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26 HIGH ST. HADLEIGH IPSWICH SUFFOLK IP7 5AP	Queenswood Sch 47175 Proposed rev a inc green space	
Date 04/07/2017 10:09 File proposed inc green spac...	Designed by MJG Checked by	
Micro Drainage	Source Control 2015.1	

Summary of Results for 30 year Return Period (+20%)

Half Drain Time : 13 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	49.486	0.186	0.0	20.7	20.7	23.8	O K
30 min Summer	49.500	0.200	0.0	20.7	20.7	25.7	O K
60 min Summer	49.486	0.186	0.0	20.7	20.7	23.8	O K
120 min Summer	49.440	0.140	0.0	20.4	20.4	17.5	O K
180 min Summer	49.410	0.110	0.0	19.8	19.8	13.6	O K
240 min Summer	49.389	0.089	0.0	17.5	17.5	10.9	O K
360 min Summer	49.363	0.063	0.0	14.2	14.2	7.6	O K
480 min Summer	49.346	0.046	0.0	11.9	11.9	5.6	O K
600 min Summer	49.335	0.035	0.0	10.3	10.3	4.1	O K
720 min Summer	49.326	0.026	0.0	9.1	9.1	3.0	O K
960 min Summer	49.313	0.013	0.0	7.5	7.5	1.5	O K
1440 min Summer	49.300	0.000	0.0	5.8	5.8	0.0	O K
2160 min Summer	49.300	0.000	0.0	4.1	4.1	0.0	O K
2880 min Summer	49.300	0.000	0.0	3.3	3.3	0.0	O K
4320 min Summer	49.300	0.000	0.0	2.4	2.4	0.0	O K
5760 min Summer	49.300	0.000	0.0	1.9	1.9	0.0	O K
7200 min Summer	49.300	0.000	0.0	1.6	1.6	0.0	O K
8640 min Summer	49.300	0.000	0.0	1.4	1.4	0.0	O K
10080 min Summer	49.300	0.000	0.0	1.2	1.2	0.0	O K
15 min Winter	49.517	0.217	0.0	20.8	20.8	28.1	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	92.906	0.0	37.6	15
30 min Summer	59.953	0.0	48.9	23
60 min Summer	36.973	0.0	60.4	40
120 min Summer	22.137	0.0	73.0	72
180 min Summer	16.232	0.0	80.6	102
240 min Summer	12.972	0.0	86.1	132
360 min Summer	9.428	0.0	93.6	192
480 min Summer	7.517	0.0	99.7	252
600 min Summer	6.302	0.0	104.4	312
720 min Summer	5.454	0.0	108.4	372
960 min Summer	4.341	0.0	115.1	492
1440 min Summer	3.143	0.0	125.0	0
2160 min Summer	2.273	0.0	135.7	0
2880 min Summer	1.806	0.0	143.6	0
4320 min Summer	1.304	0.0	155.6	0
5760 min Summer	1.034	0.0	164.6	0
7200 min Summer	0.864	0.0	171.8	0
8640 min Summer	0.746	0.0	178.0	0
10080 min Summer	0.658	0.0	183.3	0
15 min Winter	92.906	0.0	42.8	15



Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
30 min Winter	49.530	0.230	0.0	20.8	20.8	30.0	O K
60 min Winter	49.504	0.204	0.0	20.8	20.8	26.3	O K
120 min Winter	49.433	0.133	0.0	20.3	20.3	16.6	O K
180 min Winter	49.394	0.094	0.0	18.0	18.0	11.5	O K
240 min Winter	49.371	0.071	0.0	15.3	15.3	8.6	O K
360 min Winter	49.344	0.044	0.0	11.6	11.6	5.3	O K
480 min Winter	49.329	0.029	0.0	9.5	9.5	3.4	O K
600 min Winter	49.317	0.017	0.0	8.0	8.0	2.1	O K
720 min Winter	49.309	0.009	0.0	7.0	7.0	1.1	O K
960 min Winter	49.300	0.000	0.0	5.8	5.8	0.0	O K
1440 min Winter	49.300	0.000	0.0	4.1	4.1	0.0	O K
2160 min Winter	49.300	0.000	0.0	3.1	3.1	0.0	O K
2880 min Winter	49.300	0.000	0.0	2.4	2.4	0.0	O K
4320 min Winter	49.300	0.000	0.0	1.8	1.8	0.0	O K
5760 min Winter	49.300	0.000	0.0	1.4	1.4	0.0	O K
7200 min Winter	49.300	0.000	0.0	1.1	1.1	0.0	O K
8640 min Winter	49.300	0.000	0.0	1.0	1.0	0.0	O K
10080 min Winter	49.300	0.000	0.0	0.9	0.9	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	59.953	0.0	55.4	26
60 min Winter	36.973	0.0	68.8	44
120 min Winter	22.137	0.0	82.4	76
180 min Winter	16.232	0.0	90.3	104
240 min Winter	12.972	0.0	96.2	134
360 min Winter	9.428	0.0	104.9	196
480 min Winter	7.517	0.0	111.6	256
600 min Winter	6.302	0.0	117.0	316
720 min Winter	5.454	0.0	121.5	376
960 min Winter	4.341	0.0	128.9	0
1440 min Winter	3.143	0.0	140.0	0
2160 min Winter	2.273	0.0	151.9	0
2880 min Winter	1.806	0.0	160.9	0
4320 min Winter	1.304	0.0	174.3	0
5760 min Winter	1.034	0.0	184.3	0
7200 min Winter	0.864	0.0	192.5	0
8640 min Winter	0.746	0.0	199.3	0
10080 min Winter	0.658	0.0	205.3	0

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.422	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20


Pipe Network

Volume in Pipe Network (m³)	1	Dia of Outfall Pipe (m)	0.2
Slope of Outfall Pipe (1:X)	150	Roughness of Outfall Pipe (mm)	0.600

Time Area Diagram

Total Area (ha) 0.221

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:
0	4	0.218	4	8	0.001
				8	12
					0.002

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Model Details

Storage is Online Cover Level (m) 49.900

Infiltration Basin Structure

Invert Level (m) 49.300 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00  
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )
0.000	117.0	0.700	0.0	1.400	0.0	2.100	0.0
0.100	129.0	0.800	0.0	1.500	0.0	2.200	0.0
0.200	140.0	0.900	0.0	1.600	0.0	2.300	0.0
0.300	152.0	1.000	0.0	1.700	0.0	2.400	0.0
0.400	164.0	1.100	0.0	1.800	0.0	2.500	0.0
0.500	176.0	1.200	0.0	1.900	0.0		
0.600	0.0	1.300	0.0	2.000	0.0		

Hydro-Brake Optimum® Outflow Control

Unit Reference MD-SHE-0206-2100-0600-2100  
 Design Head (m) 0.600  
 Design Flow (l/s) 21.0  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Diameter (mm) 206  
 Invert Level (m) 49.210  
 Minimum Outlet Pipe Diameter (mm) 225  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	20.8
Flush-Flo™	0.300	20.8
Kick-Flo®	0.491	18.9
Mean Flow over Head Range	-	16.2

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	7.1	1.200	28.9	3.000	45.0	7.000	67.6
0.200	19.8	1.400	31.2	3.500	48.5	7.500	70.0
0.300	20.8	1.600	33.2	4.000	51.7	8.000	72.3
0.400	20.3	1.800	35.2	4.500	54.8	8.500	74.6
0.500	19.1	2.000	37.0	5.000	57.7	9.000	76.8
0.600	20.8	2.200	38.8	5.500	60.4	9.500	78.9
0.800	23.8	2.400	40.4	6.000	63.0		
1.000	26.5	2.600	42.0	6.500	65.1		