

Mucklow & Harris Ltd		Page 1
Studio 313 Scott House The Custard Factory, Gibb St... Birmingham, B9 4AA	Fole Diary CB COLLIER Network C	
Date 28/11/2022 08:41 File Storm C 22.06.22.MDX	Designed by Riaz Alam Checked by	
Innovyze	Network 2019.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 404500 337500 SK 04500 37500
Data Type	Point
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
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)
0-4	0.041	4-8	0.007

Total Area Contributing (ha) = 0.048

Total Pipe Volume (m³) = 0.884

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	12.975	0.200	64.9	0.010	6.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	4.144	0.150	27.6	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	7.500	0.100	75.0	0.006	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)
1.000	0.00	6.17	110.600	0.010	0.0	0.0	0.0	1.25	22.1	0.0
1.001	0.00	6.21	110.400	0.037	0.0	0.0	0.0	1.92	34.0	0.0
1.002	0.00	6.32	110.250	0.043	0.0	0.0	0.0	1.16	20.5	0.0

Mucklow & Harris Ltd		Page 2
Studio 313 Scott House The Custard Factory, Gibb St... Birmingham, B9 4AA	Fole Diary CB COLLIER Network C	
Date 28/11/2022 08:41 File Storm C 22.06.22.MDX	Designed by Riaz Alam Checked by	
Innovyze	Network 2019.1	

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
1.003	6.351	0.075	84.7	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	8.457	0.085	99.5	0.000	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)
1.003	0.00	6.41	110.150	0.048	0.0	0.0	0.0	1.09	19.3	0.0
1.004	0.00	6.52	110.000	0.048	0.0	0.0	0.0	1.31	52.1	0.0

Mucklow & Harris Ltd		Page 3
Studio 313 Scott House The Custard Factory, Gibb St... Birmingham, B9 4AA	Fole Diary CB COLLIER Network C	
Date 28/11/2022 08:41 File Storm C 22.06.22.MDX	Designed by Riaz Alam Checked by	
Innovyze	Network 2019.1	

Fole Diary
CB COLLIER
Network C
Designed by Riaz Alam
Checked by

Network 2019.1

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)	Backdrop (mm)
30	111.400	0.800	Open Manhole	475	1.000	110.600	150				
31	111.650	1.250	Open Manhole	475	1.001	110.400	150	1.000	110.400	150	
32	111.600	1.350	Open Manhole	475	1.002	110.250	150	1.001	110.250	150	
33	111.200	1.050	Open Manhole	475	1.003	110.150	150	1.002	110.150	150	
FCC C	111.000	1.000	Open Manhole	1800	1.004	110.000	225	1.003	110.075	150	
OUTFALL	111.000	1.085	Open Manhole	0		OUTFALL		1.004	109.915	225	

No coordinates have been specified, layout information cannot be produced.

Mucklow & Harris Ltd	Page 4
Studio 313 Scott House The Custard Factory, Gibb St... Birmingham, B9 4AA	Fole Diary CB COLLIER Network C
Date 28/11/2022 08:41 File Storm C 22.06.22.MDX	Designed by Riaz Alam Checked by
Innovyze	Network 2019.1



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	150	30	111.400	110.600	0.650	Open Manhole	475
1.001	o	150	31	111.650	110.400	1.100	Open Manhole	475
1.002	o	150	32	111.600	110.250	1.200	Open Manhole	475
1.003	o	150	33	111.200	110.150	0.900	Open Manhole	475
1.004	o	225	FCC C	111.000	110.000	0.775	Open Manhole	1800

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	12.975	64.9	31	111.650	110.400	1.100	Open Manhole	475
1.001	4.144	27.6	32	111.600	110.250	1.200	Open Manhole	475
1.002	7.500	75.0	33	111.200	110.150	0.900	Open Manhole	475
1.003	6.351	84.7	FCC C	111.000	110.075	0.775	Open Manhole	1800
1.004	8.457	99.5	OUTFALL	111.000	109.915	0.860	Open Manhole	0

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 OUTFALL 111.000 109.915 0.000 0 0

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 2
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)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.373		

Mucklow & Harris Ltd		Page 5
Studio 313 Scott House The Custard Factory, Gibb St... Birmingham, B9 4AA	Fole Diary CB COLLIER Network C	
Date 28/11/2022 08:41 File Storm C 22.06.22.MDX	Designed by Riaz Alam Checked by	
Innovyze	Network 2019.1	

Online Controls for Storm

Hydro-Brake® Optimum Manhole: FCC C, DS/PN: 1.004, Volume (m³): 2.6

Unit Reference	MD-SHE-0177-1500-0800-1500
Design Head (m)	0.800
Design Flow (l/s)	15.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	177
Invert Level (m)	110.000
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	15.0
Flush-Flo™	0.288	15.0
Kick-Flo®	0.590	13.0
Mean Flow over Head Range	-	12.5

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	6.3	1.200	18.2	3.000	28.2	7.000	42.4
0.200	14.7	1.400	19.6	3.500	30.4	7.500	43.9
0.300	15.0	1.600	20.9	4.000	32.4	8.000	45.3
0.400	14.7	1.800	22.1	4.500	34.3	8.500	46.4
0.500	14.2	2.000	23.2	5.000	36.1	9.000	47.8
0.600	13.1	2.200	24.3	5.500	37.8	9.500	49.1
0.800	15.0	2.400	25.3	6.000	39.4		
1.000	16.7	2.600	26.3	6.500	40.9		

Mucklow & Harris Ltd		Page 6
Studio 313 Scott House The Custard Factory, Gibb St... Birmingham, B9 4AA	Fole Diary CB COLLIER Network C	
Date 28/11/2022 08:41 File Storm C 22.06.22.MDX	Designed by Riaz Alam Checked by	
Innovyze	Network 2019.1	

Storage Structures for Storm

Porous Car Park Manhole: 32, DS/PN: 1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	14.3
Max Percolation (l/s)	23.8	Slope (1:X)	80.0
Safety Factor	2.0	Depression Storage (mm)	0
Porosity	0.30	Evaporation (mm/day)	0
Invert Level (m)	110.250	Cap Volume Depth (m)	0.350

Tank or Pond Manhole: FCC C, DS/PN: 1.004

Invert Level (m) 110.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	15.0	0.700	0.0	1.400	0.0	2.100	0.0
0.100	15.0	0.800	0.0	1.500	0.0	2.200	0.0
0.200	15.0	0.900	0.0	1.600	0.0	2.300	0.0
0.300	15.0	1.000	0.0	1.700	0.0	2.400	0.0
0.400	15.0	1.100	0.0	1.800	0.0	2.500	0.0
0.401	15.0	1.200	0.0	1.900	0.0		
0.600	0.0	1.300	0.0	2.000	0.0		

