

AEA - Ambiental		Page 1
Science Park Square Brighton East Sussex	4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A	
Date 27/03/2019	Designed by SD	
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX	Checked by MN	
XP Solutions		Network 2018.1

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)	1	Foul Sewage (l/s/ha) 0.000
M5-60 (mm)	19.800	Volumetric Runoff Coeff. 0.750
Ratio R	0.372	PIMP (%) 100
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%) 0
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m) 0.200
		Maximum Backdrop Height (m) 1.500
		Min Design Depth for Optimisation (m) 1.200
		Min Vel for Auto Design only (m/s) 1.00
		Min Slope for Optimisation (1:X) 500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.349	8-12	0.120

Total Area Contributing (ha) = 0.469

Total Pipe Volume (m³) = 13.087

Network Design Table for Storm

« - Indicates pipe capacity < flow

©1982-2018 Innovyze

AEA - Ambiental											Page 2	
Science Park Square Brighton East Sussex					4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A							
Date 27/03/2019					Designed by SD							
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX					Checked by MN							
XP Solutions					Network 2018.1							
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)	Section Type	Auto Design	
1.000	6.898	0.246	28.0	0.014	2.00	0.0	0.600	o	150	Pipe/Conduit		
1.001	8.564	0.145	59.2	0.030	0.00	0.0	0.600	o	150	Pipe/Conduit		
1.002	19.995	0.549	36.4	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit		
2.000	18.002	0.100	180.0	0.013	2.00	0.0	0.600	o	225	Pipe/Conduit		
1.003	17.157	0.043	400.0	0.013	0.00	0.0	0.600	o	300	Pipe/Conduit		
1.004	22.272	0.056	400.0	0.014	0.00	0.0	0.600	o	300	Pipe/Conduit		
1.005	12.374	0.031	400.0	0.013	0.00	0.0	0.600	o	300	Pipe/Conduit		
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	2.06	20.700	0.014	0.0	0.0	0.0	1.91	33.8	1.9		
1.001	50.00	2.17	20.445	0.044	0.0	0.0	0.0	1.31	23.1	5.9		
1.002	50.00	2.32	20.300	0.071	0.0	0.0	0.0	2.17	86.5	9.7		
2.000	50.00	2.31	19.800	0.013	0.0	0.0	0.0	0.97	38.6	1.8		
1.003	50.00	2.69	19.700	0.098	0.0	0.0	0.0	0.78	55.1	13.3		
1.004	50.00	3.16	19.657	0.112	0.0	0.0	0.0	0.78	55.1	15.2		
1.005	50.00	3.43	19.601	0.126	0.0	0.0	0.0	0.78	55.1	17.0		
©1982-2018 Innovyze												

AEA - Ambiental											Page 3
Science Park Square Brighton East Sussex					4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A						
Date 27/03/2019 File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX					Designed by SD Checked by MN						
XP Solutions					Network 2018.1						
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)	Section Type	Auto Design
3.000	26.255	0.088	300.0	0.014	2.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	7.052	0.018	400.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	8.074	0.020	400.0	0.207	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	29.355	0.652	45.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	25.429	0.254	100.0	0.022	2.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	9.579	0.048	200.0	0.024	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	10.083	0.202	50.0	0.024	0.00	0.0	0.600	o	225	Pipe/Conduit	
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)	
3.000	50.00	2.48	19.550	0.014	0.0	0.0	0.0	0.90	63.8	1.9	
1.006	50.00	3.58	19.462	0.140	0.0	0.0	0.0	0.78	55.1	18.9	
1.007	50.00	3.75	19.444	0.346	0.0	0.0	0.0	0.78	55.1	46.9	
1.008	50.00	3.96	19.395	0.346	0.0	0.0	0.0	2.35	166.1	46.9	
4.000	50.00	2.42	19.450	0.022	0.0	0.0	0.0	1.00	17.8	3.0	
4.001	50.00	2.65	19.196	0.046	0.0	0.0	0.0	0.71	12.5	6.3	
4.002	50.00	2.74	19.148	0.071	0.0	0.0	0.0	1.85	73.7	9.6	
©1982-2018 Innovyze											

AEA - Ambiental											Page 4	
Science Park Square Brighton East Sussex					4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A							
Date 27/03/2019 File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX					Designed by SD Checked by MN							
XP Solutions					Network 2018.1							
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)	Section Type	Auto Design	
4.003	12.794	0.320	40.0	0.016	0.00	0.0	0.600	o	300	Pipe/Conduit		
1.009	20.287	0.005	4000.0	0.035	0.00	0.0	0.600	o	150	Pipe/Conduit		
1.010	20.287	0.005	4000.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
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)		
4.003	50.00	2.82	18.946	0.087	0.0	0.0	0.0	2.49	176.2	11.8		
1.009	47.42	6.21	18.610	0.469	0.0	0.0	0.0	0.15	2.7«	60.2		
1.010	40.73	8.46	18.600	0.469	0.0	0.0	0.0	0.15	2.7«	60.2		
©1982-2018 Innovyze												

AEA - Ambiental				Page 5																																																																																																																																																																									
Science Park Square		4383_SHW_MerryEngland																																																																																																																																																																											
Brighton		Peter Nicholas Homes Ltd																																																																																																																																																																											
East Sussex		Proposed Calculations_REV A																																																																																																																																																																											
Date 27/03/2019		Designed by SD																																																																																																																																																																											
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX		Checked by MN																																																																																																																																																																											
XP Solutions		Network 2018.1																																																																																																																																																																											
Area Summary for Storm <table><thead><tr><th>Pipe Number</th><th>PIMP Type</th><th>PIMP Name</th><th>PIMP (%)</th><th>Gross Area (ha)</th><th>Imp. Area (ha)</th><th>Pipe Total (ha)</th></tr></thead><tbody><tr><td>1.000</td><td>User</td><td>-</td><td>100</td><td>0.014</td><td>0.014</td><td>0.014</td></tr><tr><td>1.001</td><td>User</td><td>-</td><td>100</td><td>0.015</td><td>0.015</td><td>0.015</td></tr><tr><td></td><td>User</td><td>-</td><td>100</td><td>0.015</td><td>0.015</td><td>0.030</td></tr><tr><td>1.002</td><td>User</td><td>-</td><td>100</td><td>0.014</td><td>0.014</td><td>0.014</td></tr><tr><td></td><td>User</td><td>-</td><td>100</td><td>0.013</td><td>0.013</td><td>0.028</td></tr><tr><td>2.000</td><td>User</td><td>-</td><td>100</td><td>0.013</td><td>0.013</td><td>0.013</td></tr><tr><td>1.003</td><td>User</td><td>-</td><td>100</td><td>0.013</td><td>0.013</td><td>0.013</td></tr><tr><td>1.004</td><td>User</td><td>-</td><td>100</td><td>0.014</td><td>0.014</td><td>0.014</td></tr><tr><td>1.005</td><td>User</td><td>-</td><td>100</td><td>0.013</td><td>0.013</td><td>0.013</td></tr><tr><td>3.000</td><td>User</td><td>-</td><td>100</td><td>0.014</td><td>0.014</td><td>0.014</td></tr><tr><td>1.006</td><td>-</td><td>-</td><td>100</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>1.007</td><td>User</td><td>-</td><td>100</td><td>0.015</td><td>0.015</td><td>0.015</td></tr><tr><td></td><td>User</td><td>-</td><td>100</td><td>0.192</td><td>0.192</td><td>0.207</td></tr><tr><td>1.008</td><td>-</td><td>-</td><td>100</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>4.000</td><td>User</td><td>-</td><td>100</td><td>0.022</td><td>0.022</td><td>0.022</td></tr><tr><td>4.001</td><td>User</td><td>-</td><td>100</td><td>0.024</td><td>0.024</td><td>0.024</td></tr><tr><td>4.002</td><td>User</td><td>-</td><td>100</td><td>0.024</td><td>0.024</td><td>0.024</td></tr><tr><td>4.003</td><td>User</td><td>-</td><td>100</td><td>0.016</td><td>0.016</td><td>0.016</td></tr><tr><td>1.009</td><td>User</td><td>-</td><td>100</td><td>0.015</td><td>0.015</td><td>0.015</td></tr><tr><td></td><td>User</td><td>-</td><td>100</td><td>0.020</td><td>0.020</td><td>0.035</td></tr><tr><td>1.010</td><td>-</td><td>-</td><td>100</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td></td><td></td><td></td><td></td><td>Total</td><td>Total</td><td>Total</td></tr><tr><td></td><td></td><td></td><td></td><td>0.469</td><td>0.469</td><td>0.469</td></tr></tbody></table>						Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)	1.000	User	-	100	0.014	0.014	0.014	1.001	User	-	100	0.015	0.015	0.015		User	-	100	0.015	0.015	0.030	1.002	User	-	100	0.014	0.014	0.014		User	-	100	0.013	0.013	0.028	2.000	User	-	100	0.013	0.013	0.013	1.003	User	-	100	0.013	0.013	0.013	1.004	User	-	100	0.014	0.014	0.014	1.005	User	-	100	0.013	0.013	0.013	3.000	User	-	100	0.014	0.014	0.014	1.006	-	-	100	0.000	0.000	0.000	1.007	User	-	100	0.015	0.015	0.015		User	-	100	0.192	0.192	0.207	1.008	-	-	100	0.000	0.000	0.000	4.000	User	-	100	0.022	0.022	0.022	4.001	User	-	100	0.024	0.024	0.024	4.002	User	-	100	0.024	0.024	0.024	4.003	User	-	100	0.016	0.016	0.016	1.009	User	-	100	0.015	0.015	0.015		User	-	100	0.020	0.020	0.035	1.010	-	-	100	0.000	0.000	0.000					Total	Total	Total					0.469	0.469	0.469
Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)																																																																																																																																																																							
1.000	User	-	100	0.014	0.014	0.014																																																																																																																																																																							
1.001	User	-	100	0.015	0.015	0.015																																																																																																																																																																							
	User	-	100	0.015	0.015	0.030																																																																																																																																																																							
1.002	User	-	100	0.014	0.014	0.014																																																																																																																																																																							
	User	-	100	0.013	0.013	0.028																																																																																																																																																																							
2.000	User	-	100	0.013	0.013	0.013																																																																																																																																																																							
1.003	User	-	100	0.013	0.013	0.013																																																																																																																																																																							
1.004	User	-	100	0.014	0.014	0.014																																																																																																																																																																							
1.005	User	-	100	0.013	0.013	0.013																																																																																																																																																																							
3.000	User	-	100	0.014	0.014	0.014																																																																																																																																																																							
1.006	-	-	100	0.000	0.000	0.000																																																																																																																																																																							
1.007	User	-	100	0.015	0.015	0.015																																																																																																																																																																							
	User	-	100	0.192	0.192	0.207																																																																																																																																																																							
1.008	-	-	100	0.000	0.000	0.000																																																																																																																																																																							
4.000	User	-	100	0.022	0.022	0.022																																																																																																																																																																							
4.001	User	-	100	0.024	0.024	0.024																																																																																																																																																																							
4.002	User	-	100	0.024	0.024	0.024																																																																																																																																																																							
4.003	User	-	100	0.016	0.016	0.016																																																																																																																																																																							
1.009	User	-	100	0.015	0.015	0.015																																																																																																																																																																							
	User	-	100	0.020	0.020	0.035																																																																																																																																																																							
1.010	-	-	100	0.000	0.000	0.000																																																																																																																																																																							
				Total	Total	Total																																																																																																																																																																							
				0.469	0.469	0.469																																																																																																																																																																							
©1982-2018 Innovyze																																																																																																																																																																													

AEA - Ambiental		Page 6														
Science Park Square	4383_SHW_MerryEngland															
Brighton	Peter Nicholas Homes Ltd															
East Sussex	Proposed Calculations_REV A															
Date 27/03/2019	Designed by SD															
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX	Checked by MN															
XP Solutions	Network 2018.1															
<u>Free Flowing Outfall Details for Storm</u> <table><thead><tr><th>Outfall Pipe Number</th><th>Outfall Name</th><th>C. Level (m)</th><th>I. Level (m)</th><th>Min I. Level (m)</th><th>D,L (mm)</th><th>W (mm)</th></tr></thead><tbody><tr><td>1.010</td><td></td><td>19.500</td><td>18.595</td><td>0.000</td><td>0</td><td>0</td></tr></tbody></table>			Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)	1.010		19.500	18.595	0.000	0	0
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)										
1.010		19.500	18.595	0.000	0	0										
©1982-2018 Innovyze																

AEA - Ambiental		Page 7
Science Park Square Brighton East Sussex	4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A	
Date 27/03/2019 File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX	Designed by SD Checked by MN	
XP Solutions Network 2018.1		

Online Controls for Storm

Orifice Manhole: PP, DS/PN: 1.007, Volume (m³): 0.8

Diameter (m) 0.042 Discharge Coefficient 0.600 Invert Level (m) 19.444

Complex Manhole: POND, DS/PN: 1.010, Volume (m³): 0.7

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0069-2000-0900-2000	Sump Available	Yes
Design Head (m)	0.900	Diameter (mm)	69
Design Flow (l/s)	2.0	Invert Level (m)	18.600
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	100
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	2.0	Kick-Flo®	0.568	1.6
Flush-Flo™	0.278	2.0	Mean Flow over Head Range	-	1.8

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

©1982-2018 Innovyze

AEA - Ambiental		Page 8									
Science Park Square	4383_SHW_MerryEngland										
Brighton	Peter Nicholas Homes Ltd										
East Sussex	Proposed Calculations_REV A										
Date 27/03/2019	Designed by SD										
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX	Checked by MN										
XP Solutions	Network 2018.1										
<u>Hydro-Brake® Optimum</u>											
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	0.600	1.7	1.600	2.6	2.600	3.2	5.000	4.4	7.500	5.3
0.200	2.0	0.800	1.9	1.800	2.7	3.000	3.5	5.500	4.6	8.000	5.5
0.300	2.0	1.000	2.1	2.000	2.9	3.500	3.7	6.000	4.8	8.500	5.7
0.400	1.9	1.200	2.3	2.200	3.0	4.000	4.0	6.500	5.0	9.000	5.8
0.500	1.8	1.400	2.4	2.400	3.1	4.500	4.2	7.000	5.2	9.500	6.0
<u>Orifice</u>											
Diameter (m) 0.085 Discharge Coefficient 0.600 Invert Level (m) 19.450											
©1982-2018 Innovyze											

AEA - Ambiental		Page 9
Science Park Square	4383_SHW_MerryEngland	
Brighton	Peter Nicholas Homes Ltd	
East Sussex	Proposed Calculations_REV A	
Date 27/03/2019	Designed by SD	
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX	Checked by MN	
XP Solutions		Network 2018.1

Storage Structures for Storm

Cellular Storage Manhole: GT, DS/PN: 3.000

Invert Level (m) 19.550 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	110.5	0.0	0.800	110.5	0.0	0.801	0.0	0.0

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

Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30 Slope (1:X) 0.0
Membrane Percolation (mm/hr) 1000 Invert Level (m) 19.850 Depression Storage (mm) 5
Max Percolation (l/s) 225.6 Width (m) 29.0 Evaporation (mm/day) 3
Safety Factor 2.0 Length (m) 28.0 Cap Volume Depth (m) 0.500

Complex Manhole: PP & GT, DS/PN: 1.009

Cellular Storage

Invert Level (m) 18.610 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

©1982-2018 Innovyze

AEA - Ambiental		Page 10
Science Park Square	4383_SHW_MerryEngland	
Brighton	Peter Nicholas Homes Ltd	
East Sussex	Proposed Calculations_REV A	
Date 27/03/2019	Designed by SD	
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX	Checked by MN	
XP Solutions	Network 2018.1	

Cellular Storage

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	121.7	0.0	0.400	121.7	0.0	0.401	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	19.010	Depression Storage (mm)	5
Max Percolation (l/s)	27.8	Width (m)	10.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	10.0	Cap Volume Depth (m)	0.750

Tank or Pond Manhole: POND, DS/PN: 1.010

Invert Level (m) 18.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	36.0	0.800	62.0

©1982-2018 Innovyze

AEA - Ambiantal										Page 11																																							
Science Park Square Brighton East Sussex					4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A																																												
Date 27/03/2019					Designed by SD																																												
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX					Checked by MN																																												
XP Solutions					Network 2018.1																																												
<u>2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>																																																	
<u>Simulation Criteria</u>																																																	
Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000 Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800 Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000																																																	
Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 2 Number of Storage Structures 4 Number of Real Time Controls 0																																																	
<u>Synthetic Rainfall Details</u>																																																	
Rainfall Model FEH Site Location GB 507331 105104 Cv (Summer) 0.750 FEH Rainfall Version 2013 Data Type Point Cv (Winter) 0.840																																																	
Margin for Flood Risk Warning (mm) 0.0 DVD Status ON Analysis Timestep 2.5 Second Increment (Extended) Inertia Status ON DTS Status ON																																																	
<u>Profile(s)</u>																																																	
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) 2, 30, 100 Climate Change (%) 40, 40, 40																																																	
<u>Water Surcharged</u>																																																	
<table border="1"> <thead> <tr> <th>US/MH</th> <th>Duration Storm</th> <th>US/CL</th> <th>Water Level</th> <th>Depth</th> <th>Flow /</th> <th>Maximum</th> <th>Discharge</th> <th>Pipe</th> </tr> <tr> <th>PN Name</th> <th>Event</th> <th>Rank</th> <th>(m)</th> <th>(m)</th> <th>Cap.</th> <th>Vol (m³)</th> <th>Vol (m³)</th> <th>Flow</th> </tr> <tr> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>1.000 1 15 minute</td> <td>2 year Summer I+40%</td> <td>15</td> <td>1 21.500</td> <td>20.739</td> <td>-0.111</td> <td>0.16</td> <td>0.010</td> <td>1.397 4.5 OK</td> </tr> </tbody> </table>														US/MH	Duration Storm	US/CL	Water Level	Depth	Flow /	Maximum	Discharge	Pipe	PN Name	Event	Rank	(m)	(m)	Cap.	Vol (m³)	Vol (m³)	Flow									Status	1.000 1 15 minute	2 year Summer I+40%	15	1 21.500	20.739	-0.111	0.16	0.010	1.397 4.5 OK
US/MH	Duration Storm	US/CL	Water Level	Depth	Flow /	Maximum	Discharge	Pipe																																									
PN Name	Event	Rank	(m)	(m)	Cap.	Vol (m³)	Vol (m³)	Flow																																									
								Status																																									
1.000 1 15 minute	2 year Summer I+40%	15	1 21.500	20.739	-0.111	0.16	0.010	1.397 4.5 OK																																									
©1982-2018 Innovyze																																																	

AEA - Ambiental												Page 12	
Science Park Square Brighton East Sussex						4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A							
Date 27/03/2019						Designed by SD							
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX						Checked by MN							
XP Solutions						Network 2018.1							
2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm													
PN	US/MH Name	Event	Duration (mins)	Storm Rank	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status	
1.001	2	15 minute 2 year Summer I+40%	15	1	21.250	20.520	-0.075	0.49	0.028	4.439	10.0	OK	
1.002	3	15 minute 2 year Summer I+40%	15	1	21.100	20.368	-0.157	0.19	0.037	7.271	15.3	OK	
2.000	4	15 minute 2 year Winter I+40%	15	1	20.600	19.982	-0.043	0.11	0.050	1.509	3.7	OK	
1.003	5	15 minute 2 year Winter I+40%	15	1	20.500	19.979	-0.021	0.40	0.871	11.010	17.5	OK	
1.004	6	360 minute 2 year Winter I+40%	360	1	20.500	19.958	0.001	0.09	1.168	39.297	4.5	SURCHARGED	
1.005	7	360 minute 2 year Winter I+40%	360	1	20.500	19.957	0.056	0.13	1.587	43.329	5.0	SURCHARGED	
3.000	GT	360 minute 2 year Winter I+40%	360	1	21.100	19.956	0.106	0.05	42.718	-16.200	3.1	SURCHARGED	
1.006	8	360 minute 2 year Winter I+40%	360	1	20.500	19.956	0.194	0.08	2.777	25.033	3.0	SURCHARGED	
1.007	PP	360 minute 2 year Winter I+40%	360	1	20.500	19.955	0.211	0.07	26.249	91.882	2.6	SURCHARGED	
1.008	9	360 minute 2 year Winter I+40%	360	1	20.300	19.419	-0.276	0.02	0.014	91.837	2.6	OK	
4.000	10	15 minute 2 year Summer I+40%	15	1	20.250	19.519	-0.081	0.43	0.018	2.276	7.2	OK	
4.001	11	1440 minute 2 year Winter I+40%	1440	1	20.000	19.374	0.028	0.06	0.221	23.468	0.7	SURCHARGED	
4.002	12	1440 minute 2 year Winter I+40%	1440	1	20.000	19.374	0.001	0.02	0.221	35.674	1.0	SURCHARGED	
4.003	13	1440 minute 2 year Winter I+40%	1440	1	19.750	19.374	0.128	0.01	0.496	43.983	1.3	SURCHARGED	
1.009	PP & GT	1440 minute 2 year Winter I+40%	1440	1	19.750	19.374	0.614	0.98	59.778	228.760	4.0	SURCHARGED	
1.010	POND	1440 minute 2 year Winter I+40%	1440	1	19.700	19.365	0.615	0.49	20.538	229.913	2.0	SURCHARGED	
©1982-2018 Innovyze													

AEA - Ambiental		Page 13
Science Park Square Brighton East Sussex	4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A	
Date 27/03/2019 File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX	Designed by SD Checked by MN	
XP Solutions Network 2018.1		

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Site Location GB 507331 105104 Cv (Summer) 0.750
 FEH Rainfall Version 2013 Data Type Point Cv (Winter) 0.840

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

Profile(s)

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) 2, 30, 100
 Climate Change (%) 40, 40, 40

PN	US/MH Name	Event	Duration (mins)	Storm Rank	US/CL (m)	Water Surcharged			Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Pipe	
						Level (m)	Depth (m)	Flow				Flow (l/s)	Status
1.000	1	15 minute 30 year Summer I+40%	15	1	21.500	20.760	-0.090	0.34	0.016	3.046	9.8	OK	

©1982-2018 Innovyze

AEA - Ambiental		Page 14
Science Park Square Brighton East Sussex	4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A	
Date 27/03/2019	Designed by SD	
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX	Checked by MN	
XP Solutions		Network 2018.1

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

PN	US/MH Name	Event	Duration (mins)	Storm Rank	US/CL (m)	Water Surcharged		Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
						Level (m)	Depth (m)					
1.001	2	15 minute 30 year Summer I+40%	15	1	21.250	20.699	0.104	1.28	0.144	9.676	25.9	SURCHARGED
1.002	3	15 minute 30 year Summer I+40%	15	1	21.100	20.418	-0.107	0.54	0.073	15.847	42.0	OK
2.000	4	360 minute 30 year Winter I+40%	360	1	20.600	20.207	0.182	0.03	0.114	8.241	1.0	SURCHARGED
1.003	5	360 minute 30 year Winter I+40%	360	1	20.500	20.207	0.207	0.17	1.310	60.783	7.2	SURCHARGED
1.004	6	360 minute 30 year Winter I+40%	360	1	20.500	20.205	0.248	0.17	1.324	68.531	8.2	SURCHARGED
1.005	7	360 minute 30 year Winter I+40%	360	1	20.500	20.204	0.303	0.23	1.701	75.134	9.1	SURCHARGED
3.000	GT	360 minute 30 year Winter I+40%	360	1	21.100	20.203	0.353	0.01	68.769	-44.492	0.9	SURCHARGED
1.006	8	360 minute 30 year Winter I+40%	360	1	20.500	20.204	0.442	0.09	2.854	27.826	3.4	SURCHARGED
1.007	PP	360 minute 30 year Winter I+40%	360	1	20.500	20.203	0.459	0.09	86.647	101.219	3.1	SURCHARGED
1.008	9	1440 minute 30 year Winter I+40%	1440	1	20.300	19.544	-0.151	0.02	0.174	288.728	2.9	OK
4.000	10	15 minute 30 year Summer I+40%	15	1	20.250	19.785	0.185	0.82	0.093	4.959	13.9	SURCHARGED
4.001	11	15 minute 30 year Summer I+40%	15	1	20.000	19.588	0.242	2.47	0.541	10.310	27.4	SURCHARGED
4.002	12	1440 minute 30 year Winter I+40%	1440	1	20.000	19.543	0.170	0.03	0.269	59.678	1.7	SURCHARGED
4.003	13	1440 minute 30 year Winter I+40%	1440	1	19.750	19.542	0.296	0.01	0.544	73.571	2.1	SURCHARGED
1.009	PP & GT	1440 minute 30 year Winter I+40%	1440	1	19.750	19.541	0.781	1.54	65.252	348.707	6.3	SURCHARGED
1.010	POND	1440 minute 30 year Winter I+40%	1440	1	19.700	19.523	0.773	0.87	28.961	345.955	3.6	SURCHARGED

AEA - Ambiantal		Page 15
Science Park Square Brighton East Sussex	4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A	
Date 27/03/2019 File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX	Designed by SD Checked by MN	
XP Solutions Network 2018.1		

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Site Location GB 507331 105104 Cv (Summer) 0.750
 FEH Rainfall Version 2013 Data Type Point Cv (Winter) 0.840

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

Profile(s)

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) 2, 30, 100
 Climate Change (%) 40, 40, 40

PN	US/MH Name	Event	Duration (mins)	Storm Rank	US/CL (m)	Water Surcharged			Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
						Level (m)	Depth (m)						
1.000	1	15 minute 100 year Summer I+40%	15	1	21.500	20.877	0.027	0.40	0.049	3.855	11.4	SURCHARGED	

©1982-2018 Innovyze

AEA - Ambiental												Page 16	
Science Park Square Brighton East Sussex					4383_SHW_MerryEngland Peter Nicholas Homes Ltd Proposed Calculations_REV A								
Date 27/03/2019					Designed by SD								
File 4383_SHW_MERRYENGLAND_DRAINAGENETWORK.MDX					Checked by MN								
XP Solutions					Network 2018.1								
100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm													
PN	US/MH Name	Event	Duration (mins)	Storm Rank	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flow / Cap.	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status	
1.001	2	15 minute 100 year Summer I+40%	15	1	21.250	20.835	0.240	1.52	0.218	12.248	30.8	SURCHARGED	
1.002	3	15 minute 100 year Winter I+40%	15	1	21.100	20.534	0.009	0.62	0.186	22.465	48.5	SURCHARGED	
2.000	4	360 minute 100 year Winter I+40%	360	1	20.600	20.346	0.321	0.03	0.153	10.143	1.2	SURCHARGED	
1.003	5	360 minute 100 year Winter I+40%	360	1	20.500	20.346	0.346	0.20	1.533	75.118	8.8	SURCHARGED	
1.004	6	360 minute 100 year Winter I+40%	360	1	20.500	20.345	0.388	0.21	1.363	84.950	10.0	SURCHARGED	
1.005	7	360 minute 100 year Winter I+40%	360	1	20.500	20.343	0.442	0.29	1.740	93.466	11.2	SURCHARGED	
3.000	GT	480 minute 100 year Winter I+40%	480	1	21.100	20.342	0.492	0.02	83.405	-48.872	1.0	SURCHARGED	
1.006	8	480 minute 100 year Winter I+40%	480	1	20.500	20.343	0.581	0.08	2.893	47.731	3.3	SURCHARGED	
1.007	PP	480 minute 100 year Winter I+40%	480	1	20.500	20.342	0.598	0.09	120.518	144.579	3.2	SURCHARGED	
1.008	9	960 minute 100 year Winter I+40%	960	1	20.300	19.590	-0.105	0.02	0.277	261.101	3.0	OK	
4.000	10	15 minute 100 year Summer I+40%	15	1	20.250	20.050	0.450	0.96	0.168	6.278	16.3	SURCHARGED	
4.001	11	15 minute 100 year Summer I+40%	15	1	20.000	19.756	0.410	3.06	0.596	13.051	33.9	SURCHARGED	
4.002	12	960 minute 100 year Winter I+40%	960	1	20.000	19.590	0.217	0.05	0.282	66.341	2.9	SURCHARGED	
4.003	13	960 minute 100 year Winter I+40%	960	1	19.750	19.588	0.342	0.02	0.557	81.275	3.4	SURCHARGED	
1.009	PP & GT	960 minute 100 year Winter I+40%	960	1	19.750	19.586	0.826	1.32	66.675	311.697	5.4	SURCHARGED	
1.010	POND	960 minute 100 year Winter I+40%	960	1	19.700	19.560	0.810	1.28	31.028	286.467	5.3	SURCHARGED	
©1982-2018 Innovyze													