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Brook House Weybrook Road Stockport, M19 2QD	9883 Car Park Subvoid Design v1.0	
Date 27/09/2022 11:58 File 9883 - Car Park Subvoid	Designed by HBL Checked by	
Innovyze	Source Control 2020.1.3	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 35 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	61.189	0.139	0.0	2.1	2.1	4.6	O K
30 min Summer	61.211	0.161	0.0	2.3	2.3	6.2	O K
60 min Summer	61.221	0.171	0.0	2.3	2.3	7.0	O K
120 min Summer	61.219	0.169	0.0	2.3	2.3	6.9	O K
180 min Summer	61.211	0.161	0.0	2.2	2.2	6.2	O K
240 min Summer	61.201	0.151	0.0	2.2	2.2	5.5	O K
360 min Summer	61.181	0.131	0.0	2.1	2.1	4.1	O K
480 min Summer	61.164	0.114	0.0	2.0	2.0	3.1	O K
600 min Summer	61.148	0.098	0.0	1.9	1.9	2.3	O K
720 min Summer	61.134	0.084	0.0	1.8	1.8	1.7	O K
960 min Summer	61.111	0.061	0.0	1.6	1.6	0.9	O K
1440 min Summer	61.078	0.028	0.0	1.3	1.3	0.2	O K
2160 min Summer	61.052	0.002	0.0	1.0	1.0	0.0	O K
2880 min Summer	61.050	0.000	0.0	0.8	0.8	0.0	O K
4320 min Summer	61.050	0.000	0.0	0.6	0.6	0.0	O K
5760 min Summer	61.050	0.000	0.0	0.4	0.4	0.0	O K
7200 min Summer	61.050	0.000	0.0	0.4	0.4	0.0	O K
8640 min Summer	61.050	0.000	0.0	0.3	0.3	0.0	O K
10080 min Summer	61.050	0.000	0.0	0.3	0.3	0.0	O K
15 min Winter	61.201	0.151	0.0	2.2	2.2	5.5	O K
30 min Winter	61.224	0.174	0.0	2.3	2.3	7.3	O K
60 min Winter	61.234	0.184	0.0	2.4	2.4	8.1	O K
120 min Winter	61.229	0.179	0.0	2.3	2.3	7.7	O K
180 min Winter	61.216	0.166	0.0	2.3	2.3	6.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	118.498	0.0	6.3	21
30 min Summer	79.373	0.0	8.9	32
60 min Summer	50.812	0.0	11.8	50
120 min Summer	31.483	0.0	15.0	84
180 min Summer	23.483	0.0	17.0	118
240 min Summer	18.956	0.0	18.3	150
360 min Summer	13.897	0.0	20.2	214
480 min Summer	11.157	0.0	21.7	274
600 min Summer	9.402	0.0	22.9	334
720 min Summer	8.170	0.0	23.9	392
960 min Summer	6.541	0.0	25.5	508
1440 min Summer	4.773	0.0	27.8	738
2160 min Summer	3.476	0.0	30.1	1072
2880 min Summer	2.772	0.0	31.8	0
4320 min Summer	2.011	0.0	34.0	0
5760 min Summer	1.600	0.0	35.4	0
7200 min Summer	1.339	0.0	36.4	0
8640 min Summer	1.157	0.0	37.1	0
10080 min Summer	1.023	0.0	37.6	0
15 min Winter	118.498	0.0	7.2	22
30 min Winter	79.373	0.0	10.2	33
60 min Winter	50.812	0.0	13.4	54
120 min Winter	31.483	0.0	16.9	90
180 min Winter	23.483	0.0	19.2	126

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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 E Outflow (l/s)	Max Volume (m³)	Status
240 min Winter	61.201	0.151	0.0	2.2	2.2	5.5	O K
360 min Winter	61.172	0.122	0.0	2.0	2.0	3.6	O K
480 min Winter	61.147	0.097	0.0	1.9	1.9	2.3	O K
600 min Winter	61.125	0.075	0.0	1.7	1.7	1.4	O K
720 min Winter	61.107	0.057	0.0	1.6	1.6	0.8	O K
960 min Winter	61.079	0.029	0.0	1.3	1.3	0.2	O K
1440 min Winter	61.051	0.001	0.0	1.0	1.0	0.0	O K
2160 min Winter	61.050	0.000	0.0	0.7	0.7	0.0	O K
2880 min Winter	61.050	0.000	0.0	0.6	0.6	0.0	O K
4320 min Winter	61.050	0.000	0.0	0.4	0.4	0.0	O K
5760 min Winter	61.050	0.000	0.0	0.3	0.3	0.0	O K
7200 min Winter	61.050	0.000	0.0	0.3	0.3	0.0	O K
8640 min Winter	61.050	0.000	0.0	0.2	0.2	0.0	O K
10080 min Winter	61.050	0.000	0.0	0.2	0.2	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
240 min Winter	18.956	0.0	20.7	160
360 min Winter	13.897	0.0	22.8	224
480 min Winter	11.157	0.0	24.5	282
600 min Winter	9.402	0.0	25.8	340
720 min Winter	8.170	0.0	26.9	394
960 min Winter	6.541	0.0	28.8	502
1440 min Winter	4.773	0.0	31.4	724
2160 min Winter	3.476	0.0	34.1	0
2880 min Winter	2.772	0.0	36.0	0
4320 min Winter	2.011	0.0	38.6	0
5760 min Winter	1.600	0.0	40.3	0
7200 min Winter	1.339	0.0	41.5	0
8640 min Winter	1.157	0.0	42.4	0
10080 min Winter	1.023	0.0	43.1	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)	18.000	Shortest Storm (mins)	15
Ratio R	0.359	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.035

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.012	4	8	0.012
			8	12	0.012

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Model Details

Storage is Online Cover Level (m) 61.525

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	16.0
Membrane Percolation (mm/hr)	1000	Length (m)	18.0
Max Percolation (l/s)	80.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	61.050	Membrane Depth (m)	300

Orifice Outflow Control

Diameter (m) 0.049 Discharge Coefficient 0.600 Invert Level (m) 60.985