


Page 1		
Ashton Court Camden Road Camden NW1 9HF		
Date 26-04-17	Designed by SG	
File POST DEV WITH MITIGATIO...	Checked by CJM	
CADS		Network 2016.1

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) 100
 M5-60 (mm) 20.900
 Ratio R 0.444
 Maximum Rainfall (mm/hr) 50
 Maximum Time of Concentration (mins) 30
 Foul Sewage (l/s/ha) 0.000
 Volumetric Runoff Coeff. 0.750
 Add Flow / Climate Change (%) 0
 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)
0-4	0.073	4-8	0.018

Total Area Contributing (ha) = 0.091

Total Pipe Volume (m³) = 1.828

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	23.000	0.153	150.3	0.018	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	14.400	0.096	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	7.400	0.357	20.7	0.018	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	2.000	0.013	150.0	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)
1.000	50.00	4.47	44.050	0.018	0.0	0.0	0.0	0.82	14.4	2.4
1.001	50.00	4.76	43.897	0.018	0.0	0.0	0.0	0.82	14.5	2.4
1.002	50.00	4.82	43.801	0.036	0.0	0.0	0.0	2.22	39.3	4.9
1.003	50.00	4.86	43.444	0.036	0.0	0.0	0.0	0.82	14.5	4.9

Ashton Court
Camden Road
Camden NW1 9HF

Date 26-04-17
File POST DEV WITH MITIGATIO...

Designed by SG
Checked by CJM



CADS

Network 2016.1

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
2.000	23.000	0.153	150.3	0.025	4.00	0.0	0.600	o	150	Pipe/Conduit	🔒
2.001	7.100	0.452	15.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🟢
3.000	8.000	1.455	5.5	0.030	4.00	0.0	0.600	o	100	Pipe/Conduit	🟢
2.002	2.000	0.015	130.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🟢
1.004	1.000	0.007	142.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🟢
1.005	20.000	0.133	150.0	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)
2.000	50.00	4.47	44.050	0.025	0.0	0.0	0.0	0.82	14.4	3.4
2.001	50.00	4.52	43.897	0.025	0.0	0.0	0.0	2.55	45.1	3.4
3.000	50.00	4.04	44.950	0.030	0.0	0.0	0.0	3.32	26.1	4.1
2.002	50.00	4.55	43.445	0.055	0.0	0.0	0.0	0.88	15.5	7.4
1.004	50.00	4.88	42.630	0.091	0.0	0.0	0.0	0.84	14.8	12.3
1.005	50.00	5.29	42.623	0.091	0.0	0.0	0.0	0.82	14.5	12.3

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall C. Name	Level I. (m)	Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
------------------------	--------------------	-----------------	--------------	------------------------	-------------	-----------

1.005		44.760	42.490	0.000	0	0
-------	--	--------	--------	-------	---	---

Simulation Criteria for Storm

Volumetric Runoff Coeff 0.840 Additional Flow - % of Total Flow 40.000
 Areal Reduction Factor 1.000 MADD Factor * 10m³/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) 720
 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 6

Number of Input Hydrographs 0 Number of Storage Structures 1
 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 Region England and Wales
 Return Period (years) 100 M5-60 (mm) 20.900

Ashton Court
Camden Road
Camden NW1 9HF

Date 26-04-17

File POST DEV WITH MITIGATIO...

CADS

Designed by SG

Checked by CJM

Network 2016.1



Synthetic Rainfall Details

Ratio R 0.444 Cv (Winter) 0.840
Profile Type Winter Storm Duration (mins) 360
Cv (Summer) 0.750

Ashton Court
Camden Road
Camden NW1 9HF

Date 26-04-17

File POST DEV WITH MITIGATIO...

Designed by SG

Checked by CJM

CADS

Network 2016.1



Online Controls for Storm

Hydro-Brake Optimum® Manhole: tank, DS/PN: 1.004, Volume (m³): 0.3

Unit Reference MD-SHE-0031-5000-1200-5000
 Design Head (m) 1.200
 Design Flow (l/s) 0.5
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 31
 Invert Level (m) 42.630
 Minimum Outlet Pipe Diameter (mm) 75
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	0.5
Flush-Flo™	0.137	0.3
Kick-Flo®	0.275	0.3
Mean Flow over Head Range	-	0.4

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	0.3	1.200	0.5	3.000	0.7	7.000	1.1
0.200	0.3	1.400	0.5	3.500	0.8	7.500	1.1
0.300	0.3	1.600	0.6	4.000	0.9	8.000	1.2
0.400	0.3	1.800	0.6	4.500	0.9	8.500	1.2
0.500	0.3	2.000	0.6	5.000	0.9	9.000	1.2
0.600	0.4	2.200	0.7	5.500	1.0	9.500	1.3
0.800	0.4	2.400	0.7	6.000	1.0		
1.000	0.5	2.600	0.7	6.500	1.1		

Ashton Court
 Camden Road
 Camden NW1 9HF

Date 26-04-17
 File POST DEV WITH MITIGATIO...

Designed by SG
 Checked by CJM



CADS Network 2016.1

Storage Structures for Storm

Cellular Storage Manhole: tank, DS/PN: 1.004

Invert Level (m) 42.630
 Infiltration Coefficient Base (m/hr) 0.00000
 Infiltration Coefficient Side (m/hr) 0.00000
 Safety Factor 2.0
 Porosity 0.95

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	40.0	40.0	5.200	40.0	171.6
0.400	40.0	50.1	5.600	40.0	181.7
0.800	40.0	60.2	6.000	40.0	191.8
1.200	40.0	70.4	6.400	40.0	201.9
1.600	40.0	80.5	6.800	40.0	212.0
2.000	40.0	90.6	7.200	40.0	222.1
2.400	40.0	100.7	7.600	40.0	232.3
2.800	40.0	110.8	8.000	40.0	242.4
3.200	40.0	121.0	8.400	40.0	252.5
3.600	40.0	131.1	8.800	40.0	262.6
4.000	40.0	141.2	9.200	40.0	272.7
4.400	40.0	151.3	9.600	40.0	282.9
4.800	40.0	161.4	10.000	40.0	293.0

Ashton Court
Camden Road
Camden NW1 9HF

Date 26-04-17

File POST DEV WITH MITIGATIO...

Designed by SG

Checked by CJM



CADS

Network 2016.1

Summary of Results for 360 minute 100 year Winter (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status
1.000	re1	44.121	-0.079	0.000	0.11	1.5	OK
1.001	1	44.120	0.073	0.000	0.12	1.5	SURCHARGED
1.002	2	44.120	0.169	0.000	0.09	3.1	SURCHARGED
1.003	3	44.119	0.526	0.000	0.28	3.1	SURCHARGED
2.000	re2	44.121	-0.079	0.000	0.16	2.1	OK
2.001	4	44.120	0.073	0.000	0.06	2.1	SURCHARGED
3.000	re3	44.972	-0.078	0.000	0.11	2.6	OK
2.002	5	44.119	0.524	0.000	0.43	4.7	SURCHARGED
1.004	tank	44.119	1.339	0.000	0.05	0.5	FLOOD RISK
1.005	6	42.642	-0.131	0.000	0.04	0.5	OK