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Columbus House Greenmeadow Springs Business Park Cardiff, CF15 7NE	AINON BAPTIST CHURCH	
Date 12/04/2021 08:23 File 21073-Soakaway calculation.MDX	Designed by ML Checked by	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes SW Manhole Sizes SW

FSR Rainfall Model - England and Wales			
Return Period (years)	2	Foul Sewage (l/s/ha)	0.000
M5-60 (mm)	19.000	Volumetric Runoff Coeff.	0.750
Ratio R	0.285	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)
0-4	0.008


Total Area Contributing (ha) = 0.008

Total Pipe Volume (m³) = 0.118

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<p style="text-align: center;"><u>Storage Structures for Storm</u></p> <p style="text-align: center;"><u>Cellular Storage Manhole: S3, DS/PN: S1.002</u></p> <p style="text-align: center;"> Invert Level (m) 38.240 Infiltration Coefficient Side (m/hr) 2.23200 Porosity 0.95 Infiltration Coefficient Base (m/hr) 2.23200 Safety Factor 10.0 </p> <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>4.5</td> <td>4.5</td> <td>0.500</td> <td>4.5</td> <td>8.7</td> <td>0.510</td> <td>0.0</td> <td>8.8</td> </tr> </tbody> </table>			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	4.5	4.5	0.500	4.5	8.7	0.510	0.0	8.8
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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	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model	FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
Region England and Wales	Ratio R 0.282 Cv (Winter) 0.840


Margin for Flood Risk Warning (mm) 300.0 DTS Status ON Inertia Status OFF
 Analysis Timestep Fine DVD Status OFF

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)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)
S1.000	S1 15 Summer		1	+0%					38.786	-0.074	0.000	0.15	
S1.001	S2 15 Summer		1	+0%	100/60 Winter				38.658	-0.082	0.000	0.07	

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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 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
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Synthetic Rainfall Details


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 Region England and Wales Ratio R 0.282 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status ON Inertia Status OFF
 Analysis Timestep Fine DVD Status OFF

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
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PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded	Half Drain	
									Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)
S1.000	S1 15	Summer	30	+0%					38.802	-0.058	0.000	0.37	
S1.001	S2 15	Summer	30	+0%	100/60	Winter			38.668	-0.072	0.000	0.17	


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PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded			Half Drain	Pipe
									Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)
S1.002	S3 60	Winter	30	+0%	30/15	Summer			38.480	0.140	0.000	0.00		36	0.0

PN	US/MH Name	Status	Level Exceeded
S1.002	S3	SURCHARGED	

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

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 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

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S1.000	S1 120 Winter		100	+40%					38.828	-0.032	0.000	0.21	
S1.001	S2 120 Winter		100	+40%	100/60 Winter				38.825	0.085	0.000	0.10	

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PN	Pipe			Status	Level Exceeded														
	US/MH Name	Flow (l/s)																	
S1.000	S1	1.6	OK																
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									Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)
S1.002	S3	120 Winter	100	+40%	30/15 Summer				38.822	0.482	0.000	0.00		68

Pipe				
PN	US/MH Name	Pipe	Status	Level
		Flow (l/s)		Exceeded
S1.002	S3	0.0	SURCHARGED	