

Surface Water Drainage Calculation

**For
Twinham,
34 Hurst Road,
Hassocks,
East Sussex,
BN6 9NL**

**Date: December 2025
Project No: 63770 Rev07**

TWINHAM,34 HURST ROAD HASOCK

Rain Garden Half-Drain Time Assessment – Technical Summary

This technical note confirms compliance of the proposed rain garden with the 24-hour half-drain time requirement, based on WinDes MicroDrainage modelling.

The drainage system has been assessed for the 1 in 100-year rainfall event plus 45% climate change, with a critical storm duration of 960 minutes, which represents the worst-case condition for peak storage and drainage performance.

Peak storage volume and half-drain time have been assessed under three increasingly conservative assumptions to identify the most critical scenario.

Option 1 – Critical Surcharge Depth (Worst-Case)

- Peak surcharge depth: 0.388 m
- Half-drain depth: 0.194 m
- Time at peak depth: 960 minutes
- Time at half-drain depth: 2304 minutes

Calculated half-drain time:
1344 minutes (22.4 hours)

✓ Compliant with 24-hour requirement.

Option 2 – Surcharge Depth + 110 mm Pipe Diameter

- Peak depth: 0.498 m
- Half-drain depth: 0.249 m
- Time at half-drain depth: 1936 minutes

Calculated half-drain time:
976 minutes (16.3 hours)

✓ Compliant with improved performance relative to Option 1.

Option 3 – Surcharge Depth + Pipe Diameter + Bedding Thickness

- Peak depth: 0.538 m
- Half-drain depth: 0.269 m
- Time at half-drain depth: 1808 minutes

Calculated half-drain time:
848 minutes (14.2 hours)

✓ Compliant with further improved performance.

TWINHAM,34 HURST ROAD HASSOCK

Compliance Statement

The most conservative assessment (Option 1) produces the longest half-drain time of 22.4 hours, which remains below the 24-hour regulatory limit.

All other assessed scenarios result in shorter half-drain times. The rain garden is therefore confirmed to be fully compliant with LLFA / SAB half-drain time requirements under the critical design storm event.

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Summary of Results for 960 minute 100 year winter (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.404	-0.106	0.000	0.01	0.0	0.2	OK
1.001	S1	63.661	0.057	0.000	0.06	0.0	0.4	SURCHARGED
2.000	RE2	65.405	-0.105	0.000	0.01	0.0	0.2	OK
2.001	S2	65.007	-0.103	0.000	0.01	0.0	0.4	OK
1.002	S3	63.661	0.107	0.000	0.12	0.0	0.8	SURCHARGED
1.003	S4	63.660	0.300	0.000	0.05	0.0	0.2	SURCHARGED
1.004	RAIN GARDEN	63.598	0.388	0.000	0.00	0.0	0.0	SURCHARGED

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Flows and Levels for Pipe 1.004 US/MH RAIN GARDEN (Storm)
960 minute 100 year Winter
Average Rainfall Intensity 5.233 mm/hr

	Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)	
OPTION 3	1808	63.477	63.096	0.267	0.0	0.0	HALF DRAIN TIME IS
	1824	63.475	63.096	0.265	0.0	0.0	
	1840	63.473	63.096	0.263	0.0	0.0	
	1856	63.470	63.096	0.260	0.0	0.0	
	1872	63.468	63.096	0.258	0.0	0.0	
	1888	63.466	63.096	0.256	0.0	0.0	
	1904	63.463	63.096	0.253	0.0	0.0	
	1920	63.461	63.096	0.251	0.0	0.0	
OPTION 2	1936	63.458	63.096	0.248	0.0	0.0	HALF DRAIN TIME IS (976 min) or 16.3 hrs
	1952	63.456	63.096	0.246	0.0	0.0	
	1968	63.454	63.096	0.244	0.0	0.0	
	1984	63.451	63.096	0.241	0.0	0.0	
	2000	63.449	63.096	0.239	0.0	0.0	
	2016	63.447	63.096	0.237	0.0	0.0	
	2032	63.444	63.096	0.234	0.0	0.0	
	2048	63.442	63.096	0.232	0.0	0.0	
	2064	63.439	63.096	0.229	0.0	0.0	
	2080	63.437	63.096	0.227	0.0	0.0	
	2096	63.435	63.096	0.225	0.0	0.0	
	2112	63.432	63.096	0.222	0.0	0.0	
	2128	63.430	63.096	0.220	0.0	0.0	
	2144	63.427	63.096	0.217	0.0	0.0	
	2160	63.425	63.096	0.215	0.0	0.0	
	2176	63.423	63.096	0.213	0.0	0.0	
	2192	63.420	63.096	0.210	0.0	0.0	
	2208	63.418	63.096	0.208	0.0	0.0	
	2224	63.415	63.096	0.205	0.0	0.0	
	2240	63.413	63.096	0.203	0.0	0.0	
OPTION 1	2256	63.411	63.096	0.201	0.0	0.0	HALF DRAIN TIME IS 1344 min (2304 - 960) = (22.4 hrs)
	2272	63.408	63.096	0.198	0.0	0.0	
	2288	63.406	63.096	0.196	0.0	0.0	
	2304	63.403	63.096	0.193	0.0	0.0	
	2320	63.401	63.096	0.191	0.0	0.0	
	2336	63.399	63.096	0.189	0.0	0.0	
	2352	63.396	63.096	0.186	0.0	0.0	
	2368	63.394	63.096	0.184	0.0	0.0	
	2384	63.391	63.096	0.181	0.0	0.0	
	2400	63.389	63.096	0.179	0.0	0.0	
	2416	63.387	63.096	0.177	0.0	0.0	
	2432	63.384	63.096	0.174	0.0	0.0	
	2448	63.382	63.096	0.172	0.0	0.0	
	2464	63.379	63.096	0.169	0.0	0.0	
	2480	63.377	63.096	0.167	0.0	0.0	
	2496	63.374	63.096	0.164	0.0	0.0	
	2512	63.372	63.096	0.162	0.0	0.0	
	2528	63.369	63.096	0.159	0.0	0.0	
	2544	63.367	63.096	0.157	0.0	0.0	
	2560	63.364	63.096	0.154	0.0	0.0	
	2576	63.362	63.096	0.152	0.0	0.0	
	2592	63.360	63.096	0.150	0.0	0.0	
	2608	63.357	63.096	0.147	0.0	0.0	
	2624	63.355	63.096	0.145	0.0	0.0	
	2640	63.352	63.096	0.142	0.0	0.0	
	2656	63.350	63.096	0.140	0.0	0.0	
	2672	63.347	63.096	0.137	0.0	0.0	
	2688	63.344	63.096	0.134	0.0	0.0	

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Flows and Levels for Pipe 1.004 US/MH RAIN GARDEN (Storm)
 960 minute 100 year Winter
 Average Rainfall Intensity 5.233 mm/hr

Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
2704	63.341	63.096	0.131	0.0	0.0

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	Dummy	63.800	63.085	63.100	600	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1200
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	6

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	20.000	Storm Duration (mins)	360
Ratio R	0.343		

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Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 0.2

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 63.250

Depth/Flow Relationship Manhole: RAIN GARDEN, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 63.100

Depth (m) Flow (l/s)

0.750 0.0000

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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 360 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.412	-0.098	0.000	0.02	0.0	0.7	OK
1.001	S1	63.629	0.025	0.000	0.18	0.0	1.3	SURCHARGED
2.000	RE2	65.413	-0.097	0.000	0.03	0.0	0.7	OK
2.001	S2	65.014	-0.096	0.000	0.04	0.0	1.3	OK
1.002	S3	63.629	0.075	0.000	0.38	0.0	2.7	SURCHARGED
1.003	S4	63.628	0.268	0.000	0.06	0.0	0.3	SURCHARGED
1.004	RAIN GARDEN	63.555	0.345	0.000	0.00	0.0	0.0	SURCHARGED

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Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (m)
RE1	66.000	0.600	Open Manhole	110	1.000	65.400	110				
S1	64.100	0.606	Open Manhole	600	1.001	63.494	110	1.000	63.494	110	
RE2	66.000	0.600	Open Manhole	110	2.000	65.400	110				
S2	65.650	0.650	Open Manhole	600	2.001	65.000	110	2.000	65.021	110	
S3	64.100	0.656	Open Manhole	600	1.002	63.444	110	1.001	63.444	110	
								2.001	63.467	110	
S4	64.000	0.750	Open Manhole	600	1.003	63.250	110	1.002	63.399	110	
RAIN GARDEN	63.850	0.750	Open Manhole	600	1.004	63.100	110	1.003	63.240	110	
Dummy	63.800	0.715	Open Manhole	600		OUTFALL		1.004	63.085	110	

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PIPELINE SCHEDULES for Storm								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600
Downstream Manhole								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600
Free Flowing Outfall Details for Storm								
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)		
1.004	Dummy	63.800	63.085	63.100	600	0		
Simulation Criteria for Storm								
Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000					
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000					
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000					
Hot Start Level (mm)	0	Run Time (mins)	1200					
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	6					
Number of Input Hydrographs	0	Number of Storage Structures	2					
Number of Online Controls	2	Number of Time/Area Diagrams	0					
Number of Offline Controls	0							
Synthetic Rainfall Details								
Rainfall Model	FSR	Profile Type	Winter					
Return Period (years)	100	Cv (Summer)	1.000					
Region	England and Wales	Cv (Winter)	1.000					
M5-60 (mm)	20.000	Storm Duration (mins)	360					
Ratio R	0.343							
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Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 0.2

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 63.250

Depth/Flow Relationship Manhole: RAIN GARDEN, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 63.100

Depth (m) Flow (l/s)

0.750 0.0000

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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 360 minute 100 year winter (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.409	-0.101	0.000	0.02	0.0	0.4	OK
1.001	S1	63.631	0.027	0.000	0.12	0.0	0.9	SURCHARGED
2.000	RE2	65.411	-0.099	0.000	0.02	0.0	0.4	OK
2.001	S2	65.012	-0.098	0.000	0.03	0.0	0.9	OK
1.002	S3	63.630	0.076	0.000	0.25	0.0	1.8	SURCHARGED
1.003	S4	63.630	0.270	0.000	0.06	0.0	0.3	SURCHARGED
1.004	RAIN GARDEN	63.556	0.346	0.000	0.00	0.0	0.0	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (m)
RE1	66.000	0.600	Open Manhole	110	1.000	65.400	110				
S1	64.100	0.606	Open Manhole	600	1.001	63.494	110	1.000	63.494	110	
RE2	66.000	0.600	Open Manhole	110	2.000	65.400	110				
S2	65.650	0.650	Open Manhole	600	2.001	65.000	110	2.000	65.021	110	
S3	64.100	0.656	Open Manhole	600	1.002	63.444	110	1.001	63.444	110	
								2.001	63.467	110	
S4	64.000	0.750	Open Manhole	600	1.003	63.250	110	1.002	63.399	110	
RAIN GARDEN	63.850	0.750	Open Manhole	600	1.004	63.100	110	1.003	63.240	110	
Dummy	63.800	0.715	Open Manhole	600		OUTFALL		1.004	63.085	110	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	Dummy	63.800	63.085	63.100	600	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1200
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	8

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	20.000	Storm Duration (mins)	480
Ratio R	0.343		

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Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 0.2

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 63.250

Depth/Flow Relationship Manhole: RAIN GARDEN, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 63.100

Depth (m) Flow (l/s)

0.750 0.0000

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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 480 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.410	-0.100	0.000	0.02	0.0	0.5	OK
1.001	S1	63.642	0.038	0.000	0.14	0.0	1.1	SURCHARGED
2.000	RE2	65.412	-0.098	0.000	0.03	0.0	0.5	OK
2.001	S2	65.013	-0.097	0.000	0.03	0.0	1.1	OK
1.002	S3	63.642	0.088	0.000	0.30	0.0	2.2	SURCHARGED
1.003	S4	63.641	0.281	0.000	0.06	0.0	0.3	SURCHARGED
1.004	RAIN GARDEN	63.573	0.363	0.000	0.00	0.0	0.0	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (m)
RE1	66.000	0.600	Open Manhole	110	1.000	65.400	110				
S1	64.100	0.606	Open Manhole	600	1.001	63.494	110	1.000	63.494	110	
RE2	66.000	0.600	Open Manhole	110	2.000	65.400	110				
S2	65.650	0.650	Open Manhole	600	2.001	65.000	110	2.000	65.021	110	
S3	64.100	0.656	Open Manhole	600	1.002	63.444	110	1.001	63.444	110	
								2.001	63.467	110	
S4	64.000	0.750	Open Manhole	600	1.003	63.250	110	1.002	63.399	110	
RAIN GARDEN	63.850	0.750	Open Manhole	600	1.004	63.100	110	1.003	63.240	110	
Dummy	63.800	0.715	Open Manhole	600		OUTFALL		1.004	63.085	110	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	Dummy	63.800	63.085	63.100	600	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1200
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	8

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	20.000	Storm Duration (mins)	480
Ratio R	0.343		

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Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 0.2

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 63.250

Depth/Flow Relationship Manhole: RAIN GARDEN, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 63.100

Depth (m) Flow (l/s)

0.750 0.0000

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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 480 minute 100 year winter (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.407	-0.103	0.000	0.01	0.0	0.4	OK
1.001	S1	63.644	0.040	0.000	0.10	0.0	0.7	SURCHARGED
2.000	RE2	65.409	-0.101	0.000	0.02	0.0	0.4	OK
2.001	S2	65.011	-0.099	0.000	0.02	0.0	0.7	OK
1.002	S3	63.643	0.089	0.000	0.20	0.0	1.4	SURCHARGED
1.003	S4	63.643	0.283	0.000	0.05	0.0	0.3	SURCHARGED
1.004	RAIN GARDEN	63.575	0.365	0.000	0.00	0.0	0.0	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	Dummy	63.800	63.085	63.100	600	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	2700
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	16

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	20.000	Storm Duration (mins)	960
Ratio R	0.343		

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Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 0.2

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 63.250

Depth/Flow Relationship Manhole: RAIN GARDEN, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 63.100

Depth (m) Flow (l/s)

0.750 0.0000

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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 960 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.406	-0.104	0.000	0.01	0.0	0.3	OK
1.001	S1	63.657	0.053	0.000	0.08	0.0	0.6	SURCHARGED
2.000	RE2	65.408	-0.102	0.000	0.02	0.0	0.3	OK
2.001	S2	65.010	-0.100	0.000	0.02	0.0	0.6	OK
1.002	S3	63.657	0.103	0.000	0.18	0.0	1.3	SURCHARGED
1.003	S4	63.657	0.297	0.000	0.05	0.0	0.3	SURCHARGED
1.004	RAIN GARDEN	63.595	0.385	0.000	0.00	0.0	0.0	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	Dummy	63.800	63.085	63.100	600	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	2700
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	16

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	20.000	Storm Duration (mins)	960
Ratio R	0.343		

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Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 0.2

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 63.250

Depth/Flow Relationship Manhole: RAIN GARDEN, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 63.100

Depth (m) Flow (l/s)

0.750 0.0000

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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 960 minute 100 year winter (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.404	-0.106	0.000	0.01	0.0	0.2	OK
1.001	S1	63.661	0.057	0.000	0.06	0.0	0.4	SURCHARGED
2.000	RE2	65.405	-0.105	0.000	0.01	0.0	0.2	OK
2.001	S2	65.007	-0.103	0.000	0.01	0.0	0.4	OK
1.002	S3	63.661	0.107	0.000	0.12	0.0	0.8	SURCHARGED
1.003	S4	63.660	0.300	0.000	0.05	0.0	0.2	SURCHARGED
1.004	RAIN GARDEN	63.598	0.388	0.000	0.00	0.0	0.0	SURCHARGED

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<u>Flows and Levels for Pipe 1.000 US/MH RE1 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
16	65.400	63.495	-0.110	0.0	0.0
32	65.400	63.496	-0.110	0.0	0.0
48	65.400	63.498	-0.110	0.0	0.0
64	65.401	63.498	-0.109	0.0	0.0
80	65.401	63.499	-0.109	0.0	0.0
96	65.401	63.499	-0.109	0.0	0.0
112	65.401	63.499	-0.109	0.0	0.0
128	65.401	63.499	-0.109	0.0	0.0
144	65.401	63.499	-0.109	0.0	0.0
160	65.401	63.499	-0.109	0.0	0.0
176	65.401	63.499	-0.109	0.0	0.0
192	65.401	63.500	-0.109	0.0	0.0
208	65.401	63.500	-0.109	0.0	0.0
224	65.401	63.500	-0.109	0.0	0.0
240	65.401	63.501	-0.109	0.0	0.0
256	65.401	63.502	-0.109	0.0	0.1
272	65.401	63.503	-0.109	0.0	0.1
288	65.401	63.504	-0.109	0.0	0.1
304	65.402	63.505	-0.108	0.0	0.1
320	65.402	63.506	-0.108	0.0	0.1
336	65.402	63.506	-0.108	0.0	0.1
352	65.402	63.507	-0.108	0.0	0.1
368	65.403	63.507	-0.107	0.0	0.1
384	65.403	63.508	-0.107	0.0	0.1
400	65.403	63.509	-0.107	0.0	0.2
416	65.403	63.509	-0.107	0.0	0.2
432	65.404	63.510	-0.106	0.0	0.2
448	65.404	63.510	-0.106	0.0	0.2
464	65.404	63.511	-0.106	0.0	0.2
480	65.404	63.511	-0.106	0.0	0.2
496	65.404	63.511	-0.106	0.0	0.2
512	65.404	63.519	-0.106	0.0	0.2
528	65.404	63.534	-0.106	0.0	0.2
544	65.404	63.549	-0.106	0.0	0.2
560	65.403	63.564	-0.107	0.0	0.2
576	65.403	63.578	-0.107	0.0	0.2
592	65.403	63.590	-0.107	0.0	0.1
608	65.403	63.601	-0.107	0.0	0.1
624	65.402	63.610	-0.108	0.0	0.1
640	65.402	63.618	-0.108	0.0	0.1
656	65.402	63.625	-0.108	0.0	0.1
672	65.402	63.630	-0.108	0.0	0.1
688	65.401	63.635	-0.109	0.0	0.1
704	65.401	63.639	-0.109	0.0	0.1
720	65.401	63.642	-0.109	0.0	0.1
736	65.401	63.644	-0.109	0.0	0.0
752	65.401	63.646	-0.109	0.0	0.0
768	65.401	63.648	-0.109	0.0	0.0
784	65.401	63.649	-0.109	0.0	0.0
800	65.401	63.651	-0.109	0.0	0.0
816	65.401	63.652	-0.109	0.0	0.0
832	65.401	63.654	-0.109	0.0	0.0
848	65.401	63.655	-0.109	0.0	0.0
864	65.401	63.657	-0.109	0.0	0.0
880	65.401	63.659	-0.109	0.0	0.0
896	65.401	63.660	-0.109	0.0	0.0
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Elstree Computing Ltd		Network W.12.6			
<u>Flows and Levels for Pipe 1.000 US/MH RE1 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
912	65.401	63.661	-0.109	0.0	0.0
928	65.400	63.661	-0.110	0.0	0.0
944	65.400	63.660	-0.110	0.0	0.0
960	65.400	63.658	-0.110	0.0	0.0
976	65.400	63.655	-0.110	0.0	0.0
992	65.400	63.652	-0.110	0.0	0.0
1008	65.400	63.649	-0.110	0.0	0.0
1024	65.400	63.647	-0.110	0.0	0.0
1040	65.400	63.644	-0.110	0.0	0.0
1056	65.400	63.642	-0.110	0.0	0.0
1072	65.400	63.640	-0.110	0.0	0.0
1088	65.400	63.637	-0.110	0.0	0.0
1104	65.400	63.635	-0.110	0.0	0.0
1120	65.400	63.632	-0.110	0.0	0.0
1136	65.400	63.630	-0.110	0.0	0.0
1152	65.400	63.627	-0.110	0.0	0.0
1168	65.400	63.625	-0.110	0.0	0.0
1184	65.400	63.623	-0.110	0.0	0.0
1200	65.400	63.620	-0.110	0.0	0.0
1216	65.400	63.618	-0.110	0.0	0.0
1232	65.400	63.616	-0.110	0.0	0.0
1248	65.400	63.613	-0.110	0.0	0.0
1264	65.400	63.611	-0.110	0.0	0.0
1280	65.400	63.608	-0.110	0.0	0.0
1296	65.400	63.606	-0.110	0.0	0.0
1312	65.400	63.604	-0.110	0.0	0.0
1328	65.400	63.601	-0.110	0.0	0.0
1344	65.400	63.599	-0.110	0.0	0.0
1360	65.400	63.596	-0.110	0.0	0.0
1376	65.400	63.594	-0.110	0.0	0.0
1392	65.400	63.592	-0.110	0.0	0.0
1408	65.400	63.589	-0.110	0.0	0.0
1424	65.400	63.587	-0.110	0.0	0.0
1440	65.400	63.585	-0.110	0.0	0.0
1456	65.400	63.582	-0.110	0.0	0.0
1472	65.400	63.580	-0.110	0.0	0.0
1488	65.400	63.577	-0.110	0.0	0.0
1504	65.400	63.575	-0.110	0.0	0.0
1520	65.400	63.573	-0.110	0.0	0.0
1536	65.400	63.570	-0.110	0.0	0.0
1552	65.400	63.568	-0.110	0.0	0.0
1568	65.400	63.565	-0.110	0.0	0.0
1584	65.400	63.563	-0.110	0.0	0.0
1600	65.400	63.560	-0.110	0.0	0.0
1616	65.400	63.558	-0.110	0.0	0.0
1632	65.400	63.556	-0.110	0.0	0.0
1648	65.400	63.553	-0.110	0.0	0.0
1664	65.400	63.551	-0.110	0.0	0.0
1680	65.400	63.549	-0.110	0.0	0.0
1696	65.400	63.546	-0.110	0.0	0.0
1712	65.400	63.544	-0.110	0.0	0.0
1728	65.400	63.542	-0.110	0.0	0.0
1744	65.400	63.539	-0.110	0.0	0.0
1760	65.400	63.537	-0.110	0.0	0.0
1776	65.400	63.534	-0.110	0.0	0.0
1792	65.400	63.532	-0.110	0.0	0.0
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<u>Flows and Levels for Pipe 1.000 US/MH RE1 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
1808	65.400	63.530	-0.110	0.0	0.0
1824	65.400	63.527	-0.110	0.0	0.0
1840	65.400	63.525	-0.110	0.0	0.0
1856	65.400	63.522	-0.110	0.0	0.0
1872	65.400	63.520	-0.110	0.0	0.0
1888	65.400	63.518	-0.110	0.0	0.0
1904	65.400	63.515	-0.110	0.0	0.0
1920	65.400	63.513	-0.110	0.0	0.0
1936	65.400	63.511	-0.110	0.0	0.0
1952	65.400	63.508	-0.110	0.0	0.0
1968	65.400	63.506	-0.110	0.0	0.0
1984	65.400	63.504	-0.110	0.0	0.0
2000	65.400	63.501	-0.110	0.0	0.0
2016	65.400	63.499	-0.110	0.0	0.0
2032	65.400	63.496	-0.110	0.0	0.0
2048	65.400	63.494	-0.110	0.0	0.0
2064	65.400	63.494	-0.110	0.0	0.0
2080	65.400	63.494	-0.110	0.0	0.0
2096	65.400	63.494	-0.110	0.0	0.0
2112	65.400	63.494	-0.110	0.0	0.0
2128	65.400	63.494	-0.110	0.0	0.0
2144	65.400	63.494	-0.110	0.0	0.0
2160	65.400	63.494	-0.110	0.0	0.0
2176	65.400	63.494	-0.110	0.0	0.0
2192	65.400	63.494	-0.110	0.0	0.0
2208	65.400	63.494	-0.110	0.0	0.0
2224	65.400	63.494	-0.110	0.0	0.0
2240	65.400	63.494	-0.110	0.0	0.0
2256	65.400	63.494	-0.110	0.0	0.0
2272	65.400	63.494	-0.110	0.0	0.0
2288	65.400	63.494	-0.110	0.0	0.0
2304	65.400	63.494	-0.110	0.0	0.0
2320	65.400	63.494	-0.110	0.0	0.0
2336	65.400	63.494	-0.110	0.0	0.0
2352	65.400	63.494	-0.110	0.0	0.0
2368	65.400	63.494	-0.110	0.0	0.0
2384	65.400	63.494	-0.110	0.0	0.0
2400	65.400	63.494	-0.110	0.0	0.0
2416	65.400	63.494	-0.110	0.0	0.0
2432	65.400	63.494	-0.110	0.0	0.0
2448	65.400	63.494	-0.110	0.0	0.0
2464	65.400	63.494	-0.110	0.0	0.0
2480	65.400	63.494	-0.110	0.0	0.0
2496	65.400	63.494	-0.110	0.0	0.0
2512	65.400	63.494	-0.110	0.0	0.0
2528	65.400	63.494	-0.110	0.0	0.0
2544	65.400	63.494	-0.110	0.0	0.0
2560	65.400	63.494	-0.110	0.0	0.0
2576	65.400	63.494	-0.110	0.0	0.0
2592	65.400	63.494	-0.110	0.0	0.0
2608	65.400	63.494	-0.110	0.0	0.0
2624	65.400	63.494	-0.110	0.0	0.0
2640	65.400	63.494	-0.110	0.0	0.0
2656	65.400	63.494	-0.110	0.0	0.0
2672	65.400	63.494	-0.110	0.0	0.0
2688	65.400	63.494	-0.110	0.0	0.0
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22 St Pancras	Surface Water Drainage													
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Elstree Computing Ltd	Network W.12.6													
<u>Flows and Levels for Pipe 1.000 US/MH RE1 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u> <table><tr><th>Time (mins)</th><th>Upstream Level (m)</th><th>Downstream Level (m)</th><th>Surcharged Depth (m)</th><th>Total O/F (l/s)</th><th>Pipe Flow (l/s)</th></tr><tr><td>2704</td><td>65.400</td><td>63.494</td><td>-0.110</td><td>0.0</td><td>0.0</td></tr></table>			Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)	2704	65.400	63.494	-0.110	0.0	0.0
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)									
2704	65.400	63.494	-0.110	0.0	0.0									
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Elstree Computing Ltd		Network W.12.6			
<u>Flows and Levels for Pipe 1.001 US/MH S1 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
16	63.495	63.446	-0.109	0.0	0.0
32	63.496	63.449	-0.108	0.0	0.0
48	63.498	63.452	-0.106	0.0	0.1
64	63.498	63.453	-0.106	0.0	0.1
80	63.499	63.454	-0.105	0.0	0.1
96	63.499	63.455	-0.105	0.0	0.1
112	63.499	63.455	-0.105	0.0	0.1
128	63.499	63.455	-0.105	0.0	0.1
144	63.499	63.455	-0.105	0.0	0.1
160	63.499	63.455	-0.105	0.0	0.1
176	63.499	63.455	-0.105	0.0	0.1
192	63.500	63.455	-0.105	0.0	0.1
208	63.500	63.455	-0.104	0.0	0.1
224	63.500	63.456	-0.104	0.0	0.1
240	63.501	63.456	-0.103	0.0	0.1
256	63.502	63.457	-0.102	0.0	0.1
272	63.503	63.457	-0.101	0.0	0.1
288	63.504	63.458	-0.100	0.0	0.1
304	63.505	63.459	-0.099	0.0	0.2
320	63.506	63.460	-0.098	0.0	0.2
336	63.506	63.461	-0.098	0.0	0.2
352	63.507	63.463	-0.097	0.0	0.2
368	63.507	63.464	-0.097	0.0	0.3
384	63.508	63.465	-0.096	0.0	0.3
400	63.509	63.466	-0.095	0.0	0.3
416	63.509	63.467	-0.095	0.0	0.3
432	63.510	63.468	-0.094	0.0	0.4
448	63.510	63.468	-0.094	0.0	0.4
464	63.511	63.469	-0.094	0.0	0.4
480	63.511	63.479	-0.093	0.0	0.4
496	63.511	63.497	-0.093	0.0	0.4
512	63.519	63.515	-0.085	0.0	0.4
528	63.534	63.532	-0.071	0.0	0.4
544	63.549	63.548	-0.055	0.0	0.4
560	63.564	63.563	-0.040	0.0	0.3
576	63.578	63.577	-0.026	0.0	0.3
592	63.590	63.589	-0.014	0.0	0.3
608	63.601	63.600	-0.003	0.0	0.3
624	63.610	63.609	0.006	0.0	0.2
640	63.618	63.617	0.014	0.0	0.2
656	63.625	63.624	0.021	0.0	0.2
672	63.630	63.630	0.026	0.0	0.2
688	63.635	63.634	0.031	0.0	0.1
704	63.639	63.638	0.034	0.0	0.1
720	63.642	63.641	0.037	0.0	0.1
736	63.644	63.644	0.040	0.0	0.1
752	63.646	63.646	0.042	0.0	0.1
768	63.648	63.647	0.044	0.0	0.1
784	63.649	63.649	0.045	0.0	0.1
800	63.651	63.650	0.047	0.0	0.1
816	63.652	63.652	0.048	0.0	0.1
832	63.654	63.653	0.050	0.0	0.1
848	63.655	63.655	0.051	0.0	0.1
864	63.657	63.657	0.053	0.0	0.1
880	63.659	63.658	0.054	0.0	0.1
896	63.660	63.660	0.056	0.0	0.1
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Elstree Computing Ltd		Network W.12.6			
<u>Flows and Levels for Pipe 1.001 US/MH S1 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
912	63.661	63.661	0.057	0.0	0.1
928	63.661	63.661	0.057	0.0	0.1
944	63.660	63.660	0.056	0.0	0.0
960	63.658	63.658	0.054	0.0	0.0
976	63.655	63.655	0.051	0.0	0.0
992	63.652	63.652	0.048	0.0	0.0
1008	63.649	63.650	0.045	0.0	0.0
1024	63.647	63.647	0.043	0.0	0.0
1040	63.644	63.645	0.040	0.0	0.0
1056	63.642	63.642	0.038	0.0	0.0
1072	63.640	63.640	0.036	0.0	0.0
1088	63.637	63.637	0.033	0.0	0.0
1104	63.635	63.635	0.031	0.0	0.0
1120	63.632	63.632	0.028	0.0	0.0
1136	63.630	63.630	0.026	0.0	0.0
1152	63.627	63.628	0.023	0.0	0.0
1168	63.625	63.625	0.021	0.0	0.0
1184	63.623	63.623	0.019	0.0	0.0
1200	63.620	63.621	0.016	0.0	0.0
1216	63.618	63.618	0.014	0.0	0.0
1232	63.616	63.616	0.012	0.0	0.0
1248	63.613	63.613	0.009	0.0	0.0
1264	63.611	63.611	0.007	0.0	0.0
1280	63.608	63.608	0.004	0.0	0.0
1296	63.606	63.606	0.002	0.0	0.0
1312	63.604	63.604	0.000	0.0	0.0
1328	63.601	63.601	-0.003	0.0	0.0
1344	63.599	63.599	-0.005	0.0	0.0
1360	63.596	63.597	-0.008	0.0	0.0
1376	63.594	63.594	-0.010	0.0	0.0
1392	63.592	63.592	-0.012	0.0	0.0
1408	63.589	63.589	-0.015	0.0	0.0
1424	63.587	63.587	-0.017	0.0	0.0
1440	63.585	63.585	-0.020	0.0	0.0
1456	63.582	63.582	-0.022	0.0	0.0
1472	63.580	63.580	-0.024	0.0	0.0
1488	63.577	63.577	-0.027	0.0	0.0
1504	63.575	63.575	-0.029	0.0	0.0
1520	63.573	63.573	-0.032	0.0	0.0
1536	63.570	63.570	-0.034	0.0	0.0
1552	63.568	63.568	-0.036	0.0	0.0
1568	63.565	63.565	-0.039	0.0	0.0
1584	63.563	63.563	-0.041	0.0	0.0
1600	63.560	63.561	-0.044	0.0	0.0
1616	63.558	63.558	-0.046	0.0	0.0
1632	63.556	63.556	-0.048	0.0	0.0
1648	63.553	63.553	-0.051	0.0	0.0
1664	63.551	63.551	-0.053	0.0	0.0
1680	63.549	63.549	-0.055	0.0	0.0
1696	63.546	63.546	-0.058	0.0	0.0
1712	63.544	63.544	-0.060	0.0	0.0
1728	63.542	63.542	-0.062	0.0	0.0
1744	63.539	63.539	-0.065	0.0	0.0
1760	63.537	63.537	-0.067	0.0	0.0
1776	63.534	63.534	-0.070	0.0	0.0
1792	63.532	63.532	-0.072	0.0	0.0
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<u>Flows and Levels for Pipe 1.001 US/MH S1 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
1808	63.530	63.530	-0.074	0.0	0.0
1824	63.527	63.527	-0.077	0.0	0.0
1840	63.525	63.525	-0.079	0.0	0.0
1856	63.522	63.522	-0.082	0.0	0.0
1872	63.520	63.520	-0.084	0.0	0.0
1888	63.518	63.518	-0.086	0.0	0.0
1904	63.515	63.515	-0.089	0.0	0.0
1920	63.513	63.513	-0.091	0.0	0.0
1936	63.511	63.511	-0.093	0.0	0.0
1952	63.508	63.508	-0.096	0.0	0.0
1968	63.506	63.506	-0.098	0.0	0.0
1984	63.504	63.504	-0.100	0.0	0.0
2000	63.501	63.501	-0.103	0.0	0.0
2016	63.499	63.499	-0.105	0.0	0.0
2032	63.496	63.496	-0.108	0.0	0.0
2048	63.494	63.494	-0.110	0.0	0.0
2064	63.494	63.492	-0.110	0.0	0.0
2080	63.494	63.489	-0.110	0.0	0.0
2096	63.494	63.487	-0.110	0.0	0.0
2112	63.494	63.484	-0.110	0.0	0.0
2128	63.494	63.482	-0.110	0.0	0.0
2144	63.494	63.480	-0.110	0.0	0.0
2160	63.494	63.477	-0.110	0.0	0.0
2176	63.494	63.475	-0.110	0.0	0.0
2192	63.494	63.473	-0.110	0.0	0.0
2208	63.494	63.470	-0.110	0.0	0.0
2224	63.494	63.468	-0.110	0.0	0.0
2240	63.494	63.465	-0.110	0.0	0.0
2256	63.494	63.463	-0.110	0.0	0.0
2272	63.494	63.460	-0.110	0.0	0.0
2288	63.494	63.458	-0.110	0.0	0.0
2304	63.494	63.456	-0.110	0.0	0.0
2320	63.494	63.453	-0.110	0.0	0.0
2336	63.494	63.451	-0.110	0.0	0.0
2352	63.494	63.448	-0.110	0.0	0.0
2368	63.494	63.446	-0.110	0.0	0.0
2384	63.494	63.444	-0.110	0.0	0.0
2400	63.494	63.444	-0.110	0.0	0.0
2416	63.494	63.444	-0.110	0.0	0.0
2432	63.494	63.444	-0.110	0.0	0.0
2448	63.494	63.444	-0.110	0.0	0.0
2464	63.494	63.444	-0.110	0.0	0.0
2480	63.494	63.444	-0.110	0.0	0.0
2496	63.494	63.444	-0.110	0.0	0.0
2512	63.494	63.444	-0.110	0.0	0.0
2528	63.494	63.444	-0.110	0.0	0.0
2544	63.494	63.444	-0.110	0.0	0.0
2560	63.494	63.444	-0.110	0.0	0.0
2576	63.494	63.444	-0.110	0.0	0.0
2592	63.494	63.444	-0.110	0.0	0.0
2608	63.494	63.444	-0.110	0.0	0.0
2624	63.494	63.444	-0.110	0.0	0.0
2640	63.494	63.444	-0.110	0.0	0.0
2656	63.494	63.444	-0.110	0.0	0.0
2672	63.494	63.444	-0.110	0.0	0.0
2688	63.494	63.444	-0.110	0.0	0.0
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Flows and Levels for Pipe 1.001 US/MH S1 (Storm)
960 minute 100 year winter
Average Rainfall Intensity 5.233 mm/hr

Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
2704	63.494	63.444	-0.110	0.0	0.0

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<u>Flows and Levels for Pipe 2.000 US/MH RE2 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
16	65.400	65.000	-0.110	0.0	0.0
32	65.400	65.001	-0.110	0.0	0.0
48	65.401	65.001	-0.109	0.0	0.0
64	65.401	65.001	-0.109	0.0	0.0
80	65.401	65.001	-0.109	0.0	0.0
96	65.401	65.001	-0.109	0.0	0.0
112	65.401	65.001	-0.109	0.0	0.0
128	65.401	65.001	-0.109	0.0	0.0
144	65.401	65.001	-0.109	0.0	0.0
160	65.401	65.001	-0.109	0.0	0.0
176	65.401	65.001	-0.109	0.0	0.0
192	65.401	65.001	-0.109	0.0	0.0
208	65.401	65.001	-0.109	0.0	0.0
224	65.401	65.001	-0.109	0.0	0.0
240	65.401	65.002	-0.109	0.0	0.0
256	65.401	65.002	-0.109	0.0	0.1
272	65.402	65.002	-0.108	0.0	0.1
288	65.402	65.002	-0.108	0.0	0.1
304	65.402	65.003	-0.108	0.0	0.1
320	65.402	65.003	-0.108	0.0	0.1
336	65.403	65.003	-0.107	0.0	0.1
352	65.403	65.004	-0.107	0.0	0.1
368	65.403	65.004	-0.107	0.0	0.1
384	65.404	65.005	-0.106	0.0	0.1
400	65.404	65.005	-0.106	0.0	0.2
416	65.404	65.006	-0.106	0.0	0.2
432	65.405	65.006	-0.105	0.0	0.2
448	65.405	65.006	-0.105	0.0	0.2
464	65.405	65.007	-0.105	0.0	0.2
480	65.405	65.007	-0.105	0.0	0.2
496	65.405	65.007	-0.105	0.0	0.2
512	65.405	65.007	-0.105	0.0	0.2
528	65.405	65.006	-0.105	0.0	0.2
544	65.405	65.006	-0.105	0.0	0.2
560	65.404	65.006	-0.106	0.0	0.2
576	65.404	65.005	-0.106	0.0	0.2
592	65.404	65.005	-0.106	0.0	0.1
608	65.403	65.004	-0.107	0.0	0.1
624	65.403	65.004	-0.107	0.0	0.1
640	65.403	65.003	-0.107	0.0	0.1
656	65.402	65.003	-0.108	0.0	0.1
672	65.402	65.003	-0.108	0.0	0.1
688	65.402	65.002	-0.108	0.0	0.1
704	65.402	65.002	-0.108	0.0	0.1
720	65.401	65.002	-0.109	0.0	0.1
736	65.401	65.002	-0.109	0.0	0.0
752	65.401	65.001	-0.109	0.0	0.0
768	65.401	65.001	-0.109	0.0	0.0
784	65.401	65.001	-0.109	0.0	0.0
800	65.401	65.001	-0.109	0.0	0.0
816	65.401	65.001	-0.109	0.0	0.0
832	65.401	65.001	-0.109	0.0	0.0
848	65.401	65.001	-0.109	0.0	0.0
864	65.401	65.001	-0.109	0.0	0.0
880	65.401	65.001	-0.109	0.0	0.0
896	65.401	65.001	-0.109	0.0	0.0
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<u>Flows and Levels for Pipe 2.000 US/MH RE2 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
912	65.401	65.001	-0.109	0.0	0.0
928	65.401	65.001	-0.109	0.0	0.0
944	65.400	65.001	-0.110	0.0	0.0
960	65.400	65.000	-0.110	0.0	0.0
976	65.400	65.000	-0.110	0.0	0.0
992	65.400	65.000	-0.110	0.0	0.0
1008	65.400	65.000	-0.110	0.0	0.0
1024	65.400	65.000	-0.110	0.0	0.0
1040	65.400	65.000	-0.110	0.0	0.0
1056	65.400	65.000	-0.110	0.0	0.0
1072	65.400	65.000	-0.110	0.0	0.0
1088	65.400	65.000	-0.110	0.0	0.0
1104	65.400	65.000	-0.110	0.0	0.0
1120	65.400	65.000	-0.110	0.0	0.0
1136	65.400	65.000	-0.110	0.0	0.0
1152	65.400	65.000	-0.110	0.0	0.0
1168	65.400	65.000	-0.110	0.0	0.0
1184	65.400	65.000	-0.110	0.0	0.0
1200	65.400	65.000	-0.110	0.0	0.0
1216	65.400	65.000	-0.110	0.0	0.0
1232	65.400	65.000	-0.110	0.0	0.0
1248	65.400	65.000	-0.110	0.0	0.0
1264	65.400	65.000	-0.110	0.0	0.0
1280	65.400	65.000	-0.110	0.0	0.0
1296	65.400	65.000	-0.110	0.0	0.0
1312	65.400	65.000	-0.110	0.0	0.0
1328	65.400	65.000	-0.110	0.0	0.0
1344	65.400	65.000	-0.110	0.0	0.0
1360	65.400	65.000	-0.110	0.0	0.0
1376	65.400	65.000	-0.110	0.0	0.0
1392	65.400	65.000	-0.110	0.0	0.0
1408	65.400	65.000	-0.110	0.0	0.0
1424	65.400	65.000	-0.110	0.0	0.0
1440	65.400	65.000	-0.110	0.0	0.0
1456	65.400	65.000	-0.110	0.0	0.0
1472	65.400	65.000	-0.110	0.0	0.0
1488	65.400	65.000	-0.110	0.0	0.0
1504	65.400	65.000	-0.110	0.0	0.0
1520	65.400	65.000	-0.110	0.0	0.0
1536	65.400	65.000	-0.110	0.0	0.0
1552	65.400	65.000	-0.110	0.0	0.0
1568	65.400	65.000	-0.110	0.0	0.0
1584	65.400	65.000	-0.110	0.0	0.0
1600	65.400	65.000	-0.110	0.0	0.0
1616	65.400	65.000	-0.110	0.0	0.0
1632	65.400	65.000	-0.110	0.0	0.0
1648	65.400	65.000	-0.110	0.0	0.0
1664	65.400	65.000	-0.110	0.0	0.0
1680	65.400	65.000	-0.110	0.0	0.0
1696	65.400	65.000	-0.110	0.0	0.0
1712	65.400	65.000	-0.110	0.0	0.0
1728	65.400	65.000	-0.110	0.0	0.0
1744	65.400	65.000	-0.110	0.0	0.0
1760	65.400	65.000	-0.110	0.0	0.0
1776	65.400	65.000	-0.110	0.0	0.0
1792	65.400	65.000	-0.110	0.0	0.0
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<u>Flows and Levels for Pipe 2.000 US/MH RE2 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
1808	65.400	65.000	-0.110	0.0	0.0
1824	65.400	65.000	-0.110	0.0	0.0
1840	65.400	65.000	-0.110	0.0	0.0
1856	65.400	65.000	-0.110	0.0	0.0
1872	65.400	65.000	-0.110	0.0	0.0
1888	65.400	65.000	-0.110	0.0	0.0
1904	65.400	65.000	-0.110	0.0	0.0
1920	65.400	65.000	-0.110	0.0	0.0
1936	65.400	65.000	-0.110	0.0	0.0
1952	65.400	65.000	-0.110	0.0	0.0
1968	65.400	65.000	-0.110	0.0	0.0
1984	65.400	65.000	-0.110	0.0	0.0
2000	65.400	65.000	-0.110	0.0	0.0
2016	65.400	65.000	-0.110	0.0	0.0
2032	65.400	65.000	-0.110	0.0	0.0
2048	65.400	65.000	-0.110	0.0	0.0
2064	65.400	65.000	-0.110	0.0	0.0
2080	65.400	65.000	-0.110	0.0	0.0
2096	65.400	65.000	-0.110	0.0	0.0
2112	65.400	65.000	-0.110	0.0	0.0
2128	65.400	65.000	-0.110	0.0	0.0
2144	65.400	65.000	-0.110	0.0	0.0
2160	65.400	65.000	-0.110	0.0	0.0
2176	65.400	65.000	-0.110	0.0	0.0
2192	65.400	65.000	-0.110	0.0	0.0
2208	65.400	65.000	-0.110	0.0	0.0
2224	65.400	65.000	-0.110	0.0	0.0
2240	65.400	65.000	-0.110	0.0	0.0
2256	65.400	65.000	-0.110	0.0	0.0
2272	65.400	65.000	-0.110	0.0	0.0
2288	65.400	65.000	-0.110	0.0	0.0
2304	65.400	65.000	-0.110	0.0	0.0
2320	65.400	65.000	-0.110	0.0	0.0
2336	65.400	65.000	-0.110	0.0	0.0
2352	65.400	65.000	-0.110	0.0	0.0
2368	65.400	65.000	-0.110	0.0	0.0
2384	65.400	65.000	-0.110	0.0	0.0
2400	65.400	65.000	-0.110	0.0	0.0
2416	65.400	65.000	-0.110	0.0	0.0
2432	65.400	65.000	-0.110	0.0	0.0
2448	65.400	65.000	-0.110	0.0	0.0
2464	65.400	65.000	-0.110	0.0	0.0
2480	65.400	65.000	-0.110	0.0	0.0
2496	65.400	65.000	-0.110	0.0	0.0
2512	65.400	65.000	-0.110	0.0	0.0
2528	65.400	65.000	-0.110	0.0	0.0
2544	65.400	65.000	-0.110	0.0	0.0
2560	65.400	65.000	-0.110	0.0	0.0
2576	65.400	65.000	-0.110	0.0	0.0
2592	65.400	65.000	-0.110	0.0	0.0
2608	65.400	65.000	-0.110	0.0	0.0
2624	65.400	65.000	-0.110	0.0	0.0
2640	65.400	65.000	-0.110	0.0	0.0
2656	65.400	65.000	-0.110	0.0	0.0
2672	65.400	65.000	-0.110	0.0	0.0
2688	65.400	65.000	-0.110	0.0	0.0
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<u>Flows and Levels for Pipe 2.000 US/MH RE2 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u> <table><tr><th>Time (mins)</th><th>Upstream Level (m)</th><th>Downstream Level (m)</th><th>Surcharged Depth (m)</th><th>Total O/F (l/s)</th><th>Pipe Flow (l/s)</th></tr><tr><td>2704</td><td>65.400</td><td>65.000</td><td>-0.110</td><td>0.0</td><td>0.0</td></tr></table>			Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)	2704	65.400	65.000	-0.110	0.0	0.0
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)									
2704	65.400	65.000	-0.110	0.0	0.0									
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Date Dec 25 File COMBINED ATTENUATION...		Designed by JS Checked by			
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<u>Flows and Levels for Pipe 2.001 US/MH S2 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
16	65.000	63.446	-0.110	0.0	0.0
32	65.001	63.449	-0.109	0.0	0.0
48	65.001	63.452	-0.109	0.0	0.1
64	65.001	63.453	-0.109	0.0	0.1
80	65.001	63.454	-0.109	0.0	0.1
96	65.001	63.455	-0.109	0.0	0.1
112	65.001	63.455	-0.109	0.0	0.1
128	65.001	63.455	-0.109	0.0	0.1
144	65.001	63.455	-0.109	0.0	0.1
160	65.001	63.455	-0.109	0.0	0.1
176	65.001	63.455	-0.109	0.0	0.1
192	65.001	63.455	-0.109	0.0	0.1
208	65.001	63.455	-0.109	0.0	0.1
224	65.001	63.456	-0.109	0.0	0.1
240	65.002	63.456	-0.108	0.0	0.1
256	65.002	63.457	-0.108	0.0	0.1
272	65.002	63.457	-0.108	0.0	0.1
288	65.002	63.458	-0.108	0.0	0.1
304	65.003	63.459	-0.107	0.0	0.2
320	65.003	63.460	-0.107	0.0	0.2
336	65.003	63.461	-0.107	0.0	0.2
352	65.004	63.463	-0.106	0.0	0.2
368	65.004	63.464	-0.106	0.0	0.3
384	65.005	63.465	-0.105	0.0	0.3
400	65.005	63.466	-0.105	0.0	0.3
416	65.006	63.467	-0.104	0.0	0.3
432	65.006	63.468	-0.104	0.0	0.4
448	65.006	63.468	-0.104	0.0	0.4
464	65.007	63.469	-0.103	0.0	0.4
480	65.007	63.479	-0.103	0.0	0.4
496	65.007	63.497	-0.103	0.0	0.4
512	65.007	63.515	-0.103	0.0	0.4
528	65.006	63.532	-0.104	0.0	0.4
544	65.006	63.548	-0.104	0.0	0.4
560	65.006	63.563	-0.104	0.0	0.3
576	65.005	63.577	-0.105	0.0	0.3
592	65.005	63.589	-0.105	0.0	0.3
608	65.004	63.600	-0.106	0.0	0.3
624	65.004	63.609	-0.106	0.0	0.2
640	65.003	63.617	-0.107	0.0	0.2
656	65.003	63.624	-0.107	0.0	0.2
672	65.003	63.630	-0.107	0.0	0.2
688	65.002	63.634	-0.108	0.0	0.1
704	65.002	63.638	-0.108	0.0	0.1
720	65.002	63.641	-0.108	0.0	0.1
736	65.002	63.644	-0.108	0.0	0.1
752	65.001	63.646	-0.109	0.0	0.1
768	65.001	63.647	-0.109	0.0	0.1
784	65.001	63.649	-0.109	0.0	0.1
800	65.001	63.650	-0.109	0.0	0.1
816	65.001	63.652	-0.109	0.0	0.1
832	65.001	63.653	-0.109	0.0	0.1
848	65.001	63.655	-0.109	0.0	0.1
864	65.001	63.657	-0.109	0.0	0.1
880	65.001	63.658	-0.109	0.0	0.1
896	65.001	63.660	-0.109	0.0	0.1
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<u>Flows and Levels for Pipe 2.001 US/MH S2 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
912	65.001	63.661	-0.109	0.0	0.1
928	65.001	63.661	-0.109	0.0	0.1
944	65.001	63.660	-0.109	0.0	0.0
960	65.000	63.658	-0.110	0.0	0.0
976	65.000	63.655	-0.110	0.0	0.0
992	65.000	63.652	-0.110	0.0	0.0
1008	65.000	63.650	-0.110	0.0	0.0
1024	65.000	63.647	-0.110	0.0	0.0
1040	65.000	63.645	-0.110	0.0	0.0
1056	65.000	63.642	-0.110	0.0	0.0
1072	65.000	63.640	-0.110	0.0	0.0
1088	65.000	63.637	-0.110	0.0	0.0
1104	65.000	63.635	-0.110	0.0	0.0
1120	65.000	63.632	-0.110	0.0	0.0
1136	65.000	63.630	-0.110	0.0	0.0
1152	65.000	63.628	-0.110	0.0	0.0
1168	65.000	63.625	-0.110	0.0	0.0
1184	65.000	63.623	-0.110	0.0	0.0
1200	65.000	63.621	-0.110	0.0	0.0
1216	65.000	63.618	-0.110	0.0	0.0
1232	65.000	63.616	-0.110	0.0	0.0
1248	65.000	63.613	-0.110	0.0	0.0
1264	65.000	63.611	-0.110	0.0	0.0
1280	65.000	63.608	-0.110	0.0	0.0
1296	65.000	63.606	-0.110	0.0	0.0
1312	65.000	63.604	-0.110	0.0	0.0
1328	65.000	63.601	-0.110	0.0	0.0
1344	65.000	63.599	-0.110	0.0	0.0
1360	65.000	63.597	-0.110	0.0	0.0
1376	65.000	63.594	-0.110	0.0	0.0
1392	65.000	63.592	-0.110	0.0	0.0
1408	65.000	63.589	-0.110	0.0	0.0
1424	65.000	63.587	-0.110	0.0	0.0
1440	65.000	63.585	-0.110	0.0	0.0
1456	65.000	63.582	-0.110	0.0	0.0
1472	65.000	63.580	-0.110	0.0	0.0
1488	65.000	63.577	-0.110	0.0	0.0
1504	65.000	63.575	-0.110	0.0	0.0
1520	65.000	63.573	-0.110	0.0	0.0
1536	65.000	63.570	-0.110	0.0	0.0
1552	65.000	63.568	-0.110	0.0	0.0
1568	65.000	63.565	-0.110	0.0	0.0
1584	65.000	63.563	-0.110	0.0	0.0
1600	65.000	63.561	-0.110	0.0	0.0
1616	65.000	63.558	-0.110	0.0	0.0
1632	65.000	63.556	-0.110	0.0	0.0
1648	65.000	63.553	-0.110	0.0	0.0
1664	65.000	63.551	-0.110	0.0	0.0
1680	65.000	63.549	-0.110	0.0	0.0
1696	65.000	63.546	-0.110	0.0	0.0
1712	65.000	63.544	-0.110	0.0	0.0
1728	65.000	63.542	-0.110	0.0	0.0
1744	65.000	63.539	-0.110	0.0	0.0
1760	65.000	63.537	-0.110	0.0	0.0
1776	65.000	63.534	-0.110	0.0	0.0
1792	65.000	63.532	-0.110	0.0	0.0
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Victoria Court 22 St Pancras West Sussex PO19 7GD	34 Hurst Road. Hassocks Surface Water Drainage Design Simulation Rev04				
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Elstree Computing Ltd	Network W.12.6				
<u>Flows and Levels for Pipe 2.001 US/MH S2 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
1808	65.000	63.530	-0.110	0.0	0.0
1824	65.000	63.527	-0.110	0.0	0.0
1840	65.000	63.525	-0.110	0.0	0.0
1856	65.000	63.522	-0.110	0.0	0.0
1872	65.000	63.520	-0.110	0.0	0.0
1888	65.000	63.518	-0.110	0.0	0.0
1904	65.000	63.515	-0.110	0.0	0.0
1920	65.000	63.513	-0.110	0.0	0.0
1936	65.000	63.511	-0.110	0.0	0.0
1952	65.000	63.508	-0.110	0.0	0.0
1968	65.000	63.506	-0.110	0.0	0.0
1984	65.000	63.504	-0.110	0.0	0.0
2000	65.000	63.501	-0.110	0.0	0.0
2016	65.000	63.499	-0.110	0.0	0.0
2032	65.000	63.496	-0.110	0.0	0.0
2048	65.000	63.494	-0.110	0.0	0.0
2064	65.000	63.492	-0.110	0.0	0.0
2080	65.000	63.489	-0.110	0.0	0.0
2096	65.000	63.487	-0.110	0.0	0.0
2112	65.000	63.484	-0.110	0.0	0.0
2128	65.000	63.482	-0.110	0.0	0.0
2144	65.000	63.480	-0.110	0.0	0.0
2160	65.000	63.477	-0.110	0.0	0.0
2176	65.000	63.475	-0.110	0.0	0.0
2192	65.000	63.473	-0.110	0.0	0.0
2208	65.000	63.470	-0.110	0.0	0.0
2224	65.000	63.468	-0.110	0.0	0.0
2240	65.000	63.465	-0.110	0.0	0.0
2256	65.000	63.463	-0.110	0.0	0.0
2272	65.000	63.460	-0.110	0.0	0.0
2288	65.000	63.458	-0.110	0.0	0.0
2304	65.000	63.456	-0.110	0.0	0.0
2320	65.000	63.453	-0.110	0.0	0.0
2336	65.000	63.451	-0.110	0.0	0.0
2352	65.000	63.448	-0.110	0.0	0.0
2368	65.000	63.446	-0.110	0.0	0.0
2384	65.000	63.444	-0.110	0.0	0.0
2400	65.000	63.444	-0.110	0.0	0.0
2416	65.000	63.444	-0.110	0.0	0.0
2432	65.000	63.444	-0.110	0.0	0.0
2448	65.000	63.444	-0.110	0.0	0.0
2464	65.000	63.444	-0.110	0.0	0.0
2480	65.000	63.444	-0.110	0.0	0.0
2496	65.000	63.444	-0.110	0.0	0.0
2512	65.000	63.444	-0.110	0.0	0.0
2528	65.000	63.444	-0.110	0.0	0.0
2544	65.000	63.444	-0.110	0.0	0.0
2560	65.000	63.444	-0.110	0.0	0.0
2576	65.000	63.444	-0.110	0.0	0.0
2592	65.000	63.444	-0.110	0.0	0.0
2608	65.000	63.444	-0.110	0.0	0.0
2624	65.000	63.444	-0.110	0.0	0.0
2640	65.000	63.444	-0.110	0.0	0.0
2656	65.000	63.444	-0.110	0.0	0.0
2672	65.000	63.444	-0.110	0.0	0.0
2688	65.000	63.444	-0.110	0.0	0.0
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Flows and Levels for Pipe 2.001 US/MH S2 (Storm)
960 minute 100 year winter
Average Rainfall Intensity 5.233 mm/hr

Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
2704	65.000	63.444	-0.110	0.0	0.0

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Date Dec 25 File COMBINED ATTENUATION...		Designed by JS Checked by			
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<u>Flows and Levels for Pipe 1.002 US/MH S3 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
16	63.446	63.251	-0.108	0.0	0.0
32	63.449	63.253	-0.105	0.0	0.1
48	63.452	63.256	-0.103	0.0	0.1
64	63.453	63.259	-0.101	0.0	0.1
80	63.454	63.263	-0.100	0.0	0.1
96	63.455	63.266	-0.099	0.0	0.1
112	63.455	63.269	-0.099	0.0	0.1
128	63.455	63.272	-0.099	0.0	0.2
144	63.455	63.275	-0.099	0.0	0.1
160	63.455	63.277	-0.099	0.0	0.2
176	63.455	63.279	-0.099	0.0	0.2
192	63.455	63.281	-0.099	0.0	0.2
208	63.455	63.283	-0.099	0.0	0.2
224	63.456	63.286	-0.098	0.0	0.2
240	63.456	63.289	-0.098	0.0	0.2
256	63.457	63.293	-0.097	0.0	0.2
272	63.457	63.297	-0.097	0.0	0.3
288	63.458	63.302	-0.096	0.0	0.3
304	63.459	63.308	-0.095	0.0	0.3
320	63.460	63.315	-0.094	0.0	0.4
336	63.461	63.324	-0.093	0.0	0.4
352	63.463	63.334	-0.091	0.0	0.5
368	63.464	63.345	-0.090	0.0	0.5
384	63.465	63.357	-0.089	0.0	0.6
400	63.466	63.374	-0.088	0.0	0.6
416	63.467	63.393	-0.087	0.0	0.7
432	63.468	63.413	-0.086	0.0	0.7
448	63.468	63.434	-0.086	0.0	0.8
464	63.469	63.455	-0.085	0.0	0.8
480	63.479	63.475	-0.076	0.0	0.8
496	63.497	63.495	-0.057	0.0	0.8
512	63.515	63.513	-0.039	0.0	0.8
528	63.532	63.530	-0.022	0.0	0.8
544	63.548	63.546	-0.006	0.0	0.7
560	63.563	63.561	0.009	0.0	0.7
576	63.577	63.575	0.023	0.0	0.6
592	63.589	63.587	0.035	0.0	0.6
608	63.600	63.598	0.046	0.0	0.5
624	63.609	63.608	0.055	0.0	0.5
640	63.617	63.616	0.063	0.0	0.4
656	63.624	63.623	0.070	0.0	0.4
672	63.630	63.629	0.076	0.0	0.3
688	63.634	63.634	0.080	0.0	0.3
704	63.638	63.637	0.084	0.0	0.3
720	63.641	63.641	0.087	0.0	0.2
736	63.644	63.643	0.090	0.0	0.2
752	63.646	63.645	0.092	0.0	0.2
768	63.647	63.647	0.093	0.0	0.2
784	63.649	63.649	0.095	0.0	0.2
800	63.650	63.650	0.096	0.0	0.2
816	63.652	63.652	0.098	0.0	0.1
832	63.653	63.653	0.099	0.0	0.1
848	63.655	63.655	0.101	0.0	0.1
864	63.657	63.656	0.103	0.0	0.1
880	63.658	63.658	0.104	0.0	0.1
896	63.660	63.659	0.105	0.0	0.1
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Date Dec 25 File COMBINED ATTENUATION...		Designed by JS Checked by			
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<u>Flows and Levels for Pipe 1.002 US/MH S3 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
912	63.661	63.660	0.106	0.0	0.1
928	63.661	63.660	0.107	0.0	0.1
944	63.660	63.660	0.106	0.0	0.1
960	63.658	63.658	0.104	0.0	0.0
976	63.655	63.655	0.101	0.0	0.0
992	63.652	63.652	0.098	0.0	0.0
1008	63.650	63.650	0.095	0.0	0.0
1024	63.647	63.647	0.093	0.0	0.0
1040	63.645	63.645	0.090	0.0	0.0
1056	63.642	63.642	0.088	0.0	0.0
1072	63.640	63.640	0.086	0.0	0.0
1088	63.637	63.637	0.083	0.0	0.0
1104	63.635	63.635	0.081	0.0	0.0
1120	63.632	63.633	0.078	0.0	0.0
1136	63.630	63.630	0.076	0.0	0.0
1152	63.628	63.628	0.073	0.0	0.0
1168	63.625	63.625	0.071	0.0	0.0
1184	63.623	63.623	0.069	0.0	0.0
1200	63.621	63.621	0.066	0.0	0.0
1216	63.618	63.618	0.064	0.0	0.0
1232	63.616	63.616	0.062	0.0	0.0
1248	63.613	63.613	0.059	0.0	0.0
1264	63.611	63.611	0.057	0.0	0.0
1280	63.608	63.609	0.054	0.0	0.0
1296	63.606	63.606	0.052	0.0	0.0
1312	63.604	63.604	0.050	0.0	0.0
1328	63.601	63.601	0.047	0.0	0.0
1344	63.599	63.599	0.045	0.0	0.0
1360	63.597	63.597	0.042	0.0	0.0
1376	63.594	63.594	0.040	0.0	0.0
1392	63.592	63.592	0.038	0.0	0.0
1408	63.589	63.589	0.035	0.0	0.0
1424	63.587	63.587	0.033	0.0	0.0
1440	63.585	63.585	0.030	0.0	0.0
1456	63.582	63.582	0.028	0.0	0.0
1472	63.580	63.580	0.026	0.0	0.0
1488	63.577	63.577	0.023	0.0	0.0
1504	63.575	63.575	0.021	0.0	0.0
1520	63.573	63.573	0.018	0.0	0.0
1536	63.570	63.570	0.016	0.0	0.0
1552	63.568	63.568	0.014	0.0	0.0
1568	63.565	63.565	0.011	0.0	0.0
1584	63.563	63.563	0.009	0.0	0.0
1600	63.561	63.561	0.006	0.0	0.0
1616	63.558	63.558	0.004	0.0	0.0
1632	63.556	63.556	0.002	0.0	0.0
1648	63.553	63.554	-0.001	0.0	0.0
1664	63.551	63.551	-0.003	0.0	0.0
1680	63.549	63.549	-0.005	0.0	0.0
1696	63.546	63.546	-0.008	0.0	0.0
1712	63.544	63.544	-0.010	0.0	0.0
1728	63.542	63.542	-0.012	0.0	0.0
1744	63.539	63.539	-0.015	0.0	0.0
1760	63.537	63.537	-0.017	0.0	0.0
1776	63.534	63.535	-0.020	0.0	0.0
1792	63.532	63.532	-0.022	0.0	0.0
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Victoria Court 22 St Pancras West Sussex PO19 7GD		34 Hurst Road. Hassocks Surface Water Drainage Design Simulation Rev04			
Date Dec 25		Designed by JS			
File COMBINED ATTENUATION...		Checked by			
Elstree Computing Ltd		Network W.12.6			
<u>Flows and Levels for Pipe 1.002 US/MH S3 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
1808	63.530	63.530	-0.024	0.0	0.0
1824	63.527	63.527	-0.027	0.0	0.0
1840	63.525	63.525	-0.029	0.0	0.0
1856	63.522	63.523	-0.032	0.0	0.0
1872	63.520	63.520	-0.034	0.0	0.0
1888	63.518	63.518	-0.036	0.0	0.0
1904	63.515	63.516	-0.039	0.0	0.0
1920	63.513	63.513	-0.041	0.0	0.0
1936	63.511	63.511	-0.043	0.0	0.0
1952	63.508	63.508	-0.046	0.0	0.0
1968	63.506	63.506	-0.048	0.0	0.0
1984	63.504	63.504	-0.050	0.0	0.0
2000	63.501	63.501	-0.053	0.0	0.0
2016	63.499	63.499	-0.055	0.0	0.0
2032	63.496	63.497	-0.058	0.0	0.0
2048	63.494	63.494	-0.060	0.0	0.0
2064	63.492	63.492	-0.062	0.0	0.0
2080	63.489	63.489	-0.065	0.0	0.0
2096	63.487	63.487	-0.067	0.0	0.0
2112	63.484	63.485	-0.070	0.0	0.0
2128	63.482	63.482	-0.072	0.0	0.0
2144	63.480	63.480	-0.075	0.0	0.0
2160	63.477	63.477	-0.077	0.0	0.0
2176	63.475	63.475	-0.079	0.0	0.0
2192	63.473	63.473	-0.082	0.0	0.0
2208	63.470	63.470	-0.084	0.0	0.0
2224	63.468	63.468	-0.087	0.0	0.0
2240	63.465	63.465	-0.089	0.0	0.0
2256	63.463	63.463	-0.091	0.0	0.0
2272	63.460	63.461	-0.094	0.0	0.0
2288	63.458	63.458	-0.096	0.0	0.0
2304	63.456	63.456	-0.098	0.0	0.0
2320	63.453	63.453	-0.101	0.0	0.0
2336	63.451	63.451	-0.103	0.0	0.0
2352	63.448	63.448	-0.106	0.0	0.0
2368	63.446	63.446	-0.108	0.0	0.0
2384	63.444	63.444	-0.110	0.0	0.0
2400	63.444	63.441	-0.110	0.0	0.0
2416	63.444	63.439	-0.110	0.0	0.0
2432	63.444	63.436	-0.110	0.0	0.0
2448	63.444	63.434	-0.110	0.0	0.0
2464	63.444	63.431	-0.110	0.0	0.0
2480	63.444	63.429	-0.110	0.0	0.0
2496	63.444	63.426	-0.110	0.0	0.0
2512	63.444	63.424	-0.110	0.0	0.0
2528	63.444	63.421	-0.110	0.0	0.0
2544	63.444	63.419	-0.110	0.0	0.0
2560	63.444	63.417	-0.110	0.0	0.0
2576	63.444	63.414	-0.110	0.0	0.0
2592	63.444	63.412	-0.110	0.0	0.0
2608	63.444	63.409	-0.110	0.0	0.0
2624	63.444	63.407	-0.110	0.0	0.0
2640	63.444	63.404	-0.110	0.0	0.0
2656	63.444	63.402	-0.110	0.0	0.0
2672	63.444	63.399	-0.110	0.0	0.0
2688	63.444	63.397	-0.110	0.0	0.0
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Victoria Court 22 St Pancras West Sussex PO19 7GD	34 Hurst Road. Hassocks Surface Water Drainage Design Simulation Rev04	
Date Dec 25 File COMBINED ATTENUATION...	Designed by JS Checked by	
Elstree Computing Ltd	Network W.12.6	

Flows and Levels for Pipe 1.002 US/MH S3 (Storm)
960 minute 100 year winter
Average Rainfall Intensity 5.233 mm/hr

Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
2704	63.444	63.395	-0.110	0.0	0.0

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Victoria Court 22 St Pancras West Sussex PO19 7GD		34 Hurst Road. Hassocks Surface Water Drainage Design Simulation Rev04			
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Elstree Computing Ltd		Network W.12.6			
<u>Flows and Levels for Pipe 1.003 US/MH S4 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
16	63.251	63.100	-0.109	0.0	0.0
32	63.253	63.100	-0.107	0.0	0.0
48	63.256	63.101	-0.104	0.0	0.0
64	63.259	63.103	-0.101	0.0	0.0
80	63.263	63.106	-0.097	0.0	0.0
96	63.266	63.110	-0.094	0.0	0.0
112	63.269	63.115	-0.091	0.0	0.0
128	63.272	63.121	-0.088	0.0	0.1
144	63.275	63.127	-0.085	0.0	0.1
160	63.277	63.133	-0.083	0.0	0.1
176	63.279	63.137	-0.081	0.0	0.1
192	63.281	63.141	-0.079	0.0	0.1
208	63.283	63.144	-0.077	0.0	0.1
224	63.286	63.147	-0.074	0.0	0.1
240	63.289	63.150	-0.071	0.0	0.1
256	63.293	63.154	-0.067	0.0	0.1
272	63.297	63.159	-0.063	0.0	0.1
288	63.302	63.166	-0.058	0.0	0.1
304	63.308	63.174	-0.052	0.0	0.1
320	63.315	63.185	-0.045	0.0	0.1
336	63.324	63.197	-0.036	0.0	0.1
352	63.334	63.212	-0.026	0.0	0.2
368	63.345	63.229	-0.015	0.0	0.2
384	63.357	63.248	-0.003	0.0	0.2
400	63.374	63.250	0.014	0.0	0.1
416	63.393	63.250	0.033	0.0	0.1
432	63.413	63.252	0.053	0.0	0.1
448	63.434	63.260	0.074	0.0	0.1
464	63.455	63.274	0.095	0.0	0.2
480	63.475	63.293	0.115	0.0	0.2
496	63.495	63.317	0.135	0.0	0.2
512	63.513	63.345	0.153	0.0	0.2
528	63.530	63.373	0.170	0.0	0.2
544	63.546	63.399	0.186	0.0	0.2
560	63.561	63.422	0.201	0.0	0.2
576	63.575	63.444	0.215	0.0	0.2
592	63.587	63.463	0.227	0.0	0.2
608	63.598	63.481	0.238	0.0	0.2
624	63.608	63.498	0.248	0.0	0.2
640	63.616	63.512	0.256	0.0	0.2
656	63.623	63.525	0.263	0.0	0.2
672	63.629	63.536	0.269	0.0	0.1
688	63.634	63.546	0.274	0.0	0.1
704	63.637	63.554	0.277	0.0	0.1
720	63.641	63.561	0.281	0.0	0.1
736	63.643	63.567	0.283	0.0	0.1
752	63.645	63.572	0.285	0.0	0.1
768	63.647	63.576	0.287	0.0	0.1
784	63.649	63.579	0.289	0.0	0.1
800	63.650	63.582	0.290	0.0	0.1
816	63.652	63.584	0.292	0.0	0.1
832	63.653	63.587	0.293	0.0	0.1
848	63.655	63.589	0.295	0.0	0.1
864	63.656	63.591	0.296	0.0	0.1
880	63.658	63.592	0.298	0.0	0.1
896	63.659	63.594	0.299	0.0	0.1
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Victoria Court 22 St Pancras West Sussex PO19 7GD		34 Hurst Road. Hassocks Surface Water Drainage Design Simulation Rev04			
Date Dec 25 File COMBINED ATTENUATION...		Designed by JS Checked by			
Elstree Computing Ltd		Network W.12.6			
<u>Flows and Levels for Pipe 1.003 US/MH S4 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
912	63.660	63.596	0.300	0.0	0.1
928	63.660	63.597	0.300	0.0	0.1
944	63.660	63.598	0.300	0.0	0.1
960	63.658	63.598	0.298	0.0	0.1
976	63.655	63.598	0.295	0.0	0.1
992	63.652	63.597	0.292	0.0	0.1
1008	63.650	63.595	0.290	0.0	0.1
1024	63.647	63.593	0.287	0.0	0.1
1040	63.645	63.591	0.285	0.0	0.1
1056	63.642	63.589	0.282	0.0	0.1
1072	63.640	63.587	0.280	0.0	0.1
1088	63.637	63.585	0.277	0.0	0.1
1104	63.635	63.582	0.275	0.0	0.1
1120	63.633	63.580	0.273	0.0	0.1
1136	63.630	63.578	0.270	0.0	0.1
1152	63.628	63.575	0.268	0.0	0.1
1168	63.625	63.573	0.265	0.0	0.1
1184	63.623	63.571	0.263	0.0	0.1
1200	63.621	63.568	0.261	0.0	0.1
1216	63.618	63.566	0.258	0.0	0.1
1232	63.616	63.563	0.256	0.0	0.1
1248	63.613	63.561	0.253	0.0	0.1
1264	63.611	63.559	0.251	0.0	0.1
1280	63.609	63.556	0.249	0.0	0.1
1296	63.606	63.554	0.246	0.0	0.1
1312	63.604	63.552	0.244	0.0	0.1
1328	63.601	63.549	0.241	0.0	0.1
1344	63.599	63.547	0.239	0.0	0.1
1360	63.597	63.544	0.237	0.0	0.1
1376	63.594	63.542	0.234	0.0	0.1
1392	63.592	63.540	0.232	0.0	0.1
1408	63.589	63.537	0.229	0.0	0.1
1424	63.587	63.535	0.227	0.0	0.1
1440	63.585	63.532	0.225	0.0	0.1
1456	63.582	63.530	0.222	0.0	0.1
1472	63.580	63.528	0.220	0.0	0.1
1488	63.577	63.525	0.217	0.0	0.1
1504	63.575	63.523	0.215	0.0	0.1
1520	63.573	63.520	0.213	0.0	0.1
1536	63.570	63.518	0.210	0.0	0.1
1552	63.568	63.516	0.208	0.0	0.1
1568	63.565	63.513	0.205	0.0	0.1
1584	63.563	63.511	0.203	0.0	0.1
1600	63.561	63.508	0.201	0.0	0.1
1616	63.558	63.506	0.198	0.0	0.1
1632	63.556	63.504	0.196	0.0	0.1
1648	63.554	63.501	0.194	0.0	0.1
1664	63.551	63.499	0.191	0.0	0.1
1680	63.549	63.496	0.189	0.0	0.1
1696	63.546	63.494	0.186	0.0	0.1
1712	63.544	63.492	0.184	0.0	0.1
1728	63.542	63.489	0.182	0.0	0.1
1744	63.539	63.487	0.179	0.0	0.1
1760	63.537	63.485	0.177	0.0	0.1
1776	63.535	63.482	0.175	0.0	0.1
1792	63.532	63.480	0.172	0.0	0.1
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Victoria Court 22 St Pancras West Sussex PO19 7GD		34 Hurst Road. Hassocks Surface Water Drainage Design Simulation Rev04			
Date Dec 25 File COMBINED ATTENUATION...		Designed by JS Checked by			
Elstree Computing Ltd		Network W.12.6			
<u>Flows and Levels for Pipe 1.003 US/MH S4 (Storm)</u> <u>960 minute 100 year winter</u> <u>Average Rainfall Intensity 5.233 mm/hr</u>					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
1808	63.530	63.477	0.170	0.0	0.1
1824	63.527	63.475	0.167	0.0	0.1
1840	63.525	63.473	0.165	0.0	0.1
1856	63.523	63.470	0.163	0.0	0.1
1872	63.520	63.468	0.160	0.0	0.1
1888	63.518	63.466	0.158	0.0	0.1
1904	63.516	63.463	0.156	0.0	0.1
1920	63.513	63.461	0.153	0.0	0.1
1936	63.511	63.458	0.151	0.0	0.1
1952	63.508	63.456	0.148	0.0	0.1
1968	63.506	63.454	0.146	0.0	0.1
1984	63.504	63.451	0.144	0.0	0.1
2000	63.501	63.449	0.141	0.0	0.1
2016	63.499	63.447	0.139	0.0	0.1
2032	63.497	63.444	0.137	0.0	0.1
2048	63.494	63.442	0.134	0.0	0.1
2064	63.492	63.439	0.132	0.0	0.1
2080	63.489	63.437	0.129	0.0	0.1
2096	63.487	63.435	0.127	0.0	0.1
2112	63.485	63.432	0.125	0.0	0.1
2128	63.482	63.430	0.122	0.0	0.1
2144	63.480	63.427	0.120	0.0	0.1
2160	63.477	63.425	0.117	0.0	0.1
2176	63.475	63.423	0.115	0.0	0.1
2192	63.473	63.420	0.113	0.0	0.1
2208	63.470	63.418	0.110	0.0	0.1
2224	63.468	63.415	0.108	0.0	0.1
2240	63.465	63.413	0.105	0.0	0.1
2256	63.463	63.411	0.103	0.0	0.1
2272	63.461	63.408	0.101	0.0	0.1
2288	63.458	63.406	0.098	0.0	0.1
2304	63.456	63.403	0.096	0.0	0.1
2320	63.453	63.401	0.093	0.0	0.1
2336	63.451	63.399	0.091	0.0	0.1
2352	63.448	63.396	0.088	0.0	0.1
2368	63.446	63.394	0.086	0.0	0.1
2384	63.444	63.391	0.084	0.0	0.1
2400	63.441	63.389	0.081	0.0	0.1
2416	63.439	63.387	0.079	0.0	0.1
2432	63.436	63.384	0.076	0.0	0.1
2448	63.434	63.382	0.074	0.0	0.1
2464	63.431	63.379	0.071	0.0	0.1
2480	63.429	63.377	0.069	0.0	0.1
2496	63.426	63.374	0.066	0.0	0.1
2512	63.424	63.372	0.064	0.0	0.1
2528	63.421	63.369	0.061	0.0	0.1
2544	63.419	63.367	0.059	0.0	0.1
2560	63.417	63.364	0.057	0.0	0.1
2576	63.414	63.362	0.054	0.0	0.1
2592	63.412	63.360	0.052	0.0	0.1
2608	63.409	63.357	0.049	0.0	0.1
2624	63.407	63.355	0.047	0.0	0.1
2640	63.404	63.352	0.044	0.0	0.1
2656	63.402	63.350	0.042	0.0	0.1
2672	63.399	63.347	0.039	0.0	0.1
2688	63.397	63.344	0.037	0.0	0.1
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Victoria Court 22 St Pancras West Sussex PO19 7GD	34 Hurst Road. Hassocks Surface Water Drainage Design Simulation Rev04	
Date Dec 25 File COMBINED ATTENUATION...	Designed by JS Checked by	
Elstree Computing Ltd	Network W.12.6	

Flows and Levels for Pipe 1.003 US/MH S4 (Storm)
960 minute 100 year winter
Average Rainfall Intensity 5.233 mm/hr

Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
2704	63.395	63.341	0.035	0.0	0.1

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Victoria Court 22 St Pancras West Sussex PO19 7GD		34 Hurst Road. Hassocks Surface Water Drainage Design Simulation Rev04			
Date Dec 25 File COMBINED ATTENUATION...		Designed by JS Checked by			
Elstree Computing Ltd		Network W.12.6			
Flows and Levels for Pipe 1.004 US/MH RAIN GARDEN (Storm) 960 minute 100 year winter Average Rainfall Intensity 5.233 mm/hr					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
16	63.100	63.096	-0.110	0.0	0.0
32	63.100	63.096	-0.110	0.0	0.0
48	63.101	63.096	-0.109	0.0	0.0
64	63.103	63.096	-0.107	0.0	0.0
80	63.106	63.096	-0.104	0.0	0.0
96	63.110	63.096	-0.100	0.0	0.0
112	63.115	63.096	-0.095	0.0	0.0
128	63.121	63.096	-0.089	0.0	0.0
144	63.127	63.096	-0.083	0.0	0.0
160	63.133	63.096	-0.077	0.0	0.0
176	63.137	63.096	-0.073	0.0	0.0
192	63.141	63.096	-0.069	0.0	0.0
208	63.144	63.096	-0.066	0.0	0.0
224	63.147	63.096	-0.063	0.0	0.0
240	63.150	63.096	-0.060	0.0	0.0
256	63.154	63.096	-0.056	0.0	0.0
272	63.159	63.096	-0.051	0.0	0.0
288	63.166	63.096	-0.044	0.0	0.0
304	63.174	63.096	-0.036	0.0	0.0
320	63.185	63.096	-0.025	0.0	0.0
336	63.197	63.096	-0.013	0.0	0.0
352	63.212	63.096	0.002	0.0	0.0
368	63.229	63.096	0.019	0.0	0.0
384	63.248	63.096	0.038	0.0	0.0
400	63.250	63.096	0.040	0.0	0.0
416	63.250	63.096	0.040	0.0	0.0
432	63.252	63.096	0.042	0.0	0.0
448	63.260	63.096	0.050	0.0	0.0
464	63.274	63.096	0.064	0.0	0.0
480	63.293	63.096	0.083	0.0	0.0
496	63.317	63.096	0.107	0.0	0.0
512	63.345	63.096	0.135	0.0	0.0
528	63.373	63.096	0.163	0.0	0.0
544	63.399	63.096	0.189	0.0	0.0
560	63.422	63.096	0.212	0.0	0.0
576	63.444	63.096	0.234	0.0	0.0
592	63.463	63.096	0.253	0.0	0.0
608	63.481	63.096	0.271	0.0	0.0
624	63.498	63.096	0.288	0.0	0.0
640	63.512	63.096	0.302	0.0	0.0
656	63.525	63.096	0.315	0.0	0.0
672	63.536	63.096	0.326	0.0	0.0
688	63.546	63.096	0.336	0.0	0.0
704	63.554	63.096	0.344	0.0	0.0
720	63.561	63.096	0.351	0.0	0.0
736	63.567	63.096	0.357	0.0	0.0
752	63.572	63.096	0.362	0.0	0.0
768	63.576	63.096	0.366	0.0	0.0
784	63.579	63.096	0.369	0.0	0.0
800	63.582	63.096	0.372	0.0	0.0
816	63.584	63.096	0.374	0.0	0.0
832	63.587	63.096	0.377	0.0	0.0
848	63.589	63.096	0.379	0.0	0.0
864	63.591	63.096	0.381	0.0	0.0
880	63.592	63.096	0.382	0.0	0.0
896	63.594	63.096	0.384	0.0	0.0
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Victoria Court 22 St Pancras West Sussex PO19 7GD	34 Hurst Road. Hassocks Surface Water Drainage Design Simulation Rev04				
Date Dec 25	Designed by JS				
File COMBINED ATTENUATION...	Checked by				
Elstree Computing Ltd	Network W.12.6				
Flows and Levels for Pipe 1.004 US/MH RAIN GARDEN (Storm) 960 minute 100 year winter Average Rainfall Intensity 5.233 mm/hr					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
912	63.596	63.096	0.386	0.0	0.0
928	63.597	63.096	0.387	0.0	0.0
944	63.598	63.096	0.388	0.0	0.0
960	63.598	63.096	0.388	0.0	0.0
976	63.598	63.096	0.388	0.0	0.0
992	63.597	63.096	0.387	0.0	0.0
1008	63.595	63.096	0.385	0.0	0.0
1024	63.593	63.096	0.383	0.0	0.0
1040	63.591	63.096	0.381	0.0	0.0
1056	63.589	63.096	0.379	0.0	0.0
1072	63.587	63.096	0.377	0.0	0.0
1088	63.585	63.096	0.375	0.0	0.0
1104	63.582	63.096	0.372	0.0	0.0
1120	63.580	63.096	0.370	0.0	0.0
1136	63.578	63.096	0.368	0.0	0.0
1152	63.575	63.096	0.365	0.0	0.0
1168	63.573	63.096	0.363	0.0	0.0
1184	63.571	63.096	0.361	0.0	0.0
1200	63.568	63.096	0.358	0.0	0.0
1216	63.566	63.096	0.356	0.0	0.0
1232	63.563	63.096	0.353	0.0	0.0
1248	63.561	63.096	0.351	0.0	0.0
1264	63.559	63.096	0.349	0.0	0.0
1280	63.556	63.096	0.346	0.0	0.0
1296	63.554	63.096	0.344	0.0	0.0
1312	63.552	63.096	0.342	0.0	0.0
1328	63.549	63.096	0.339	0.0	0.0
1344	63.547	63.096	0.337	0.0	0.0
1360	63.544	63.096	0.334	0.0	0.0
1376	63.542	63.096	0.332	0.0	0.0
1392	63.540	63.096	0.330	0.0	0.0
1408	63.537	63.096	0.327	0.0	0.0
1424	63.535	63.096	0.325	0.0	0.0
1440	63.532	63.096	0.322	0.0	0.0
1456	63.530	63.096	0.320	0.0	0.0
1472	63.528	63.096	0.318	0.0	0.0
1488	63.525	63.096	0.315	0.0	0.0
1504	63.523	63.096	0.313	0.0	0.0
1520	63.520	63.096	0.310	0.0	0.0
1536	63.518	63.096	0.308	0.0	0.0
1552	63.516	63.096	0.306	0.0	0.0
1568	63.513	63.096	0.303	0.0	0.0
1584	63.511	63.096	0.301	0.0	0.0
1600	63.508	63.096	0.298	0.0	0.0
1616	63.506	63.096	0.296	0.0	0.0
1632	63.504	63.096	0.294	0.0	0.0
1648	63.501	63.096	0.291	0.0	0.0
1664	63.499	63.096	0.289	0.0	0.0
1680	63.496	63.096	0.286	0.0	0.0
1696	63.494	63.096	0.284	0.0	0.0
1712	63.492	63.096	0.282	0.0	0.0
1728	63.489	63.096	0.279	0.0	0.0
1744	63.487	63.096	0.277	0.0	0.0
1760	63.485	63.096	0.275	0.0	0.0
1776	63.482	63.096	0.272	0.0	0.0
1792	63.480	63.096	0.270	0.0	0.0
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Date Dec 25 File COMBINED ATTENUATION...		Designed by JS Checked by			
Elstree Computing Ltd		Network W.12.6			
Flows and Levels for Pipe 1.004 US/MH RAIN GARDEN (Storm) 960 minute 100 year winter Average Rainfall Intensity 5.233 mm/hr					
Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
1808	63.477	63.096	0.267	0.0	0.0
1824	63.475	63.096	0.265	0.0	0.0
1840	63.473	63.096	0.263	0.0	0.0
1856	63.470	63.096	0.260	0.0	0.0
1872	63.468	63.096	0.258	0.0	0.0
1888	63.466	63.096	0.256	0.0	0.0
1904	63.463	63.096	0.253	0.0	0.0
1920	63.461	63.096	0.251	0.0	0.0
1936	63.458	63.096	0.248	0.0	0.0
1952	63.456	63.096	0.246	0.0	0.0
1968	63.454	63.096	0.244	0.0	0.0
1984	63.451	63.096	0.241	0.0	0.0
2000	63.449	63.096	0.239	0.0	0.0
2016	63.447	63.096	0.237	0.0	0.0
2032	63.444	63.096	0.234	0.0	0.0
2048	63.442	63.096	0.232	0.0	0.0
2064	63.439	63.096	0.229	0.0	0.0
2080	63.437	63.096	0.227	0.0	0.0
2096	63.435	63.096	0.225	0.0	0.0
2112	63.432	63.096	0.222	0.0	0.0
2128	63.430	63.096	0.220	0.0	0.0
2144	63.427	63.096	0.217	0.0	0.0
2160	63.425	63.096	0.215	0.0	0.0
2176	63.423	63.096	0.213	0.0	0.0
2192	63.420	63.096	0.210	0.0	0.0
2208	63.418	63.096	0.208	0.0	0.0
2224	63.415	63.096	0.205	0.0	0.0
2240	63.413	63.096	0.203	0.0	0.0
2256	63.411	63.096	0.201	0.0	0.0
2272	63.408	63.096	0.198	0.0	0.0
2288	63.406	63.096	0.196	0.0	0.0
2304	63.403	63.096	0.193	0.0	0.0
2320	63.401	63.096	0.191	0.0	0.0
2336	63.399	63.096	0.189	0.0	0.0
2352	63.396	63.096	0.186	0.0	0.0
2368	63.394	63.096	0.184	0.0	0.0
2384	63.391	63.096	0.181	0.0	0.0
2400	63.389	63.096	0.179	0.0	0.0
2416	63.387	63.096	0.177	0.0	0.0
2432	63.384	63.096	0.174	0.0	0.0
2448	63.382	63.096	0.172	0.0	0.0
2464	63.379	63.096	0.169	0.0	0.0
2480	63.377	63.096	0.167	0.0	0.0
2496	63.374	63.096	0.164	0.0	0.0
2512	63.372	63.096	0.162	0.0	0.0
2528	63.369	63.096	0.159	0.0	0.0
2544	63.367	63.096	0.157	0.0	0.0
2560	63.364	63.096	0.154	0.0	0.0
2576	63.362	63.096	0.152	0.0	0.0
2592	63.360	63.096	0.150	0.0	0.0
2608	63.357	63.096	0.147	0.0	0.0
2624	63.355	63.096	0.145	0.0	0.0
2640	63.352	63.096	0.142	0.0	0.0
2656	63.350	63.096	0.140	0.0	0.0
2672	63.347	63.096	0.137	0.0	0.0
2688	63.344	63.096	0.134	0.0	0.0
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Flows and Levels for Pipe 1.004 US/MH RAIN GARDEN (Storm)
960 minute 100 year winter
Average Rainfall Intensity 5.233 mm/hr

Time (mins)	Upstream Level (m)	Downstream Level (m)	Surcharged Depth (m)	Total O/F (l/s)	Pipe Flow (l/s)
2704	63.341	63.096	0.131	0.0	0.0

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (m)
RE1	66.000	0.600	Open Manhole	110	1.000	65.400	110				
S1	64.100	0.606	Open Manhole	600	1.001	63.494	110	1.000	63.494	110	
RE2	66.000	0.600	Open Manhole	110	2.000	65.400	110				
S2	65.650	0.650	Open Manhole	600	2.001	65.000	110	2.000	65.021	110	
S3	64.100	0.656	Open Manhole	600	1.002	63.444	110	1.001	63.444	110	
								2.001	63.467	110	
S4	64.000	0.750	Open Manhole	600	1.003	63.250	110	1.002	63.399	110	
RAIN GARDEN	63.850	0.750	Open Manhole	600	1.004	63.100	110	1.003	63.240	110	
Dummy	63.800	0.715	Open Manhole	600		OUTFALL		1.004	63.085	110	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	Dummy	63.800	63.085	63.100	600	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	4320
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	24

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	20.000	Storm Duration (mins)	2160
Ratio R	0.343		

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Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 0.2

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 63.250

Depth/Flow Relationship Manhole: RAIN GARDEN, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 63.100

Depth (m) Flow (l/s)

0.750 0.0000

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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 2160 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.403	-0.107	0.000	0.01	0.0	0.2	OK
1.001	S1	63.627	0.022	0.000	0.05	0.0	0.3	SURCHARGED
2.000	RE2	65.404	-0.106	0.000	0.01	0.0	0.2	OK
2.001	S2	65.006	-0.104	0.000	0.01	0.0	0.3	OK
1.002	S3	63.626	0.072	0.000	0.10	0.0	0.7	SURCHARGED
1.003	S4	63.626	0.266	0.000	0.04	0.0	0.2	SURCHARGED
1.004	RAIN GARDEN	63.566	0.356	0.000	0.00	0.0	0.0	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (m)
RE1	66.000	0.600	Open Manhole	110	1.000	65.400	110				
S1	64.100	0.606	Open Manhole	600	1.001	63.494	110	1.000	63.494	110	
RE2	66.000	0.600	Open Manhole	110	2.000	65.400	110				
S2	65.650	0.650	Open Manhole	600	2.001	65.000	110	2.000	65.021	110	
S3	64.100	0.656	Open Manhole	600	1.002	63.444	110	1.001	63.444	110	
								2.001	63.467	110	
S4	64.000	0.750	Open Manhole	600	1.003	63.250	110	1.002	63.399	110	
RAIN GARDEN	63.850	0.750	Open Manhole	600	1.004	63.100	110	1.003	63.240	110	
Dummy	63.800	0.715	Open Manhole	600		OUTFALL		1.004	63.085	110	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	Dummy	63.800	63.085	63.100	600	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	4320
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	24

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	20.000	Storm Duration (mins)	2160
Ratio R	0.343		

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Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 0.2

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 63.250

Depth/Flow Relationship Manhole: RAIN GARDEN, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 63.100

Depth (m) Flow (l/s)

0.750 0.0000

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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 2160 minute 100 year winter (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.402	-0.108	0.000	0.00	0.0	0.1	OK
1.001	S1	63.626	0.022	0.000	0.03	0.0	0.2	SURCHARGED
2.000	RE2	65.403	-0.107	0.000	0.01	0.0	0.1	OK
2.001	S2	65.004	-0.106	0.000	0.01	0.0	0.2	OK
1.002	S3	63.626	0.072	0.000	0.06	0.0	0.5	SURCHARGED
1.003	S4	63.625	0.265	0.000	0.04	0.0	0.2	SURCHARGED
1.004	RAIN GARDEN	63.565	0.355	0.000	0.00	0.0	0.0	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (m)
RE1	66.000	0.600	Open Manhole	110	1.000	65.400	110				
S1	64.100	0.606	Open Manhole	600	1.001	63.494	110	1.000	63.494	110	
RE2	66.000	0.600	Open Manhole	110	2.000	65.400	110				
S2	65.650	0.650	Open Manhole	600	2.001	65.000	110	2.000	65.021	110	
S3	64.100	0.656	Open Manhole	600	1.002	63.444	110	1.001	63.444	110	
								2.001	63.467	110	
S4	64.000	0.750	Open Manhole	600	1.003	63.250	110	1.002	63.399	110	
RAIN GARDEN	63.850	0.750	Open Manhole	600	1.004	63.100	110	1.003	63.240	110	
Dummy	63.800	0.715	Open Manhole	600		OUTFALL		1.004	63.085	110	

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PIPELINE SCHEDULES for Storm								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600
Downstream Manhole								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600
Free Flowing Outfall Details for Storm								
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)		
1.004	Dummy	63.800	63.085	63.100	600	0		
Simulation Criteria for Storm								
Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000					
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000					
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000					
Hot Start Level (mm)	0	Run Time (mins)	2880					
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	24					
Number of Input Hydrographs	0	Number of Storage Structures	2					
Number of Online Controls	2	Number of Time/Area Diagrams	0					
Number of Offline Controls	0							
Synthetic Rainfall Details								
Rainfall Model	FSR	Profile Type	Summer					
Return Period (years)	100	Cv (Summer)	1.000					
Region	England and Wales	Cv (Winter)	1.000					
M5-60 (mm)	20.000	Storm Duration (mins)	1440					
Ratio R	0.343							
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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 1440 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.404	-0.106	0.000	0.01	0.0	0.2	OK
1.001	S1	63.646	0.042	0.000	0.06	0.0	0.5	SURCHARGED
2.000	RE2	65.406	-0.104	0.000	0.01	0.0	0.2	OK
2.001	S2	65.008	-0.102	0.000	0.01	0.0	0.5	OK
1.002	S3	63.646	0.092	0.000	0.13	0.0	0.9	SURCHARGED
1.003	S4	63.646	0.286	0.000	0.05	0.0	0.2	SURCHARGED
1.004	RAIN GARDEN	63.586	0.376	0.000	0.00	0.0	0.0	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	45
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.343	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.76
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.014	4-8	0.002

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.381

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	16.200	1.906	8.5	0.004	5.00	0.0	0.600	o	110
1.001	5.000	0.050	100.0	0.004	0.00	0.0	0.600	o	110
2.000	3.600	0.379	9.5	0.004	5.00	0.0	0.600	o	110
2.001	9.200	1.533	6.0	0.004	0.00	0.0	0.600	o	110
1.002	3.600	0.045	80.0	0.000	0.00	0.0	0.600	o	110
1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	110
1.004	1.500	0.015	100.0	0.000	0.00	0.0	0.600	o	110

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	65.400	0.004	0.0	0.0	0.3	2.84	27.0	1.0
1.001	50.00	5.20	63.494	0.008	0.0	0.0	0.6	0.82	7.8	2.1
2.000	50.00	5.02	65.400	0.004	0.0	0.0	0.3	2.69	25.5	1.0
2.001	50.00	5.07	65.000	0.008	0.0	0.0	0.6	3.38	32.2	2.1
1.002	50.00	5.26	63.444	0.016	0.0	0.0	1.3	0.92	8.7	4.2
1.003	50.00	5.28	63.250	0.016	0.0	0.0	1.3	0.82	7.8	4.2
1.004	50.00	5.31	63.100	0.016	0.0	0.0	1.3	0.82	7.8	4.2

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PIPELINE SCHEDULES for Storm								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	110	RE1	66.000	65.400	0.490	Open Manhole	110
1.001	o	110	S1	64.100	63.494	0.496	Open Manhole	600
2.000	o	110	RE2	66.000	65.400	0.490	Open Manhole	110
2.001	o	110	S2	65.650	65.000	0.540	Open Manhole	600
1.002	o	110	S3	64.100	63.444	0.546	Open Manhole	600
1.003	o	110	S4	64.000	63.250	0.640	Open Manhole	600
1.004	o	110	RAIN GARDEN	63.850	63.100	0.640	Open Manhole	600
Downstream Manhole								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.200	8.5	S1	64.100	63.494	0.496	Open Manhole	600
1.001	5.000	100.0	S3	64.100	63.444	0.546	Open Manhole	600
2.000	3.600	9.5	S2	65.650	65.021	0.519	Open Manhole	600
2.001	9.200	6.0	S3	64.100	63.467	0.523	Open Manhole	600
1.002	3.600	80.0	S4	64.000	63.399	0.491	Open Manhole	600
1.003	1.000	100.0	RAIN GARDEN	63.850	63.240	0.500	Open Manhole	600
1.004	1.500	100.0	Dummy	63.800	63.085	0.605	Open Manhole	600
Free Flowing Outfall Details for Storm								
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)		
1.004	Dummy	63.800	63.085	63.100	600	0		
Simulation Criteria for Storm								
Volumetric Runoff Coeff	1.000	Foul Sewage per hectare (l/s)	0.000					
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	45.000					
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000					
Hot Start Level (mm)	0	Run Time (mins)	2880					
Manhole Headloss Coeff (Global)	0.000	Output Interval (mins)	24					
Number of Input Hydrographs	0	Number of Storage Structures	2					
Number of Online Controls	2	Number of Time/Area Diagrams	0					
Number of Offline Controls	0							
Synthetic Rainfall Details								
Rainfall Model	FSR	Profile Type	Winter					
Return Period (years)	100	Cv (Summer)	1.000					
Region	England and Wales	Cv (Winter)	1.000					
M5-60 (mm)	20.000	Storm Duration (mins)	1440					
Ratio R	0.343							
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Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 0.2

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 63.250

Depth/Flow Relationship Manhole: RAIN GARDEN, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 63.100

Depth (m) Flow (l/s)

0.750 0.0000

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Storage Structures for Storm

cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 63.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.500	0.0	46.4
0.400	32.0	46.4			

Infiltration Blanket Manhole: RAIN GARDEN, DS/PN: 1.004

Infiltration Coefficient Base (m/hr) 0.04561 Diameter/Width (m) 1.5
Safety Factor 2.0 Length (m) 9.5
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 63.100

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	RE1	0.000
1.001	S1	0.000
2.000	RE2	0.000
2.001	S2	0.000
1.002	S3	0.000
1.003	S4	0.000
1.004	RAIN GARDEN	0.000

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Summary of Results for 1440 minute 100 year winter (Storm)

Margin for Flood Risk Warning (mm) 0.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	RE1	65.403	-0.107	0.000	0.01	0.0	0.2	OK
1.001	S1	63.651	0.047	0.000	0.04	0.0	0.3	SURCHARGED
2.000	RE2	65.404	-0.106	0.000	0.01	0.0	0.2	OK
2.001	S2	65.005	-0.105	0.000	0.01	0.0	0.3	OK
1.002	S3	63.651	0.097	0.000	0.09	0.0	0.6	SURCHARGED
1.003	S4	63.651	0.291	0.000	0.04	0.0	0.2	SURCHARGED
1.004	RAIN GARDEN	63.590	0.380	0.000	0.00	0.0	0.0	SURCHARGED

EXISTING 0.6m x 2.0m DEEP FOUL
SEWER
SILVERSDEN
PIL: 61.20
BSL: 62.00(TBC)
DEPTH: 2.00m

NEW FW CONNECTION INTO
THE EXISTING FW MANHOLE
LEVEL 63.32
DEPTH: 2.00m

ASSUMED ROUTE OF THE EXISTING FW
RISING MAIN TO BE CONFIRMED ON
SITE BY THE CONTRACTOR PRIOR TO
CONSTRUCTION

THE EXISTING FW RISING MAIN TO
BE MAINTAINED PROTECTED BY THE
CONTRACTOR DURING CONSTRUCTION

RAIN GARDEN
FILLED WITH MAXIMUM 600mm TYPE 3X
IN GEOTEXTILE MEMBRANE WITH 150
COMPOST/SAND AND NATIVE SOIL.

100mm PERFORATED
DISTRIBUTION DRAIN

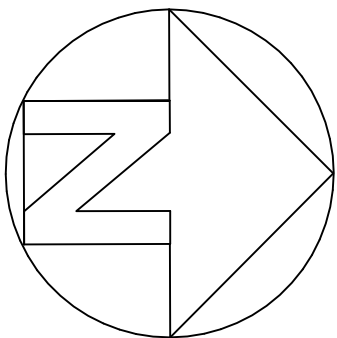
PRIVATE TANK CONTROLLED
DISCHARGE ORAR 0.4 L/S

DUMMY MANHOLE SS NOT TO BE CONSTRUCTED.
THE MANHOLE IS FITTED WITH DEPTH/FLOW
CONTROL IN THE DRAINAGE SIMULATION TO ENSURE
NO WATER ESCAPES THE MANHOLE OUTLET WITH
THE VOLUME OF THE RAIN GARDEN.

ATTENUATION STORAGE TANK
Eas Versa Void Cellular Structure Modules
(600x500x200mm units)
CL 64.10 (TBC)
BOT: 63.25 (TBC)
TONK SIZE 16.0x2.0x0.40m dp
Storage = 12.20 cum

Note: Greater strength units may be required
depending on the design and soil conditions during the
construction period – Contractor to liaise with
manufacturer.

EXISTING FW RISING MAIN TO PRIVATE
DRAINAGE SYSTEM OF THE HAM SITE
PROPERTY TO BE MAINTAINED



KEY

- Soil Vent Pipe with Rodding Access
- RWP Rain Water Pipe with Rodding Access
- SS Stub Stack with Air Admission valve
- RE Rodding Eye
- CD Channel Drain
- FW -Existing Private Surface Water Sewer
- SW -Proposed Private Surface Water Sewer
- SW -Proposed Private Perforate Drain
- SW -Existing Public Surface Water Sewer
- FW -Existing Private Foul Water Sewer
- FW -Proposed Private Foul Water Sewer
- FW -Existing Public Foul Water Sewer
- FW -Existing Private Foul Water Pumping Main
- F6 Foul Manhole
- S6 Surface Water Manhole
- EX.FLIC Existing Private Foul Water Manhole
- Existing Private Foul Water Pumping Station
- SW Attenuation Tank
- SW Rain Garden

FOUL WATER MANHOLE SCHEDULE						
M/H REF	APPROX. COVER LEVEL	INVERT LEVEL	DEPTH (M)	M/H TYPE	COVER TYPE	COMMENTS
F1	65.46	64.86	0.60	3	B125	
F2	64.85	64.20	0.65	3	B125	
F3	64.43	63.83	0.60	3	B125	TO EXISTING FW MH IL:63.26
SURFACE WATER MANHOLE SCHEDULE						
M/H REF	APPROX. COVER LEVEL	INVERT LEVEL	DEPTH (M)	M/H TYPE	COVER TYPE	COMMENTS
RE1	66.00	65.40	0.60	RODDING EYE	-	
S1	64.10	63.494	0.606	3	B125	TO ATTENUATION TANK
RE2	66.00	65.40	0.60	RODDING EYE	-	
S2	65.65	65.00	0.65	3	B125	
S3	64.10	63.444	0.656	3A SILT TRAP	B125	TO ATTENUATION TANK
S4	64.00	63.25	0.75	3B 600ø FLOW CONTROL MH	B125	TO RAIN GARDEN

ALL DIMENSIONS AND LEVELS
TO BE CHECKED AND
CONFIRMED BY THE ARCHITECT
PRIOR TO CONSTRUCTION.

In addition to these notes, reference shall be made to the specification of
works and the relevant Architect's and Specialist's drawings and specifications.
The Contractor is responsible for verifying all site dimensions before
commencing works.
All dimensions are in millimetres unless noted otherwise.
This drawing has been produced electronically and may have been photo
reduced or enlarged when printed or copied. Dimensions on this drawing shall
not be used for construction purposes. Any discrepancy between dimensions
errors or omissions are to be reported to the engineer immediately.
Levels are in metres unless noted otherwise to Ordnance Survey datum.
The Contractor is responsible for the stability of the building whilst the works
are in progress.

NOTES

- THIS DRAWING IS BASED ON DRAWING NO. B04.3.24 BY
BELMONT DESIGNS ARCHITECTURE PRACTICE LIMITED.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH
THE FOLLOWING DRAWING:
63770/11 DRAINAGE DETAILS SHEET 1 OF 2
63770/12 DRAINAGE DETAILS SHEET 2 OF 2
- CONTRACTOR IS TO TAKE NECESSARY PRECAUTIONS TO
ENSURE THAT TRENCHES ARE KEPT CLEAR OF GROUND
WATER DURING CONSTRUCTION.
- ALL DRAINAGE WORKS TO BE CARRIED OUT IN
ACCORDANCE WITH 'SEWERS FOR ADOPTION' 7TH
EDITION.
- ALL ADOPTED PIPEWORK TO BE 100% VITRIFIED CLAY
UNLESS NOTED OTHERWISE.
- ALL PIPEWORK THROUGH WALLS TO BE IN
ACCORDANCE WITH THE BUILDING REGULATIONS.
- ALL PIPEWORK UNDER ROADS WITH LESS THAN 900MM
COVER TO HAVE 150MM CONCRETE SURROUND.
- MINIMUM GRADIENT TO DRAINS TO BE 1:40 FOR
110Ø OR 110Ø FW AND 1:100 FOR 110Ø SW.
- ALL ADOPTED PIPEWORK, DRAINAGE LATERALS OR
PIPE CONNECTION TO THE PUBLIC SHALL BE VITRIFIED
CLAY (VC) PIPE MATERIAL TO SOUTHERN WATER
APPROVAL.
- POSITIONS OF MANHOLES SHOWN ON THIS DRAWING
ARE INDICATIVE ONLY. ACTUAL LOCATIONS TO BE
FINALIZED ON SITE.
- PROVIDE CONCRETE LINTELS OVER OPENINGS WHERE
PIPES PASS THROUGH WALLS. ALLOW FOR 150MM
CLEARANCE ALL ROUND PIPE.

REV	DESCRIPTION	DATE	BY
G	ADDED RAIN GARDEN DETAIL	04/12/25JS	
F	ADDED DUMMY MH IN RAIN GARDEN	20/11/25JS	
E	ATTN. TANK /RAIN GRADEN SIZE AND DRAINAGE LEVELS	10/11/25JS	
D	MENDED RAIN GARDEN DEPTH	29/10/25JS	
C	MENDED SW DRAINAGE LAYOUT	04/09/25JS	
B	MENDED SW DRAINAGE LAYOUT	07/08/25JS	
A	MENDED DRAINAGE LAYOUT	05/06/25JS	
O	ORIGINAL ISSUE	30/04/25JS	

DIXON HURST

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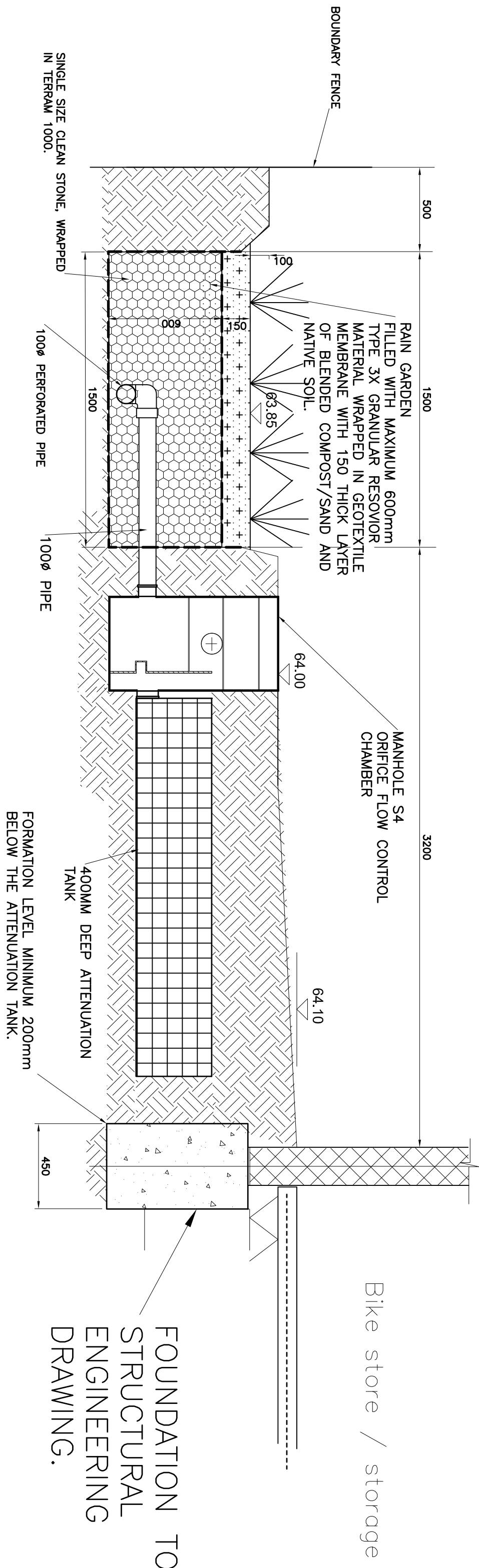
LAND ADJACENT TO TWINHAM
34 HURST ROAD,
HAS SOCKS, BN6 9NL

DRAINAGE LAYOUT

DRAWING No.	REV	CHECKED
63770 / 10	G	
SCALE	DATE	DRAWN
1:125@ A1	JULY 25	JS
AutoCAD Ref: 63770-10.dwg		APPROVED

This drawing is produced using AutoCAD. Only written dimensions are to be respected.

This drawing is produced using AutoCAD. Only written dimensions are to be respected.



SECTION THROUGH ATTENUATION TANK, FLOW CONTROL AND RAIN GARDEN

SCALE 1:20

FOUNDATION TO
STRUCTURAL
ENGINEERING
DRAWING.

Bike store / storage

In addition to these notes, reference shall be made to the specification of works and the relevant Architect's and Specialist's drawings and specifications. The Contractor is responsible for verifying all site dimensions before commencing work.

All dimensions are in millimetres unless noted otherwise.

This drawing has been produced electronically and may have been photo reduced or scanned. Dimensions shall be taken from the original drawing. Errors or omissions are to be reported to the engineer immediately.

Levels are in metres unless noted otherwise to Ordnance Survey datum. The Contractor is responsible for the stability of the building whilst the works are in progress.

NOTES

- THIS DRAWING IS BASED ON DRAWING NO. B04.3.24 BY BELMONT DESIGNS ARCHITECTURE PRACTICE LIMITED.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE FOLLOWING DRAWING:
63770/10 DRAINAGE LAYOUT
63770/11 DRAINAGE DETAIL SHEET 1 OF 2
- CONTRACTOR IS TO TAKE NECESSARY PRECAUTIONS TO ENSURE THAT TRENCHES ARE KEPT CLEAR OF GROUND WATER DURING CONSTRUCTION.
- ALL DRAINAGE WORKS TO BE CARRIED OUT IN ACCORDANCE WITH "SEWERS FOR ADOPTION" 7TH EDITION.
- ALL ADOPTED PIPEWORK TO BE 1000 VITRIFIED CLAY UNLESS NOTED OTHERWISE.
- ALL PIPEWORK THROUGH WALLS TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS.
- ALL PIPEWORK UNDER ROADS WITH LESS THAN 900MM COVER TO HAVE 150MM CONCRETE SURROUND.
- MINIMUM GRADIENT TO DRAINS TO BE 1:40 FOR 1100 OR 1100 FW AND 1:100 FOR 1100 SW.
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- POSITIONS OF MANHOLES SHOWN ON THIS DRAWING ARE INDICATIVE ONLY. ACTUAL LOCATIONS TO BE FINALIZED ON SITE.
- PROVIDE CONCRETE LINTELS OVER OPENINGS WHERE PIPES PASS THROUGH WALLS. ALLOW FOR 150MM CLEARANCE ALL ROUND PIPE.

ALL DIMENSIONS AND LEVELS
TO BE CHECKED AND
CONFIRMED BY THE ARCHITECT
PRIOR TO CONSTRUCTION.

C	RAIN GARDEN SIZE /DETAIL	04/12/25JS
B	RAIN GARDEN SIZE	10/11/25JS
A	RAIN GARDEN LEVELS	03/11/25JS
O	ORIGINAL ISSUE	04/09/25JS
REV	DESCRIPTION	DATE BY

DIXON HURST

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CONTRACT

LAND ADJACENT TO TWINHAM
34 HURST ROAD,
HASSOCKS, BN6 9NL

DRAINAGE DETAILS SHEET 2 OF 2

DRAWING NO.	REV	CHECKED
63770	112	C
SCALE	DATE	DRAWN
1:200 A1	SEPT 25	JS
AutoCAD Ref: 63770-10.dwg		

This drawing is produced using AutoCAD. Only written dimensions are to be respected.