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Merchants House Wapping Road Bristol BS1 4RW	Brent Cross Shopping Centre Surface Water Energy Centre	
Date 05.04.2017 File 170213 RMA.MDX	Designed by DT Checked by HC	
Micro Drainage		Network 2016.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW Energy Centre

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	20.900	Minimum Backdrop Height (m)	0.000
Ratio R	0.439	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits






Time Area Diagram for SW Energy Centre

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.138	4-8	0.022

Total Area Contributing (ha) = 0.160

Total Pipe Volume (m³) = 4.394

Network Design Table for SW Energy Centre

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	27.738	0.280	99.1	0.040	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	39.518	0.400	98.8	0.040	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	9.368	0.100	93.7	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	11.985	0.120	99.9	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	21.900	0.600	36.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table


PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.35	39.240	0.040	0.0	0.0	0.0	1.31	52.2	5.4
2.000	50.00	4.50	40.315	0.040	0.0	0.0	0.0	1.32	52.3	5.4
2.001	50.00	4.62	39.915	0.080	0.0	0.0	0.0	1.35	53.7	10.8
2.002	50.00	4.77	39.815	0.120	0.0	0.0	0.0	1.31	52.0	16.2
1.001	50.00	4.94	37.660	0.160	0.0	0.0	0.0	2.17	86.4	21.7

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Manhole Schedules for SW Energy Centre

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
EC.SWMH1	41.740	2.500	Open Manhole	1200	1.000	39.240	225				
EC.SWMH2	41.740	1.425	Open Manhole	1200	2.000	40.315	225				
EC.SWMH3	41.740	1.825	Open Manhole	1200	2.001	39.915	225	2.000	39.915	225	
EC.SWMH4	41.740	1.925	Open Manhole	1200	2.002	39.815	225	2.001	39.815	225	
EC.SWMH5	41.740	4.080	Open Manhole	1200	1.001	37.660	225	1.000	38.960	225	1300
								2.002	39.695	225	2035
	38.660	1.600	Open Manhole	0		OUTFALL		1.001	37.060	225	

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PIPELINE SCHEDULES for SW Energy Centre

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	EC.SWMH1	41.740	39.240	2.275	Open Manhole	1200
2.000	o	225	EC.SWMH2	41.740	40.315	1.200	Open Manhole	1200
2.001	o	225	EC.SWMH3	41.740	39.915	1.600	Open Manhole	1200
2.002	o	225	EC.SWMH4	41.740	39.815	1.700	Open Manhole	1200
1.001	o	225	EC.SWMH5	41.740	37.660	3.855	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	27.738	99.1	EC.SWMH5	41.740	38.960	2.555	Open Manhole	1200
2.000	39.518	98.8	EC.SWMH3	41.740	39.915	1.600	Open Manhole	1200
2.001	9.368	93.7	EC.SWMH4	41.740	39.815	1.700	Open Manhole	1200
2.002	11.985	99.9	EC.SWMH5	41.740	39.695	1.820	Open Manhole	1200
1.001	21.900	36.5		38.660	37.060	1.375	Open Manhole	0

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Online Controls for SW Energy Centre


Hydro-Brake Optimum® Manhole: EC.SWMH5, DS/PN: 1.001, Volume (m³): 6.1

Unit Reference	MD-SHE-0131-1300-3500-1300
Design Head (m)	3.500
Design Flow (l/s)	13.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	131
Invert Level (m)	37.660
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	3.500	13.0
Flush-Flo™	0.565	9.9
Kick-Flo®	1.170	7.7
Mean Flow over Head Range	-	9.9

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)
0.100	4.7	1.200	7.8	3.000	12.1	7.000	18.1
0.200	8.3	1.400	8.4	3.500	13.0	7.500	18.7
0.300	9.2	1.600	9.0	4.000	13.8	8.000	19.3
0.400	9.6	1.800	9.5	4.500	14.6	8.500	19.8
0.500	9.8	2.000	10.0	5.000	15.4	9.000	20.4
0.600	9.8	2.200	10.4	5.500	16.1	9.500	20.9
0.800	9.6	2.400	10.9	6.000	16.8		
1.000	9.0	2.600	11.3	6.500	17.5		


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Storage Structures for SW Energy Centre

Cellular Storage Manhole: EC.SWMH5, DS/PN: 1.001

Invert Level (m) 39.240 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	20.0	0.0	1.300	20.0	0.0
0.100	20.0	0.0	1.400	20.0	0.0
0.200	20.0	0.0	1.500	20.0	0.0
0.300	20.0	0.0	1.501	0.0	0.0
0.400	20.0	0.0	1.700	0.0	0.0
0.500	20.0	0.0	1.800	0.0	0.0
0.600	20.0	0.0	1.900	0.0	0.0
0.700	20.0	0.0	2.000	0.0	0.0
0.800	20.0	0.0	2.100	0.0	0.0
0.900	20.0	0.0	2.200	0.0	0.0
1.000	20.0	0.0	2.300	0.0	0.0
1.100	20.0	0.0	2.400	0.0	0.0
1.200	20.0	0.0	2.500	0.0	0.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW Energy Centre

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
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 Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FSR Ratio R 0.439
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.900 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 1, 2, 10, 30, 100
Climate Change (%) 0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	EC.SWMH1	15 Winter	1	+0%	10/15 Summer				39.330
2.000	EC.SWMH2	15 Winter	1	+0%	100/15 Winter				40.369
2.001	EC.SWMH3	15 Winter	1	+0%	100/15 Summer				39.993
2.002	EC.SWMH4	15 Winter	1	+0%	100/15 Summer				39.910
1.001	EC.SWMH5	15 Winter	1	+0%	1/15 Summer				39.326

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	
1.000	EC.SWMH1	-0.135	0.000	0.13		6.4	OK	
2.000	EC.SWMH2	-0.171	0.000	0.13		6.4	OK	
2.001	EC.SWMH3	-0.147	0.000	0.26		11.4	OK	
2.002	EC.SWMH4	-0.130	0.000	0.37		16.4	OK	
1.001	EC.SWMH5	1.441	0.000	0.12		9.1	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
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 Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FSR Ratio R 0.439
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.900 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 1, 2, 10, 30, 100
Climate Change (%) 0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	EC.SWMH1	15 Winter	2	+0%	10/15 Summer				39.443
2.000	EC.SWMH2	15 Winter	2	+0%	100/15 Winter				40.376
2.001	EC.SWMH3	15 Winter	2	+0%	100/15 Summer				40.005
2.002	EC.SWMH4	15 Winter	2	+0%	100/15 Summer				39.926
1.001	EC.SWMH5	15 Winter	2	+0%	1/15 Summer				39.439

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	
1.000	EC.SWMH1	-0.022	0.000	0.17		8.2	OK	
2.000	EC.SWMH2	-0.164	0.000	0.17		8.2	OK	
2.001	EC.SWMH3	-0.135	0.000	0.33		14.7	OK	
2.002	EC.SWMH4	-0.114	0.000	0.48		21.3	OK	
1.001	EC.SWMH5	1.554	0.000	0.12		9.4	SURCHARGED	

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW Energy Centre

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
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 Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FSR Ratio R 0.439
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.900 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 1, 2, 10, 30, 100
Climate Change (%) 0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	EC.SWMH1	15 Winter	10	+0%	10/15 Summer				39.748
2.000	EC.SWMH2	15 Winter	10	+0%	100/15 Winter				40.391
2.001	EC.SWMH3	15 Winter	10	+0%	100/15 Summer				40.036
2.002	EC.SWMH4	15 Winter	10	+0%	100/15 Summer				39.973
1.001	EC.SWMH5	15 Winter	10	+0%	1/15 Summer				39.742

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	EC.SWMH1	0.283	0.000	0.22	10.5	SURCHARGED	
2.000	EC.SWMH2	-0.149	0.000	0.25	12.3	OK	
2.001	EC.SWMH3	-0.104	0.000	0.56	24.6	OK	
2.002	EC.SWMH4	-0.067	0.000	0.83	36.8	OK	
1.001	EC.SWMH5	1.857	0.000	0.13	10.2	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
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 Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FSR Ratio R 0.439
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.900 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 1, 2, 10, 30, 100
Climate Change (%) 0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	EC.SWMH1	30 Winter	100	+30%	10/15 Summer				41.078
2.000	EC.SWMH2	30 Winter	100	+30%	100/15 Winter				41.103
2.001	EC.SWMH3	30 Winter	100	+30%	100/15 Summer				41.094
2.002	EC.SWMH4	30 Winter	100	+30%	100/15 Summer				41.085
1.001	EC.SWMH5	30 Winter	100	+30%	1/15 Summer				41.070

PN	US/MH Name	Surcharged Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s) Status	
1.000	EC.SWMH1	1.613	0.000	0.34	16.5 SURCHARGED	
2.000	EC.SWMH2	0.563	0.000	0.39	19.5 SURCHARGED	
2.001	EC.SWMH3	0.954	0.000	0.76	33.7 SURCHARGED	
2.002	EC.SWMH4	1.045	0.000	1.14	50.9 SURCHARGED	
1.001	EC.SWMH5	3.185	0.000	0.16	12.8 SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW Energy Centre Surcharged at 39.384

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	20.900	Minimum Backdrop Height (m)	0.000
Ratio R	0.439	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits






Time Area Diagram for SW Energy Centre Surcharged at 39.384

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.138	4-8	0.022

Total Area Contributing (ha) = 0.160


Total Pipe Volume (m³) = 4.394

Network Design Table for SW Energy Centre Surcharged at 39.384

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
1.000	27.738	0.280	99.1	0.040	4.00	0.0	0.600	o	225	Pipe/Conduit		
2.000	39.518	0.400	98.8	0.040	4.00	0.0	0.600	o	225	Pipe/Conduit		
2.001	9.368	0.100	93.7	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit		
2.002	11.985	0.120	99.9	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit		
1.001	21.900	0.600	36.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		


Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.35	39.240	0.040	0.0	0.0	0.0	1.31	52.2	5.4
2.000	50.00	4.50	40.315	0.040	0.0	0.0	0.0	1.32	52.3	5.4
2.001	50.00	4.62	39.915	0.080	0.0	0.0	0.0	1.35	53.7	10.8
2.002	50.00	4.77	39.815	0.120	0.0	0.0	0.0	1.31	52.0	16.2
1.001	50.00	4.94	37.660	0.160	0.0	0.0	0.0	2.17	86.4	21.7

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Manhole Schedules for SW Energy Centre Surcharged at 39.384

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
EC.SWMH1	41.740	2.500	Open Manhole	1200	1.000	39.240	225				
EC.SWMH2	41.740	1.425	Open Manhole	1200	2.000	40.315	225				
EC.SWMH3	41.740	1.825	Open Manhole	1200	2.001	39.915	225	2.000	39.915	225	
EC.SWMH4	41.740	1.925	Open Manhole	1200	2.002	39.815	225	2.001	39.815	225	
EC.SWMH5	41.740	4.080	Open Manhole	1200	1.001	37.660	225	1.000	38.960	225	1300
								2.002	39.695	225	2035
	38.660	1.600	Open Manhole	0		OUTFALL		1.001	37.060	225	

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PIPELINE SCHEDULES for SW Energy Centre Surcharged at 39.384

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	EC.SWMH1	41.740	39.240	2.275	Open Manhole	1200
2.000	o	225	EC.SWMH2	41.740	40.315	1.200	Open Manhole	1200
2.001	o	225	EC.SWMH3	41.740	39.915	1.600	Open Manhole	1200
2.002	o	225	EC.SWMH4	41.740	39.815	1.700	Open Manhole	1200
1.001	o	225	EC.SWMH5	41.740	37.660	3.855	Open Manhole	1200

Downstream Manhole


PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	27.738	99.1	EC.SWMH5	41.740	38.960	2.555	Open Manhole	1200
2.000	39.518	98.8	EC.SWMH3	41.740	39.915	1.600	Open Manhole	1200
2.001	9.368	93.7	EC.SWMH4	41.740	39.815	1.700	Open Manhole	1200
2.002	11.985	99.9	EC.SWMH5	41.740	39.695	1.820	Open Manhole	1200
1.001	21.900	36.5		38.660	37.060	1.375	Open Manhole	0

Simulation Criteria for SW Energy Centre Surcharged at 39.384

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.900	Storm Duration (mins)	30
Ratio R	0.439		

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Online Controls for SW Energy Centre Surcharged at 39.384


Hydro-Brake Optimum® Manhole: EC.SWMH5, DS/PN: 1.001, Volume (m³): 6.1

Unit Reference	MD-SHE-0131-1300-3500-1300
Design Head (m)	3.500
Design Flow (l/s)	13.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	131
Invert Level (m)	37.660
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	3.500	13.0
Flush-Flo™	0.565	9.9
Kick-Flo®	1.170	7.7
Mean Flow over Head Range	-	9.9

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)
0.100	4.7	1.200	7.8	3.000	12.1	7.000	18.1
0.200	8.3	1.400	8.4	3.500	13.0	7.500	18.7
0.300	9.2	1.600	9.0	4.000	13.8	8.000	19.3
0.400	9.6	1.800	9.5	4.500	14.6	8.500	19.8
0.500	9.8	2.000	10.0	5.000	15.4	9.000	20.4
0.600	9.8	2.200	10.4	5.500	16.1	9.500	20.9
0.800	9.6	2.400	10.9	6.000	16.8		
1.000	9.0	2.600	11.3	6.500	17.5		


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Storage Structures for SW Energy Centre Surcharged at 39.384

Cellular Storage Manhole: EC.SWMH5, DS/PN: 1.001

Invert Level (m) 39.240 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	24.0	0.0	1.300	24.0	0.0
0.100	24.0	0.0	1.400	24.0	0.0
0.200	24.0	0.0	1.500	24.0	0.0
0.300	24.0	0.0	1.501	0.0	0.0
0.400	24.0	0.0	1.700	0.0	0.0
0.500	24.0	0.0	1.800	0.0	0.0
0.600	24.0	0.0	1.900	0.0	0.0
0.700	24.0	0.0	2.000	0.0	0.0
0.800	24.0	0.0	2.100	0.0	0.0
0.900	24.0	0.0	2.200	0.0	0.0
1.000	24.0	0.0	2.300	0.0	0.0
1.100	24.0	0.0	2.400	0.0	0.0
1.200	24.0	0.0	2.500	0.0	0.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW Energy Centre Surcharged at 39.384

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	0.000
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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FSR	Ratio R	0.439
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 10, 30, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Water Level (m)
1.000	EC.SWMH1	60 Winter	1	+0%	1/15 Summer			39.554
2.000	EC.SWMH2	15 Winter	1	+0%	100/15 Winter			40.369
2.001	EC.SWMH3	15 Winter	1	+0%	100/15 Summer			39.993
2.002	EC.SWMH4	15 Winter	1	+0%	30/30 Winter			39.910
1.001	EC.SWMH5	60 Winter	1	+0%	1/15 Summer			39.550

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	
1.000	EC.SWMH1	0.089	0.000	0.06		2.7	SURCHARGED	
2.000	EC.SWMH2	-0.171	0.000	0.13		6.4	OK	
2.001	EC.SWMH3	-0.147	0.000	0.26		11.4	OK	
2.002	EC.SWMH4	-0.130	0.000	0.37		16.4	OK	
1.001	EC.SWMH5	1.665	0.000	0.09		7.0	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW Energy Centre Surcharged at 39.384

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
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 Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FSR Ratio R 0.439
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.900 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 1, 2, 10, 30, 100
Climate Change (%) 0, 0, 0, 0, 30














PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	EC.SWMH1	60 Winter	30	+0%	1/15 Summer				40.096
2.000	EC.SWMH2	15 Winter	30	+0%	100/15 Winter				40.402
2.001	EC.SWMH3	60 Winter	30	+0%	100/15 Summer				40.108
2.002	EC.SWMH4	60 Winter	30	+0%	30/30 Winter				40.101
1.001	EC.SWMH5	60 Winter	30	+0%	1/15 Summer				40.090

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	
1.000	EC.SWMH1	0.631	0.000	0.13		6.5	SURCHARGED	
2.000	EC.SWMH2	-0.138	0.000	0.32		15.6	OK	
2.001	EC.SWMH3	-0.032	0.000	0.33		14.8	OK	
2.002	EC.SWMH4	0.061	0.000	0.50		22.3	SURCHARGED	
1.001	EC.SWMH5	2.205	0.000	0.12		9.8	SURCHARGED	

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FOUL SEWERAGE DESIGN

Network Design Table for FW Shopping Centre

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Units	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	27.985	0.500	56.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.001	42.584	0.700	60.8	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
2.000	2.541	0.075	33.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.002	28.277	0.375	75.4	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.003	29.561	0.300	98.5	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
3.000	78.477	1.400	56.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
3.001	2.401	0.025	96.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
3.002	70.961	0.700	101.4	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.004	7.174	0.080	89.7	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.005	26.337	0.250	105.3	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
4.000	15.074	0.250	60.3	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
5.000	42.548	0.710	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
6.000	36.554	0.710	51.5	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	40.890	0.000	0.0	0.0	0.0	0	0.00	1.17	20.7	0.0
1.001	40.390	0.000	0.0	0.0	0.0	0	0.00	1.12	19.9	0.0
2.000	40.890	0.000	0.0	0.0	0.0	0	0.00	1.51	26.7	0.0
1.002	39.690	0.000	0.0	0.0	0.0	0	0.00	1.01	17.8	0.0
1.003	39.315	0.000	0.0	0.0	0.0	0	0.00	0.88	15.6	0.0
3.000	40.890	0.000	0.0	0.0	0.0	0	0.00	1.17	20.7	0.0
3.001	39.490	0.000	0.0	0.0	0.0	0	0.00	0.89	15.8	0.0
3.002	39.465	0.000	0.0	0.0	0.0	0	0.00	0.87	15.4	0.0
1.004	38.765	0.000	0.0	0.0	0.0	0	0.00	0.93	16.3	0.0
1.005	38.685	0.000	0.0	0.0	0.0	0	0.00	0.85	15.1	0.0
4.000	40.890	0.000	0.0	0.0	0.0	0	0.00	1.13	20.0	0.0
5.000	40.890	0.000	0.0	0.0	0.0	0	0.00	1.13	20.0	0.0
6.000	40.890	0.000	0.0	0.0	0.0	0	0.00	1.22	21.6	0.0

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FOUL SEWERAGE DESIGN

Network Design Table for FW Shopping Centre

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Units	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.001	14.569	0.180	80.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
5.002	39.652	0.495	80.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.006	14.663	0.150	97.8	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
7.000	22.271	0.400	55.7	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
7.001	15.278	0.250	61.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.007	45.387	0.450	100.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.008	20.098	0.200	100.5	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.009	76.996	0.396	194.4	0.000	0.0	0.0	1.500	o	1000	Pipe/Conduit	
8.000	26.250	0.650	40.4	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
8.001	9.051	0.250	36.2	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
8.002	15.011	0.250	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
8.003	7.542	0.100	75.4	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
9.000	16.799	0.450	37.3	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
9.001	9.349	0.250	37.4	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
9.002	36.866	0.600	61.4	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	




Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.001	40.180	0.000	0.0	0.0	0.0	0	0.00	0.97	17.2	0.0
5.002	40.000	0.000	0.0	0.0	0.0	0	0.00	0.98	17.3	0.0
1.006	38.435	0.000	0.0	0.0	0.0	0	0.00	0.89	15.7	0.0
7.000	40.890	0.000	0.0	0.0	0.0	0	0.00	1.18	20.8	0.0
7.001	40.490	0.000	0.0	0.0	0.0	0	0.00	1.12	19.8	0.0
1.007	38.285	0.000	0.0	0.0	0.0	0	0.00	0.87	15.4	0.0
1.008	37.835	0.000	0.0	0.0	0.0	0	0.00	0.87	15.4	0.0
1.009	36.785	0.000	0.0	0.0	0.0	0	0.00	2.15	1688.4	0.0
8.000	40.890	0.000	0.0	0.0	0.0	0	0.00	1.38	24.4	0.0
8.001	40.240	0.000	0.0	0.0	0.0	0	0.00	1.46	25.8	0.0
8.002	39.990	0.000	0.0	0.0	0.0	0	0.00	1.13	20.0	0.0
8.003	39.740	0.000	0.0	0.0	0.0	0	0.00	1.01	17.8	0.0
9.000	40.890	0.000	0.0	0.0	0.0	0	0.00	1.44	25.4	0.0
9.001	40.440	0.000	0.0	0.0	0.0	0	0.00	1.44	25.4	0.0
9.002	40.190	0.000	0.0	0.0	0.0	0	0.00	1.12	19.8	0.0

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FOUL SEWERAGE DESIGN

Network Design Table for FW Shopping Centre

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Units	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
8.004	19.047	0.200	95.2	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
8.005	9.463	0.100	94.6	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.010	32.910	0.164	200.7	0.000	0.0	0.0	1.500	o	1000	Pipe/Conduit	

Network Results Table


PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.004	39.590	0.000	0.0	0.0	0.0	0	0.00	0.90	15.9	0.0
8.005	39.390	0.000	0.0	0.0	0.0	0	0.00	0.90	15.9	0.0
1.010	33.864	0.000	0.0	0.0	0.0	0	0.00	2.12	1661.9	0.0

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Manhole Schedules for FW Shopping Centre

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
E.FWMH1	42.365	1.475	Open Manhole	1200	1.000	40.890	150				
E.FWMH2	42.365	1.975	Open Manhole	1200	1.001	40.390	150	1.000	40.390	150	
E.FWMH3	42.365	1.475	Open Manhole	1200	2.000	40.890	150				
E.FWMH4	42.365	2.675	Open Manhole	1200	1.002	39.690	150	1.001	39.690	150	
								2.000	40.815	150	1125
E.FWMH5	42.365	3.050	Open Manhole	1200	1.003	39.315	150	1.002	39.315	150	
E.FWMH6	42.365	1.475	Open Manhole	1200	3.000	40.890	150				
E.FWMH7	42.365	2.875	Open Manhole	1200	3.001	39.490	150	3.000	39.490	150	
INTERNAL	42.365	2.900	Open Manhole	1200	3.002	39.465	150	3.001	39.465	150	
INTERNAL	42.365	3.600	Open Manhole	1200	1.004	38.765	150	1.003	39.015	150	250
								3.002	38.765	150	
INTERNAL	42.365	3.680	Open Manhole	1200	1.005	38.685	150	1.004	38.685	150	
E.FWMH8	42.365	1.475	Open Manhole	1200	4.000	40.890	150				
E.FWMH09A	42.365	1.475	Open Manhole	1200	5.000	40.890	150				
E.FWMH09B	42.365	1.475	Open Manhole	1200	6.000	40.890	150				
E.FWMH09C	42.365	2.185	Open Manhole	1200	5.001	40.180	150	5.000	40.180	150	
								6.000	40.180	150	
E.FWMH09D	42.365	2.365	Open Manhole	1200	5.002	40.000	150	5.001	40.000	150	
E.FWMH9	42.365	3.930	Open Manhole	1200	1.006	38.435	150	1.005	38.435	150	
								4.000	40.640	150	2205
								5.002	39.505	150	1070
E.FWMH10	42.365	1.475	Open Manhole	1200	7.000	40.890	150				
E.FWMH11	42.365	1.875	Open Manhole	1200	7.001	40.490	150	7.000	40.490	150	
E.FWMH12	42.365	4.080	Open Manhole	1200	1.007	38.285	150	1.006	38.285	150	
								7.001	40.240	150	1955
E.FWMH13	42.365	4.530	Open Manhole	1200	1.008	37.835	150	1.007	37.835	150	
TRENCH	42.365	5.580	Open Manhole	1900	1.009	36.785	1000	1.008	37.635	150	
W.FWMH1	42.365	1.475	Open Manhole	1200	8.000	40.890	150				
W.FWMH2	42.365	2.125	Open Manhole	1200	8.001	40.240	150	8.000	40.240	150	
W.FWMH3	42.365	2.375	Open Manhole	1200	8.002	39.990	150	8.001	39.990	150	
W.FWMH4	42.365	2.625	Open Manhole	1200	8.003	39.740	150	8.002	39.740	150	
W.FWMH5	42.365	1.475	Open Manhole	1200	9.000	40.890	150				
W.FWMH6	42.365	1.925	Open Manhole	1200	9.001	40.440	150	9.000	40.440	150	
W.FWMH7	42.365	2.175	Open Manhole	1200	9.002	40.190	150	9.001	40.190	150	
W.FWMH8	42.365	2.775	Open Manhole	1200	8.004	39.590	150	8.003	39.640	150	50
								9.002	39.590	150	
W.FWMH9	42.365	2.975	Open Manhole	1200	8.005	39.390	150	8.004	39.390	150	
FINAL	42.365	8.501	Open Manhole	1900	1.010	33.864	1000	1.009	36.389	1000	2525

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Manhole Schedules for FW Shopping Centre

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
	0.000		Open Manhole	0		OUTFALL		8.005	39.290	150	4576
								1.010	33.700	1000	

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PIPELINE SCHEDULES for FW Shopping Centre

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	E.FWMH1	42.365	40.890	1.325	Open Manhole	1200
1.001	o	150	E.FWMH2	42.365	40.390	1.825	Open Manhole	1200
2.000	o	150	E.FWMH3	42.365	40.890	1.325	Open Manhole	1200
1.002	o	150	E.FWMH4	42.365	39.690	2.525	Open Manhole	1200
1.003	o	150	E.FWMH5	42.365	39.315	2.900	Open Manhole	1200
3.000	o	150	E.FWMH6	42.365	40.890	1.325	Open Manhole	1200
3.001	o	150	E.FWMH7	42.365	39.490	2.725	Open Manhole	1200
3.002	o	150	INTERNAL	42.365	39.465	2.750	Open Manhole	1200
1.004	o	150	INTERNAL	42.365	38.765	3.450	Open Manhole	1200
1.005	o	150	INTERNAL	42.365	38.685	3.530	Open Manhole	1200
4.000	o	150	E.FWMH8	42.365	40.890	1.325	Open Manhole	1200
5.000	o	150	E.FWMH09A	42.365	40.890	1.325	Open Manhole	1200
6.000	o	150	E.FWMH09B	42.365	40.890	1.325	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	27.985	56.0	E.FWMH2	42.365	40.390	1.825	Open Manhole	1200
1.001	42.584	60.8	E.FWMH4	42.365	39.690	2.525	Open Manhole	1200
2.000	2.541	33.9	E.FWMH4	42.365	40.815	1.400	Open Manhole	1200
1.002	28.277	75.4	E.FWMH5	42.365	39.315	2.900	Open Manhole	1200
1.003	29.561	98.5	INTERNAL	42.365	39.015	3.200	Open Manhole	1200
3.000	78.477	56.1	E.FWMH7	42.365	39.490	2.725	Open Manhole	1200
3.001	2.401	96.1	INTERNAL	42.365	39.465	2.750	Open Manhole	1200
3.002	70.961	101.4	INTERNAL	42.365	38.765	3.450	Open Manhole	1200
1.004	7.174	89.7	INTERNAL	42.365	38.685	3.530	Open Manhole	1200
1.005	26.337	105.3	E.FWMH9	42.365	38.435	3.780	Open Manhole	1200
4.000	15.074	60.3	E.FWMH9	42.365	40.640	1.575	Open Manhole	1200
5.000	42.548	59.9	E.FWMH09C	42.365	40.180	2.035	Open Manhole	1200
6.000	36.554	51.5	E.FWMH09C	42.365	40.180	2.035	Open Manhole	1200

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PIPELINE SCHEDULES for FW Shopping Centre

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	o	150	E.FWMH09C	42.365	40.180	2.035	Open Manhole	1200
5.002	o	150	E.FWMH09D	42.365	40.000	2.215	Open Manhole	1200
1.006	o	150	E.FWMH9	42.365	38.435	3.780	Open Manhole	1200
7.000	o	150	E.FWMH10	42.365	40.890	1.325	Open Manhole	1200
7.001	o	150	E.FWMH11	42.365	40.490	1.725	Open Manhole	1200
1.007	o	150	E.FWMH12	42.365	38.285	3.930	Open Manhole	1200
1.008	o	150	E.FWMH13	42.365	37.835	4.380	Open Manhole	1200
1.009	o	1000	TRENCH	42.365	36.785	4.580	Open Manhole	1900
8.000	o	150	W.FWMH1	42.365	40.890	1.325	Open Manhole	1200
8.001	o	150	W.FWMH2	42.365	40.240	1.975	Open Manhole	1200
8.002	o	150	W.FWMH3	42.365	39.990	2.225	Open Manhole	1200
8.003	o	150	W.FWMH4	42.365	39.740	2.475	Open Manhole	1200
9.000	o	150	W.FWMH5	42.365	40.890	1.325	Open Manhole	1200
9.001	o	150	W.FWMH6	42.365	40.440	1.775	Open Manhole	1200
9.002	o	150	W.FWMH7	42.365	40.190	2.025	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	14.569	80.9	E.FWMH09D	42.365	40.000	2.215	Open Manhole	1200
5.002	39.652	80.1	E.FWMH9	42.365	39.505	2.710	Open Manhole	1200
1.006	14.663	97.8	E.FWMH12	42.365	38.285	3.930	Open Manhole	1200
7.000	22.271	55.7	E.FWMH11	42.365	40.490	1.725	Open Manhole	1200
7.001	15.278	61.1	E.FWMH12	42.365	40.240	1.975	Open Manhole	1200
1.007	45.387	100.9	E.FWMH13	42.365	37.835	4.380	Open Manhole	1200
1.008	20.098	100.5	TRENCH	42.365	37.635	4.580	Open Manhole	1900
1.009	76.996	194.4	FINAL	42.365	36.389	4.976	Open Manhole	1900
8.000	26.250	40.4	W.FWMH2	42.365	40.240	1.975	Open Manhole	1200
8.001	9.051	36.2	W.FWMH3	42.365	39.990	2.225	Open Manhole	1200
8.002	15.011	60.0	W.FWMH4	42.365	39.740	2.475	Open Manhole	1200
8.003	7.542	75.4	W.FWMH8	42.365	39.640	2.575	Open Manhole	1200
9.000	16.799	37.3	W.FWMH6	42.365	40.440	1.775	Open Manhole	1200
9.001	9.349	37.4	W.FWMH7	42.365	40.190	2.025	Open Manhole	1200
9.002	36.866	61.4	W.FWMH8	42.365	39.590	2.625	Open Manhole	1200

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PIPELINE SCHEDULES for FW Shopping Centre

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
8.004	o	150	W.FWMH8	42.365	39.590	2.625	Open Manhole	1200
8.005	o	150	W.FWMH9	42.365	39.390	2.825	Open Manhole	1200
1.010	o	1000	FINAL	42.365	33.864	7.501	Open Manhole	1900

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
8.004	19.047	95.2	W.FWMH9	42.365	39.390	2.825	Open Manhole	1200
8.005	9.463	94.6	FINAL	42.365	39.290	2.925	Open Manhole	1900
1.010	32.910	200.7		0.000	33.700		Open Manhole	0

UK and Ireland Office Locations

