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4, Ironstone Way Brixworth Northampton, NN3 9UD	25910 - Kestrel Way, Luton SW 1 in 100 Year + 40% CC FSR	
Date 13/12/2023 File Network 1.MDX	Designed by TL Checked by TL	
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	10
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

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Online Controls for Storm


Hydro-Brake Optimum® Manhole: SFCC1, DS/PN: S1.009, Volume (m³): 9.4

Unit Reference	MD-SHE-0086-3600-1250-3600
Design Head (m)	1.250
Design Flow (l/s)	3.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	86
Invert Level (m)	121.250
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.250	3.6
Flush-Flo™	0.378	3.6
Kick-Flo®	0.770	2.9
Mean Flow over Head Range	-	3.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.6	1.200	3.5	3.000	5.4	7.000	8.1
0.200	3.4	1.400	3.8	3.500	5.8	7.500	8.3
0.300	3.6	1.600	4.0	4.000	6.2	8.000	8.6
0.400	3.6	1.800	4.3	4.500	6.5	8.500	8.8
0.500	3.5	2.000	4.5	5.000	6.9	9.000	9.1
0.600	3.4	2.200	4.7	5.500	7.2	9.500	9.3
0.800	2.9	2.400	4.9	6.000	7.5		
1.000	3.2	2.600	5.1	6.500	7.8		

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Storage Structures for Storm

Porous Car Park Manhole: S5, DS/PN: S1.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	27.8
Max Percolation (l/s)	37.1	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.595	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: S6, DS/PN: S2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	26.7	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.595	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: S8, DS/PN: S1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	22.5
Max Percolation (l/s)	30.0	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.045	Cap Volume Depth (m)	0.225

Tank or Pond Manhole: SHW2, DS/PN: S1.007

Invert Level (m) 121.800


Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	35.4	0.800	147.5	0.801	0.0

Porous Car Park Manhole: S11, DS/PN: S3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	27.5
Max Percolation (l/s)	36.7	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.695	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: S12, DS/PN: S3.001

Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0
Membrane Percolation (mm/hr)	1000	Porosity	0.30
Max Percolation (l/s)	30.0	Invert Level (m)	123.195

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Porous Car Park Manhole: S12, DS/PN: S3.001

Width (m) 4.8 Depression Storage (mm) 5
Length (m) 22.5 Evaporation (mm/day) 3
Slope (1:X) 60.0 Cap Volume Depth (m) 0.225

Tank or Pond Manhole: S13, DS/PN: S1.008

Invert Level (m) 121.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	65.0	1.200	65.0

Filter Drain Manhole: S16, DS/PN: S4.002

Infiltration Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.300
Infiltration Coefficient Side (m/hr) 0.00000 Pipe Depth above Invert (m) 0.000
Safety Factor 2.0 Number of Pipes 1
Porosity 0.30 Slope (1:X) 150.0
Invert Level (m) 123.340 Cap Volume Depth (m) 1.260
Trench Width (m) 0.6 Cap Infiltration Depth (m) 0.000
Trench Length (m) 18.0


Porous Car Park Manhole: S22, DS/PN: S5.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
Membrane Percolation (mm/hr) 1000 Length (m) 16.8
Max Percolation (l/s) 22.4 Slope (1:X) 60.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 122.595 Cap Volume Depth (m) 0.225

Tank or Pond Manhole: S23, DS/PN: S4.008


Invert Level (m) 121.265

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	384.0	1.200	384.0	1.201	0.0

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	124.600	0.750	0.000	1.68	64.4	FLOOD RISK	
S1.001	S2	124.371	0.646	0.000	1.80	71.3	FLOOD RISK	
S1.002	S3	123.784	0.249	0.000	1.33	111.0	SURCHARGED	
S1.003	S4	123.430	0.105	0.000	0.80	112.1	SURCHARGED	
S1.004	S5	123.222	0.222	0.000	0.67	124.7	SURCHARGED	
S2.000	S6	123.768	0.718	0.000	1.11	25.7	FLOOD RISK	
S2.001	S7	123.208	0.658	0.000	1.65	25.8	FLOOD RISK	
S1.005	S8	122.968	0.518	0.000	1.45	162.2	SURCHARGED	
S1.006	SHW1	122.543	0.293	0.000	1.74	161.6	SURCHARGED	
S1.007	SHW2	121.993	-0.407	0.000	0.23	161.2	OK	
S3.000	S11	123.164	0.014	0.000	1.01	35.4	SURCHARGED	
S3.001	S12	122.597	-0.053	0.000	0.75	35.4	OK	
S1.008	S13	121.900	0.000	0.000	0.64	176.1	SURCHARGED	
S4.000	S14	124.601	0.751	0.881	1.88	74.5	FLOOD	1
S4.001	S15	124.043	0.383	0.000	1.41	74.1	SURCHARGED	
S4.002	S16	123.969	0.329	0.000	1.12	87.2	SURCHARGED	
S4.003	S17	123.816	0.296	0.000	1.64	87.6	SURCHARGED	
S4.004	S18	123.693	0.188	0.000	1.27	102.6	SURCHARGED	
S4.005	S19	123.420	0.075	0.000	1.42	103.6	SURCHARGED	
S4.006	S20	123.201	-0.059	0.000	0.95	132.4	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH		Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water
	Name	Storm							Level (m)
S4.007	S21	15	Winter	100	+40%				122.807
S5.000	S22	15	Winter	100	+40%	100/15	Summer		122.173
S4.008	S23	30	Winter	100	+40%	100/30	Winter		121.876
S1.009	SFCC1	30	Winter	100	+40%	100/15	Summer		121.884

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S4.007	S21	-0.143	0.000	0.52		133.7		OK
S5.000	S22	0.123	0.000	1.27		26.6	SURCHARGED	
S4.008	S23	0.011	0.000	0.01		2.7	SURCHARGED	
S1.009	SFCC1	0.484	0.000	0.25		3.6	SURCHARGED	