

RGP Design Limited							Page 1
Metro House			59 Elm Grove				
Northgate			Barnham				
Chichester PO19 1BE			PO22 0HJ				
Date 31/01/2018			Designed by SPB				
File D1393 POROUS PAVING AND...			Checked by LDF				
XP Solutions			Source Control 2016.1				
Summary of Results for 100 year Return Period (+40%)							
Half Drain Time : 103 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	99.288	0.138	0.0	2.7	2.7	16.3	O K
30 min Summer	99.335	0.185	0.0	2.8	2.8	21.9	Flood Risk
60 min Summer	99.371	0.221	0.0	2.9	2.9	26.0	Flood Risk
120 min Summer	99.381	0.231	0.0	2.9	2.9	27.2	Flood Risk
180 min Summer	99.375	0.225	0.0	2.9	2.9	26.5	Flood Risk
240 min Summer	99.365	0.215	0.0	2.9	2.9	25.4	Flood Risk
360 min Summer	99.347	0.197	0.0	2.8	2.8	23.2	Flood Risk
480 min Summer	99.328	0.178	0.0	2.8	2.8	20.9	Flood Risk
600 min Summer	99.309	0.159	0.0	2.7	2.7	18.7	Flood Risk
720 min Summer	99.291	0.141	0.0	2.7	2.7	16.6	O K
960 min Summer	99.257	0.107	0.0	2.6	2.6	12.7	O K
1440 min Summer	99.206	0.056	0.0	2.5	2.5	6.6	O K
2160 min Summer	99.161	0.011	0.0	2.4	2.4	1.3	O K
2880 min Summer	99.150	0.000	0.0	2.2	2.2	0.0	O K
4320 min Summer	99.150	0.000	0.0	1.6	1.6	0.0	O K
5760 min Summer	99.150	0.000	0.0	1.3	1.3	0.0	O K
7200 min Summer	99.150	0.000	0.0	1.1	1.1	0.0	O K
8640 min Summer	99.150	0.000	0.0	0.9	0.9	0.0	O K
10080 min Summer	99.150	0.000	0.0	0.8	0.8	0.0	O K
15 min Winter	99.308	0.158	0.0	2.7	2.7	18.6	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
15 min Summer	124.996	0.0	18.8	21			
30 min Summer	84.600	0.0	26.2	34			
60 min Summer	54.663	0.0	34.2	62			
120 min Summer	34.072	0.0	43.3	100			
180 min Summer	25.432	0.0	48.7	134			
240 min Summer	20.503	0.0	52.6	168			
360 min Summer	15.144	0.0	58.3	236			
480 min Summer	12.197	0.0	62.7	304			
600 min Summer	10.303	0.0	66.2	370			
720 min Summer	8.970	0.0	69.2	434			
960 min Summer	7.202	0.0	74.0	560			
1440 min Summer	5.275	0.0	81.4	796			
2160 min Summer	3.854	0.0	88.8	1128			
2880 min Summer	3.080	0.0	94.4	0			
4320 min Summer	2.242	0.0	102.2	0			
5760 min Summer	1.787	0.0	107.8	0			
7200 min Summer	1.500	0.0	112.3	0			
8640 min Summer	1.301	0.0	116.0	0			
10080 min Summer	1.153	0.0	119.1	0			
15 min Winter	124.996	0.0	21.3	22			
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Summary of Results for 100 year Return Period (+40%)							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	99.363	0.213	0.0	2.8	2.8	25.1	Flood Risk
60 min Winter	99.407	0.257	0.0	2.9	2.9	30.3	Flood Risk
120 min Winter	99.423	0.273	0.0	3.0	3.0	32.1	Flood Risk
180 min Winter	99.414	0.264	0.0	2.9	2.9	31.1	Flood Risk
240 min Winter	99.400	0.250	0.0	2.9	2.9	29.5	Flood Risk
360 min Winter	99.371	0.221	0.0	2.9	2.9	26.0	Flood Risk
480 min Winter	99.341	0.191	0.0	2.8	2.8	22.5	Flood Risk
600 min Winter	99.311	0.161	0.0	2.7	2.7	19.0	Flood Risk
720 min Winter	99.284	0.134	0.0	2.7	2.7	15.8	O K
960 min Winter	99.236	0.086	0.0	2.6	2.6	10.1	O K
1440 min Winter	99.168	0.018	0.0	2.4	2.4	2.1	O K
2160 min Winter	99.150	0.000	0.0	2.0	2.0	0.0	O K
2880 min Winter	99.150	0.000	0.0	1.6	1.6	0.0	O K
4320 min Winter	99.150	0.000	0.0	1.2	1.2	0.0	O K
5760 min Winter	99.150	0.000	0.0	0.9	0.9	0.0	O K
7200 min Winter	99.150	0.000	0.0	0.8	0.8	0.0	O K
8640 min Winter	99.150	0.000	0.0	0.7	0.7	0.0	O K
10080 min Winter	99.150	0.000	0.0	0.6	0.6	0.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
30 min Winter	84.600	0.0	29.5	34			
60 min Winter	54.663	0.0	39.0	62			
120 min Winter	34.072	0.0	48.9	114			
180 min Winter	25.432	0.0	54.8	142			
240 min Winter	20.503	0.0	59.2	182			
360 min Winter	15.144	0.0	65.7	256			
480 min Winter	12.197	0.0	70.6	328			
600 min Winter	10.303	0.0	74.5	398			
720 min Winter	8.970	0.0	77.8	464			
960 min Winter	7.202	0.0	83.2	588			
1440 min Winter	5.275	0.0	91.5	806			
2160 min Winter	3.854	0.0	100.0	0			
2880 min Winter	3.080	0.0	106.2	0			
4320 min Winter	2.242	0.0	115.2	0			
5760 min Winter	1.787	0.0	121.6	0			
7200 min Winter	1.500	0.0	126.8	0			
8640 min Winter	1.301	0.0	131.1	0			
10080 min Winter	1.153	0.0	134.7	0			
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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.300	Shortest Storm (mins)	15
Ratio R	0.336	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.089

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.053	4 8	0.026	8 12	0.010

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Model Details

Storage is Online Cover Level (m) 99.600

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	39.3
Max Percolation (l/s)	109.2	Slope (1:X)	0.0
Safety Factor	1.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.150	Membrane Depth (m)	0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0082-2500-0500-2500
Design Head (m)	0.500
Design Flow (l/s)	2.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	82
Invert Level (m)	98.697
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	2.5
Flush-Flo™	0.152	2.5
Kick-Flo®	0.349	2.1
Mean Flow over Head Range	-	2.1

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	2.4	1.200	3.7	3.000	5.7	7.000	8.6
0.200	2.5	1.400	4.0	3.500	6.2	7.500	8.9
0.300	2.3	1.600	4.3	4.000	6.6	8.000	9.2
0.400	2.3	1.800	4.5	4.500	6.9	8.500	9.5
0.500	2.5	2.000	4.7	5.000	7.3	9.000	9.8
0.600	2.7	2.200	5.0	5.500	7.6	9.500	10.0
0.800	3.1	2.400	5.2	6.000	8.0		
1.000	3.4	2.600	5.4	6.500	8.3		

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