

4, Ironstone Way
Brixworth
Northampton, NN3 9UD

MORLEY SITE
SW HYDRAULICS
REV A 23.03.22



Date 23/03/22 6:08 PM
File 23200 - Whole Site

Designed by JPP
Checked by

Innovyze

Network 2018.1.1

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.337	4-8	0.229

Total Area Contributing (ha) = 0.566

Total Pipe Volume (m³) = 17.838

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Online Controls for Storm

Pump Manhole: 13, DS/PN: 1.008, Volume (m³): 4.5

Invert Level (m) 68.650

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	49.2000	0.900	49.2000	1.700	0.0000	2.500	0.0000
0.200	49.2000	1.000	49.2000	1.800	0.0000	2.600	0.0000
0.300	49.2000	1.100	49.2000	1.900	0.0000	2.700	0.0000
0.400	49.2000	1.200	49.2000	2.000	0.0000	2.800	0.0000
0.500	49.2000	1.250	49.2000	2.100	0.0000	2.900	0.0000
0.600	49.2000	1.251	0.0000	2.200	0.0000	3.000	0.0000
0.700	49.2000	1.500	0.0000	2.300	0.0000		
0.800	49.2000	1.600	0.0000	2.400	0.0000		

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Storage Structures for Storm

Porous Car Park Manhole: qmax1, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	26.1
Max Percolation (l/s)	34.8	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.070	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: qmax2, DS/PN: 1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	44.7
Max Percolation (l/s)	59.6	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.070	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: qmax3, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	21.3
Max Percolation (l/s)	28.4	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.070	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: qmax4, DS/PN: 1.007

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	44.6
Max Percolation (l/s)	59.5	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	70.070	Cap Volume Depth (m)	0.350

Cellular Storage Manhole: 13, DS/PN: 1.008

Invert Level (m)	68.700	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	105.0	0.0	1.201	0.0	0.0
1.200	105.0	0.0			

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

Simulation Criteria

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

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


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.407
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 1.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	100/15 Summer				70.051
1.001	2	15 Winter	1	+0%	30/15 Winter				69.821
1.002	3	15 Winter	1	+0%	30/15 Summer				69.635
1.003	4	15 Winter	1	+0%	30/15 Summer				69.374
1.004	5	15 Winter	1	+0%	30/15 Summer				69.324
2.000	qmax1	15 Winter	1	+0%	30/15 Summer				69.611
1.005	qmax2	15 Winter	1	+0%	30/15 Summer				69.304
1.006	6	15 Winter	1	+0%	1/15 Winter				69.244
3.000	qmax3	15 Winter	1	+0%	30/15 Summer				69.528
1.007	qmax4	15 Winter	1	+0%	30/15 Summer				69.164
4.000	7	15 Winter	1	+0%					70.099
4.001	8	15 Winter	1	+0%					69.898
4.002	9	15 Winter	1	+0%					69.856
4.003	10	15 Winter	1	+0%	100/30 Winter				69.664
4.004	11	15 Winter	1	+0%	100/15 Winter				69.476
5.000	12	15 Winter	1	+0%	100/15 Winter				69.385

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

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
1.000	1	-0.149	0.000	0.24		9.2	OK	
1.001	2	-0.150	0.000	0.24		9.0	OK	
1.002	3	-0.166	0.000	0.16		9.0	OK	
1.003	4	-0.206	0.000	0.21		16.4	OK	
1.004	5	-0.069	0.000	0.26		15.3	OK	
2.000	qmax1	-0.130	0.000	0.36		17.9	OK	
1.005	qmax2	-0.031	0.000	0.45		29.1	OK	
1.006	6	0.018	0.000	0.49		27.7	SURCHARGED	
3.000	qmax3	-0.134	0.000	0.33		17.9	OK	
1.007	qmax4	-0.095	0.000	0.79		42.0	OK	
4.000	7	-0.176	0.000	0.11		5.0	OK	
4.001	8	-0.165	0.000	0.16		5.0	OK	
4.002	9	-0.157	0.000	0.20		9.3	OK	
4.003	10	-0.157	0.000	0.20		9.3	OK	
4.004	11	-0.155	0.000	0.21		9.3	OK	
5.000	12	-0.180	0.000	0.09		4.8	OK	


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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	13 15	Winter	1	+0%	30/15	Summer			68.744

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status	
1.008	13	-0.206	0.000	0.65		46.1	OK	

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

Simulation Criteria

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

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


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.407
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 1.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	30	+0%	100/15 Summer				70.103
1.001	2	15 Winter	30	+0%	30/15 Winter				69.992
1.002	3	15 Winter	30	+0%	30/15 Summer				69.941
1.003	4	15 Winter	30	+0%	30/15 Summer				69.909
1.004	5	15 Winter	30	+0%	30/15 Summer				69.799
2.000	qmax1	15 Winter	30	+0%	30/15 Summer				69.963
1.005	qmax2	15 Winter	30	+0%	30/15 Summer				69.717
1.006	6	15 Winter	30	+0%	1/15 Winter				69.552
3.000	qmax3	15 Winter	30	+0%	30/15 Summer				69.726
1.007	qmax4	15 Winter	30	+0%	30/15 Summer				69.452
4.000	7	15 Winter	30	+0%					70.128
4.001	8	15 Winter	30	+0%					69.936
4.002	9	15 Winter	30	+0%					69.907
4.003	10	15 Winter	30	+0%	100/30 Winter				69.715
4.004	11	15 Winter	30	+0%	100/15 Winter				69.530
5.000	12	15 Winter	30	+0%	100/15 Winter				69.410

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

PN	US/MH Name	Surcharged		Flooded	Flow / Overflow Cap. (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow (l/s)		Flow (l/s)		
1.000	1	-0.097	0.000	0.59		22.5	OK	
1.001	2	0.021	0.000	0.53		19.8	SURCHARGED	
1.002	3	0.140	0.000	0.42		24.5	SURCHARGED	
1.003	4	0.329	0.000	0.42		33.0	SURCHARGED	
1.004	5	0.406	0.000	0.62		36.8	SURCHARGED	
2.000	qmax1	0.222	0.000	0.77		38.4	SURCHARGED	
1.005	qmax2	0.382	0.000	1.22		78.5	SURCHARGED	
1.006	6	0.326	0.000	1.41		78.7	SURCHARGED	
3.000	qmax3	0.064	0.000	0.76		41.0	SURCHARGED	
1.007	qmax4	0.193	0.000	2.30		121.8	SURCHARGED	
4.000	7	-0.147	0.000	0.26		12.3	OK	
4.001	8	-0.127	0.000	0.39		12.2	OK	
4.002	9	-0.106	0.000	0.54		25.1	OK	
4.003	10	-0.106	0.000	0.53		24.8	OK	
4.004	11	-0.101	0.000	0.58		25.2	OK	
5.000	12	-0.155	0.000	0.21		11.8	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	13	30 Winter	30	+0%	30/15 Summer				69.132

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status	
1.008	13	0.182	0.000	0.69		49.2	SURCHARGED	

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

Simulation Criteria

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


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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.407
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840
Margin for Flood Risk Warning (mm) 1.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	100	+40%	100/15 Summer				70.777
1.001	2	15 Winter	100	+40%	30/15 Winter				70.658
1.002	3	15 Winter	100	+40%	30/15 Summer				70.551
1.003	4	15 Winter	100	+40%	30/15 Summer				70.463
1.004	5	15 Winter	100	+40%	30/15 Summer				70.331
2.000	qmax1	15 Winter	100	+40%	30/15 Summer				70.516
1.005	qmax2	15 Winter	100	+40%	30/15 Summer				70.257
1.006	6	30 Winter	100	+40%	1/15 Winter				69.995
3.000	qmax3	15 Winter	100	+40%	30/15 Summer				70.324
1.007	qmax4	30 Winter	100	+40%	30/15 Summer				69.871
4.000	7	15 Winter	100	+40%					70.160
4.001	8	15 Winter	100	+40%					69.986
4.002	9	15 Winter	100	+40%					69.968
4.003	10	30 Winter	100	+40%	100/30 Winter				69.827
4.004	11	30 Winter	100	+40%	100/15 Winter				69.819
5.000	12	30 Winter	100	+40%	100/15 Winter				69.819

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

PN	US/MH Name	Surcharged		Flooded	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.					
1.000	1	0.577	0.000	0.83		31.4	SURCHARGED		
1.001	2	0.687	0.000	0.82		30.5	SURCHARGED		
1.002	3	0.750	0.000	0.53		30.6	SURCHARGED		
1.003	4	0.883	0.000	0.81		62.9	SURCHARGED		
1.004	5	0.938	0.000	1.23		73.3	SURCHARGED		
2.000	qmax1	0.775	0.000	0.94		46.8	SURCHARGED		
1.005	qmax2	0.922	0.000	1.72		110.9	SURCHARGED		
1.006	6	0.769	0.000	1.87		104.3	SURCHARGED		
3.000	qmax3	0.662	0.000	1.11		59.9	SURCHARGED		
1.007	qmax4	0.612	0.000	3.19		168.9	SURCHARGED		
4.000	7	-0.115	0.000	0.47		22.3	OK		
4.001	8	-0.077	0.000	0.72		22.6	OK		
4.002	9	-0.045	0.000	0.97		45.4	OK		
4.003	10	0.006	0.000	0.75		35.3	SURCHARGED		
4.004	11	0.188	0.000	0.81		35.1	SURCHARGED		
5.000	12	0.254	0.000	0.30		17.1	SURCHARGED		

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	13 30	Winter	100	+40%	30/15	Summer			69.813

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	13	0.863	0.000	0.69		49.2	SURCHARGED	