


CRITICAL STORM & GENERAL STORAGE REQ'T

Stevenson Associates		Page 1
PO Box 58 Monk Fryston Leeds LS25 5WZ	Bishop's Close Cawood	
Date April 2015 File BC 1.SRC	Designed By Stevenson Checked By	
Micro Drainage	Storage Design W.11.3	

RECEIVED
13 May 2015
BUSINESS SUPPORT

Summary of Results for 50 year Return Period

Storm Duration (mins)	Maximum Control (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m ³)	Status
15 Summer	2.4	2.4	6.7732	0.5532	32.7	O K
30 Summer	2.6	2.6	6.8703	0.6503	41.3	O K
60 Summer	2.7	2.7	6.9538	0.7338	48.4	O K
120 Summer	2.8	2.8	6.9968	0.7768	51.9	O K
180 Summer	2.8	2.8	6.9883	0.7683	51.2	O K
240 Summer	2.8	2.8	6.9718	0.7518	49.9	O K
360 Summer	2.7	2.7	6.9373	0.7173	47.1	O K
480 Summer	2.7	2.7	6.9083	0.6883	44.6	O K
600 Summer	2.6	2.6	6.8813	0.6613	42.3	O K
720 Summer	2.6	2.6	6.8553	0.6353	40.0	O K
960 Summer	2.5	2.5	6.8063	0.5863	35.6	O K
15 Winter	2.5	2.5	6.8198	0.5998	36.9	O K
30 Winter	2.7	2.7	6.9343	0.7143	46.8	O K
60 Winter	2.9	2.9	7.0423	0.8223	55.3	O K
120 Winter	3.0	3.0	7.1193	0.8993	60.2	O K
180 Winter	3.0	3.0	7.1168	0.8968	60.0	O K
240 Winter	3.0	3.0	7.0888	0.8688	58.4	O K
360 Winter	2.9	2.9	7.0348	0.8148	54.7	O K
480 Winter	2.8	2.8	6.9883	0.7683	51.2	O K
600 Winter	2.7	2.7	6.9453	0.7253	47.8	O K
720 Winter	2.7	2.7	6.9053	0.6853	44.4	O K
960 Winter	2.5	2.5	6.8308	0.6108	37.8	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	80.37	18
30 Summer	52.55	33
60 Summer	32.83	62
120 Summer	19.89	120
180 Summer	14.67	156
240 Summer	11.76	188
360 Summer	8.57	254
480 Summer	6.85	324
600 Summer	5.75	392
720 Summer	4.98	462
960 Summer	3.97	598
15 Winter	80.37	18
30 Winter	52.55	32
60 Winter	32.83	60
120 Winter	19.89	118
180 Winter	14.67	170
240 Winter	11.76	196
360 Winter	8.57	272
480 Winter	6.85	350
600 Winter	5.75	426
720 Winter	4.98	500
960 Winter	3.97	644

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Bishop's Close
 Cawood



Date April 2015
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Micro Drainage

Storage Design W.11.3

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	50	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.000	Shortest Storm (mins)	15		
Ratio-R	0.400	Longest Storm (mins)	960		

Time / Area Diagram

Total Area (ha) = 0.232

Time	(mins)	Area
from:	to:	(ha)
0	4	0.232

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Circular Pipe Details

Diameter (m) 0.900 Length (m) 100.000 Cover Level (m) 7.670
 Slope (1:x) 500.0 Invert Level (m) 6.220

Hydro-Brake Outflow Control

Design Head (m) 0.900 Hydro-Brake Type MD6 Invert Level (m) 6.220
 Design Flow (l/s) 3.0 Diameter (mm) 75

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)
0.10	2.0	0.60	2.5	1.60	4.1	2.60	5.2	5.00	7.2	7.50	8.8
0.20	2.3	0.80	2.9	1.80	4.3	3.00	5.6	5.50	7.5	8.00	9.1
0.30	2.1	1.00	3.2	2.00	4.5	3.50	6.0	6.00	7.9	8.50	9.3
0.40	2.2	1.20	3.5	2.20	4.8	4.00	6.4	6.50	8.2	9.00	9.6
0.50	2.3	1.40	3.8	2.40	5.0	4.50	6.8	7.00	8.5	9.50	9.9

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Date April 2015 File BC30-120W.SIM	Designed By Stevenson Checked By	
Micro Drainage	Simulation W.11.3	

Global Variables

Region	FSR - England & Wales
Return Period (yrs)	30
M5-60 (mm)	19.000
Ratio R	0.400
Volumetric Runoff Coef	0.840
Profile Type	Winter
PIMP (%)	100
Areal Reduction Factor	1.000
Storm Duration (mins)	120
Hot Start (mins)	0
Hot Start Level (mm)	0
Manhole Headloss Coefficient	0.500
MADD Factor * 10m ³ /ha Storage	2.000
Foul Sewage/Hectare (l/s)	0.00
Additional Flow - % of Total Flow	30
Number of Input Hydrographs	0
Number of Time/Area Diagrams	0
Number of Bifurcations	0
Number of Overflows	0
Number of Off-Line Controls	0
Number of On-Line Controls	2

Starting Storm file name

C:\USERS\STEVENSON\DOCUMENTS\WINDES DATA\BISHOP'S CLOSE CAWOOD\BC1.SWS

Freely Discharging Outfalls

Outfall Pipe Number	Outfall MH/No	C.Level (m)	I.Level (m)	D,L (mm)	B (mm)
1.004	Existing	7.770	5.910	1050	0

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Simulation W.11.3

On-Line Controls (Hydro-Brake®)

US/PN	Volume (m³)	Ctrl MH Name	Invert (m)	Type	Dia (m)	D.Head (m)	D.Flow (l/s)	Headloss (m)	Flow (l/s)
1.003	0.075	6	6.220	Md6 SW Only	0.075	0.900	3.0	0.1	2.0
								0.2	2.3
								0.3	2.1
								0.4	2.2
								0.5	2.3
								0.6	2.5
								0.7	2.7
								0.8	2.9
								0.9	3.0
								1.0	3.2
								1.2	3.5
2.000	13.148	6	6.220	Md6 SW Only	0.075	0.900	3.0	0.1	2.0
								0.2	2.3
								0.3	2.1
								0.4	2.2
								0.5	2.3
								0.6	2.5
								0.7	2.7
								0.8	2.9
								0.9	3.0
								1.0	3.2
								1.2	3.5
1.4	3.8								
1.6	4.1								
1.8	4.3								

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Simulation W.11.3

Network Details

PN	Length (m)	Fall (m)	Slope (1:x)	Area (ha)	T.E. (mins)	Rain Pro	k (mm)	Hyd Sect	Dia (mm)
1.000	48.30	0.322	150.0	0.033	5.00	1	0.600	o	150
1.001	15.00	0.100	150.0	0.025	0.00	1	0.600	o	150
1.002	40.00	0.080	500.0	0.000	0.00	1	0.600	oo	1
1.003	6.50	0.018	361.1	0.052	0.00	1	0.600	o	150
2.000	48.00	0.100	480.0	0.122	5.00	1	0.600	o	600
1.004	45.90	0.310	148.1	0.000	0.00	1	0.600	o	150

PN	USMH No.	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl No.	US/MH (mm)
1.000	1	7.750	6.740	0.860	7.650	6.418	1.082		1050
1.001	2	7.650	6.418	1.082	7.600	6.318	1.132		1050
1.002	3	7.600	6.318	0.382	7.630	6.238	0.492		3000
1.003	4	7.630	6.238	1.242	7.670	6.220	1.300		3000
2.000	5	7.600	6.320	0.680	7.670	6.220	0.850		1500
1.004	6	7.670	6.220	1.300	7.770	5.910	1.710	9	1500

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Summary of Results

Return Period (years)	30	Analysis Time Step	Fine
Storm Duration (mins)	120	DTS Status	ON
Profile Type	Winter	DVD Status	OFF
Margin for Flood Risk warning (mm)	300	Inertia Status	OFF

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m ³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	7.081	0.191	0.000	0.31	0.0	4.4	SURCH'ED
1.001	7.075	0.507	0.000	0.51	0.0	6.8	SURCH'ED
1.002	7.071	-0.147	0.000	0.00	0.0	5.0	O K
1.003	7.071	0.683	0.000	0.41	0.0	3.3	SURCH'ED
2.000	7.072	0.152	0.000	0.06	0.0	15.0	SURCH'ED
1.004	7.077	0.707	0.000	0.21	0.0	3.0	SURCH'ED

*3.0 l/s MAX
 (NO FLOODING)*

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Rainfall Hyetograph

Region	FSR - England & Wales	Profile Type	Winter
Return Period (yrs)	30	Storm Duration (mins)	120
M5-60 (mm)	19.000		
Ratio R	0.400		

Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)
4	2.44	28	9.15	52	35.27	76	29.40	100	8.14
8	5.99	32	11.14	56	40.32	80	23.72	104	7.88
12	7.50	36	14.24	60	43.91	84	18.59	108	7.88
16	7.88	40	18.59	64	43.91	88	14.24	112	7.50
20	7.88	44	23.72	68	40.32	92	11.14	116	5.99
24	8.14	48	29.40	72	35.27	96	9.15	120	2.44