

GGP Consult					Page 1
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY					
Date 07/02/2023 08:02 File Huyton - 5 ls.SRCX		Designed by GGPAeecOne Checked by			
Innovyze		Source Control 2019.1			
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	33.986	0.286	5.0	45.7	O K
30 min Summer	34.066	0.366	5.0	58.6	O K
60 min Summer	34.133	0.433	5.0	69.3	O K
120 min Summer	34.165	0.465	5.0	74.5	O K
180 min Summer	34.164	0.464	5.0	74.2	O K
240 min Summer	34.153	0.453	5.0	72.5	O K
360 min Summer	34.126	0.426	5.0	68.1	O K
480 min Summer	34.096	0.396	5.0	63.3	O K
600 min Summer	34.066	0.366	5.0	58.5	O K
720 min Summer	34.037	0.337	5.0	53.9	O K
960 min Summer	33.985	0.285	5.0	45.7	O K
1440 min Summer	33.907	0.207	4.9	33.2	O K
2160 min Summer	33.840	0.140	4.5	22.4	O K
2880 min Summer	33.811	0.111	4.0	17.7	O K
4320 min Summer	33.786	0.086	3.1	13.7	O K
5760 min Summer	33.773	0.073	2.5	11.7	O K
7200 min Summer	33.765	0.065	2.1	10.4	O K
8640 min Summer	33.759	0.059	1.8	9.4	O K
10080 min Summer	33.755	0.055	1.6	8.7	O K
15 min Winter	34.022	0.322	5.0	51.6	O K
30 min Winter	34.115	0.415	5.0	66.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	137.181	0.0	49.6	21	
30 min Summer	90.378	0.0	65.3	35	
60 min Summer	56.713	0.0	82.0	62	
120 min Summer	34.360	0.0	99.4	116	
180 min Summer	25.274	0.0	109.7	146	
240 min Summer	20.196	0.0	116.9	176	
360 min Summer	14.701	0.0	127.6	244	
480 min Summer	11.729	0.0	135.7	312	
600 min Summer	9.837	0.0	142.3	378	
720 min Summer	8.516	0.0	147.8	442	
960 min Summer	6.777	0.0	156.9	568	
1440 min Summer	4.904	0.0	170.3	808	
2160 min Summer	3.543	0.0	184.5	1148	
2880 min Summer	2.810	0.0	195.2	1496	
4320 min Summer	2.024	0.0	210.9	2208	
5760 min Summer	1.602	0.0	222.5	2936	
7200 min Summer	1.335	0.0	231.9	3672	
8640 min Summer	1.151	0.0	239.7	4408	
10080 min Summer	1.014	0.0	246.5	5112	
15 min Winter	137.181	0.0	55.5	21	
30 min Winter	90.378	0.0	73.2	35	
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Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	34.193	0.493	5.0	78.9	O K
120 min Winter	34.238	0.538	5.0	86.1	O K
180 min Winter	34.234	0.534	5.0	85.4	O K
240 min Winter	34.217	0.517	5.0	82.8	O K
360 min Winter	34.177	0.477	5.0	76.3	O K
480 min Winter	34.131	0.431	5.0	69.0	O K
600 min Winter	34.085	0.385	5.0	61.6	O K
720 min Winter	34.041	0.341	5.0	54.5	O K
960 min Winter	33.965	0.265	5.0	42.4	O K
1440 min Winter	33.863	0.163	4.7	26.1	O K
2160 min Winter	33.807	0.107	3.9	17.1	O K
2880 min Winter	33.787	0.087	3.1	13.9	O K
4320 min Winter	33.769	0.069	2.3	11.0	O K
5760 min Winter	33.759	0.059	1.8	9.5	O K
7200 min Winter	33.753	0.053	1.5	8.5	O K
8640 min Winter	33.748	0.048	1.3	7.7	O K
10080 min Winter	33.745	0.045	1.2	7.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	56.713	0.0	91.9	62	
120 min Winter	34.360	0.0	111.3	118	
180 min Winter	25.274	0.0	122.8	170	
240 min Winter	20.196	0.0	130.9	192	
360 min Winter	14.701	0.0	142.9	266	
480 min Winter	11.729	0.0	152.0	340	
600 min Winter	9.837	0.0	159.4	408	
720 min Winter	8.516	0.0	165.6	476	
960 min Winter	6.777	0.0	175.7	600	
1440 min Winter	4.904	0.0	190.7	824	
2160 min Winter	3.543	0.0	206.7	1144	
2880 min Winter	2.810	0.0	218.6	1496	
4320 min Winter	2.024	0.0	236.2	2208	
5760 min Winter	1.602	0.0	249.2	2936	
7200 min Winter	1.335	0.0	259.7	3672	
8640 min Winter	1.151	0.0	268.5	4408	
10080 min Winter	1.014	0.0	276.1	5144	
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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)	20.000	Shortest Storm (mins)	15
Ratio R	0.392	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.193

Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)
0 4	0.096	4 8	0.097

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Model Details

Storage is Online Cover Level (m) 35.220

Tank or Pond Structure

Invert Level (m) 33.700

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	160.0	0.800	160.0	0.801	1.0	1.520	1.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0105-5000-1050-5000
Design Head (m)	1.050
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	33.697
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.050	5.0
Flush-Flo™	0.313	5.0
Kick-Flo®	0.667	4.1
Mean Flow over Head Range	-	4.3

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	3.5	1.200	5.3	3.000	8.2	7.000	12.2
0.200	4.8	1.400	5.7	3.500	8.8	7.500	12.6
0.300	5.0	1.600	6.1	4.000	9.4	8.000	13.0
0.400	4.9	1.800	6.4	4.500	9.9	8.500	13.4
0.500	4.8	2.000	6.7	5.000	10.4	9.000	13.8
0.600	4.5	2.200	7.1	5.500	10.9	9.500	14.1
0.800	4.4	2.400	7.3	6.000	11.3		
1.000	4.9	2.600	7.6	6.500	11.8		

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