568	2.420	629	2.420
203	2.420	264	2.420	325	2.420	386	2.420	447	2.420	508	2.420	569	2.420	630	2.420
204	2.420	265	2.420	326	2.420	387	2.420	448	2.420	509	2.420	570	2.420	631	2.420
205	2.420	266	2.420	327	2.420	388	2.420	449	2.420	510	2.420	571	2.420	632	2.420
206	2.420	267	2.420	328	2.420	389	2.420	450	2.420	511	2.420	572	2.420	633	2.420
207	2.420	268	2.420	329	2.420	390	2.420	451	2.420	512	2.420	573	2.420	634	2.420
208	2.420	269	2.420	330	2.420	391	2.420	452	2.420	513	2.420	574	2.420	635	2.420
209	2.420	270	2.420	331	2.420	392	2.420	453	2.420	514	2.420	575	2.420	636	2.420
210	2.420	271	2.420	332	2.420	393	2.420	454	2.420	515	2.420	576	2.420	637	2.420
211	2.420	272	2.420	333	2.420	394	2.420	455	2.420	516	2.420	577	2.420	638	2.420
212	2.420	273	2.420	334	2.420	395	2.420	456	2.420	517	2.420	578	2.420	639	2.420
213	2.420	274	2.420	335	2.420	396	2.420	457	2.420	518	2.420	579	2.420	640	2.420
214	2.420	275	2.420	336	2.420	397	2.420	458	2.420	519	2.420	580	2.420	641	2.420
215	2.420	276	2.420	337	2.420	398	2.420	459	2.420	520	2.420	581	2.420	642	2.420
216	2.420	277	2.420	338	2.420	399	2.420	460	2.420	521	2.420	582	2.420	643	2.420
217	2.420	278	2.420	339	2.420	400	2.420	461	2.420	522	2.420	583	2.420	644	2.420
218	2.420	279	2.420	340	2.420	401	2.420	462	2.420	523	2.420	584	2.420	645	2.420
219	2.420	280	2.420	341	2.420	402	2.420	463	2.420	524	2.420	585	2.420	646	2.420
220	2.420	281	2.420	342	2.420	403	2.420	464	2.420	525	2.420	586	2.420	647	2.420
221	2.420	282	2.420	343	2.420	404	2.420	465	2.420	526	2.420	587	2.420	648	2.420
222	2.420	283	2.420	344	2.420	405	2.420	466	2.420	527	2.420	588	2.420	649	2.420
223	2.420	284	2.420	345	2.420	406	2.420	467	2.420	528	2.420	589	2.420	650	2.420
224	2.420	285	2.420	346	2.420	407	2.420	468	2.420	529	2.420	590	2.420	651	2.420
225	2.420	286	2.420	347	2.420	408	2.420	469	2.420	530	2.420	591	2.420	652	2.420
226	2.420	287	2.420	348	2.420	409	2.420	470	2.420	531	2.420	592	2.420	653	2.420
227	2.420	288	2.420	349	2.420	410	2.420	471	2.420	532	2.420	593	2.420	654	2.420
228	2.420	289	2.420	350	2.420	411	2.420	472	2.420	533	2.420	594	2.420	655	2.420
229	2.420	290	2.420	351	2.420	412	2.420	473	2.420	534	2.420	595	2.420	656	2.420
230	2.420	291	2.420	352	2.420	413	2.420	474	2.420	535	2.420	596	2.420	657	2.420
231	2.420	292	2.420	353	2.420	414	2.420	475	2.420	536	2.420	597	2.420	658	2.420
232	2.420	293	2.420	354	2.420	415	2.420	476	2.420	537	2.420	598	2.420	659	2.420
233	2.420	294	2.420	355	2.420	416	2.420	477	2.420	538	2.420	599	2.420	660	2.420
234	2.420	295	2.420	356	2.420	417	2.420	478	2.420	539	2.420	600	2.420	661	2.420
235	2.420	296	2.420	357	2.420	418	2.420	479	2.420	540	2.420	601	2.420	662	2.420
236	2.420	297	2.420	358	2.420	419	2.420	480	2.420	541	2.420	602	2.420	663	2.420
237	2.420	298	2.420	359	2.420	420	2.420	481	2.420	542	2.420	603	2.420	664	2.420

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
665	2.420	726	2.420	787	2.420	848	2.420	909	2.420	970	2.420	1031	2.420	1092	2.420
666	2.420	727	2.420	788	2.420	849	2.420	910	2.420	971	2.420	1032	2.420	1093	2.420
667	2.420	728	2.420	789	2.420	850	2.420	911	2.420	972	2.420	1033	2.420	1094	2.420
668	2.420	729	2.420	790	2.420	851	2.420	912	2.420	973	2.420	1034	2.420	1095	2.420
669	2.420	730	2.420	791	2.420	852	2.420	913	2.420	974	2.420	1035	2.420	1096	2.420
670	2.420	731	2.420	792	2.420	853	2.420	914	2.420	975	2.420	1036	2.420	1097	2.420
671	2.420	732	2.420	793	2.420	854	2.420	915	2.420	976	2.420	1037	2.420	1098	2.420
672	2.420	733	2.420	794	2.420	855	2.420	916	2.420	977	2.420	1038	2.420	1099	2.420
673	2.420	734	2.420	795	2.420	856	2.420	917	2.420	978	2.420	1039	2.420	1100	2.420
674	2.420	735	2.420	796	2.420	857	2.420	918	2.420	979	2.420	1040	2.420	1101	2.420
675	2.420	736	2.420	797	2.420	858	2.420	919	2.420	980	2.420	1041	2.420	1102	2.420
676	2.420	737	2.420	798	2.420	859	2.420	920	2.420	981	2.420	1042	2.420	1103	2.420
677	2.420	738	2.420	799	2.420	860	2.420	921	2.420	982	2.420	1043	2.420	1104	2.420
678	2.420	739	2.420	800	2.420	861	2.420	922	2.420	983	2.420	1044	2.420	1105	2.420
679	2.420	740	2.420	801	2.420	862	2.420	923	2.420	984	2.420	1045	2.420	1106	2.420
680	2.420	741	2.420	802	2.420	863	2.420	924	2.420	985	2.420	1046	2.420	1107	2.420
681	2.420	742	2.420	803	2.420	864	2.420	925	2.420	986	2.420	1047	2.420	1108	2.420
682	2.420	743	2.420	804	2.420	865	2.420	926	2.420	987	2.420	1048	2.420	1109	2.420
683	2.420	744	2.420	805	2.420	866	2.420	927	2.420	988	2.420	1049	2.420	1110	2.420
684	2.420	745	2.420	806	2.420	867	2.420	928	2.420	989	2.420	1050	2.420	1111	2.420
685	2.420	746	2.420	807	2.420	868	2.420	929	2.420	990	2.420	1051	2.420	1112	2.420
686	2.420	747	2.420	808	2.420	869	2.420	930	2.420	991	2.420	1052	2.420	1113	2.420
687	2.420	748	2.420	809	2.420	870	2.420	931	2.420	992	2.420	1053	2.420	1114	2.420
688	2.420	749	2.420	810	2.420	871	2.420	932	2.420	993	2.420	1054	2.420	1115	2.420
689	2.420	750	2.420	811	2.420	872	2.420	933	2.420	994	2.420	1055	2.420	1116	2.420
690	2.420	751	2.420	812	2.420	873	2.420	934	2.420	995	2.420	1056	2.420	1117	2.420
691	2.420	752	2.420	813	2.420	874	2.420	935	2.420	996	2.420	1057	2.420	1118	2.420
692	2.420	753	2.420	814	2.420	875	2.420	936	2.420	997	2.420	1058	2.420	1119	2.420
693	2.420	754	2.420	815	2.420	876	2.420	937	2.420	998	2.420	1059	2.420	1120	2.420
694	2.420	755	2.420	816	2.420	877	2.420	938	2.420	999	2.420	1060	2.420	1121	2.420
695	2.420	756	2.420	817	2.420	878	2.420	939	2.420	1000	2.420	1061	2.420	1122	2.420
696	2.420	757	2.420	818	2.420	879	2.420	940	2.420	1001	2.420	1062	2.420	1123	2.420
697	2.420	758	2.420	819	2.420	880	2.420	941	2.420	1002	2.420	1063	2.420	1124	2.420
698	2.420	759	2.420	820	2.420	881	2.420	942	2.420	1003	2.420	1064	2.420	1125	2.420
699	2.420	760	2.420	821	2.420	882	2.420	943	2.420	1004	2.420	1065	2.420	1126	2.420
700	2.420	761	2.420	822	2.420	883	2.420	944	2.420	1005	2.420	1066	2.420	1127	2.420
701	2.420	762	2.420	823	2.420	884	2.420	945	2.420	1006	2.420	1067	2.420	1128	2.420
702	2.420	763	2.420	824	2.420	885	2.420	946	2.420	1007	2.420	1068	2.420	1129	2.420
703	2.420	764	2.420	825	2.420	886	2.420	947	2.420	1008	2.420	1069	2.420	1130	2.420
704	2.420	765	2.420	826	2.420	887	2.420	948	2.420	1009	2.420	1070	2.420	1131	2.420
705	2.420	766	2.420	827	2.420	888	2.420	949	2.420	1010	2.420	1071	2.420	1132	2.420
706	2.420	767	2.420	828	2.420	889	2.420	950	2.420	1011	2.420	1072	2.420	1133	2.420
707	2.420	768	2.420	829	2.420	890	2.420	951	2.420	1012	2.420	1073	2.420	1134	2.420
708	2.420	769	2.420	830	2.420	891	2.420	952	2.420	1013	2.420	1074	2.420	1135	2.420
709	2.420	770	2.420	831	2.420	892	2.420	953	2.420	1014	2.420	1075	2.420	1136	2.420
710	2.420	771	2.420	832	2.420	893	2.420	954	2.420	1015	2.420	1076	2.420	1137	2.420
711	2.420	772	2.420	833	2.420	894	2.420	955	2.420	1016	2.420	1077	2.420	1138	2.420
712	2.420	773	2.420	834	2.420	895	2.420	956	2.420	1017	2.420	1078	2.420	1139	2.420
713	2.420	774	2.420	835	2.420	896	2.420	957	2.420	1018	2.420	1079	2.420	1140	2.420
714	2.420	775	2.420	836	2.420	897	2.420	958	2.420	1019	2.420	1080	2.420	1141	2.420
715	2.420	776	2.420	837	2.420	898	2.420	959	2.420	1020	2.420	1081	2.420	1142	2.420
716	2.420	777	2.420	838	2.420	899	2.420	960	2.420	1021	2.420	1082	2.420	1143	2.420
717	2.420	778	2.420	839	2.420	900	2.420	961	2.420	1022	2.420	1083	2.420	1144	2.420
718	2.420	779	2.420	840	2.420	901	2.420	962	2.420	1023	2.420	1084	2.420	1145	2.420
719	2.420	780	2.420	841	2.420	902	2.420	963	2.420	1024	2.420	1085	2.420	1146	2.420
720	2.420	781	2.420	842	2.420	903	2.420	964	2.420	1025	2.420	1086	2.420	1147	2.420
721	2.420	782	2.420	843	2.420	904	2.420	965	2.420	1026	2.420	1087	2.420	1148	2.420
722	2.420	783	2.420	844	2.420	905	2.420	966	2.420	1027	2.420	1088	2.420	1149	2.420
723	2.420	784	2.420	845	2.420	906	2.420	967	2.420	1028	2.420	1089	2.420	1150	2.420
724	2.420	785	2.420	846	2.420	907	2.420	968	2.420	1029	2.420	1090	2.420	1151	2.420
725	2.420	786	2.420	847	2.420	908	2.420	969	2.420	1030	2.420	1091	2.420	1152	2.420

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1153	2.420	1189	2.420	1225	2.420	1261	2.420	1297	2.420	1333	2.420	1369	2.420	1405	2.420
1154	2.420	1190	2.420	1226	2.420	1262	2.420	1298	2.420	1334	2.420	1370	2.420	1406	2.420
1155	2.420	1191	2.420	1227	2.420	1263	2.420	1299	2.420	1335	2.420	1371	2.420	1407	2.420
1156	2.420	1192	2.420	1228	2.420	1264	2.420	1300	2.420	1336	2.420	1372	2.420	1408	2.420
1157	2.420	1193	2.420	1229	2.420	1265	2.420	1301	2.420	1337	2.420	1373	2.420	1409	2.420
1158	2.420	1194	2.420	1230	2.420	1266	2.420	1302	2.420	1338	2.420	1374	2.420	1410	2.420
1159	2.420	1195	2.420	1231	2.420	1267	2.420	1303	2.420	1339	2.420	1375	2.420	1411	2.420
1160	2.420	1196	2.420	1232	2.420	1268	2.420	1304	2.420	1340	2.420	1376	2.420	1412	2.420
1161	2.420	1197	2.420	1233	2.420	1269	2.420	1305	2.420	1341	2.420	1377	2.420	1413	2.420
1162	2.420	1198	2.420	1234	2.420	1270	2.420	1306	2.420	1342	2.420	1378	2.420	1414	2.420
1163	2.420	1199	2.420	1235	2.420	1271	2.420	1307	2.420	1343	2.420	1379	2.420	1415	2.420
1164	2.420	1200	2.420	1236	2.420	1272	2.420	1308	2.420	1344	2.420	1380	2.420	1416	2.420
1165	2.420	1201	2.420	1237	2.420	1273	2.420	1309	2.420	1345	2.420	1381	2.420	1417	2.420
1166	2.420	1202	2.420	1238	2.420	1274	2.420	1310	2.420	1346	2.420	1382	2.420	1418	2.420
1167	2.420	1203	2.420	1239	2.420	1275	2.420	1311	2.420	1347	2.420	1383	2.420	1419	2.420
1168	2.420	1204	2.420	1240	2.420	1276	2.420	1312	2.420	1348	2.420	1384	2.420	1420	2.420
1169	2.420	1205	2.420	1241	2.420	1277	2.420	1313	2.420	1349	2.420	1385	2.420	1421	2.420
1170	2.420	1206	2.420	1242	2.420	1278	2.420	1314	2.420	1350	2.420	1386	2.420	1422	2.420
1171	2.420	1207	2.420	1243	2.420	1279	2.420	1315	2.420	1351	2.420	1387	2.420	1423	2.420
1172	2.420	1208	2.420	1244	2.420	1280	2.420	1316	2.420	1352	2.420	1388	2.420	1424	2.420
1173	2.420	1209	2.420	1245	2.420	1281	2.420	1317	2.420	1353	2.420	1389	2.420	1425	2.420
1174	2.420	1210	2.420	1246	2.420	1282	2.420	1318	2.420	1354	2.420	1390	2.420	1426	2.420
1175	2.420	1211	2.420	1247	2.420	1283	2.420	1319	2.420	1355	2.420	1391	2.420	1427	2.420
1176	2.420	1212	2.420	1248	2.420	1284	2.420	1320	2.420	1356	2.420	1392	2.420	1428	2.420
1177	2.420	1213	2.420	1249	2.420	1285	2.420	1321	2.420	1357	2.420	1393	2.420	1429	2.420
1178	2.420	1214	2.420	1250	2.420	1286	2.420	1322	2.420	1358	2.420	1394	2.420	1430	2.420
1179	2.420	1215	2.420	1251	2.420	1287	2.420	1323	2.420	1359	2.420	1395	2.420	1431	2.420
1180	2.420	1216	2.420	1252	2.420	1288	2.420	1324	2.420	1360	2.420	1396	2.420	1432	2.420
1181	2.420	1217	2.420	1253	2.420	1289	2.420	1325	2.420	1361	2.420	1397	2.420	1433	2.420
1182	2.420	1218	2.420	1254	2.420	1290	2.420	1326	2.420	1362	2.420	1398	2.420	1434	2.420
1183	2.420	1219	2.420	1255	2.420	1291	2.420	1327	2.420	1363	2.420	1399	2.420	1435	2.420
1184	2.420	1220	2.420	1256	2.420	1292	2.420	1328	2.420	1364	2.420	1400	2.420	1436	2.420
1185	2.420	1221	2.420	1257	2.420	1293	2.420	1329	2.420	1365	2.420	1401	2.420	1437	2.420
1186	2.420	1222	2.420	1258	2.420	1294	2.420	1330	2.420	1366	2.420	1402	2.420	1438	2.420
1187	2.420	1223	2.420	1259	2.420	1295	2.420	1331	2.420	1367	2.420	1403	2.420	1439	2.420
1188	2.420	1224	2.420	1260	2.420	1296	2.420	1332	2.420	1368	2.420	1404	2.420	1440	2.420

Online Controls for Storm

Hydro-Brake® Optimum Manhole: RC1008, DS/PN: 1.008, Volume (m³): 4.1

Unit Reference	MD-SCU-0112-2000-2600-2000
Design Head (m)	2.600
Design Flow (l/s)	20.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	112
Invert Level (m)	85.195
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.600	20.0	Kick-Flo®	0.169	5.5
Flush-Flo™	0.140	5.6	Mean Flow over Head Range	-	13.5

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)
0.100	4.3	0.800	11.4	2.000	17.6	4.000	24.6	7.000	32.2
0.200	6.0	1.000	12.7	2.200	18.5	4.500	26.0	7.500	33.3
0.300	7.2	1.200	13.8	2.400	19.2	5.000	27.4	8.000	34.4
0.400	8.2	1.400	14.9	2.600	20.0	5.500	28.7	8.500	35.4
0.500	9.1	1.600	15.9	3.000	21.4	6.000	29.9	9.000	36.4
0.600	10.0	1.800	16.8	3.500	23.1	6.500	31.1	9.500	37.4

Storage Structures for Storm

Tank or Pond Pipe: 1.006

Manning's N 0.035 Invert Level (m) 85.250

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	655.0	2.600	1593.0	2.601	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
US/MH				Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm	Period	Change		Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	RC1000	15 Summer		2	+0%	100/15 Summer				88.495	-0.325	0.000
1.001	RC1001	15 Summer		2	+0%	100/15 Summer				87.844	-0.366	0.000
1.002	RC1002	15 Summer		2	+0%	100/15 Summer				87.303	-0.397	0.000
1.003	RC1003	15 Summer		2	+0%	100/15 Summer				86.973	-0.427	0.000
1.004	RC1004	15 Summer		2	+0%	100/15 Summer				86.616	-0.534	0.000
2.000	RC1100	15 Summer		2	+0%	100/15 Summer				89.443	-0.237	0.000
2.001	RC1101	15 Summer		2	+0%	30/15 Summer				88.897	-0.258	0.000
2.002	RC1102	15 Summer		2	+0%	100/15 Summer				88.474	-0.386	0.000
2.003	RC1103	15 Summer		2	+0%					88.017	-0.448	0.000
3.000	RC1200	15 Summer		2	+0%	100/15 Summer				87.251	-0.409	0.000
3.001	RC1201	15 Summer		2	+0%	100/15 Summer				87.112	-0.498	0.000
3.002	RC1202	15 Summer		2	+0%	100/15 Summer				87.070	-0.490	0.000
2.004	RC1104	15 Summer		2	+0%	100/15 Summer				86.978	-0.532	0.000
1.005	RC1005	1440 Summer		2	+0%	5/1440 Summer				86.381	-0.174	0.000
4.000	RC1300	15 Summer		2	+0%	30/1440 Summer				86.674	-0.366	0.000
4.001	RC1301	1440 Summer		2	+0%	2/1440 Summer				86.381	0.031	0.000
1.006	RC1006	1440 Summer		2	+0%					86.381	-1.469	0.000
1.007	RC1007	1440 Summer		2	+0%	2/15 Summer				86.381	0.832	0.000
1.008	RC1008	1440 Summer		2	+0%	2/15 Summer				86.486	0.991	0.000
1.009	RC1009	1440 Summer		2	+0%	2/15 Summer				86.391	1.001	0.000
1.010	RC1010	1440 Summer		2	+0%	2/15 Summer				86.391	1.191	0.000
1.011	RC1011	1440 Summer		2	+0%	2/15 Summer				86.391	1.416	0.000

Half Drain Pipe								
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded	
1.000	RC1000	0.17			56.8	OK		
1.001	RC1001	0.19			85.8	OK		
1.002	RC1002	0.25			120.1	OK		
1.003	RC1003	0.28			147.4	OK		

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	RC1004	0.18			173.6	OK	
2.000	RC1100	0.28			54.9	OK	
2.001	RC1101	0.36			84.9	OK	
2.002	RC1102	0.26			108.9	OK	
2.003	RC1103	0.14			141.7	OK	
3.000	RC1200	0.22			55.6	OK	
3.001	RC1201	0.19			83.5	OK	
3.002	RC1202	0.26			113.9	OK	
2.004	RC1104	0.19			253.4	OK	
1.005	RC1005	0.03			42.0	OK	
4.000	RC1300	0.08			27.6	OK	
4.001	RC1301	0.01			1.7	SURCHARGED	
1.006	RC1006	0.00			104.7	OK	
1.007	RC1007	0.27			15.8	SURCHARGED	
1.008	RC1008	0.17			13.7	SURCHARGED	
1.009	RC1009	0.41			40.2	SURCHARGED	
1.010	RC1010	0.71			79.1	SURCHARGED	
1.011	RC1011	1.30			100.7	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
US/MH			Return Climate		First (X)		First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)	
1.000	RC1000	15 Summer	5	+0%	100/15 Summer				88.520	-0.300	0.000	
1.001	RC1001	15 Summer	5	+0%	100/15 Summer				87.874	-0.336	0.000	
1.002	RC1002	15 Summer	5	+0%	100/15 Summer				87.345	-0.355	0.000	
1.003	RC1003	15 Summer	5	+0%	100/15 Summer				87.024	-0.376	0.000	
1.004	RC1004	15 Summer	5	+0%	100/15 Summer				86.657	-0.493	0.000	
2.000	RC1100	15 Summer	5	+0%	100/15 Summer				89.471	-0.209	0.000	
2.001	RC1101	15 Summer	5	+0%	30/15 Summer				88.939	-0.216	0.000	
2.002	RC1102	15 Summer	5	+0%	100/15 Summer				88.518	-0.342	0.000	
2.003	RC1103	15 Summer	5	+0%					88.049	-0.416	0.000	
3.000	RC1200	15 Summer	5	+0%	100/15 Summer				87.290	-0.370	0.000	
3.001	RC1201	15 Summer	5	+0%	100/15 Summer				87.166	-0.444	0.000	
3.002	RC1202	15 Summer	5	+0%	100/15 Summer				87.123	-0.437	0.000	
2.004	RC1104	15 Summer	5	+0%	100/15 Summer				87.019	-0.491	0.000	
1.005	RC1005	1440 Winter	5	+0%	5/1440 Summer				86.583	0.028	0.000	
4.000	RC1300	15 Summer	5	+0%	30/1440 Summer				86.690	-0.350	0.000	
4.001	RC1301	1440 Winter	5	+0%	2/1440 Summer				86.583	0.233	0.000	
1.006	RC1006	1440 Winter	5	+0%					86.583	-1.267	0.000	
1.007	RC1007	1440 Winter	5	+0%	2/15 Summer				86.584	1.035	0.000	
1.008	RC1008	1440 Winter	5	+0%	2/15 Summer				86.710	1.215	0.000	
1.009	RC1009	1440 Summer	5	+0%	2/15 Summer				86.588	1.198	0.000	
1.010	RC1010	1440 Winter	5	+0%	2/15 Summer				86.589	1.389	0.000	
1.011	RC1011	1440 Winter	5	+0%	2/15 Summer				86.589	1.614	0.000	

		Half Drain			Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded	
1.000	RC1000	0.24			79.8	OK		
1.001	RC1001	0.26			119.8	OK		
1.002	RC1002	0.35			168.3	OK		
1.003	RC1003	0.39			206.6	OK		

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	RC1004	0.25			242.7	OK	
2.000	RC1100	0.39			77.1	OK	
2.001	RC1101	0.51			118.9	OK	
2.002	RC1102	0.36			152.5	OK	
2.003	RC1103	0.20			198.1	OK	
3.000	RC1200	0.30			77.4	OK	
3.001	RC1201	0.27			116.4	OK	
3.002	RC1202	0.37			159.5	OK	
2.004	RC1104	0.26			354.0	OK	
1.005	RC1005	0.02			32.7	SURCHARGED	
4.000	RC1300	0.11			38.8	OK	
4.001	RC1301	0.01			1.3	SURCHARGED	
1.006	RC1006	0.00			102.7	OK	
1.007	RC1007	0.29			17.0	SURCHARGED	
1.008	RC1008	0.18			14.8	SURCHARGED	
1.009	RC1009	0.45			43.9	SURCHARGED	
1.010	RC1010	0.74			83.1	SURCHARGED	
1.011	RC1011	1.35			104.3	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

										Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)	
1.000	RC1000	15 Summer	30	+0%	100/15 Summer				88.582	-0.238	0.000	
1.001	RC1001	15 Summer	30	+0%	100/15 Summer				87.976	-0.234	0.000	
1.002	RC1002	15 Summer	30	+0%	100/15 Summer				87.499	-0.201	0.000	
1.003	RC1003	15 Summer	30	+0%	100/15 Summer				87.232	-0.168	0.000	
1.004	RC1004	1440 Summer	30	+0%	100/15 Summer				87.062	-0.088	0.000	
2.000	RC1100	15 Summer	30	+0%	100/15 Summer				89.551	-0.129	0.000	
2.001	RC1101	15 Summer	30	+0%	30/15 Summer				89.163	0.008	0.000	
2.002	RC1102	15 Summer	30	+0%	100/15 Summer				88.684	-0.176	0.000	
2.003	RC1103	15 Summer	30	+0%					88.146	-0.319	0.000	
3.000	RC1200	15 Summer	30	+0%	100/15 Summer				87.410	-0.250	0.000	
3.001	RC1201	15 Summer	30	+0%	100/15 Summer				87.356	-0.254	0.000	
3.002	RC1202	15 Summer	30	+0%	100/15 Summer				87.319	-0.241	0.000	
2.004	RC1104	15 Summer	30	+0%	100/15 Summer				87.165	-0.345	0.000	
1.005	RC1005	1440 Summer	30	+0%	5/1440 Summer				87.062	0.507	0.000	
4.000	RC1300	1440 Summer	30	+0%	30/1440 Summer				87.062	0.022	0.000	
4.001	RC1301	1440 Summer	30	+0%	2/1440 Summer				87.062	0.712	0.000	
1.006	RC1006	1440 Summer	30	+0%					87.062	-0.788	0.000	
1.007	RC1007	1440 Summer	30	+0%	2/15 Summer				87.062	1.513	0.000	
1.008	RC1008	1440 Winter	30	+0%	2/15 Summer				87.185	1.690	0.000	
1.009	RC1009	1440 Summer	30	+0%	2/15 Summer				87.006	1.616	0.000	
1.010	RC1010	1440 Summer	30	+0%	2/15 Summer				87.004	1.804	0.000	
1.011	RC1011	1440 Summer	30	+0%	2/15 Summer				87.002	2.027	0.000	

			Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded	
1.000	RC1000	0.44			148.5	OK		
1.001	RC1001	0.55			252.2	OK		
1.002	RC1002	0.76			370.7	OK		
1.003	RC1003	0.87			460.6	OK		

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

		Half Drain Pipe					
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.004	RC1004	0.03			33.0	OK	
2.000	RC1100	0.72			143.5	OK	
2.001	RC1101	1.02			240.5	SURCHARGED	
2.002	RC1102	0.79			331.4	OK	
2.003	RC1103	0.44			429.5	OK	
3.000	RC1200	0.56			143.5	OK	
3.001	RC1201	0.55			237.9	OK	
3.002	RC1202	0.80			347.2	OK	
2.004	RC1104	0.56			767.0	OK	
1.005	RC1005	0.05			73.9	SURCHARGED	
4.000	RC1300	0.01			3.2	SURCHARGED	
4.001	RC1301	0.01			2.5	SURCHARGED	
1.006	RC1006	0.00			107.1	OK	
1.007	RC1007	0.32			18.9	SURCHARGED	
1.008	RC1008	0.21			17.0	SURCHARGED	
1.009	RC1009	0.54			53.0	SURCHARGED	
1.010	RC1010	0.86			96.3	SURCHARGED	
1.011	RC1011	1.62			125.0	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000
Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0
MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0
Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500
Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0
Number of Offline Controls 0
Number of Time/Area Diagrams 0

Number of Online Controls 1
Number of Storage Structures 1
Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
Data Type Point

FEH Rainfall Version 2013 Cv (Summer) 1.000

Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

DVD Status OFF

Inertia Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 2, 5, 30, 100

Climate Change (%) 0, 0, 0, 45

											Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)		
1.000	RC1000	15 Summer	100	+45%	100/15 Summer				89.000	0.180	0.000		
1.001	RC1001	15 Summer	100	+45%	100/15 Summer				88.825	0.615	0.000		
1.002	RC1002	15 Summer	100	+45%	100/15 Summer				88.507	0.807	0.000		
1.003	RC1003	15 Summer	100	+45%	100/15 Summer				88.152	0.752	0.000		
1.004	RC1004	1440 Winter	100	+45%	100/15 Summer				87.829	0.679	0.000		
2.000	RC1100	15 Summer	100	+45%	100/15 Summer				91.177	1.497	0.000		
2.001	RC1101	15 Summer	100	+45%	30/15 Summer				90.463	1.308	0.000		
2.002	RC1102	15 Summer	100	+45%	100/15 Summer				89.448	0.588	0.000		
2.003	RC1103	15 Summer	100	+45%					88.389	-0.076	0.000		
3.000	RC1200	15 Summer	100	+45%	100/15 Summer				88.020	0.360	0.000		
3.001	RC1201	15 Summer	100	+45%	100/15 Summer				87.986	0.376	0.000		
3.002	RC1202	15 Summer	100	+45%	100/15 Summer				87.940	0.380	0.000		
2.004	RC1104	15 Summer	100	+45%	100/15 Summer				87.844	0.334	0.000		
1.005	RC1005	1440 Winter	100	+45%	5/1440 Summer				87.829	1.274	0.000		
4.000	RC1300	1440 Winter	100	+45%	30/1440 Summer				87.828	0.788	0.000		
4.001	RC1301	1440 Winter	100	+45%	2/1440 Summer				87.828	1.478	0.000		
1.006	RC1006	1440 Winter	100	+45%					87.828	-0.022	0.000		
1.007	RC1007	1440 Winter	100	+45%	2/15 Summer				87.828	2.279	0.000		
1.008	RC1008	1440 Winter	100	+45%	2/15 Summer				87.973	2.478	0.000		
1.009	RC1009	1440 Winter	100	+45%	2/15 Summer				87.029	1.639	0.000		
1.010	RC1010	1440 Winter	100	+45%	2/15 Summer				87.018	1.818	0.000		
1.011	RC1011	1440 Winter	100	+45%	2/15 Summer				87.007	2.032	0.000		

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	RC1000	0.85			288.6	SURCHARGED	
1.001	RC1001	0.95			431.1	SURCHARGED	
1.002	RC1002	1.28			619.3	SURCHARGED	
1.003	RC1003	1.50			797.8	SURCHARGED	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	RC1004	0.04			36.9	SURCHARGED	
2.000	RC1100	1.21			239.4	FLOOD RISK	
2.001	RC1101	1.84			433.2	FLOOD RISK	
2.002	RC1102	1.45			611.7	SURCHARGED	
2.003	RC1103	0.77			757.1	OK	
3.000	RC1200	1.10			283.2	SURCHARGED	
3.001	RC1201	1.08			468.1	SURCHARGED	
3.002	RC1202	1.61			701.2	SURCHARGED	
2.004	RC1104	0.97			1321.7	SURCHARGED	
1.005	RC1005	0.06			85.0	SURCHARGED	
4.000	RC1300	0.01			3.6	SURCHARGED	
4.001	RC1301	0.01			3.4	SURCHARGED	
1.006	RC1006	0.00			110.1	FLOOD RISK	
1.007	RC1007	0.37			22.0	FLOOD RISK	
1.008	RC1008	0.25			20.0	FLOOD RISK	
1.009	RC1009	0.60			58.6	SURCHARGED	
1.010	RC1010	0.90			100.8	SURCHARGED	
1.011	RC1011	1.68			130.0	SURCHARGED	

APPENDIX II

APPENDIX I2

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.229	0.229	0.229
1.001	-	-	100	0.229	0.229	0.229
1.002	-	-	100	0.229	0.229	0.229
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.167	0.167	0.167
1.005	-	-	100	0.167	0.167	0.167
1.006	-	-	100	0.167	0.167	0.167
1.007	-	-	100	0.167	0.167	0.167
2.000	-	-	100	0.167	0.167	0.167
2.001	-	-	100	0.167	0.167	0.167
2.002	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.167	0.167	0.167
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.229	0.229	0.229
4.001	-	-	100	0.229	0.229	0.229
4.002	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.229	0.229	0.229
5.001	-	-	100	0.000	0.000	0.000
4.003	-	-	100	0.000	0.000	0.000
4.004	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.167	0.167	0.167
6.001	-	-	100	0.167	0.167	0.167
6.002	-	-	100	0.167	0.167	0.167
4.005	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				3.044	3.044	3.044

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)
1.013	RC2014	88.000	85.990	0.000	1200	0

Online Controls for Storm

Hydro-Brake® Optimum Manhole: RC2013, DS/PN: 1.013, Volume (m³): 3.5

Unit Reference	MD-SCU-0135-2500-1915-2500
Design Head (m)	1.915
Design Flow (l/s)	25.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	135
Invert Level (m)	86.085
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.915	25.0	Kick-Flo®	0.203	8.6
Flush-Flo™	0.167	8.8	Mean Flow over Head Range	-	16.9

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)
0.100	5.4	0.800	16.5	2.000	25.5	4.000	35.7	7.000	46.8
0.200	8.7	1.000	18.3	2.200	26.7	4.500	37.7	7.500	48.4
0.300	10.4	1.200	20.0	2.400	27.9	5.000	39.7	8.000	49.9
0.400	11.9	1.400	21.5	2.600	29.0	5.500	41.6	8.500	51.4
0.500	13.2	1.600	22.9	3.000	31.0	6.000	43.4	9.000	52.8
0.600	14.4	1.800	24.3	3.500	33.4	6.500	45.1	9.500	54.3

Storage Structures for Storm

Tank or Pond Pipe: 1.010

Manning's N 0.035 Invert Level (m) 86.150

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	780.0	1.850	1800.0	1.851	0.0

Tank or Pond Pipe: 1.011

Manning's N 0.035 Invert Level (m) 86.149

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	390.0	1.850	900.0	1.851	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm	Period	Change		Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	RC2000	15 Summer	2	+0%	100/15 Summer					89.420	-0.315	0.000
1.001	RC2001	15 Summer	2	+0%	100/15 Summer					88.665	-0.370	0.000
1.002	RC2002	15 Summer	2	+0%	100/15 Summer					87.877	-0.423	0.000
1.003	RC2003	15 Summer	2	+0%	100/15 Summer					87.769	-0.431	0.000
1.004	RC2004	15 Summer	2	+0%	100/15 Summer					87.607	-0.458	0.000
1.005	RC2005	15 Summer	2	+0%	100/15 Summer					87.556	-0.439	0.000
1.006	RC2006	15 Summer	2	+0%	100/15 Summer					87.327	-0.618	0.000
1.007	RC2007	15 Summer	2	+0%	100/15 Summer					87.136	-0.689	0.000
2.000	RC2100	15 Summer	2	+0%	100/15 Summer					88.644	-0.246	0.000
2.001	RC2101	15 Summer	2	+0%	100/15 Summer					88.291	-0.299	0.000
2.002	RC2102	15 Summer	2	+0%						87.848	-0.342	0.000
3.000	RC2200	15 Summer	2	+0%	100/15 Summer					87.328	-0.292	0.000
1.008	RC2008	15 Summer	2	+0%	100/15 Summer					86.660	-0.620	0.000
1.009	RC2009	600 Summer	2	+0%	100/15 Summer					86.595	-0.655	0.000
1.010	RC2010	600 Summer	2	+0%						86.595	-1.405	0.000
4.000	RC2300	15 Summer	2	+0%	100/15 Summer					89.787	-0.273	0.000
4.001	RC2301	15 Summer	2	+0%	100/15 Summer					89.483	-0.327	0.000
4.002	RC2302	15 Summer	2	+0%	100/15 Summer					89.247	-0.393	0.000
5.000	RC2400	15 Summer	2	+0%	100/15 Summer					89.719	-0.261	0.000
5.001	RC2401	15 Summer	2	+0%						89.567	-0.313	0.000
4.003	RC2303	15 Summer	2	+0%						88.936	-0.584	0.000
4.004	RC2304	15 Summer	2	+0%	100/15 Summer					88.208	-0.507	0.000
6.000	RC2500	15 Summer	2	+0%	100/15 Summer					89.384	-0.296	0.000
6.001	RC2501	15 Summer	2	+0%	100/15 Summer					89.212	-0.343	0.000
6.002	RC2502	15 Summer	2	+0%						89.010	-0.400	0.000
4.005	RC2305	15 Summer	2	+0%						87.829	-0.721	0.000
1.011	RC2011	600 Summer	2	+0%						86.595	-1.405	0.000
1.012	RC2012	600 Summer	2	+0%	2/120 Summer					86.596	0.148	0.000
1.013	RC2013	600 Summer	2	+0%	2/15 Summer	100/360 Summer				86.892	0.582	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	RC2000	0.18			59.0	OK	
1.001	RC2001	0.18			92.5	OK	
1.002	RC2002	0.30			127.3	OK	
1.003	RC2003	0.27			123.5	OK	
1.004	RC2004	0.28			141.8	OK	
1.005	RC2005	0.36			166.0	OK	
1.006	RC2006	0.21			185.3	OK	
1.007	RC2007	0.12			204.4	OK	
2.000	RC2100	0.25			44.5	OK	
2.001	RC2101	0.23			66.8	OK	
2.002	RC2102	0.13			68.4	OK	
3.000	RC2200	0.26			45.3	OK	
1.008	RC2008	0.35			265.5	OK	
1.009	RC2009	0.06			58.5	OK	
1.010	RC2010	0.00			41.6	OK	
4.000	RC2300	0.28			54.6	OK	
4.001	RC2301	0.30			91.4	OK	
4.002	RC2302	0.26			89.3	OK	
5.000	RC2400	0.35			60.1	OK	
5.001	RC2401	0.18			57.1	OK	
4.003	RC2303	0.11			143.8	OK	
4.004	RC2304	0.22			139.3	OK	
6.000	RC2500	0.24			43.0	OK	
6.001	RC2501	0.25			67.6	OK	
6.002	RC2502	0.13			93.2	OK	
4.005	RC2305	0.08			232.1	OK	
1.011	RC2011	0.00			49.3	OK	
1.012	RC2012	0.37			22.3	SURCHARGED	
1.013	RC2013	0.31			13.2	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	RC2000	15 Summer	5	+0%	100/15 Summer				89.445	-0.290	0.000
1.001	RC2001	15 Summer	5	+0%	100/15 Summer				88.695	-0.340	0.000
1.002	RC2002	15 Summer	5	+0%	100/15 Summer				87.929	-0.371	0.000
1.003	RC2003	15 Summer	5	+0%	100/15 Summer				87.820	-0.380	0.000
1.004	RC2004	15 Summer	5	+0%	100/15 Summer				87.671	-0.394	0.000
1.005	RC2005	15 Summer	5	+0%	100/15 Summer				87.622	-0.373	0.000
1.006	RC2006	15 Summer	5	+0%	100/15 Summer				87.381	-0.564	0.000
1.007	RC2007	15 Summer	5	+0%	100/15 Summer				87.177	-0.648	0.000
2.000	RC2100	15 Summer	5	+0%	100/15 Summer				88.671	-0.219	0.000
2.001	RC2101	15 Summer	5	+0%	100/15 Summer				88.323	-0.267	0.000
2.002	RC2102	15 Summer	5	+0%					87.870	-0.320	0.000
3.000	RC2200	15 Summer	5	+0%	100/15 Summer				87.361	-0.259	0.000
1.008	RC2008	15 Summer	5	+0%	100/15 Summer				86.751	-0.529	0.000
1.009	RC2009	480 Winter	5	+0%	100/15 Summer				86.717	-0.533	0.000
1.010	RC2010	480 Winter	5	+0%					86.717	-1.283	0.000
4.000	RC2300	15 Summer	5	+0%	100/15 Summer				89.824	-0.236	0.000
4.001	RC2301	15 Summer	5	+0%	100/15 Summer				89.521	-0.289	0.000
4.002	RC2302	15 Summer	5	+0%	100/15 Summer				89.290	-0.350	0.000
5.000	RC2400	15 Summer	5	+0%	100/15 Summer				89.760	-0.220	0.000
5.001	RC2401	15 Summer	5	+0%					89.593	-0.287	0.000
4.003	RC2303	15 Summer	5	+0%					88.963	-0.557	0.000
4.004	RC2304	15 Summer	5	+0%	100/15 Summer				88.253	-0.462	0.000
6.000	RC2500	15 Summer	5	+0%	100/15 Summer				89.416	-0.264	0.000
6.001	RC2501	15 Summer	5	+0%	100/15 Summer				89.249	-0.306	0.000
6.002	RC2502	15 Summer	5	+0%					89.036	-0.374	0.000
4.005	RC2305	15 Summer	5	+0%					87.857	-0.693	0.000
1.011	RC2011	480 Winter	5	+0%					86.718	-1.282	0.000
1.012	RC2012	480 Winter	5	+0%	2/120 Summer				86.718	0.270	0.000
1.013	RC2013	480 Winter	5	+0%	2/15 Summer	100/360 Summer			87.081	0.771	0.000

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

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	RC2000	0.26			83.0	OK	
1.001	RC2001	0.26			129.3	OK	
1.002	RC2002	0.42			178.6	OK	
1.003	RC2003	0.38			173.2	OK	
1.004	RC2004	0.38			197.3	OK	
1.005	RC2005	0.50			231.6	OK	
1.006	RC2006	0.29			258.8	OK	
1.007	RC2007	0.17			286.1	OK	
2.000	RC2100	0.35			62.5	OK	
2.001	RC2101	0.32			93.5	OK	
2.002	RC2102	0.18			96.4	OK	
3.000	RC2200	0.37			63.5	OK	
1.008	RC2008	0.48			370.8	OK	
1.009	RC2009	0.06			56.2	OK	
1.010	RC2010	0.00			20.3	OK	
4.000	RC2300	0.40			75.9	OK	
4.001	RC2301	0.42			126.7	OK	
4.002	RC2302	0.35			123.2	OK	
5.000	RC2400	0.49			84.4	OK	
5.001	RC2401	0.26			81.0	OK	
4.003	RC2303	0.15			195.0	OK	
4.004	RC2304	0.30			192.2	OK	
6.000	RC2500	0.34			60.4	OK	
6.001	RC2501	0.36			94.6	OK	
6.002	RC2502	0.18			130.2	OK	
4.005	RC2305	0.12			321.5	OK	
1.011	RC2011	0.00			38.3	OK	
1.012	RC2012	0.42			25.2	SURCHARGED	
1.013	RC2013	0.34			14.4	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	RC2000	15 Summer		30	+0%	100/15 Summer				89.513	-0.222	0.000
1.001	RC2001	15 Summer		30	+0%	100/15 Summer				88.793	-0.242	0.000
1.002	RC2002	15 Summer		30	+0%	100/15 Summer				88.134	-0.166	0.000
1.003	RC2003	15 Summer		30	+0%	100/15 Summer				88.044	-0.156	0.000
1.004	RC2004	15 Summer		30	+0%	100/15 Summer				87.975	-0.090	0.000
1.005	RC2005	15 Summer		30	+0%	100/15 Summer				87.929	-0.066	0.000
1.006	RC2006	15 Summer		30	+0%	100/15 Summer				87.556	-0.389	0.000
1.007	RC2007	15 Summer		30	+0%	100/15 Summer				87.301	-0.524	0.000
2.000	RC2100	15 Summer		30	+0%	100/15 Summer				88.742	-0.148	0.000
2.001	RC2101	15 Summer		30	+0%	100/15 Summer				88.427	-0.163	0.000
2.002	RC2102	15 Summer		30	+0%					87.934	-0.256	0.000
3.000	RC2200	15 Summer		30	+0%	100/15 Summer				87.448	-0.172	0.000
1.008	RC2008	15 Summer		30	+0%	100/15 Summer				87.079	-0.201	0.000
1.009	RC2009	360 Winter		30	+0%	100/15 Summer				87.042	-0.208	0.000
1.010	RC2010	360 Winter		30	+0%					87.042	-0.958	0.000
4.000	RC2300	15 Summer		30	+0%	100/15 Summer				89.932	-0.128	0.000
4.001	RC2301	15 Summer		30	+0%	100/15 Summer				89.663	-0.147	0.000
4.002	RC2302	15 Summer		30	+0%	100/15 Summer				89.433	-0.207	0.000
5.000	RC2400	15 Summer		30	+0%	100/15 Summer				89.880	-0.100	0.000
5.001	RC2401	15 Summer		30	+0%					89.663	-0.217	0.000
4.003	RC2303	15 Summer		30	+0%					89.046	-0.474	0.000
4.004	RC2304	15 Summer		30	+0%	100/15 Summer				88.392	-0.323	0.000
6.000	RC2500	15 Summer		30	+0%	100/15 Summer				89.500	-0.180	0.000
6.001	RC2501	15 Summer		30	+0%	100/15 Summer				89.377	-0.178	0.000
6.002	RC2502	15 Summer		30	+0%					89.116	-0.294	0.000
4.005	RC2305	15 Summer		30	+0%					87.952	-0.598	0.000
1.011	RC2011	360 Winter		30	+0%					87.042	-0.958	0.000
1.012	RC2012	360 Winter		30	+0%	2/120 Summer				87.042	0.594	0.000
1.013	RC2013	360 Winter		30	+0%	2/15 Summer	100/360 Summer			87.449	1.139	0.000

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

PN	US/MH Name	Flow / Cap.	Half Drain Overflow (l/s)	Pipe Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	RC2000	0.48			154.4	OK	
1.001	RC2001	0.54			271.9	OK	
1.002	RC2002	0.91			391.1	OK	
1.003	RC2003	0.80			364.0	OK	
1.004	RC2004	0.79			406.8	OK	
1.005	RC2005	1.00			465.0	OK	
1.006	RC2006	0.60			523.6	OK	
1.007	RC2007	0.35			584.8	OK	
2.000	RC2100	0.66			116.3	OK	
2.001	RC2101	0.68			197.4	OK	
2.002	RC2102	0.38			202.2	OK	
3.000	RC2200	0.64			108.9	OK	
1.008	RC2008	1.05			804.8	OK	
1.009	RC2009	0.11			112.9	OK	
1.010	RC2010	0.00			36.4	OK	
4.000	RC2300	0.74			141.3	OK	
4.001	RC2301	0.86			262.6	OK	
4.002	RC2302	0.74			257.0	OK	
5.000	RC2400	0.92			157.0	OK	
5.001	RC2401	0.49			151.0	OK	
4.003	RC2303	0.29			380.3	OK	
4.004	RC2304	0.60			381.3	OK	
6.000	RC2500	0.63			112.6	OK	
6.001	RC2501	0.74			197.7	OK	
6.002	RC2502	0.40			286.6	OK	
4.005	RC2305	0.24			656.3	OK	
1.011	RC2011	0.00			71.2	OK	
1.012	RC2012	0.50			29.6	SURCHARGED	
1.013	RC2013	0.41			17.6	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

									Water	Surcharged	Flooded	
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume
PN	Name	Storm	Period	Change		Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)
1.000	RC2000	15 Summer	100	+45%	100/15 Summer					89.942	0.207	0.000
1.001	RC2001	15 Summer	100	+45%	100/15 Summer					89.708	0.673	0.000
1.002	RC2002	15 Summer	100	+45%	100/15 Summer					89.222	0.922	0.000
1.003	RC2003	15 Summer	100	+45%	100/15 Summer					89.015	0.815	0.000
1.004	RC2004	15 Summer	100	+45%	100/15 Summer					88.773	0.708	0.000
1.005	RC2005	15 Summer	100	+45%	100/15 Summer					88.532	0.537	0.000
1.006	RC2006	15 Summer	100	+45%	100/15 Summer					88.192	0.247	0.000
1.007	RC2007	15 Summer	100	+45%	100/15 Summer					87.974	0.149	0.000
2.000	RC2100	15 Summer	100	+45%	100/15 Summer					89.471	0.581	0.000
2.001	RC2101	15 Summer	100	+45%	100/15 Summer					88.954	0.364	0.000
2.002	RC2102	15 Summer	100	+45%						88.024	-0.166	0.000
3.000	RC2200	15 Summer	100	+45%	100/15 Summer					87.799	0.179	0.000
1.008	RC2008	15 Summer	100	+45%	100/15 Summer					87.689	0.409	0.000
1.009	RC2009	480 Winter	100	+45%	100/15 Summer					87.675	0.425	0.000
1.010	RC2010	480 Winter	100	+45%						87.674	-0.326	0.000
4.000	RC2300	15 Summer	100	+45%	100/15 Summer					90.854	0.794	0.000
4.001	RC2301	15 Summer	100	+45%	100/15 Summer					90.216	0.406	0.000
4.002	RC2302	15 Summer	100	+45%	100/15 Summer					89.755	0.115	0.000
5.000	RC2400	15 Summer	100	+45%	100/15 Summer					90.240	0.260	0.000
5.001	RC2401	15 Summer	100	+45%						89.849	-0.031	0.000
4.003	RC2303	15 Summer	100	+45%						89.192	-0.328	0.000
4.004	RC2304	15 Summer	100	+45%	100/15 Summer					88.733	0.018	0.000
6.000	RC2500	15 Summer	100	+45%	100/15 Summer					89.953	0.273	0.000
6.001	RC2501	15 Summer	100	+45%	100/15 Summer					89.731	0.176	0.000
6.002	RC2502	15 Summer	100	+45%						89.242	-0.168	0.000
4.005	RC2305	15 Summer	100	+45%						88.070	-0.480	0.000
1.011	RC2011	480 Winter	100	+45%						87.674	-0.326	0.000
1.012	RC2012	480 Winter	100	+45%	2/120 Summer					87.674	1.226	0.000
1.013	RC2013	480 Summer	100	+45%	2/15 Summer	100/360 Summer				88.081	1.771	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	RC2000	0.94			301.5	SURCHARGED	
1.001	RC2001	0.88			444.5	SURCHARGED	
1.002	RC2002	1.50			642.7	SURCHARGED	
1.003	RC2003	1.39			629.0	SURCHARGED	
1.004	RC2004	1.49			765.4	SURCHARGED	
1.005	RC2005	1.95			906.7	SURCHARGED	
1.006	RC2006	1.18			1034.0	SURCHARGED	
1.007	RC2007	0.69			1142.8	SURCHARGED	
2.000	RC2100	1.22			215.4	SURCHARGED	
2.001	RC2101	1.36			392.2	SURCHARGED	
2.002	RC2102	0.73			391.0	OK	
3.000	RC2200	1.20			205.9	SURCHARGED	
1.008	RC2008	2.00			1537.5	SURCHARGED	
1.009	RC2009	0.17			164.5	SURCHARGED	
1.010	RC2010	0.00			50.1	OK	
4.000	RC2300	1.39			267.0	SURCHARGED	
4.001	RC2301	1.69			515.7	SURCHARGED	
4.002	RC2302	1.43			494.8	SURCHARGED	
5.000	RC2400	1.85			316.6	SURCHARGED	
5.001	RC2401	0.97			299.7	OK	
4.003	RC2303	0.57			741.3	OK	
4.004	RC2304	1.17			742.9	SURCHARGED	
6.000	RC2500	1.20			214.8	SURCHARGED	
6.001	RC2501	1.48			393.4	SURCHARGED	
6.002	RC2502	0.81			575.0	OK	
4.005	RC2305	0.46			1266.8	OK	
1.011	RC2011	0.01			102.2	OK	
1.012	RC2012	0.58			34.5	SURCHARGED	
1.013	RC2013	0.52			22.5	FLOOD RISK	

APPENDIX I3

SGi Consulting		Page 1
4th Floor, Colchester House 40 Peter Street Manchester, M2 5GP		
Date 24/03/2023 09:15	Designed by sgicivils	
File Resi - Catchment 2 001 FEH.MDX	Checked by	
Micro Drainage	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	60.000	0.700	85.7	0.229	2.50	0.0	0.600		o	450	Pipe/Conduit	
1.001	55.000	0.735	74.8	0.229	0.00	0.0	0.600		o	525	Pipe/Conduit	
1.002	30.000	0.100	300.0	0.229	0.00	0.0	0.600		o	675	Pipe/Conduit	
1.003	40.000	0.135	296.3	0.000	0.00	0.0	0.600		o	675	Pipe/Conduit	
1.004	20.000	0.070	285.7	0.167	0.00	0.0	0.600		o	750	Pipe/Conduit	
1.005	15.000	0.050	300.0	0.167	0.00	0.0	0.600		o	750	Pipe/Conduit	
1.006	36.385	0.120	303.2	0.167	0.00	0.0	0.600		o	900	Pipe/Conduit	
1.007	30.000	0.545	55.0	0.167	0.00	0.0	0.600		o	900	Pipe/Conduit	
2.000	30.000	0.300	100.0	0.167	2.50	0.0	0.600		o	375	Pipe/Conduit	
2.001	39.701	0.400	99.3	0.167	0.00	0.0	0.600		o	450	Pipe/Conduit	
2.002	16.304	0.910	17.9	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
3.000	60.000	0.200	300.0	0.167	2.50	0.0	0.600		o	450	Pipe/Conduit	
1.008	10.000	0.030	333.3	0.000	0.00	0.0	0.600		o	1050	Pipe/Conduit	
1.009	14.177	0.050	283.5	0.000	0.00	0.0	0.600		o	1050	Pipe/Conduit	
1.010	87.272	0.001	87272.0	0.000	0.00	0.0		0.035 → _ /			Pond/Tank	
4.000	60.000	0.250	240.0	0.229	2.50	0.0	0.600		o	450	Pipe/Conduit	
4.001	30.000	0.170	176.5	0.229	0.00	0.0	0.600		o	525	Pipe/Conduit	
4.002	21.536	0.120	179.5	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
5.000	25.000	0.100	250.0	0.229	2.50	0.0	0.600		o	450	Pipe/Conduit	
5.001	28.664	0.360	79.6	0.000	0.00	0.0	0.600		o	450	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)
1.000	0.00	1.00	89.285	0.229	0.0	0.0	0.0	2.20	349.4	0.0
1.001	0.00	1.00	88.510	0.458	0.0	0.0	0.0	2.59	561.0	0.0
1.002	0.00	1.00	87.625	0.687	0.0	0.0	0.0	1.51	539.6	0.0
1.003	0.00	1.00	87.525	0.687	0.0	0.0	0.0	1.52	543.0	0.0
1.004	0.00	1.00	87.315	0.854	0.0	0.0	0.0	1.65	729.2	0.0
1.005	0.00	1.00	87.245	1.021	0.0	0.0	0.0	1.61	711.5	0.0
1.006	0.00	1.00	87.045	1.188	0.0	0.0	0.0	1.79	1141.4	0.0
1.007	0.00	1.00	86.925	1.355	0.0	0.0	0.0	4.23	2689.8	0.0
2.000	0.00	1.00	88.515	0.167	0.0	0.0	0.0	1.81	200.1	0.0
2.001	0.00	1.00	88.140	0.334	0.0	0.0	0.0	2.04	324.6	0.0
2.002	0.00	1.00	87.740	0.334	0.0	0.0	0.0	4.82	766.7	0.0
3.000	0.00	1.00	87.170	0.167	0.0	0.0	0.0	1.17	185.8	0.0
1.008	0.00	1.00	86.230	1.856	0.0	0.0	0.0	1.88	1629.6	0.0
1.009	0.00	1.00	86.200	1.856	0.0	0.0	0.0	2.04	1767.8	0.0
1.010	0.00	1.00	86.150	1.856	0.0	0.0	0.0	0.07	1993.6	0.0
4.000	0.00	1.00	89.610	0.229	0.0	0.0	0.0	1.31	208.0	0.0
4.001	0.00	1.00	89.285	0.458	0.0	0.0	0.0	1.68	364.3	0.0
4.002	0.00	1.00	89.040	0.458	0.0	0.0	0.0	1.81	513.1	0.0
5.000	0.00	1.00	89.530	0.229	0.0	0.0	0.0	1.28	203.8	0.0
5.001	0.00	1.00	89.430	0.229	0.0	0.0	0.0	2.28	362.6	0.0

STORM SEWER DESIGN by the Modified Rational Method

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
4.003	53.851	0.805	66.9	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
4.004	11.124	0.165	67.4	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
6.000	30.000	0.125	240.0	0.167	2.50	0.0	0.600		o	450	Pipe/Conduit	
6.001	35.000	0.145	241.4	0.167	0.00	0.0	0.600		o	525	Pipe/Conduit	
6.002	20.452	0.860	23.8	0.167	0.00	0.0	0.600		o	525	Pipe/Conduit	
4.005	18.920	1.500	12.6	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
1.011	32.274	0.001	32274.0	0.000	0.00	0.0		0.035 →_/			Pond/Tank	
1.012	15.493	0.063	245.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.013	9.547	0.095	100.5	0.000	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)
4.003	0.00	1.00	88.770	0.687	0.0	0.0	0.0	3.42	1513.0	0.0
4.004	0.00	1.00	87.965	0.687	0.0	0.0	0.0	3.41	1507.1	0.0
6.000	0.00	1.00	89.230	0.167	0.0	0.0	0.0	1.31	208.0	0.0
6.001	0.00	1.00	89.030	0.334	0.0	0.0	0.0	1.44	311.1	0.0
6.002	0.00	1.00	88.885	0.501	0.0	0.0	0.0	4.61	997.3	0.0
4.005	0.00	1.00	87.650	1.188	0.0	0.0	0.0	8.85	5628.2	0.0
1.011	0.00	1.00	86.149	3.044	0.0	0.0	0.0	0.12	4450.6	0.0
1.012	0.00	1.00	86.148	3.044	0.0	0.0	0.0	1.00	70.6	0.0
1.013	0.00	1.00	86.085	3.044	0.0	0.0	0.0	1.57	110.9	0.0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.229	0.229	0.229
1.001	-	-	100	0.229	0.229	0.229
1.002	-	-	100	0.229	0.229	0.229
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.167	0.167	0.167
1.005	-	-	100	0.167	0.167	0.167
1.006	-	-	100	0.167	0.167	0.167
1.007	-	-	100	0.167	0.167	0.167
2.000	-	-	100	0.167	0.167	0.167
2.001	-	-	100	0.167	0.167	0.167
2.002	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.167	0.167	0.167
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.229	0.229	0.229
4.001	-	-	100	0.229	0.229	0.229
4.002	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.229	0.229	0.229
5.001	-	-	100	0.000	0.000	0.000
4.003	-	-	100	0.000	0.000	0.000
4.004	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.167	0.167	0.167
6.001	-	-	100	0.167	0.167	0.167
6.002	-	-	100	0.167	0.167	0.167
4.005	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				3.044	3.044	3.044

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.013	RC2014	88.000	85.990	0.000	1200	0

Datum (m) 85.990 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	1.010	16	1.010	31	1.010	46	1.010	61	1.010	76	1.010	91	1.010	106	1.010
2	1.010	17	1.010	32	1.010	47	1.010	62	1.010	77	1.010	92	1.010	107	1.010
3	1.010	18	1.010	33	1.010	48	1.010	63	1.010	78	1.010	93	1.010	108	1.010
4	1.010	19	1.010	34	1.010	49	1.010	64	1.010	79	1.010	94	1.010	109	1.010
5	1.010	20	1.010	35	1.010	50	1.010	65	1.010	80	1.010	95	1.010	110	1.010
6	1.010	21	1.010	36	1.010	51	1.010	66	1.010	81	1.010	96	1.010	111	1.010
7	1.010	22	1.010	37	1.010	52	1.010	67	1.010	82	1.010	97	1.010	112	1.010
8	1.010	23	1.010	38	1.010	53	1.010	68	1.010	83	1.010	98	1.010	113	1.010
9	1.010	24	1.010	39	1.010	54	1.010	69	1.010	84	1.010	99	1.010	114	1.010
10	1.010	25	1.010	40	1.010	55	1.010	70	1.010	85	1.010	100	1.010	115	1.010
11	1.010	26	1.010	41	1.010	56	1.010	71	1.010	86	1.010	101	1.010	116	1.010
12	1.010	27	1.010	42	1.010	57	1.010	72	1.010	87	1.010	102	1.010	117	1.010
13	1.010	28	1.010	43	1.010	58	1.010	73	1.010	88	1.010	103	1.010	118	1.010
14	1.010	29	1.010	44	1.010	59	1.010	74	1.010	89	1.010	104	1.010	119	1.010
15	1.010	30	1.010	45	1.010	60	1.010	75	1.010	90	1.010	105	1.010	120	1.010

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
121	1.010	182	1.010	243	1.010	304	1.010	365	1.010	426	1.010	487	1.010	548	1.010
122	1.010	183	1.010	244	1.010	305	1.010	366	1.010	427	1.010	488	1.010	549	1.010
123	1.010	184	1.010	245	1.010	306	1.010	367	1.010	428	1.010	489	1.010	550	1.010
124	1.010	185	1.010	246	1.010	307	1.010	368	1.010	429	1.010	490	1.010	551	1.010
125	1.010	186	1.010	247	1.010	308	1.010	369	1.010	430	1.010	491	1.010	552	1.010
126	1.010	187	1.010	248	1.010	309	1.010	370	1.010	431	1.010	492	1.010	553	1.010
127	1.010	188	1.010	249	1.010	310	1.010	371	1.010	432	1.010	493	1.010	554	1.010
128	1.010	189	1.010	250	1.010	311	1.010	372	1.010	433	1.010	494	1.010	555	1.010
129	1.010	190	1.010	251	1.010	312	1.010	373	1.010	434	1.010	495	1.010	556	1.010
130	1.010	191	1.010	252	1.010	313	1.010	374	1.010	435	1.010	496	1.010	557	1.010
131	1.010	192	1.010	253	1.010	314	1.010	375	1.010	436	1.010	497	1.010	558	1.010
132	1.010	193	1.010	254	1.010	315	1.010	376	1.010	437	1.010	498	1.010	559	1.010
133	1.010	194	1.010	255	1.010	316	1.010	377	1.010	438	1.010	499	1.010	560	1.010
134	1.010	195	1.010	256	1.010	317	1.010	378	1.010	439	1.010	500	1.010	561	1.010
135	1.010	196	1.010	257	1.010	318	1.010	379	1.010	440	1.010	501	1.010	562	1.010
136	1.010	197	1.010	258	1.010	319	1.010	380	1.010	441	1.010	502	1.010	563	1.010
137	1.010	198	1.010	259	1.010	320	1.010	381	1.010	442	1.010	503	1.010	564	1.010
138	1.010	199	1.010	260	1.010	321	1.010	382	1.010	443	1.010	504	1.010	565	1.010
139	1.010	200	1.010	261	1.010	322	1.010	383	1.010	444	1.010	505	1.010	566	1.010
140	1.010	201	1.010	262	1.010	323	1.010	384	1.010	445	1.010	506	1.010	567	1.010
141	1.010	202	1.010	263	1.010	324	1.010	385	1.010	446	1.010	507	1.010	568	1.010
142	1.010	203	1.010	264	1.010	325	1.010	386	1.010	447	1.010	508	1.010	569	1.010
143	1.010	204	1.010	265	1.010	326	1.010	387	1.010	448	1.010	509	1.010	570	1.010
144	1.010	205	1.010	266	1.010	327	1.010	388	1.010	449	1.010	510	1.010	571	1.010
145	1.010	206	1.010	267	1.010	328	1.010	389	1.010	450	1.010	511	1.010	572	1.010
146	1.010	207	1.010	268	1.010	329	1.010	390	1.010	451	1.010	512	1.010	573	1.010
147	1.010	208	1.010	269	1.010	330	1.010	391	1.010	452	1.010	513	1.010	574	1.010
148	1.010	209	1.010	270	1.010	331	1.010	392	1.010	453	1.010	514	1.010	575	1.010
149	1.010	210	1.010	271	1.010	332	1.010	393	1.010	454	1.010	515	1.010	576	1.010
150	1.010	211	1.010	272	1.010	333	1.010	394	1.010	455	1.010	516	1.010	577	1.010
151	1.010	212	1.010	273	1.010	334	1.010	395	1.010	456	1.010	517	1.010	578	1.010
152	1.010	213	1.010	274	1.010	335	1.010	396	1.010	457	1.010	518	1.010	579	1.010
153	1.010	214	1.010	275	1.010	336	1.010	397	1.010	458	1.010	519	1.010	580	1.010
154	1.010	215	1.010	276	1.010	337	1.010	398	1.010	459	1.010	520	1.010	581	1.010
155	1.010	216	1.010	277	1.010	338	1.010	399	1.010	460	1.010	521	1.010	582	1.010
156	1.010	217	1.010	278	1.010	339	1.010	400	1.010	461	1.010	522	1.010	583	1.010
157	1.010	218	1.010	279	1.010	340	1.010	401	1.010	462	1.010	523	1.010	584	1.010
158	1.010	219	1.010	280	1.010	341	1.010	402	1.010	463	1.010	524	1.010	585	1.010
159	1.010	220	1.010	281	1.010	342	1.010	403	1.010	464	1.010	525	1.010	586	1.010
160	1.010	221	1.010	282	1.010	343	1.010	404	1.010	465	1.010	526	1.010	587	1.010
161	1.010	222	1.010	283	1.010	344	1.010	405	1.010	466	1.010	527	1.010	588	1.010
162	1.010	223	1.010	284	1.010	345	1.010	406	1.010	467	1.010	528	1.010	589	1.010
163	1.010	224	1.010	285	1.010	346	1.010	407	1.010	468	1.010	529	1.010	590	1.010
164	1.010	225	1.010	286	1.010	347	1.010	408	1.010	469	1.010	530	1.010	591	1.010
165	1.010	226	1.010	287	1.010	348	1.010	409	1.010	470	1.010	531	1.010	592	1.010
166	1.010	227	1.010	288	1.010	349	1.010	410	1.010	471	1.010	532	1.010	593	1.010
167	1.010	228	1.010	289	1.010	350	1.010	411	1.010	472	1.010	533	1.010	594	1.010
168	1.010	229	1.010	290	1.010	351	1.010	412	1.010	473	1.010	534	1.010	595	1.010
169	1.010	230	1.010	291	1.010	352	1.010	413	1.010	474	1.010	535	1.010	596	1.010
170	1.010	231	1.010	292	1.010	353	1.010	414	1.010	475	1.010	536	1.010	597	1.010
171	1.010	232	1.010	293	1.010	354	1.010	415	1.010	476	1.010	537	1.010	598	1.010
172	1.010	233	1.010	294	1.010	355	1.010	416	1.010	477	1.010	538	1.010	599	1.010
173	1.010	234	1.010	295	1.010	356	1.010	417	1.010	478	1.010	539	1.010	600	1.010
174	1.010	235	1.010	296	1.010	357	1.010	418	1.010	479	1.010	540	1.010	601	1.010
175	1.010	236	1.010	297	1.010	358	1.010	419	1.010	480	1.010	541	1.010	602	1.010
176	1.010	237	1.010	298	1.010	359	1.010	420	1.010	481	1.010	542	1.010	603	1.010
177	1.010	238	1.010	299	1.010	360	1.010	421	1.010	482	1.010	543	1.010	604	1.010
178	1.010	239	1.010	300	1.010	361	1.010	422	1.010	483	1.010	544	1.010	605	1.010
179	1.010	240	1.010	301	1.010	362	1.010	423	1.010	484	1.010	545	1.010	606	1.010
180	1.010	241	1.010	302	1.010	363	1.010	424	1.010	485	1.010	546	1.010	607	1.010
181	1.010	242	1.010	303	1.010	364	1.010	425	1.010	486	1.010	547	1.010	608	1.010

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
609	1.010	670	1.010	731	1.010	792	1.010	853	1.010	914	1.010	975	1.010	1036	1.010
610	1.010	671	1.010	732	1.010	793	1.010	854	1.010	915	1.010	976	1.010	1037	1.010
611	1.010	672	1.010	733	1.010	794	1.010	855	1.010	916	1.010	977	1.010	1038	1.010
612	1.010	673	1.010	734	1.010	795	1.010	856	1.010	917	1.010	978	1.010	1039	1.010
613	1.010	674	1.010	735	1.010	796	1.010	857	1.010	918	1.010	979	1.010	1040	1.010
614	1.010	675	1.010	736	1.010	797	1.010	858	1.010	919	1.010	980	1.010	1041	1.010
615	1.010	676	1.010	737	1.010	798	1.010	859	1.010	920	1.010	981	1.010	1042	1.010
616	1.010	677	1.010	738	1.010	799	1.010	860	1.010	921	1.010	982	1.010	1043	1.010
617	1.010	678	1.010	739	1.010	800	1.010	861	1.010	922	1.010	983	1.010	1044	1.010
618	1.010	679	1.010	740	1.010	801	1.010	862	1.010	923	1.010	984	1.010	1045	1.010
619	1.010	680	1.010	741	1.010	802	1.010	863	1.010	924	1.010	985	1.010	1046	1.010
620	1.010	681	1.010	742	1.010	803	1.010	864	1.010	925	1.010	986	1.010	1047	1.010
621	1.010	682	1.010	743	1.010	804	1.010	865	1.010	926	1.010	987	1.010	1048	1.010
622	1.010	683	1.010	744	1.010	805	1.010	866	1.010	927	1.010	988	1.010	1049	1.010
623	1.010	684	1.010	745	1.010	806	1.010	867	1.010	928	1.010	989	1.010	1050	1.010
624	1.010	685	1.010	746	1.010	807	1.010	868	1.010	929	1.010	990	1.010	1051	1.010
625	1.010	686	1.010	747	1.010	808	1.010	869	1.010	930	1.010	991	1.010	1052	1.010
626	1.010	687	1.010	748	1.010	809	1.010	870	1.010	931	1.010	992	1.010	1053	1.010
627	1.010	688	1.010	749	1.010	810	1.010	871	1.010	932	1.010	993	1.010	1054	1.010
628	1.010	689	1.010	750	1.010	811	1.010	872	1.010	933	1.010	994	1.010	1055	1.010
629	1.010	690	1.010	751	1.010	812	1.010	873	1.010	934	1.010	995	1.010	1056	1.010
630	1.010	691	1.010	752	1.010	813	1.010	874	1.010	935	1.010	996	1.010	1057	1.010
631	1.010	692	1.010	753	1.010	814	1.010	875	1.010	936	1.010	997	1.010	1058	1.010
632	1.010	693	1.010	754	1.010	815	1.010	876	1.010	937	1.010	998	1.010	1059	1.010
633	1.010	694	1.010	755	1.010	816	1.010	877	1.010	938	1.010	999	1.010	1060	1.010
634	1.010	695	1.010	756	1.010	817	1.010	878	1.010	939	1.010	1000	1.010	1061	1.010
635	1.010	696	1.010	757	1.010	818	1.010	879	1.010	940	1.010	1001	1.010	1062	1.010
636	1.010	697	1.010	758	1.010	819	1.010	880	1.010	941	1.010	1002	1.010	1063	1.010
637	1.010	698	1.010	759	1.010	820	1.010	881	1.010	942	1.010	1003	1.010	1064	1.010
638	1.010	699	1.010	760	1.010	821	1.010	882	1.010	943	1.010	1004	1.010	1065	1.010
639	1.010	700	1.010	761	1.010	822	1.010	883	1.010	944	1.010	1005	1.010	1066	1.010
640	1.010	701	1.010	762	1.010	823	1.010	884	1.010	945	1.010	1006	1.010	1067	1.010
641	1.010	702	1.010	763	1.010	824	1.010	885	1.010	946	1.010	1007	1.010	1068	1.010
642	1.010	703	1.010	764	1.010	825	1.010	886	1.010	947	1.010	1008	1.010	1069	1.010
643	1.010	704	1.010	765	1.010	826	1.010	887	1.010	948	1.010	1009	1.010	1070	1.010
644	1.010	705	1.010	766	1.010	827	1.010	888	1.010	949	1.010	1010	1.010	1071	1.010
645	1.010	706	1.010	767	1.010	828	1.010	889	1.010	950	1.010	1011	1.010	1072	1.010
646	1.010	707	1.010	768	1.010	829	1.010	890	1.010	951	1.010	1012	1.010	1073	1.010
647	1.010	708	1.010	769	1.010	830	1.010	891	1.010	952	1.010	1013	1.010	1074	1.010
648	1.010	709	1.010	770	1.010	831	1.010	892	1.010	953	1.010	1014	1.010	1075	1.010
649	1.010	710	1.010	771	1.010	832	1.010	893	1.010	954	1.010	1015	1.010	1076	1.010
650	1.010	711	1.010	772	1.010	833	1.010	894	1.010	955	1.010	1016	1.010	1077	1.010
651	1.010	712	1.010	773	1.010	834	1.010	895	1.010	956	1.010	1017	1.010	1078	1.010
652	1.010	713	1.010	774	1.010	835	1.010	896	1.010	957	1.010	1018	1.010	1079	1.010
653	1.010	714	1.010	775	1.010	836	1.010	897	1.010	958	1.010	1019	1.010	1080	1.010
654	1.010	715	1.010	776	1.010	837	1.010	898	1.010	959	1.010	1020	1.010	1081	1.010
655	1.010	716	1.010	777	1.010	838	1.010	899	1.010	960	1.010	1021	1.010	1082	1.010
656	1.010	717	1.010	778	1.010	839	1.010	900	1.010	961	1.010	1022	1.010	1083	1.010
657	1.010	718	1.010	779	1.010	840	1.010	901	1.010	962	1.010	1023	1.010	1084	1.010
658	1.010	719	1.010	780	1.010	841	1.010	902	1.010	963	1.010	1024	1.010	1085	1.010
659	1.010	720	1.010	781	1.010	842	1.010	903	1.010	964	1.010	1025	1.010	1086	1.010
660	1.010	721	1.010	782	1.010	843	1.010	904	1.010	965	1.010	1026	1.010	1087	1.010
661	1.010	722	1.010	783	1.010	844	1.010	905	1.010	966	1.010	1027	1.010	1088	1.010
662	1.010	723	1.010	784	1.010	845	1.010	906	1.010	967	1.010	1028	1.010	1089	1.010
663	1.010	724	1.010	785	1.010	846	1.010	907	1.010	968	1.010	1029	1.010	1090	1.010
664	1.010	725	1.010	786	1.010	847	1.010	908	1.010	969	1.010	1030	1.010	1091	1.010
665	1.010	726	1.010	787	1.010	848	1.010	909	1.010	970	1.010	1031	1.010	1092	1.010
666	1.010	727	1.010	788	1.010	849	1.010	910	1.010	971	1.010	1032	1.010	1093	1.010
667	1.010	728	1.010	789	1.010	850	1.010	911	1.010	972	1.010	1033	1.010	1094	1.010
668	1.010	729	1.010	790	1.010	851	1.010	912	1.010	973	1.010	1034	1.010	1095	1.010
669	1.010	730	1.010	791	1.010	852	1.010	913	1.010	974	1.010	1035	1.010	1096	1.010

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1097	1.010	1140	1.010	1183	1.010	1226	1.010	1269	1.010	1312	1.010	1355	1.010	1398	1.010
1098	1.010	1141	1.010	1184	1.010	1227	1.010	1270	1.010	1313	1.010	1356	1.010	1399	1.010
1099	1.010	1142	1.010	1185	1.010	1228	1.010	1271	1.010	1314	1.010	1357	1.010	1400	1.010
1100	1.010	1143	1.010	1186	1.010	1229	1.010	1272	1.010	1315	1.010	1358	1.010	1401	1.010
1101	1.010	1144	1.010	1187	1.010	1230	1.010	1273	1.010	1316	1.010	1359	1.010	1402	1.010
1102	1.010	1145	1.010	1188	1.010	1231	1.010	1274	1.010	1317	1.010	1360	1.010	1403	1.010
1103	1.010	1146	1.010	1189	1.010	1232	1.010	1275	1.010	1318	1.010	1361	1.010	1404	1.010
1104	1.010	1147	1.010	1190	1.010	1233	1.010	1276	1.010	1319	1.010	1362	1.010	1405	1.010
1105	1.010	1148	1.010	1191	1.010	1234	1.010	1277	1.010	1320	1.010	1363	1.010	1406	1.010
1106	1.010	1149	1.010	1192	1.010	1235	1.010	1278	1.010	1321	1.010	1364	1.010	1407	1.010
1107	1.010	1150	1.010	1193	1.010	1236	1.010	1279	1.010	1322	1.010	1365	1.010	1408	1.010
1108	1.010	1151	1.010	1194	1.010	1237	1.010	1280	1.010	1323	1.010	1366	1.010	1409	1.010
1109	1.010	1152	1.010	1195	1.010	1238	1.010	1281	1.010	1324	1.010	1367	1.010	1410	1.010
1110	1.010	1153	1.010	1196	1.010	1239	1.010	1282	1.010	1325	1.010	1368	1.010	1411	1.010
1111	1.010	1154	1.010	1197	1.010	1240	1.010	1283	1.010	1326	1.010	1369	1.010	1412	1.010
1112	1.010	1155	1.010	1198	1.010	1241	1.010	1284	1.010	1327	1.010	1370	1.010	1413	1.010
1113	1.010	1156	1.010	1199	1.010	1242	1.010	1285	1.010	1328	1.010	1371	1.010	1414	1.010
1114	1.010	1157	1.010	1200	1.010	1243	1.010	1286	1.010	1329	1.010	1372	1.010	1415	1.010
1115	1.010	1158	1.010	1201	1.010	1244	1.010	1287	1.010	1330	1.010	1373	1.010	1416	1.010
1116	1.010	1159	1.010	1202	1.010	1245	1.010	1288	1.010	1331	1.010	1374	1.010	1417	1.010
1117	1.010	1160	1.010	1203	1.010	1246	1.010	1289	1.010	1332	1.010	1375	1.010	1418	1.010
1118	1.010	1161	1.010	1204	1.010	1247	1.010	1290	1.010	1333	1.010	1376	1.010	1419	1.010
1119	1.010	1162	1.010	1205	1.010	1248	1.010	1291	1.010	1334	1.010	1377	1.010	1420	1.010
1120	1.010	1163	1.010	1206	1.010	1249	1.010	1292	1.010	1335	1.010	1378	1.010	1421	1.010
1121	1.010	1164	1.010	1207	1.010	1250	1.010	1293	1.010	1336	1.010	1379	1.010	1422	1.010
1122	1.010	1165	1.010	1208	1.010	1251	1.010	1294	1.010	1337	1.010	1380	1.010	1423	1.010
1123	1.010	1166	1.010	1209	1.010	1252	1.010	1295	1.010	1338	1.010	1381	1.010	1424	1.010
1124	1.010	1167	1.010	1210	1.010	1253	1.010	1296	1.010	1339	1.010	1382	1.010	1425	1.010
1125	1.010	1168	1.010	1211	1.010	1254	1.010	1297	1.010	1340	1.010	1383	1.010	1426	1.010
1126	1.010	1169	1.010	1212	1.010	1255	1.010	1298	1.010	1341	1.010	1384	1.010	1427	1.010
1127	1.010	1170	1.010	1213	1.010	1256	1.010	1299	1.010	1342	1.010	1385	1.010	1428	1.010
1128	1.010	1171	1.010	1214	1.010	1257	1.010	1300	1.010	1343	1.010	1386	1.010	1429	1.010
1129	1.010	1172	1.010	1215	1.010	1258	1.010	1301	1.010	1344	1.010	1387	1.010	1430	1.010
1130	1.010	1173	1.010	1216	1.010	1259	1.010	1302	1.010	1345	1.010	1388	1.010	1431	1.010
1131	1.010	1174	1.010	1217	1.010	1260	1.010	1303	1.010	1346	1.010	1389	1.010	1432	1.010
1132	1.010	1175	1.010	1218	1.010	1261	1.010	1304	1.010	1347	1.010	1390	1.010	1433	1.010
1133	1.010	1176	1.010	1219	1.010	1262	1.010	1305	1.010	1348	1.010	1391	1.010	1434	1.010
1134	1.010	1177	1.010	1220	1.010	1263	1.010	1306	1.010	1349	1.010	1392	1.010	1435	1.010
1135	1.010	1178	1.010	1221	1.010	1264	1.010	1307	1.010	1350	1.010	1393	1.010	1436	1.010
1136	1.010	1179	1.010	1222	1.010	1265	1.010	1308	1.010	1351	1.010	1394	1.010	1437	1.010
1137	1.010	1180	1.010	1223	1.010	1266	1.010	1309	1.010	1352	1.010	1395	1.010	1438	1.010
1138	1.010	1181	1.010	1224	1.010	1267	1.010	1310	1.010	1353	1.010	1396	1.010	1439	1.010
1139	1.010	1182	1.010	1225	1.010	1268	1.010	1311	1.010	1354	1.010	1397	1.010	1440	1.010

Online Controls for Storm

Hydro-Brake® Optimum Manhole: RC2013, DS/PN: 1.013, Volume (m³): 3.5

Unit Reference	MD-SCU-0135-2500-1915-2500
Design Head (m)	1.915
Design Flow (l/s)	25.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	135
Invert Level (m)	86.085
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.915	25.0	Kick-Flo®	0.203	8.6
Flush-Flo™	0.167	8.8	Mean Flow over Head Range	-	16.9

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)
0.100	5.4	0.800	16.5	2.000	25.5	4.000	35.7	7.000	46.8
0.200	8.7	1.000	18.3	2.200	26.7	4.500	37.7	7.500	48.4
0.300	10.4	1.200	20.0	2.400	27.9	5.000	39.7	8.000	49.9
0.400	11.9	1.400	21.5	2.600	29.0	5.500	41.6	8.500	51.4
0.500	13.2	1.600	22.9	3.000	31.0	6.000	43.4	9.000	52.8
0.600	14.4	1.800	24.3	3.500	33.4	6.500	45.1	9.500	54.3

Storage Structures for Storm

Tank or Pond Pipe: 1.010

Manning's N 0.035 Invert Level (m) 86.150

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	780.0	1.850	1800.0	1.851	0.0

Tank or Pond Pipe: 1.011

Manning's N 0.035 Invert Level (m) 86.149

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	390.0	1.850	900.0	1.851	0.0

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Micro Drainage	Network 2020.1.3	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

PN	US/MH Name	Storm	Return Climate		First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
			Period	Change					Level (m)	Depth (m)
1.000	RC2000	15 Summer	2	+0%	100/15 Summer				89.420	-0.315
1.001	RC2001	15 Summer	2	+0%	100/15 Summer				88.665	-0.370
1.002	RC2002	15 Summer	2	+0%	100/15 Summer				87.877	-0.423
1.003	RC2003	15 Summer	2	+0%	100/15 Summer				87.769	-0.431
1.004	RC2004	15 Summer	2	+0%	100/15 Summer				87.607	-0.458
1.005	RC2005	15 Summer	2	+0%	100/15 Summer				87.556	-0.439
1.006	RC2006	15 Summer	2	+0%	100/15 Summer				87.327	-0.618
1.007	RC2007	15 Summer	2	+0%	100/15 Summer				87.136	-0.689
2.000	RC2100	15 Summer	2	+0%	100/15 Summer				88.644	-0.246
2.001	RC2101	15 Summer	2	+0%	100/15 Summer				88.291	-0.299
2.002	RC2102	15 Summer	2	+0%					87.848	-0.342
3.000	RC2200	15 Summer	2	+0%	100/15 Summer				87.328	-0.292
1.008	RC2008	1440 Winter	2	+0%	100/15 Summer				86.856	-0.424
1.009	RC2009	1440 Winter	2	+0%	30/1440 Summer				86.856	-0.394
1.010	RC2010	1440 Winter	2	+0%					86.857	-1.143
4.000	RC2300	15 Summer	2	+0%	100/15 Summer				89.787	-0.273
4.001	RC2301	15 Summer	2	+0%	100/15 Summer				89.483	-0.327
4.002	RC2302	15 Summer	2	+0%	100/15 Summer				89.247	-0.393
5.000	RC2400	15 Summer	2	+0%	100/15 Summer				89.719	-0.261
5.001	RC2401	15 Summer	2	+0%					89.567	-0.313
4.003	RC2303	15 Summer	2	+0%					88.936	-0.584
4.004	RC2304	15 Summer	2	+0%	100/15 Summer				88.208	-0.507
6.000	RC2500	15 Summer	2	+0%	100/15 Summer				89.384	-0.296
6.001	RC2501	15 Summer	2	+0%	100/15 Summer				89.212	-0.343
6.002	RC2502	15 Summer	2	+0%					89.010	-0.400
4.005	RC2305	15 Summer	2	+0%					87.829	-0.721
1.011	RC2011	1440 Winter	2	+0%					86.857	-1.143
1.012	RC2012	1440 Winter	2	+0%	2/60 Summer				86.857	0.409
1.013	RC2013	1440 Winter	2	+0%	2/30 Summer	100/120 Winter			87.288	0.903

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

PN	US/MH Name	Flooded		Half Drain		Pipe	Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
1.000	RC2000	0.000	0.18			59.0	OK	
1.001	RC2001	0.000	0.18			92.5	OK	
1.002	RC2002	0.000	0.30			127.3	OK	
1.003	RC2003	0.000	0.27			123.5	OK	
1.004	RC2004	0.000	0.28			141.8	OK	
1.005	RC2005	0.000	0.36			166.0	OK	
1.006	RC2006	0.000	0.21			185.3	OK	
1.007	RC2007	0.000	0.12			204.4	OK	
2.000	RC2100	0.000	0.25			44.5	OK	
2.001	RC2101	0.000	0.23			66.8	OK	
2.002	RC2102	0.000	0.13			68.4	OK	
3.000	RC2200	0.000	0.26			45.3	OK	
1.008	RC2008	0.000	0.03			19.9	OK	
1.009	RC2009	0.000	0.02			19.9	OK	
1.010	RC2010	0.000	0.00			60.6	OK	
4.000	RC2300	0.000	0.28			54.6	OK	
4.001	RC2301	0.000	0.30			91.4	OK	
4.002	RC2302	0.000	0.26			89.3	OK	
5.000	RC2400	0.000	0.35			60.1	OK	
5.001	RC2401	0.000	0.18			57.1	OK	
4.003	RC2303	0.000	0.11			143.8	OK	
4.004	RC2304	0.000	0.22			139.3	OK	
6.000	RC2500	0.000	0.24			43.0	OK	
6.001	RC2501	0.000	0.25			67.6	OK	
6.002	RC2502	0.000	0.13			93.2	OK	
4.005	RC2305	0.000	0.08			232.1	OK	
1.011	RC2011	0.000	0.00			45.3	OK	
1.012	RC2012	0.000	0.46			27.5	SURCHARGED	
1.013	RC2013	0.000	0.20			15.8	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 1.000
Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 45

US/MH		Storm	Return Climate		First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
PN	Name		Period	Change					Level (m)	Depth (m)
1.000	RC2000	15 Summer	5	+0%	100/15 Summer				89.445	-0.290
1.001	RC2001	15 Summer	5	+0%	100/15 Summer				88.695	-0.340
1.002	RC2002	15 Summer	5	+0%	100/15 Summer				87.929	-0.371
1.003	RC2003	15 Summer	5	+0%	100/15 Summer				87.820	-0.380
1.004	RC2004	15 Summer	5	+0%	100/15 Summer				87.671	-0.394
1.005	RC2005	15 Summer	5	+0%	100/15 Summer				87.622	-0.373
1.006	RC2006	15 Summer	5	+0%	100/15 Summer				87.381	-0.564
1.007	RC2007	15 Summer	5	+0%	100/15 Summer				87.177	-0.648
2.000	RC2100	15 Summer	5	+0%	100/15 Summer				88.671	-0.219
2.001	RC2101	15 Summer	5	+0%	100/15 Summer				88.323	-0.267
2.002	RC2102	15 Summer	5	+0%					87.870	-0.320
3.000	RC2200	15 Summer	5	+0%	100/15 Summer				87.361	-0.259
1.008	RC2008	1440 Winter	5	+0%	100/15 Summer				86.975	-0.305
1.009	RC2009	1440 Winter	5	+0%	30/1440 Summer				86.976	-0.274
1.010	RC2010	1440 Winter	5	+0%					86.976	-1.024
4.000	RC2300	15 Summer	5	+0%	100/15 Summer				89.824	-0.236
4.001	RC2301	15 Summer	5	+0%	100/15 Summer				89.521	-0.289
4.002	RC2302	15 Summer	5	+0%	100/15 Summer				89.290	-0.350
5.000	RC2400	15 Summer	5	+0%	100/15 Summer				89.760	-0.220
5.001	RC2401	15 Summer	5	+0%					89.593	-0.287
4.003	RC2303	15 Summer	5	+0%					88.963	-0.557
4.004	RC2304	15 Summer	5	+0%	100/15 Summer				88.253	-0.462
6.000	RC2500	15 Summer	5	+0%	100/15 Summer				89.416	-0.264
6.001	RC2501	15 Summer	5	+0%	100/15 Summer				89.249	-0.306
6.002	RC2502	15 Summer	5	+0%					89.036	-0.374
4.005	RC2305	15 Summer	5	+0%					87.857	-0.693
1.011	RC2011	1440 Winter	5	+0%					86.976	-1.024
1.012	RC2012	1440 Winter	5	+0%	2/60 Summer				86.976	0.528
1.013	RC2013	1440 Winter	5	+0%	2/30 Summer	100/120 Winter			87.375	0.990

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

PN	US/MH Name	Flooded		Half Drain		Pipe	Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
1.000	RC2000	0.000	0.26			83.0	OK	
1.001	RC2001	0.000	0.26			129.3	OK	
1.002	RC2002	0.000	0.42			178.6	OK	
1.003	RC2003	0.000	0.38			173.2	OK	
1.004	RC2004	0.000	0.38			197.3	OK	
1.005	RC2005	0.000	0.50			231.6	OK	
1.006	RC2006	0.000	0.29			258.8	OK	
1.007	RC2007	0.000	0.17			286.1	OK	
2.000	RC2100	0.000	0.35			62.5	OK	
2.001	RC2101	0.000	0.32			93.5	OK	
2.002	RC2102	0.000	0.18			96.4	OK	
3.000	RC2200	0.000	0.37			63.5	OK	
1.008	RC2008	0.000	0.03			24.4	OK	
1.009	RC2009	0.000	0.02			24.3	OK	
1.010	RC2010	0.000	0.00			67.3	OK	
4.000	RC2300	0.000	0.40			75.9	OK	
4.001	RC2301	0.000	0.42			126.7	OK	
4.002	RC2302	0.000	0.35			123.2	OK	
5.000	RC2400	0.000	0.49			84.4	OK	
5.001	RC2401	0.000	0.26			81.0	OK	
4.003	RC2303	0.000	0.15			195.0	OK	
4.004	RC2304	0.000	0.30			192.2	OK	
6.000	RC2500	0.000	0.34			60.4	OK	
6.001	RC2501	0.000	0.36			94.6	OK	
6.002	RC2502	0.000	0.18			130.2	OK	
4.005	RC2305	0.000	0.12			321.5	OK	
1.011	RC2011	0.000	0.00			49.9	OK	
1.012	RC2012	0.000	0.49			28.9	SURCHARGED	
1.013	RC2013	0.000	0.22			16.9	SURCHARGED	

SGi Consulting		Page 13
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Micro Drainage	Network 2020.1.3	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 2, 5, 30, 100
 Climate Change (%) 0, 0, 0, 45

PN	US/MH Name	Storm	Return Climate		First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
			Period	Change					Level (m)	Depth (m)
1.000	RC2000	15 Summer	30	+0%	100/15 Summer				89.513	-0.222
1.001	RC2001	15 Summer	30	+0%	100/15 Summer				88.793	-0.242
1.002	RC2002	15 Summer	30	+0%	100/15 Summer				88.134	-0.166
1.003	RC2003	15 Summer	30	+0%	100/15 Summer				88.044	-0.156
1.004	RC2004	15 Summer	30	+0%	100/15 Summer				87.975	-0.090
1.005	RC2005	15 Summer	30	+0%	100/15 Summer				87.929	-0.066
1.006	RC2006	15 Summer	30	+0%	100/15 Summer				87.556	-0.389
1.007	RC2007	15 Summer	30	+0%	100/15 Summer				87.301	-0.524
2.000	RC2100	15 Summer	30	+0%	100/15 Summer				88.742	-0.148
2.001	RC2101	15 Summer	30	+0%	100/15 Summer				88.427	-0.163
2.002	RC2102	15 Summer	30	+0%					87.934	-0.256
3.000	RC2200	15 Summer	30	+0%	100/15 Summer				87.448	-0.172
1.008	RC2008	1440 Winter	30	+0%	100/15 Summer				87.262	-0.018
1.009	RC2009	1440 Winter	30	+0%	30/1440 Summer				87.262	0.012
1.010	RC2010	1440 Winter	30	+0%					87.262	-0.738
4.000	RC2300	15 Summer	30	+0%	100/15 Summer				89.932	-0.128
4.001	RC2301	15 Summer	30	+0%	100/15 Summer				89.663	-0.147
4.002	RC2302	15 Summer	30	+0%	100/15 Summer				89.433	-0.207
5.000	RC2400	15 Summer	30	+0%	100/15 Summer				89.880	-0.100
5.001	RC2401	15 Summer	30	+0%					89.663	-0.217
4.003	RC2303	15 Summer	30	+0%					89.046	-0.474
4.004	RC2304	15 Summer	30	+0%	100/15 Summer				88.392	-0.323
6.000	RC2500	15 Summer	30	+0%	100/15 Summer				89.500	-0.180
6.001	RC2501	15 Summer	30	+0%	100/15 Summer				89.377	-0.178
6.002	RC2502	15 Summer	30	+0%					89.116	-0.294
4.005	RC2305	15 Summer	30	+0%					87.952	-0.598
1.011	RC2011	1440 Winter	30	+0%					87.262	-0.738
1.012	RC2012	1440 Winter	30	+0%	2/60 Summer				87.262	0.814
1.013	RC2013	1440 Winter	30	+0%	2/30 Summer	100/120 Winter			87.651	1.266

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

PN	US/MH Name	Flooded		Half Drain		Pipe	Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
1.000	RC2000	0.000	0.48			154.4	OK	
1.001	RC2001	0.000	0.54			271.9	OK	
1.002	RC2002	0.000	0.91			391.1	OK	
1.003	RC2003	0.000	0.80			364.0	OK	
1.004	RC2004	0.000	0.79			406.8	OK	
1.005	RC2005	0.000	1.00			465.0	OK	
1.006	RC2006	0.000	0.60			523.6	OK	
1.007	RC2007	0.000	0.35			584.8	OK	
2.000	RC2100	0.000	0.66			116.3	OK	
2.001	RC2101	0.000	0.68			197.4	OK	
2.002	RC2102	0.000	0.38			202.2	OK	
3.000	RC2200	0.000	0.64			108.9	OK	
1.008	RC2008	0.000	0.05			36.6	OK	
1.009	RC2009	0.000	0.04			36.3	SURCHARGED	
1.010	RC2010	0.000	0.00			60.9	OK	
4.000	RC2300	0.000	0.74			141.3	OK	
4.001	RC2301	0.000	0.86			262.6	OK	
4.002	RC2302	0.000	0.74			257.0	OK	
5.000	RC2400	0.000	0.92			157.0	OK	
5.001	RC2401	0.000	0.49			151.0	OK	
4.003	RC2303	0.000	0.29			380.3	OK	
4.004	RC2304	0.000	0.60			381.3	OK	
6.000	RC2500	0.000	0.63			112.6	OK	
6.001	RC2501	0.000	0.74			197.7	OK	
6.002	RC2502	0.000	0.40			286.6	OK	
4.005	RC2305	0.000	0.24			656.3	OK	
1.011	RC2011	0.000	0.00			46.0	OK	
1.012	RC2012	0.000	0.53			31.4	SURCHARGED	
1.013	RC2013	0.000	0.25			19.4	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 1.000
Site Location GB 339198 334094 SJ 39198 34094 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 45

US/MH		Return Climate		First (X)		First (Y)		First (Z)		Water	Surcharged
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Overflow	Act.	Level	Depth
1.000	RC2000	15 Summer	100	+45%	100/15 Summer					89.942	0.207
1.001	RC2001	15 Summer	100	+45%	100/15 Summer					89.708	0.673
1.002	RC2002	15 Summer	100	+45%	100/15 Summer					89.222	0.922
1.003	RC2003	15 Summer	100	+45%	100/15 Summer					89.015	0.815
1.004	RC2004	15 Summer	100	+45%	100/15 Summer					88.773	0.708
1.005	RC2005	15 Summer	100	+45%	100/15 Summer					88.532	0.537
1.006	RC2006	15 Summer	100	+45%	100/15 Summer					88.192	0.247
1.007	RC2007	15 Summer	100	+45%	100/15 Summer					87.974	0.149
2.000	RC2100	15 Summer	100	+45%	100/15 Summer					89.471	0.581
2.001	RC2101	15 Summer	100	+45%	100/15 Summer					88.954	0.364
2.002	RC2102	15 Summer	100	+45%						88.024	-0.166
3.000	RC2200	1440 Winter	100	+45%	100/15 Summer					87.822	0.202
1.008	RC2008	1440 Winter	100	+45%	100/15 Summer					87.822	0.542
1.009	RC2009	1440 Winter	100	+45%	30/1440 Summer					87.821	0.571
1.010	RC2010	1440 Winter	100	+45%						87.821	-0.179
4.000	RC2300	15 Summer	100	+45%	100/15 Summer					90.854	0.794
4.001	RC2301	15 Summer	100	+45%	100/15 Summer					90.216	0.406
4.002	RC2302	15 Summer	100	+45%	100/15 Summer					89.755	0.115
5.000	RC2400	15 Summer	100	+45%	100/15 Summer					90.240	0.260
5.001	RC2401	15 Summer	100	+45%						89.849	-0.031
4.003	RC2303	15 Summer	100	+45%						89.192	-0.328
4.004	RC2304	15 Summer	100	+45%	100/15 Summer					88.733	0.018
6.000	RC2500	15 Summer	100	+45%	100/15 Summer					89.953	0.273
6.001	RC2501	15 Summer	100	+45%	100/15 Summer					89.731	0.176
6.002	RC2502	15 Summer	100	+45%						89.242	-0.168
4.005	RC2305	15 Summer	100	+45%						88.070	-0.480
1.011	RC2011	1440 Winter	100	+45%						87.821	-0.179
1.012	RC2012	1440 Winter	100	+45%	2/60 Summer					87.821	1.373
1.013	RC2013	1440 Winter	100	+45%	2/30 Summer	100/120 Winter				88.236	1.851

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

PN	US/MH Name	Flooded		Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Volume (m³)	Flow / Cap.					
1.000	RC2000	0.000	0.94			301.5	SURCHARGED	
1.001	RC2001	0.000	0.88			444.5	SURCHARGED	
1.002	RC2002	0.000	1.50			642.7	SURCHARGED	
1.003	RC2003	0.000	1.39			629.0	SURCHARGED	
1.004	RC2004	0.000	1.49			765.4	SURCHARGED	
1.005	RC2005	0.000	1.95			906.7	SURCHARGED	
1.006	RC2006	0.000	1.18			1034.0	SURCHARGED	
1.007	RC2007	0.000	0.69			1142.8	SURCHARGED	
2.000	RC2100	0.000	1.22			215.4	SURCHARGED	
2.001	RC2101	0.000	1.36			392.2	SURCHARGED	
2.002	RC2102	0.000	0.73			391.0	OK	
3.000	RC2200	0.000	0.04			6.1	SURCHARGED	
1.008	RC2008	0.000	0.09			67.5	SURCHARGED	
1.009	RC2009	0.000	0.07			67.5	SURCHARGED	
1.010	RC2010	0.000	0.00			66.0	FLOOD RISK	
4.000	RC2300	0.000	1.39			267.0	SURCHARGED	
4.001	RC2301	0.000	1.69			515.7	SURCHARGED	
4.002	RC2302	0.000	1.43			494.8	SURCHARGED	
5.000	RC2400	0.000	1.85			316.6	SURCHARGED	
5.001	RC2401	0.000	0.97			299.7	OK	
4.003	RC2303	0.000	0.57			741.3	OK	
4.004	RC2304	0.000	1.17			742.9	SURCHARGED	
6.000	RC2500	0.000	1.20			214.8	SURCHARGED	
6.001	RC2501	0.000	1.48			393.4	SURCHARGED	
6.002	RC2502	0.000	0.81			575.0	OK	
4.005	RC2305	0.000	0.46			1266.8	OK	
1.011	RC2011	0.000	0.00			47.7	FLOOD RISK	
1.012	RC2012	0.000	0.58			34.6	FLOOD RISK	
1.013	RC2013	0.000	0.30			23.4	FLOOD RISK	