

Unit 9 The Chase
Foxholes B'ness Park
Hertford SG13 7NN

Salisbury Square, Hatfield
11501548
Existing Drainage

Date 04/03/2011
File Existing Network.mdx

Designed By ukdid001
Checked By



Micro Drainage

Network W.12.4.1

PIPELINE SCHEDULES for S1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1-1.000	o	150	S1-1	76.310	74.800	1.360	1050
S1-1.001	o	150	S1-2	75.680	73.025	2.505	1200
S1-1.002	o	225	S1-3	75.390	72.711	2.454	1200
S1-2.000	o	225	S1-4	73.540	71.700	1.615	1200
S1-1.003	o	225	S1-4	72.560	71.153	1.182	1050
S1-3.000	o	100	S1-6	72.350	71.350	0.900	1050
S1-1.004	o	300	S1-5	72.290	70.605	1.385	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1-1.000	26.631	15.0	S1-2	75.680	73.025	2.505	1200
S1-1.001	12.183	51.0	S1-3	75.390	72.786	2.454	1200
S1-1.002	65.418	42.0	S1-4	72.560	71.153	1.182	1050
S1-2.000	46.432	93.1	S1-4	72.560	71.201	1.134	1050
S1-1.003	19.001	47.0	S1-5	72.290	70.749	1.316	1050
S1-3.000	20.168	37.0	S1-5	72.290	70.805	1.385	1050
S1-1.004	52.799	46.0	S1-	72.670	69.457	2.913	0

Free Flowing Outfall Details for S1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1-1.004	S1-	72.670	69.457	69.640	0	0

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Simulation Criteria for S1

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S1

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) 100
 Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1-1.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
S1-1.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
S1-1.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
S1-2.000	15 Winter	100	0%	100/15 Summer	100/15 Winter			1
S1-1.003	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
S1-3.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
S1-1.004	15 Winter	100	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1-1.000	S1-1	76.324	1.374	14.142	1.08	0.0	47.4	FLOOD
S1-1.001	S1-2	75.686	2.511	6.355	2.73	0.0	61.9	FLOOD
S1-1.002	S1-3	75.393	2.457	3.273	1.35	0.0	104.9	FLOOD
S1-2.000	S1-4	73.540	1.615	0.365	1.39	0.0	71.6	FLOOD
S1-1.003	S1-4	72.577	1.199	16.898	2.00	0.0	136.9	FLOOD
S1-3.000	S1-6	72.353	0.903	3.272	1.63	0.0	15.7	FLOOD
S1-1.004	S1-5	70.842	-0.063	0.000	0.98	0.0	152.6	OK

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Micro Drainage	Network W.12.4.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S1

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1-1.000	26.631	1.775	15.0	0.118	5.00	0.0	0.600	o	150
S1-1.001	12.183	0.239	51.0	0.036	0.00	0.0	0.600	o	150
S1-1.002	65.418	1.558	42.0	0.139	0.00	0.0	0.600	o	225
S1-2.000	46.432	0.499	93.1	0.108	5.00	0.0	0.600	o	225
S1-1.003	19.001	0.404	47.0	0.037	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1-1.000	50.00	5.17	74.800	0.118	0.0	0.0	0.0	2.61	46.2	16.0
S1-1.001	50.00	5.31	73.025	0.154	0.0	0.0	0.0	1.41	25.0	20.9
S1-1.002	50.00	5.85	72.711	0.293	0.0	0.0	0.0	2.02	80.5	39.7
S1-2.000	50.00	5.57	71.700	0.108	0.0	0.0	0.0	1.36	53.9	14.6
S1-1.003	50.00	6.02	71.153	0.438	0.0	0.0	0.0	1.91	76.0	59.3

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Network Design Table for S1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (1/s)	k (mm)	HYD SECT	DIA (mm)
S1-3.000	20.168	0.545	37.0	0.044	5.00	0.0	0.600	o	100
S1-1.004	52.799	1.148	46.0	0.000	0.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (1/s)	Foul (1/s)	Add Flow (1/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S1-3.000	50.00	5.26	71.350	0.044	0.0	0.0	0.0	1.27	10.0	6.0
S1-1.004	50.00	6.40	70.605	0.482	0.0	0.0	0.0	2.32	164.3	65.3

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PIPELINE SCHEDULES for S1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1-1.000	o	150	S1-1	76.310	74.800	1.360	1050
S1-1.001	o	150	S1-2	75.680	73.025	2.505	1200
S1-1.002	o	225	S1-3	75.390	72.711	2.454	1200
S1-2.000	o	225	S1-4	73.540	71.700	1.615	1200
S1-1.003	o	225	S1-4	72.560	71.153	1.182	1050
S1-3.000	o	100	S1-6	72.350	71.350	0.900	1050
S1-1.004	o	300	S1-5	72.290	70.605	1.385	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1-1.000	26.631	15.0	S1-2	75.680	73.025	2.505	1200
S1-1.001	12.183	51.0	S1-3	75.390	72.786	2.454	1200
S1-1.002	65.418	42.0	S1-4	72.560	71.153	1.182	1050
S1-2.000	46.432	93.1	S1-4	72.560	71.201	1.134	1050
S1-1.003	19.001	47.0	S1-5	72.290	70.749	1.316	1050
S1-3.000	20.168	37.0	S1-5	72.290	70.805	1.385	1050
S1-1.004	52.799	46.0	S1-	72.670	69.457	2.913	0

Free Flowing Outfall Details for S1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1-1.004	S1-	72.670	69.457	69.640	0	0

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Simulation Criteria for S1

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S1

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1-1.000	15 Winter	2	0%	30/15 Summer	30/15 Summer			8
S1-1.001	15 Winter	2	0%	2/15 Summer	100/15 Summer			5
S1-1.002	15 Winter	2	0%	30/15 Summer	100/15 Summer			4
S1-2.000	15 Winter	2	0%	30/15 Summer	100/15 Summer			3
S1-1.003	15 Winter	2	0%	2/15 Winter	30/15 Winter			7
S1-3.000	15 Winter	2	0%	30/15 Summer	100/15 Summer			5
S1-1.004	15 Winter	2	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1-1.000	S1-1	74.875	-0.075	0.000	0.49	0.0	21.5	OK
S1-1.001	S1-2	73.265	0.090	0.000	1.18	0.0	26.7	SURCHARGED
S1-1.002	S1-3	72.839	-0.097	0.000	0.61	0.0	47.3	OK
S1-2.000	S1-4	71.797	-0.128	0.000	0.37	0.0	19.3	OK
S1-1.003	S1-4	71.386	0.008	0.000	1.02	0.0	70.1	SURCHARGED
S1-3.000	S1-6	71.421	-0.029	0.000	0.82	0.0	7.9	OK
S1-1.004	S1-5	70.754	-0.151	0.000	0.50	0.0	77.0	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S1

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1-1.000	15 Winter	30	0%	30/15 Summer	30/15 Summer			8
S1-1.001	15 Winter	30	0%	2/15 Summer	100/15 Summer			5
S1-1.002	15 Winter	30	0%	30/15 Summer	100/15 Summer			4
S1-2.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			3
S1-1.003	15 Winter	30	0%	2/15 Winter	30/15 Winter			7
S1-3.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			5
S1-1.004	15 Winter	30	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1-1.000	S1-1	76.312	1.362	1.714	0.87	0.0	38.2	FLOOD
S1-1.001	S1-2	75.517	2.342	0.000	2.20	0.0	49.8	FLOOD RISK
S1-1.002	S1-3	74.750	1.814	0.000	1.17	0.0	91.0	SURCHARGED
S1-2.000	S1-4	72.939	1.014	0.000	0.83	0.0	42.6	SURCHARGED
S1-1.003	S1-4	72.561	1.183	0.946	1.99	0.0	136.2	FLOOD
S1-3.000	S1-6	72.332	0.882	0.000	1.60	0.0	15.4	FLOOD RISK
S1-1.004	S1-5	70.841	-0.064	0.000	0.98	0.0	151.7	OK


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S1

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1-1.000	15 Winter	100	+30%	30/15 Summer	30/15 Summer			8
S1-1.001	15 Winter	100	+30%	2/15 Summer	100/15 Summer			5
S1-1.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
S1-2.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			3
S1-1.003	15 Winter	100	+30%	2/15 Winter	30/15 Winter			7
S1-3.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			5
S1-1.004	15 Winter	100	+30%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1-1.000	S1-1	76.335	1.385	24.858	1.12	0.0	49.2	FLOOD
S1-1.001	S1-2	75.692	2.517	11.618	2.89	0.0	65.4	FLOOD
S1-1.002	S1-3	75.401	2.465	11.369	1.35	0.0	104.9	FLOOD
S1-2.000	S1-4	73.545	1.620	5.353	1.39	0.0	71.8	FLOOD
S1-1.003	S1-4	72.590	1.212	29.774	2.01	0.0	137.4	FLOOD
S1-3.000	S1-6	72.357	0.907	6.747	1.63	0.0	15.7	FLOOD
S1-1.004	S1-5	70.843	-0.062	0.000	0.99	0.0	153.2	OK

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S2

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S2-1.000	19.440	0.249	78.1	0.030	5.00	0.0	0.600	o	100
S2-2.000	43.784	2.737	16.0	0.087	5.00	0.0	0.600	o	150
S2-1.001	5.379	1.793	3.0	0.000	0.00	0.0	0.600	o	150
S2-1.002	44.519	0.636	70.0	0.012	0.00	0.0	0.600	o	225
S2-1.003	2.977	0.992	3.0	0.082	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2-1.000	50.00	5.37	71.740	0.030	0.0	0.0	0.0	0.87	6.8	4.1
S2-2.000	50.00	5.29	74.300	0.087	0.0	0.0	0.0	2.53	44.7	11.8
S2-1.001	50.00	5.39	71.441	0.117	0.0	0.0	0.0	5.86	103.6	15.8
S2-1.002	50.00	5.86	69.573	0.129	0.0	0.0	0.0	1.57	62.2	17.5
S2-1.003	50.00	5.87	68.937	0.211	0.0	0.0	0.0	7.61	302.5	28.6

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PIPELINE SCHEDULES for S2

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S2-1.000	o	100	S2-1	72.630	71.740	0.790	1050
S2-2.000	o	150	S2-2	75.010	74.300	0.560	1050
S2-1.001	o	150	S2-2	72.490	71.441	0.899	1050
S2-1.002	o	225	S2-3	71.900	69.573	2.102	1200
S2-1.003	o	225	S2-4	72.260	68.937	3.098	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S2-1.000	19.440	78.1	S2-2	72.490	71.491	0.899	1050
S2-2.000	43.784	16.0	S2-2	72.490	71.563	0.777	1050
S2-1.001	5.379	3.0	S2-3	71.900	69.648	2.102	1200
S2-1.002	44.519	70.0	S2-4	72.260	68.937	3.098	1200
S2-1.003	2.977	3.0	S2-	72.200	67.945	4.030	0

Free Flowing Outfall Details for S2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S2-1.003	S2-	72.200	67.945	67.890	0	0

Simulation Criteria for S2

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model FEH
Return Period (years) 30

Unit 9 The Chase
 Foxholes B'ness Park
 Hertford SG13 7NN

Salisbury Square, Hatfield
 11501548
 Existing Drainage



Date 04/03/2011
 File Existing Network.mdx

Designed By ukdid001
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Micro Drainage

Network W.12.4.1

Synthetic Rainfall Details

Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S2

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) 100
 Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S2-1.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
S2-2.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
S2-1.001	15 Winter	100	0%					
S2-1.002	15 Winter	100	0%	100/15 Summer				
S2-1.003	15 Winter	100	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S2-1.000	S2-1	72.631	0.791	1.229	2.05	0.0	13.5	FLOOD
S2-2.000	S2-2	75.011	0.561	1.169	1.10	0.0	47.7	FLOOD
S2-1.001	S2-2	71.536	-0.055	0.000	0.73	0.0	61.3	OK
S2-1.002	S2-3	70.015	0.217	0.000	1.15	0.0	68.5	SURCHARGED
S2-1.003	S2-4	69.109	-0.053	0.000	0.92	0.0	129.1	OK

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Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
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Micro Drainage	Network W.12.4.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S2

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S2-1.000	19.440	0.249	78.1	0.030	5.00	0.0	0.600	o	100
S2-2.000	43.784	2.737	16.0	0.087	5.00	0.0	0.600	o	150
S2-1.001	5.379	1.793	3.0	0.000	0.00	0.0	0.600	o	150
S2-1.002	44.519	0.636	70.0	0.012	0.00	0.0	0.600	o	225
S2-1.003	2.977	0.992	3.0	0.082	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2-1.000	50.00	5.37	71.740	0.030	0.0	0.0	0.0	0.87	6.8	4.1
S2-2.000	50.00	5.29	74.300	0.087	0.0	0.0	0.0	2.53	44.7	11.8
S2-1.001	50.00	5.39	71.441	0.117	0.0	0.0	0.0	5.86	103.6	15.8
S2-1.002	50.00	5.86	69.573	0.129	0.0	0.0	0.0	1.57	62.2	17.5
S2-1.003	50.00	5.87	68.937	0.211	0.0	0.0	0.0	7.61	302.5	28.6

Unit 9 The Chase
Foxholes B'ness Park
Hertford SG13 7NN

Salisbury Square, Hatfield
11501548
Existing Drainage

Date 04/03/2011
File Existing Network.mdx

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Micro Drainage

Network W.12.4.1

PIPELINE SCHEDULES for S2

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S2-1.000	o	100	S2-1	72.630	71.740	0.790	1050
S2-2.000	o	150	S2-2	75.010	74.300	0.560	1050
S2-1.001	o	150	S2-2	72.490	71.441	0.899	1050
S2-1.002	o	225	S2-3	71.900	69.573	2.102	1200
S2-1.003	o	225	S2-4	72.260	68.937	3.098	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S2-1.000	19.440	78.1	S2-2	72.490	71.491	0.899	1050
S2-2.000	43.784	16.0	S2-2	72.490	71.563	0.777	1050
S2-1.001	5.379	3.0	S2-3	71.900	69.648	2.102	1200
S2-1.002	44.519	70.0	S2-4	72.260	68.937	3.098	1200
S2-1.003	2.977	3.0	S2-	72.200	67.945	4.030	0

Free Flowing Outfall Details for S2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S2-1.003	S2-	72.200	67.945	67.890	0	0

Simulation Criteria for S2

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model FEH
Return Period (years) 30

Unit 9 The Chase
 Foxholes B'ness Park
 Hertford SG13 7NN

Salisbury Square, Hatfield
 11501548
 Existing Drainage



Date 04/03/2011
 File Existing Network.mdx

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Micro Drainage

Network W.12.4.1

Synthetic Rainfall Details

Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S2

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S2-1.000	15 Winter	2	0%	30/15 Summer	100/15 Summer			4
S2-2.000	15 Winter	2	0%	100/15 Summer	100/15 Summer			4
S2-1.001	15 Winter	2	0%					
S2-1.002	15 Winter	2	0%	100/15 Summer				
S2-1.003	15 Winter	2	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S2-1.000	S2-1	71.810	-0.030	0.000	0.82	0.0	5.4	OK
S2-2.000	S2-2	74.363	-0.087	0.000	0.36	0.0	15.7	OK
S2-1.001	S2-2	71.493	-0.098	0.000	0.25	0.0	21.1	OK
S2-1.002	S2-3	69.671	-0.127	0.000	0.39	0.0	23.0	OK
S2-1.003	S2-4	69.014	-0.148	0.000	0.25	0.0	35.4	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S2

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S2-1.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			4
S2-2.000	15 Winter	30	0%	100/15 Summer	100/15 Summer			4
S2-1.001	15 Winter	30	0%					
S2-1.002	15 Winter	30	0%	100/15 Summer				
S2-1.003	15 Winter	30	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S2-1.000	S2-1	72.371	0.531	0.000	1.76	0.0	11.6	FLOOD RISK
S2-2.000	S2-2	74.417	-0.033	0.000	0.95	0.0	41.2	OK
S2-1.001	S2-2	71.528	-0.063	0.000	0.62	0.0	52.2	OK
S2-1.002	S2-3	69.752	-0.046	0.000	0.97	0.0	57.5	OK
S2-1.003	S2-4	69.077	-0.085	0.000	0.68	0.0	94.8	OK


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S2

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S2-1.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
S2-2.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
S2-1.001	15 Summer	100	+30%					
S2-1.002	15 Winter	100	+30%	100/15 Summer				
S2-1.003	15 Winter	100	+30%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S2-1.000	S2-1	72.633	0.793	3.363	2.05	0.0	13.5	FLOOD
S2-2.000	S2-2	75.016	0.566	6.467	1.10	0.0	47.8	FLOOD
S2-1.001	S2-2	71.537	-0.054	0.000	0.73	0.0	61.3	OK
S2-1.002	S2-3	70.238	0.440	0.000	1.23	0.0	72.8	SURCHARGED
S2-1.003	S2-4	69.311	0.149	0.000	1.06	0.0	149.4	SURCHARGED

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Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
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Micro Drainage		Network W.12.4.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S3

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S3

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S3-1.000	53.259	2.959	18.0	0.153	5.00	0.0	0.600	o	225
S3-2.000	42.276	0.783	54.0	0.107	5.00	0.0	0.600	o	225
S3-1.001	4.946	2.473	2.0	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3-1.000	50.00	5.29	73.370	0.153	0.0	0.0	0.0	3.10	123.2	20.7
S3-2.000	50.00	5.39	71.150	0.107	0.0	0.0	0.0	1.78	70.9	14.5
S3-1.001	50.00	5.40	70.367	0.260	0.0	0.0	0.0	9.32	370.7	35.2

PIPELINE SCHEDULES for S3

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S3-1.000	o	225	S3-1	76.640	73.370	3.045	1200
S3-2.000	o	225	S3-2	73.440	71.150	2.065	1200
S3-1.001	o	225	S3-2	73.090	70.367	2.498	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S3-1.000	53.259	18.0	S3-2	73.090	70.411	2.454	1200
S3-2.000	42.276	54.0	S3-2	73.090	70.367	2.498	1200
S3-1.001	4.946	2.0	S3-	72.200	67.894	4.081	0

Free Flowing Outfall Details for S3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S3-1.001	S3-	72.200	67.894	67.890	0	0

Simulation Criteria for S3

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311

Unit 9 The Chase
Foxholes B'ness Park
Hertford SG13 7NN

Salisbury Square, Hatfield
11501548
Existing Drainage

Date 04/03/2011
File Existing Network.mdx

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Micro Drainage

Network W.12.4.1

Synthetic Rainfall Details

D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S3

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) 100
 Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S3-1.000	15 Winter	100	0%					
S3-2.000	15 Winter	100	0%	100/15 Summer				
S3-1.001	15 Winter	100	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S3-1.000	S3-1	73.546	-0.049	0.000	0.95	0.0	112.6	OK
S3-2.000	S3-2	71.609	0.234	0.000	1.13	0.0	76.5	SURCHARGED
S3-1.001	S3-2	70.528	-0.064	0.000	0.85	0.0	187.5	OK

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Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
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Micro Drainage		Network W.12.4.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S3

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S3

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S3-1.000	53.259	2.959	18.0	0.153	5.00	0.0	0.600	o	225
S3-2.000	42.276	0.783	54.0	0.107	5.00	0.0	0.600	o	225
S3-1.001	4.946	2.473	2.0	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3-1.000	50.00	5.29	73.370	0.153	0.0	0.0	0.0	3.10	123.2	20.7
S3-2.000	50.00	5.39	71.150	0.107	0.0	0.0	0.0	1.78	70.9	14.5
S3-1.001	50.00	5.40	70.367	0.260	0.0	0.0	0.0	9.32	370.7	35.2

PIPELINE SCHEDULES for S3

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S3-1.000	o	225	S3-1	76.640	73.370	3.045	1200
S3-2.000	o	225	S3-2	73.440	71.150	2.065	1200
S3-1.001	o	225	S3-2	73.090	70.367	2.498	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S3-1.000	53.259	18.0	S3-2	73.090	70.411	2.454	1200
S3-2.000	42.276	54.0	S3-2	73.090	70.367	2.498	1200
S3-1.001	4.946	2.0	S3-	72.200	67.894	4.081	0

Free Flowing Outfall Details for S3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S3-1.001	S3-	72.200	67.894	67.890	0	0

Simulation Criteria for S3

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311

Unit 9 The Chase
Foxholes B'ness Park
Hertford SG13 7NN

Salisbury Square, Hatfield
11501548
Existing Drainage

Date 04/03/2011
File Existing Network.mdx

Designed By ukdid001
Checked By




Micro Drainage

Network W.12.4.1

Synthetic Rainfall Details

D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

WSP Management Services		Page 4
Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
Date 04/03/2011 File Existing Network.mdx	Designed By ukdid001 Checked By	
Micro Drainage	Network W.12.4.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S3

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S3-1.000	15 Winter	2	0%	100/15 Summer				
S3-2.000	15 Winter	2	0%	100/15 Summer				
S3-1.001	15 Winter	2	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S3-1.000	S3-1	73.444	-0.151	0.000	0.23	0.0	27.8	OK
S3-2.000	S3-2	71.233	-0.142	0.000	0.28	0.0	19.2	OK
S3-1.001	S3-2	70.438	-0.154	0.000	0.21	0.0	46.8	OK


30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S3

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S3-1.000	15 Winter	30	0%	100/15	Summer			
S3-2.000	15 Winter	30	0%	100/15	Summer			
S3-1.001	15 Winter	30	0%	100/15	Summer			

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S3-1.000	S3-1	73.499	-0.096	0.000	0.61	0.0	72.8	OK
S3-2.000	S3-2	71.299	-0.076	0.000	0.75	0.0	50.3	OK
S3-1.001	S3-2	70.489	-0.103	0.000	0.55	0.0	122.5	OK

WSP Management Services		Page 6
Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
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Micro Drainage		Network W.12.4.1


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S3

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S3-1.000	15 Winter	100	+30%	100/15	Summer			
S3-2.000	15 Winter	100	+30%	100/15	Summer			
S3-1.001	15 Winter	100	+30%	100/15	Summer			

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S3-1.000	S3-1	74.602	1.007	0.000	1.14	0.0	135.1	SURCHARGED
S3-2.000	S3-2	72.266	0.891	0.000	1.42	0.0	96.2	SURCHARGED
S3-1.001	S3-2	70.695	0.103	0.000	1.02	0.0	227.0	SURCHARGED

WSP Management Services		Page 1
Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
Date 04/03/2011 File Existing Network.mdx	Designed By ukdid001 Checked By	
Micro Drainage		Network W.12.4.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S4

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S4

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S4-1.000	12.728	2.546	5.0	0.040	5.00	0.0	0.600	o	100
S4-1.001	17.085	0.130	131.4	0.000	0.00	0.0	0.600	o	150

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4-1.000	50.00	5.06	71.290	0.040	0.0	0.0	0.0	3.48	27.4	5.4
S4-1.001	50.00	5.39	68.694	0.040	0.0	0.0	0.0	0.87	15.5	5.4

Unit 9 The Chase
Foxholes B'ness Park
Herford SG13 7NN

Salisbury Square, Hatfield
11501548
Existing Drainage

Date 04/03/2011
File Existing Network.mdx

Designed By ukdid001
Checked By



Micro Drainage

Network W.12.4.1

PIPELINE SCHEDULES for S4

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S4-1.000	o	100	S4-1	74.470	71.290	3.080	1200
S4-1.001	o	150	S4-2	73.570	68.694	4.726	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S4-1.000	12.728	5.0	S4-2	73.570	68.744	4.726	1200
S4-1.001	17.085	131.4	S4-	71.660	68.564	2.946	0

Free Flowing Outfall Details for S4


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S4-1.001	S4-	71.660	68.564	68.470	0	0

Simulation Criteria for S4

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		


Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750

WSP Management Services		Page 3
Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
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Micro Drainage	Network W.12.4.1	

Synthetic Rainfall Details

Cv (Winter) 0.840
Storm Duration (mins) 30

WSP Management Services		Page 4
Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
Date 04/03/2011 File Existing Network.mdx	Designed By ukdid001 Checked By	
Micro Drainage	Network W.12.4.1	


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S4

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) 100
 Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S4-1.000	15 Winter	100	0%	100/15 Summer				
S4-1.001	15 Winter	100	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S4-1.000	S4-1	71.777	0.387	0.000	1.01	0.0	26.1	SURCHARGED
S4-1.001	S4-2	69.132	0.288	0.000	1.80	0.0	26.0	SURCHARGED

WSP Management Services		Page 1
Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
Date 04/03/2011 File Existing Network.mdx	Designed By ukdid001 Checked By	
Micro Drainage		Network W.12.4.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S4

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S4

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S4-1.000	12.728	2.546	5.0	0.040	5.00	0.0	0.600	o	100
S4-1.001	17.085	0.130	131.4	0.000	0.00	0.0	0.600	o	150

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4-1.000	50.00	5.06	71.290	0.040	0.0	0.0	0.0	3.48	27.4	5.4
S4-1.001	50.00	5.39	68.694	0.040	0.0	0.0	0.0	0.87	15.5	5.4

Unit 9 The Chase
Foxholes B'ness Park
Herford SG13 7NN

Salisbury Square, Hatfield
11501548
Existing Drainage

Date 04/03/2011
File Existing Network.mdx

Designed By ukdid001
Checked By



Micro Drainage

Network W.12.4.1

PIPELINE SCHEDULES for S4

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S4-1.000	o	100	S4-1	74.470	71.290	3.080	1200
S4-1.001	o	150	S4-2	73.570	68.694	4.726	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S4-1.000	12.728	5.0	S4-2	73.570	68.744	4.726	1200
S4-1.001	17.085	131.4	S4-	71.660	68.564	2.946	0

Free Flowing Outfall Details for S4


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S4-1.001	S4-	71.660	68.564	68.470	0	0

Simulation Criteria for S4

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		


Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750

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Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
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Micro Drainage	Network W.12.4.1	

Synthetic Rainfall Details

Cv (Winter) 0.840
Storm Duration (mins) 30

WSP Management Services		Page 4
Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501548 Existing Drainage	
Date 04/03/2011 File Existing Network.mdx	Designed By ukdid001 Checked By	
Micro Drainage	Network W.12.4.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S4

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S4-1.000	15 Winter	2	0%	100/15 Summer				
S4-1.001	15 Winter	2	0%	30/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (1/s)	Pipe Flow (1/s)	Status
S4-1.000	S4-1	71.326	-0.064	0.000	0.28	0.0	7.3	OK
S4-1.001	S4-2	68.770	-0.074	0.000	0.50	0.0	7.2	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S4

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S4-1.000	15 Winter	30	0%	100/15	Summer			
S4-1.001	15 Winter	30	0%	30/15	Summer			

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S4-1.000	S4-1	71.355	-0.035	0.000	0.74	0.0	19.2	OK
S4-1.001	S4-2	68.937	0.093	0.000	1.31	0.0	18.9	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S4

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

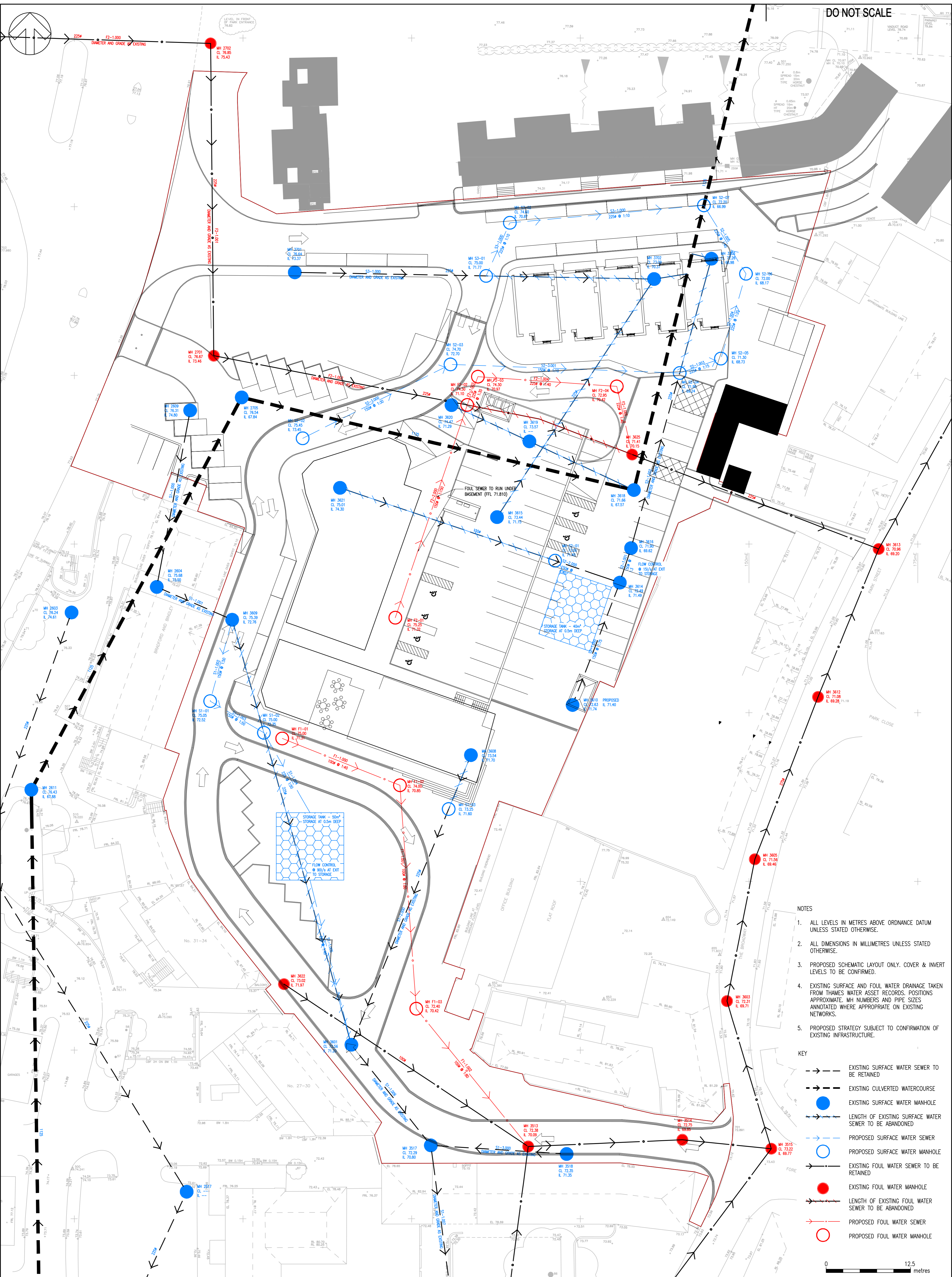
Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S4-1.000	15 Winter	100	+30%	100/15	Summer			
S4-1.001	15 Winter	100	+30%	30/15	Summer			

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S4-1.000	S4-1	72.763	1.373	0.000	1.17	0.0	30.2	SURCHARGED
S4-1.001	S4-2	69.270	0.426	0.000	2.08	0.0	30.0	SURCHARGED

Appendix H Proposed Drainage Strategy

DO NOT SCALE



- NOTES**
1. ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE.
 2. ALL DIMENSIONS IN MILLIMETRES UNLESS STATED OTHERWISE.
 3. PROPOSED SCHEMATIC LAYOUT ONLY. COVER & INVERT LEVELS TO BE CONFIRMED.
 4. EXISTING SURFACE AND FOUL WATER DRAINAGE TAKEN FROM THAMES WATER ASSET RECORDS. POSITIONS APPROXIMATE. MH NUMBERS AND PIPE SIZES ANNOTATED WHERE APPROPRIATE ON EXISTING NETWORKS.
 5. PROPOSED STRATEGY SUBJECT TO CONFIRMATION OF EXISTING INFRASTRUCTURE.

- KEY**
- - - - - EXISTING SURFACE WATER SEWER TO BE RETAINED
 - - - - - EXISTING CULVERTED WATERCOURSE
 - EXISTING SURFACE WATER MANHOLE
 - - - - - LENGTH OF EXISTING SURFACE WATER SEWER TO BE ABANDONED
 - PROPOSED SURFACE WATER SEWER
 - PROPOSED SURFACE WATER MANHOLE
 - - - - - EXISTING FOUL WATER SEWER TO BE RETAINED
 - EXISTING FOUL WATER MANHOLE
 - - - - - LENGTH OF EXISTING FOUL WATER SEWER TO BE ABANDONED
 - PROPOSED FOUL WATER SEWER
 - PROPOSED FOUL WATER MANHOLE



N:\Other Offices\Projects\Cambridge\Salisbury Square_Hatfield\DRAWINGS\AUTOCAD\1458-D-001.dwg 3/16/2011 3:14 PM Duke, Dominic

REV	DATE	BY	DESCRIPTION	CHK	APD
C	06/09/11	DID	UPDATED MASTERPLAN LAYOUT	SEX	HWP
B	16/03/11	DID	ADDED SCALE BAR	HWP	HWP
A	11/03/11	DID	FIRST ISSUE	HWP	HWP

DRAWING STATUS: FOR INFORMATION ONLY

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CLIENT: GASCOYNE CECIL ESTATES
 ARCHITECT: BROOKS MURRAY

PROJECT: SALISBURY SQUARE OLD HATFIELD
 TITLE: OUTLINE FOUL WATER AND SURFACE WATER DRAINAGE PROPOSALS WITH STORAGE

SCALE @ A1: 1:250	CHECKED: HWP	APPROVED: HWP
CAD FILE: 1458-D-001.dwg	DESIGN-DRAWN: DID	DATE: MARCH 2011
PROJECT No: 11501458	DRAWING No: 1458 - D - 001	REV: C

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Appendix I Proposed Drainage Calculations

WSP Management Services		Page 1
Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501458 Proposed Networks	
Date March 2011 File Proposed Network.mdx	Designed By ukdid001 Checked By	
Micro Drainage		Network W.12.4.1

FOUL SEWERAGE DESIGN

Design Criteria for F1

Pipe Sizes	Standard	Manhole Sizes	STANDARD
Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.000
Flow Per Person (l/per/day)	200.00	Maximum Backdrop Height (m)	0.000
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500


Designed with Level Soffits

Network Design Table for F1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F1-1.000	18.774	0.458	41.0	0.000	6	0.2	1.500	o	100
F1-1.001	33.197	0.431	77.0	0.000	0	0.0	1.500	o	100
F1-1.002	26.312	0.329	80.0	0.000	0	0.0	1.500	o	100

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1-1.000	71.310	0.000	0.2	6	0.0	16	0.54	1.04	8.2	0.5
F1-1.001	70.852	0.000	0.2	6	0.0	19	0.44	0.76	6.0	0.5
F1-1.002	70.421	0.000	0.2	6	0.0	19	0.43	0.74	5.8	0.5

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Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501458 Proposed Networks	
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PIPELINE SCHEDULES for F1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1-1.000	o	100	F1-1	74.900	71.310	3.490	1200
F1-1.001	o	100	F1-2	74.000	70.852	3.048	1200
F1-1.002	o	100	F1-3	72.400	70.421	1.879	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1-1.000	18.774	41.0	F1-2	74.000	70.852	3.048	1200
F1-1.001	33.197	77.0	F1-3	72.400	70.421	1.879	1200
F1-1.002	26.312	80.0	F1-	72.380	70.092	2.188	0

Free Flowing Outfall Details for F1


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
F1-1.002	F1-	72.380	70.092	70.090	0	0

Simulation Criteria for F1

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		


Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes

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Synthetic Rainfall Details

Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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FOUL SEWERAGE DESIGN

Design Criteria for F2

Pipe Sizes	Standard	Manhole Sizes	STANDARD
Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	200.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for F2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F2-1.000	35.274	0.280	126.0	0.000	0	0.0	1.500	o	225
F2-1.001	46.289	1.929	24.0	0.000	0	0.0	1.500	o	225
F2-1.002	38.258	2.528	15.1	0.000	0	0.0	1.500	o	225
F2-2.000	33.300	0.222	150.0	0.000	13	0.2	1.500	o	150
F2-1.003	4.479	0.128	35.0	0.000	0	0.0	1.500	o	225
F2-1.004	20.634	0.558	37.0	0.000	5	0.0	1.500	o	225
F2-1.005	10.352	0.259	40.0	0.000	0	0.0	1.500	o	225

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F2-1.000	75.710	0.000	0.0	0	0.0	0	0.00	1.02	40.6	0.0
F2-1.001	75.430	0.000	0.0	0	0.0	0	0.00	2.35	93.4	0.0
F2-1.002	73.501	0.000	0.0	0	0.0	0	0.00	2.96	117.7	0.0
F2-2.000	71.320	0.000	0.2	13	0.0	25	0.38	0.71	12.6	0.7
F2-1.003	70.973	0.000	0.2	13	0.0	16	0.60	1.94	77.3	0.7
F2-1.004	70.845	0.000	0.2	18	0.0	18	0.64	1.89	75.2	1.0
F2-1.005	70.287	0.000	0.2	18	0.0	18	0.62	1.82	72.3	1.0

PIPELINE SCHEDULES for F2

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F2-1.000	o	225	F2-1	77.420	75.710	1.485	1050
F2-1.001	o	225	F2-2	76.850	75.430	1.195	1050
F2-1.002	o	225	F2-3	76.670	73.501	2.944	1200
F2-2.000	o	150	F2-4	75.250	71.320	3.780	1200
F2-1.003	o	225	F2-4	74.300	70.973	3.102	1200
F2-1.004	o	225	F2-5	74.300	70.845	3.230	1200
F2-1.005	o	225	F2-6	72.950	70.287	2.438	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F2-1.000	35.274	126.0	F2-2	76.850	75.430	1.195	1050
F2-1.001	46.289	24.0	F2-3	76.670	73.501	2.944	1200
F2-1.002	38.258	15.1	F2-4	74.300	70.973	3.102	1200
F2-2.000	33.300	150.0	F2-4	74.300	71.098	3.052	1200
F2-1.003	4.479	35.0	F2-5	74.300	70.845	3.230	1200
F2-1.004	20.634	37.0	F2-6	72.950	70.287	2.438	1200
F2-1.005	10.352	40.0	F2-	71.410	70.028	1.157	0

Free Flowing Outfall Details for F2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
F2-1.005	F2-	71.410	70.028	70.150	0	0

Simulation Criteria for F2

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

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Micro Drainage

Network W.12.4.1

Simulation Criteria for F2

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S1

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1-1.000	26.631	1.775	15.0	0.052	5.00	0.0	0.600	o	150
S1-1.001	12.183	0.239	51.0	0.045	0.00	0.0	0.600	o	150
S1-1.002	12.494	0.241	51.8	0.017	0.00	0.0	0.600	o	150
S1-1.003	9.239	0.171	54.0	0.007	0.00	0.0	0.600	o	150
S1-1.004	24.009	0.437	55.0	0.121	0.00	0.0	0.600	o	225
S1-1.005	24.009	0.437	55.0	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1-1.000	50.00	5.17	74.800	0.052	0.0	0.0	0.0	2.61	46.2	7.0
S1-1.001	50.00	5.31	73.025	0.097	0.0	0.0	0.0	1.41	25.0	13.1
S1-1.002	50.00	5.46	72.786	0.114	0.0	0.0	0.0	1.40	24.7	15.4
S1-1.003	50.00	5.57	72.545	0.121	0.0	0.0	0.0	1.37	24.2	16.4
S1-1.004	50.00	5.80	72.299	0.242	0.0	0.0	0.0	1.77	70.3	32.8
S1-1.005	50.00	6.03	71.640	0.242	0.0	0.0	0.0	1.77	70.3	32.8

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Network Design Table for S1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (1/s)	k (mm)	HYD SECT	DIA (mm)
S1-2.000	37.791	0.398	95.0	0.091	5.00	0.0	0.600	o	225
S1-1.006	19.001	0.404	47.0	0.037	0.00	0.0	0.600	o	225
S1-3.000	20.168	0.545	37.0	0.044	5.00	0.0	0.600	o	150
S1-1.007	52.799	1.148	46.0	0.000	0.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (1/s)	Foul (1/s)	Add Flow (1/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S1-2.000	50.00	5.47	71.600	0.091	0.0	0.0	0.0	1.34	53.4	12.3
S1-1.006	50.00	6.19	71.202	0.370	0.0	0.0	0.0	1.91	76.0	50.1
S1-3.000	50.00	5.20	71.350	0.044	0.0	0.0	0.0	1.66	29.3	6.0
S1-1.007	50.00	6.57	70.655	0.414	0.0	0.0	0.0	2.32	164.3	56.1

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PIPELINE SCHEDULES for S1

Upstream Manhole


PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1-1.000	o	150	S1-1	76.310	74.800	1.360	1050
S1-1.001	o	150	S1-2	75.680	73.025	2.505	1200
S1-1.002	o	150	S1-3	75.390	72.786	2.454	1200
S1-1.003	o	150	S1-4	75.050	72.545	2.355	1200
S1-1.004	o	225	S1-5	75.000	72.299	2.476	1200
S1-1.005	o	225	S1-6	74.000	71.640	2.135	1200
S1-2.000	o	225	S1-6	73.250	71.600	1.425	1050
S1-1.006	o	225	S1-6	72.560	71.202	1.133	1050
S1-3.000	o	150	S1-8	72.350	71.350	0.850	1050
S1-1.007	o	300	S1-7	72.290	70.655	1.335	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1-1.000	26.631	15.0	S1-2	75.680	73.025	2.505	1200
S1-1.001	12.183	51.0	S1-3	75.390	72.786	2.454	1200
S1-1.002	12.494	51.8	S1-4	75.050	72.545	2.355	1200
S1-1.003	9.239	54.0	S1-5	75.000	72.374	2.476	1200
S1-1.004	24.009	55.0	S1-6	74.000	71.862	1.913	1200
S1-1.005	24.009	55.0	S1-6	72.560	71.203	1.132	1050
S1-2.000	37.791	95.0	S1-6	72.560	71.202	1.133	1050
S1-1.006	19.001	47.0	S1-7	72.290	70.798	1.267	1050
S1-3.000	20.168	37.0	S1-7	72.290	70.805	1.335	1050
S1-1.007	52.799	46.0	S1-	72.670	69.507	2.863	0

Free Flowing Outfall Details for S1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1-1.007	S1-	72.670	69.507	69.640	0	0


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Simulation Criteria for S1

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	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		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for S1

Depth/Flow Relationship Manhole: S1-6, DS/PN: S1-1.005, Volume (m³): 3.6

Invert Level (m) 71.640

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	90.0000	0.900	90.0000	1.700	90.0000	2.500	90.0000
0.200	90.0000	1.000	90.0000	1.800	90.0000	2.600	90.0000
0.300	90.0000	1.100	90.0000	1.900	90.0000	2.700	90.0000
0.400	90.0000	1.200	90.0000	2.000	90.0000	2.800	90.0000
0.500	90.0000	1.300	90.0000	2.100	90.0000	2.900	90.0000
0.600	90.0000	1.400	90.0000	2.200	90.0000	3.000	90.0000
0.700	90.0000	1.500	90.0000	2.300	90.0000		
0.800	90.0000	1.600	90.0000	2.400	90.0000		

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Storage Structures for S1

Tank or Pond Manhole: S1-6, DS/PN: S1-1.005

Invert Level (m) 71.640

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	0.500	100.0	0.501	0.0


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S1

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) 100
 Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1-1.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
S1-1.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
S1-1.002	15 Winter	100	0%	100/15 Summer				
S1-1.003	15 Winter	100	0%	100/15 Summer				
S1-1.004	15 Winter	100	0%	100/15 Summer				
S1-1.005	15 Winter	100	0%	100/15 Summer				
S1-2.000	15 Winter	100	0%	100/15 Summer				
S1-1.006	15 Winter	100	0%	100/15 Summer				
S1-3.000	15 Winter	100	0%	100/15 Summer				
S1-1.007	15 Winter	100	0%					

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1-1.000	S1-1	76.311	1.361	0.858	0.59	0.0	26.2	FLOOD
S1-1.001	S1-2	75.683	2.508	3.503	1.99	0.0	45.2	FLOOD
S1-1.002	S1-3	75.290	2.354	0.000	2.18	0.0	49.1	FLOOD RISK
S1-1.003	S1-4	74.505	1.810	0.000	2.44	0.0	52.2	SURCHARGED
S1-1.004	S1-5	73.792	1.268	0.000	1.96	0.0	126.6	SURCHARGED
S1-1.005	S1-6	72.076	0.211	0.000	1.11	0.0	71.9	SURCHARGED
S1-2.000	S1-6	72.490	0.665	0.000	1.24	0.0	62.7	SURCHARGED
S1-1.006	S1-6	71.888	0.461	0.000	1.46	0.0	99.8	SURCHARGED
S1-3.000	S1-8	71.645	0.145	0.000	1.13	0.0	31.1	SURCHARGED
S1-1.007	S1-7	70.866	-0.089	0.000	0.84	0.0	129.9	OK

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S1

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500


Designed with Level Soffits

Network Design Table for S1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1-1.000	26.631	1.775	15.0	0.052	5.00	0.0	0.600	o	150
S1-1.001	12.183	0.239	51.0	0.045	0.00	0.0	0.600	o	150
S1-1.002	12.494	0.241	51.8	0.017	0.00	0.0	0.600	o	150
S1-1.003	9.239	0.171	54.0	0.007	0.00	0.0	0.600	o	150
S1-1.004	24.009	0.437	55.0	0.121	0.00	0.0	0.600	o	225
S1-1.005	24.009	0.437	55.0	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1-1.000	50.00	5.17	74.800	0.052	0.0	0.0	0.0	2.61	46.2	7.0
S1-1.001	50.00	5.31	73.025	0.097	0.0	0.0	0.0	1.41	25.0	13.1
S1-1.002	50.00	5.46	72.786	0.114	0.0	0.0	0.0	1.40	24.7	15.4
S1-1.003	50.00	5.57	72.545	0.121	0.0	0.0	0.0	1.37	24.2	16.4
S1-1.004	50.00	5.80	72.299	0.242	0.0	0.0	0.0	1.77	70.3	32.8
S1-1.005	50.00	6.03	71.640	0.242	0.0	0.0	0.0	1.77	70.3	32.8

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Network Design Table for S1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (1/s)	k (mm)	HYD SECT	DIA (mm)
S1-2.000	37.791	0.398	95.0	0.091	5.00	0.0	0.600	o	225
S1-1.006	19.001	0.404	47.0	0.037	0.00	0.0	0.600	o	225
S1-3.000	20.168	0.545	37.0	0.044	5.00	0.0	0.600	o	150
S1-1.007	52.799	1.148	46.0	0.000	0.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (1/s)	Foul (1/s)	Add Flow (1/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S1-2.000	50.00	5.47	71.600	0.091	0.0	0.0	0.0	1.34	53.4	12.3
S1-1.006	50.00	6.19	71.202	0.370	0.0	0.0	0.0	1.91	76.0	50.1
S1-3.000	50.00	5.20	71.350	0.044	0.0	0.0	0.0	1.66	29.3	6.0
S1-1.007	50.00	6.57	70.655	0.414	0.0	0.0	0.0	2.32	164.3	56.1

PIPELINE SCHEDULES for S1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1-1.000	o	150	S1-1	76.310	74.800	1.360	1050
S1-1.001	o	150	S1-2	75.680	73.025	2.505	1200
S1-1.002	o	150	S1-3	75.390	72.786	2.454	1200
S1-1.003	o	150	S1-4	75.050	72.545	2.355	1200
S1-1.004	o	225	S1-5	75.000	72.299	2.476	1200
S1-1.005	o	225	S1-6	74.000	71.640	2.135	1200
S1-2.000	o	225	S1-6	73.250	71.600	1.425	1050
S1-1.006	o	225	S1-6	72.560	71.202	1.133	1050
S1-3.000	o	150	S1-8	72.350	71.350	0.850	1050
S1-1.007	o	300	S1-7	72.290	70.655	1.335	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1-1.000	26.631	15.0	S1-2	75.680	73.025	2.505	1200
S1-1.001	12.183	51.0	S1-3	75.390	72.786	2.454	1200
S1-1.002	12.494	51.8	S1-4	75.050	72.545	2.355	1200
S1-1.003	9.239	54.0	S1-5	75.000	72.374	2.476	1200
S1-1.004	24.009	55.0	S1-6	74.000	71.862	1.913	1200
S1-1.005	24.009	55.0	S1-6	72.560	71.203	1.132	1050
S1-2.000	37.791	95.0	S1-6	72.560	71.202	1.133	1050
S1-1.006	19.001	47.0	S1-7	72.290	70.798	1.267	1050
S1-3.000	20.168	37.0	S1-7	72.290	70.805	1.335	1050
S1-1.007	52.799	46.0	S1-	72.670	69.507	2.863	0

Free Flowing Outfall Details for S1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1-1.007	S1-	72.670	69.507	69.640	0	0

Unit 9 The Chase Foxholes B'ness Park Hertford SG13 7NN	Salisbury Square, Hatfield 11501458 Proposed Networks
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Micro Drainage	Network W.12.4.1
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Simulation Criteria for S1

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	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		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for S1

Depth/Flow Relationship Manhole: S1-6, DS/PN: S1-1.005, Volume (m³): 3.6

Invert Level (m) 71.640

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	90.0000	0.900	90.0000	1.700	90.0000	2.500	90.0000
0.200	90.0000	1.000	90.0000	1.800	90.0000	2.600	90.0000
0.300	90.0000	1.100	90.0000	1.900	90.0000	2.700	90.0000
0.400	90.0000	1.200	90.0000	2.000	90.0000	2.800	90.0000
0.500	90.0000	1.300	90.0000	2.100	90.0000	2.900	90.0000
0.600	90.0000	1.400	90.0000	2.200	90.0000	3.000	90.0000
0.700	90.0000	1.500	90.0000	2.300	90.0000		
0.800	90.0000	1.600	90.0000	2.400	90.0000		

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Micro Drainage


Network W.12.4.1

Storage Structures for S1

Tank or Pond Manhole: S1-6, DS/PN: S1-1.005

Invert Level (m) 71.640

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	0.500	100.0	0.501	0.0

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S1

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1-1.000	15 Winter	2	0%	30/15 Summer	100/15 Summer			4
S1-1.001	15 Winter	2	0%	30/15 Summer	100/15 Summer			4
S1-1.002	15 Winter	2	0%	30/15 Summer	100/15 Summer			2
S1-1.003	15 Winter	2	0%	30/15 Summer				
S1-1.004	15 Winter	2	0%	30/15 Summer				
S1-1.005	15 Winter	2	0%	30/15 Winter				
S1-2.000	15 Winter	2	0%	30/15 Summer				
S1-1.006	15 Winter	2	0%	30/15 Summer				
S1-3.000	15 Winter	2	0%	100/15 Summer				
S1-1.007	15 Winter	2	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1-1.000	S1-1	74.847	-0.103	0.000	0.22	0.0	9.5	OK
S1-1.001	S1-2	73.121	-0.054	0.000	0.72	0.0	16.3	OK
S1-1.002	S1-3	72.894	-0.042	0.000	0.85	0.0	19.1	OK
S1-1.003	S1-4	72.660	-0.035	0.000	0.95	0.0	20.2	OK
S1-1.004	S1-5	72.425	-0.099	0.000	0.60	0.0	38.7	OK
S1-1.005	S1-6	71.679	-0.186	0.000	0.54	0.0	34.8	OK
S1-2.000	S1-6	71.689	-0.136	0.000	0.32	0.0	16.3	OK
S1-1.006	S1-6	71.354	-0.073	0.000	0.79	0.0	54.2	OK
S1-3.000	S1-8	71.405	-0.095	0.000	0.29	0.0	8.0	OK
S1-1.007	S1-7	70.786	-0.169	0.000	0.39	0.0	60.8	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S1

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1-1.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			4
S1-1.001	15 Winter	30	0%	30/15 Summer	100/15 Summer			4
S1-1.002	15 Winter	30	0%	30/15 Summer	100/15 Summer			2
S1-1.003	15 Winter	30	0%	30/15 Summer				
S1-1.004	15 Winter	30	0%	30/15 Summer				
S1-1.005	15 Winter	30	0%	30/15 Winter				
S1-2.000	15 Winter	30	0%	30/15 Summer				
S1-1.006	15 Winter	30	0%	30/15 Summer				
S1-3.000	15 Winter	30	0%	100/15 Summer				
S1-1.007	15 Winter	30	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1-1.000	S1-1	75.144	0.194	0.000	0.53	0.0	23.2	SURCHARGED
S1-1.001	S1-2	74.798	1.623	0.000	1.50	0.0	34.0	SURCHARGED
S1-1.002	S1-3	74.262	1.326	0.000	1.78	0.0	40.1	SURCHARGED
S1-1.003	S1-4	73.549	0.854	0.000	2.07	0.0	44.3	SURCHARGED
S1-1.004	S1-5	72.980	0.456	0.000	1.42	0.0	91.5	SURCHARGED
S1-1.005	S1-6	71.866	0.001	0.000	0.96	0.0	62.0	SURCHARGED
S1-2.000	S1-6	71.931	0.106	0.000	0.82	0.0	41.4	SURCHARGED
S1-1.006	S1-6	71.668	0.241	0.000	1.27	0.0	86.9	SURCHARGED
S1-3.000	S1-8	71.449	-0.051	0.000	0.76	0.0	21.0	OK
S1-1.007	S1-7	70.839	-0.116	0.000	0.69	0.0	106.4	OK


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S1

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X SurchARGE	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1-1.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
S1-1.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
S1-1.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
S1-1.003	15 Winter	100	+30%	30/15 Summer				
S1-1.004	15 Winter	100	+30%	30/15 Summer				
S1-1.005	15 Winter	100	+30%	30/15 Winter				
S1-2.000	15 Winter	100	+30%	30/15 Summer				
S1-1.006	15 Winter	100	+30%	30/15 Summer				
S1-3.000	15 Winter	100	+30%	100/15 Summer				
S1-1.007	15 Winter	100	+30%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1-1.000	S1-1	76.314	1.364	4.105	0.61	0.0	26.8	FLOOD
S1-1.001	S1-2	75.691	2.516	10.564	2.15	0.0	48.7	FLOOD
S1-1.002	S1-3	75.391	2.455	1.369	2.18	0.0	49.1	FLOOD
S1-1.003	S1-4	75.003	2.308	0.000	2.39	0.0	51.1	FLOOD RISK
S1-1.004	S1-5	74.550	2.026	0.000	2.34	0.0	151.1	SURCHARGED
S1-1.005	S1-6	73.037	1.172	0.000	1.25	0.0	80.8	SURCHARGED
S1-2.000	S1-6	73.070	1.245	0.000	1.59	0.0	80.3	FLOOD RISK
S1-1.006	S1-6	72.406	0.979	0.000	1.83	0.0	125.6	FLOOD RISK
S1-3.000	S1-8	72.066	0.566	0.000	1.41	0.0	38.9	FLOOD RISK
S1-1.007	S1-7	70.887	-0.068	0.000	0.96	0.0	149.7	OK

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S2

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S2-1.000	19.440	0.250	77.8	0.037	5.00	0.0	0.600	o	150
S2-2.000	10.128	0.250	40.5	0.097	5.00	0.0	0.600	o	150
S2-1.001	5.379	1.793	3.0	0.000	0.00	0.0	0.600	o	150
S2-1.002	26.931	0.379	71.1	0.043	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2-1.000	50.00	5.28	71.400	0.037	0.0	0.0	0.0	1.14	20.2	5.0
S2-2.000	50.00	5.11	71.400	0.097	0.0	0.0	0.0	1.59	28.0	13.1
S2-1.001	50.00	5.30	70.800	0.134	0.0	0.0	0.0	5.86	103.6	18.1
S2-1.002	50.00	5.59	68.932	0.177	0.0	0.0	0.0	1.55	61.8	24.0

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Micro Drainage

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Network Design Table for S2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (1/s)	k (mm)	HYD SECT	DIA (mm)
S2-3.000	24.496	0.742	33.0	0.112	5.00	0.0	0.600	o	225
S2-3.001	33.994	3.399	10.0	0.036	0.00	0.0	0.600	o	225
S2-1.003	6.470	0.498	13.0	0.000	0.00	0.0	0.600	o	300
S2-1.004	13.107	0.570	23.0	0.032	0.00	0.0	0.600	o	300
S2-1.005	11.900	0.283	42.0	0.027	0.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (1/s)	Foul (1/s)	Add Flow (1/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S2-3.000	50.00	5.18	73.450	0.112	0.0	0.0	0.0	2.28	90.8	15.2
S2-3.001	50.00	5.31	72.708	0.148	0.0	0.0	0.0	4.16	165.5	20.0
S2-1.003	50.00	5.61	68.478	0.325	0.0	0.0	0.0	4.38	310.0	44.0
S2-1.004	50.00	5.68	67.980	0.357	0.0	0.0	0.0	3.29	232.7	48.3
S2-1.005	50.00	5.76	67.410	0.384	0.0	0.0	0.0	2.43	171.9	52.0

PIPELINE SCHEDULES for S2

Upstream Manhole


PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S2-1.000	o	150	S2-1	72.630	71.400	1.080	1050
S2-2.000	o	150	S2-2	73.000	71.400	1.450	1050
S2-1.001	o	150	S2-2	72.490	70.800	1.540	1200
S2-1.002	o	225	S2-3	71.900	68.932	2.743	1200
S2-3.000	o	225	S2-5	75.450	73.450	1.775	1200
S2-3.001	o	225	S2-6	74.700	72.708	1.767	1200
S2-1.003	o	300	S2-4	71.900	68.478	3.122	1200
S2-1.004	o	300	S2-5	71.300	67.980	3.020	1200
S2-1.005	o	300	S2-6	72.000	67.410	4.290	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S2-1.000	19.440	77.8	S2-2	72.490	71.150	1.190	1200
S2-2.000	10.128	40.5	S2-2	72.490	71.150	1.190	1200
S2-1.001	5.379	3.0	S2-3	71.900	69.007	2.743	1200
S2-1.002	26.931	71.1	S2-4	71.900	68.553	3.122	1200
S2-3.000	24.496	33.0	S2-6	74.700	72.708	1.767	1200
S2-3.001	33.994	10.0	S2-4	71.900	69.309	2.366	1200
S2-1.003	6.470	13.0	S2-5	71.300	67.980	3.020	1200
S2-1.004	13.107	23.0	S2-6	72.000	67.410	4.290	1200
S2-1.005	11.900	42.0	S2-	72.200	67.127	4.773	0

Free Flowing Outfall Details for S2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S2-1.005	S2-	72.200	67.127	67.890	0	0


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Micro Drainage	Network W.12.4.1	

Simulation Criteria for S2

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	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		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for S2

Depth/Flow Relationship Manhole: S2-2, DS/PN: S2-1.001, Volume (m³): 2.4

Invert Level (m) 70.800

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	15.0000	0.900	15.0000	1.700	15.0000	2.500	15.0000
0.200	15.0000	1.000	15.0000	1.800	15.0000	2.600	15.0000
0.300	15.0000	1.100	15.0000	1.900	15.0000	2.700	15.0000
0.400	15.0000	1.200	15.0000	2.000	15.0000	2.800	15.0000
0.500	15.0000	1.300	15.0000	2.100	15.0000	2.900	15.0000
0.600	15.0000	1.400	15.0000	2.200	15.0000	3.000	15.0000
0.700	15.0000	1.500	15.0000	2.300	15.0000		
0.800	15.0000	1.600	15.0000	2.400	15.0000		

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Micro Drainage

Network W.12.4.1

Storage Structures for S2

Tank or Pond Manhole: S2-2, DS/PN: S2-1.001

Invert Level (m) 70.800

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	80.0	0.500	80.0	0.501	0.0


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S2

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) 100
 Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S2-1.000	15 Winter	100	0%	100/15 Summer				
S2-2.000	15 Winter	100	0%	100/15 Summer	100/15 Winter			1
S2-1.001	15 Winter	100	0%	100/15 Summer				
S2-1.002	15 Winter	100	0%					
S2-3.000	15 Winter	100	0%					
S2-3.001	15 Winter	100	0%					
S2-1.003	15 Winter	100	0%	100/15 Summer				
S2-1.004	15 Winter	100	0%	100/15 Summer				
S2-1.005	15 Winter	100	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S2-1.000	S2-1	71.785	0.235	0.000	1.40	0.0	26.4	SURCHARGED
S2-2.000	S2-2	73.000	1.450	0.061	2.58	0.0	64.4	FLOOD
S2-1.001	S2-2	71.234	0.284	0.000	0.18	0.0	15.0	SURCHARGED
S2-1.002	S2-3	69.141	-0.016	0.000	0.84	0.0	48.4	OK
S2-3.000	S2-5	73.648	-0.027	0.000	0.98	0.0	82.3	OK
S2-3.001	S2-6	72.850	-0.083	0.000	0.71	0.0	110.1	OK
S2-1.003	S2-4	68.890	0.112	0.000	0.87	0.0	154.1	SURCHARGED
S2-1.004	S2-5	68.513	0.233	0.000	0.93	0.0	176.1	SURCHARGED
S2-1.005	S2-6	68.017	0.307	0.000	1.46	0.0	194.3	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S2

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S2-1.000	19.440	0.250	77.8	0.037	5.00	0.0	0.600	o	150
S2-2.000	10.128	0.250	40.5	0.097	5.00	0.0	0.600	o	150
S2-1.001	5.379	1.793	3.0	0.000	0.00	0.0	0.600	o	150
S2-1.002	26.931	0.379	71.1	0.043	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2-1.000	50.00	5.28	71.400	0.037	0.0	0.0	0.0	1.14	20.2	5.0
S2-2.000	50.00	5.11	71.400	0.097	0.0	0.0	0.0	1.59	28.0	13.1
S2-1.001	50.00	5.30	70.800	0.134	0.0	0.0	0.0	5.86	103.6	18.1
S2-1.002	50.00	5.59	68.932	0.177	0.0	0.0	0.0	1.55	61.8	24.0

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Network Design Table for S2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (1/s)	k (mm)	HYD SECT	DIA (mm)
S2-3.000	24.496	0.742	33.0	0.112	5.00	0.0	0.600	o	225
S2-3.001	33.994	3.399	10.0	0.036	0.00	0.0	0.600	o	225
S2-1.003	6.470	0.498	13.0	0.000	0.00	0.0	0.600	o	300
S2-1.004	13.107	0.570	23.0	0.032	0.00	0.0	0.600	o	300
S2-1.005	11.900	0.283	42.0	0.027	0.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (1/s)	Foul (1/s)	Add Flow (1/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)
S2-3.000	50.00	5.18	73.450	0.112	0.0	0.0	0.0	2.28	90.8	15.2
S2-3.001	50.00	5.31	72.708	0.148	0.0	0.0	0.0	4.16	165.5	20.0
S2-1.003	50.00	5.61	68.478	0.325	0.0	0.0	0.0	4.38	310.0	44.0
S2-1.004	50.00	5.68	67.980	0.357	0.0	0.0	0.0	3.29	232.7	48.3
S2-1.005	50.00	5.76	67.410	0.384	0.0	0.0	0.0	2.43	171.9	52.0

PIPELINE SCHEDULES for S2

Upstream Manhole


PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S2-1.000	o	150	S2-1	72.630	71.400	1.080	1050
S2-2.000	o	150	S2-2	73.000	71.400	1.450	1050
S2-1.001	o	150	S2-2	72.490	70.800	1.540	1200
S2-1.002	o	225	S2-3	71.900	68.932	2.743	1200
S2-3.000	o	225	S2-5	75.450	73.450	1.775	1200
S2-3.001	o	225	S2-6	74.700	72.708	1.767	1200
S2-1.003	o	300	S2-4	71.900	68.478	3.122	1200
S2-1.004	o	300	S2-5	71.300	67.980	3.020	1200
S2-1.005	o	300	S2-6	72.000	67.410	4.290	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S2-1.000	19.440	77.8	S2-2	72.490	71.150	1.190	1200
S2-2.000	10.128	40.5	S2-2	72.490	71.150	1.190	1200
S2-1.001	5.379	3.0	S2-3	71.900	69.007	2.743	1200
S2-1.002	26.931	71.1	S2-4	71.900	68.553	3.122	1200
S2-3.000	24.496	33.0	S2-6	74.700	72.708	1.767	1200
S2-3.001	33.994	10.0	S2-4	71.900	69.309	2.366	1200
S2-1.003	6.470	13.0	S2-5	71.300	67.980	3.020	1200
S2-1.004	13.107	23.0	S2-6	72.000	67.410	4.290	1200
S2-1.005	11.900	42.0	S2-	72.200	67.127	4.773	0

Free Flowing Outfall Details for S2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S2-1.005	S2-	72.200	67.127	67.890	0	0


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Simulation Criteria for S2

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	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		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for S2

Depth/Flow Relationship Manhole: S2-2, DS/PN: S2-1.001, Volume (m³): 2.4

Invert Level (m) 70.800

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	15.0000	0.900	15.0000	1.700	15.0000	2.500	15.0000
0.200	15.0000	1.000	15.0000	1.800	15.0000	2.600	15.0000
0.300	15.0000	1.100	15.0000	1.900	15.0000	2.700	15.0000
0.400	15.0000	1.200	15.0000	2.000	15.0000	2.800	15.0000
0.500	15.0000	1.300	15.0000	2.100	15.0000	2.900	15.0000
0.600	15.0000	1.400	15.0000	2.200	15.0000	3.000	15.0000
0.700	15.0000	1.500	15.0000	2.300	15.0000		
0.800	15.0000	1.600	15.0000	2.400	15.0000		

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Storage Structures for S2

Tank or Pond Manhole: S2-2, DS/PN: S2-1.001

Invert Level (m) 70.800

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	80.0	0.500	80.0	0.501	0.0

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S2

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S2-1.000	15 Winter	2	0%	100/15 Summer				
S2-2.000	15 Winter	2	0%	30/15 Summer	100/15 Summer			2
S2-1.001	15 Winter	2	0%	30/15 Summer	100/15 Winter			1
S2-1.002	15 Winter	2	0%	100/15 Summer				
S2-3.000	15 Winter	2	0%	100/15 Summer				
S2-3.001	15 Winter	2	0%					
S2-1.003	15 Winter	2	0%	100/15 Summer				
S2-1.004	15 Winter	2	0%	100/15 Summer				
S2-1.005	15 Winter	2	0%	30/15 Winter				

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S2-1.000	S2-1	71.462	-0.088	0.000	0.35	0.0	6.7	OK
S2-2.000	S2-2	71.494	-0.056	0.000	0.71	0.0	17.6	OK
S2-1.001	S2-2	70.877	-0.073	0.000	0.14	0.0	11.6	OK
S2-1.002	S2-3	69.015	-0.142	0.000	0.29	0.0	16.4	OK
S2-3.000	S2-5	73.526	-0.149	0.000	0.24	0.0	20.4	OK
S2-3.001	S2-6	72.770	-0.163	0.000	0.17	0.0	25.8	OK
S2-1.003	S2-4	68.575	-0.203	0.000	0.23	0.0	40.3	OK
S2-1.004	S2-5	68.079	-0.201	0.000	0.24	0.0	45.2	OK
S2-1.005	S2-6	67.536	-0.174	0.000	0.37	0.0	49.1	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S2

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S2-1.000	15 Winter	30	0%	100/15 Summer				
S2-2.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			2
S2-1.001	15 Winter	30	0%	30/15 Summer	100/15 Winter			1
S2-1.002	15 Winter	30	0%	100/15 Summer				
S2-3.000	15 Winter	30	0%	100/15 Summer				
S2-3.001	15 Winter	30	0%					
S2-1.003	15 Winter	30	0%	100/15 Summer				
S2-1.004	15 Winter	30	0%	100/15 Summer				
S2-1.005	15 Winter	30	0%	30/15 Winter				

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S2-1.000	S2-1	71.515	-0.035	0.000	0.93	0.0	17.5	OK
S2-2.000	S2-2	72.074	0.524	0.000	1.76	0.0	43.9	SURCHARGED
S2-1.001	S2-2	71.051	0.101	0.000	0.18	0.0	15.0	SURCHARGED
S2-1.002	S2-3	69.064	-0.093	0.000	0.64	0.0	36.6	OK
S2-3.000	S2-5	73.582	-0.093	0.000	0.64	0.0	53.7	OK
S2-3.001	S2-6	72.816	-0.117	0.000	0.46	0.0	71.6	OK
S2-1.003	S2-4	68.650	-0.128	0.000	0.61	0.0	107.3	OK
S2-1.004	S2-5	68.160	-0.120	0.000	0.65	0.0	122.7	OK
S2-1.005	S2-6	67.721	0.011	0.000	1.02	0.0	136.0	SURCHARGED


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S2

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S2-1.000	15 Winter	100	+30%	100/15 Summer				
S2-2.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
S2-1.001	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
S2-1.002	15 Winter	100	+30%	100/15 Summer				
S2-3.000	15 Winter	100	+30%	100/15 Summer				
S2-3.001	15 Winter	100	+30%					
S2-1.003	15 Winter	100	+30%	100/15 Summer				
S2-1.004	15 Winter	100	+30%	100/15 Summer				
S2-1.005	15 Winter	100	+30%	30/15 Winter				

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S2-1.000	S2-1	72.517	0.967	0.000	1.78	0.0	33.7	FLOOD RISK
S2-2.000	S2-2	73.004	1.454	4.476	2.62	0.0	65.4	FLOOD
S2-1.001	S2-2	72.498	1.548	0.333	0.18	0.0	15.0	FLOOD
S2-1.002	S2-3	69.927	0.770	0.000	0.89	0.0	50.9	SURCHARGED
S2-3.000	S2-5	74.115	0.440	0.000	1.26	0.0	105.0	SURCHARGED
S2-3.001	S2-6	72.876	-0.057	0.000	0.88	0.0	137.6	OK
S2-1.003	S2-4	69.616	0.838	0.000	1.05	0.0	186.5	SURCHARGED
S2-1.004	S2-5	69.056	0.776	0.000	1.13	0.0	212.8	SURCHARGED
S2-1.005	S2-6	68.320	0.610	0.000	1.76	0.0	235.2	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S3

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500


Designed with Level Soffits

Network Design Table for S3

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S3-1.000	28.360	1.576	18.0	0.087	5.00	0.0	0.600	o	225
S3-1.001	8.625	0.863	10.0	0.038	0.00	0.0	0.600	o	225
S3-1.002	28.875	2.888	10.0	0.062	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3-1.000	50.00	5.15	73.370	0.087	0.0	0.0	0.0	3.10	123.2	11.8
S3-1.001	50.00	5.19	71.794	0.125	0.0	0.0	0.0	4.16	165.5	16.9
S3-1.002	50.00	5.30	70.931	0.187	0.0	0.0	0.0	4.16	165.5	25.3

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Micro Drainage	Network W.12.4.1	

PIPELINE SCHEDULES for S3

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S3-1.000	o	225	S3-1	76.640	73.370	3.045	1200
S3-1.001	o	225	S3-2	75.000	71.794	2.981	1200
S3-1.002	o	225	S3-3	74.600	70.931	3.444	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S3-1.000	28.360	18.0	S3-2	75.000	71.794	2.981	1200
S3-1.001	8.625	10.0	S3-3	74.600	70.931	3.444	1200
S3-1.002	28.875	10.0	S3-	72.200	68.043	3.932	0

Free Flowing Outfall Details for S3


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S3-1.002	S3-	72.200	68.043	67.890	0	0

Simulation Criteria for S3

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		


Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes

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Micro Drainage	Network W.12.4.1	

Synthetic Rainfall Details

Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Micro Drainage		Network W.12.4.1


100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S3

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) 100
 Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S3-1.000	15 Winter	100	0%					
S3-1.001	15 Winter	100	0%					
S3-1.002	15 Winter	100	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S3-1.000	S3-1	73.492	-0.103	0.000	0.56	0.0	64.6	OK
S3-1.001	S3-2	71.937	-0.082	0.000	0.72	0.0	94.0	OK
S3-1.002	S3-3	71.103	-0.053	0.000	0.93	0.0	142.6	OK

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S3

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500


Designed with Level Soffits

Network Design Table for S3

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S3-1.000	28.360	1.576	18.0	0.087	5.00	0.0	0.600	o	225
S3-1.001	8.625	0.863	10.0	0.038	0.00	0.0	0.600	o	225
S3-1.002	28.875	2.888	10.0	0.062	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3-1.000	50.00	5.15	73.370	0.087	0.0	0.0	0.0	3.10	123.2	11.8
S3-1.001	50.00	5.19	71.794	0.125	0.0	0.0	0.0	4.16	165.5	16.9
S3-1.002	50.00	5.30	70.931	0.187	0.0	0.0	0.0	4.16	165.5	25.3

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Micro Drainage	Network W.12.4.1	

PIPELINE SCHEDULES for S3

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S3-1.000	o	225	S3-1	76.640	73.370	3.045	1200
S3-1.001	o	225	S3-2	75.000	71.794	2.981	1200
S3-1.002	o	225	S3-3	74.600	70.931	3.444	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S3-1.000	28.360	18.0	S3-2	75.000	71.794	2.981	1200
S3-1.001	8.625	10.0	S3-3	74.600	70.931	3.444	1200
S3-1.002	28.875	10.0	S3-	72.200	68.043	3.932	0

Free Flowing Outfall Details for S3


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S3-1.002	S3-	72.200	68.043	67.890	0	0

Simulation Criteria for S3

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		


Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Summer Storms	Yes

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Micro Drainage	Network W.12.4.1	

Synthetic Rainfall Details

Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Micro Drainage	Network W.12.4.1	


2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S3

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S3-1.000	15 Winter	2	0%					
S3-1.001	15 Winter	2	0%	100/15 Summer				
S3-1.002	15 Winter	2	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S3-1.000	S3-1	73.426	-0.169	0.000	0.14	0.0	15.9	OK
S3-1.001	S3-2	71.856	-0.163	0.000	0.17	0.0	21.6	OK
S3-1.002	S3-3	71.000	-0.156	0.000	0.20	0.0	31.1	OK

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Micro Drainage	Network W.12.4.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S3

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S3-1.000	15 Winter	30	0%					
S3-1.001	15 Winter	30	0%	100/15 Summer				
S3-1.002	15 Winter	30	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m ³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S3-1.000	S3-1	73.464	-0.131	0.000	0.36	0.0	41.8	OK
S3-1.001	S3-2	71.903	-0.116	0.000	0.46	0.0	60.8	OK
S3-1.002	S3-3	71.058	-0.098	0.000	0.60	0.0	92.2	OK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for S3

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, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S3-1.000	15 Winter	100	+30%					
S3-1.001	15 Winter	100	+30%	100/15 Summer				
S3-1.002	15 Winter	100	+30%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S3-1.000	S3-1	73.515	-0.080	0.000	0.73	0.0	83.9	OK
S3-1.001	S3-2	72.470	0.451	0.000	0.88	0.0	115.2	SURCHARGED
S3-1.002	S3-3	71.804	0.648	0.000	1.11	0.0	170.4	SURCHARGED

