Camden

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1. Project & Site Details

Project / Site Name (including sub-catchment / stage / phase where appropriate)	Garages to the South of 27a West End Lane
Address & post code	Garages to the South of 27a West End Lane, West Hampstead, NW6 4QJ
OS Grid ref. (Easting, Northing)	E 525487
	N 18841
LPA reference (if applicable)	-
Brief description of proposed work	Proposed demolition of the existing eight garages and the erection of a three storey plus lower ground floor building comprising 3x1 bed units, 4x2 bed units, and 1x3 bed units (Class C3) with associated acess and infrastructure
Total site Area	305 m^2
Total existing impervious area	305 m^2
Total proposed impervious area	305 m^2
Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	N/A
Existing drainage connection type and location	Assumed connection to Thames Water combined sewer
Designer Name	Elen Wyatt
Designer Position	Water Consultant
Designer Company	Create Consulting Engineers

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	N/A
Bedrock geology classification	London Clay Formation
Site infiltration rate	N/A m/s
Depth to groundwater level	N/A m below ground level
Is infiltration feasible?	No

2b. Drainage Hierarchy

	Feasible (Y/N)	*Proposed (Y/N)*
1 store rainwater for later use	Y	N
2 use infiltration techniques, such as porous surfaces in non-clay areas	N	N
3 attenuate rainwater in ponds or open water features for gradual release	N	N
4 attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Y
5 discharge rainwater direct to a watercourse	N	N
6 discharge rainwater to a surface water sewer/drain	N	N
7 discharge rainwater to the combined sewer.	Y	Y

2c. Proposed Discharge Details

Proposed discharge location	To Thames Water combined sewer in West End Lane via new connection
Has the owner/regulator of the discharge location been consulted?	Yes - Pre Dev reponse confirms capacity

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3. Drainage Strategy

3a. Discharge Rates & Required Storage

	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	0.12			
1 in 1	0.1	3.5	1.7	1
1 in 30	0.27	8.57	9	1
1 in 100	0.38	11.05	14.6	1
1 in 100 + CC			24.2	1
Climate change allowance used		40%		
3b. Principal Method of Flow Control		Pump		

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	67	92	0
Blue roofs	0	0	0
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	305	54	0
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	305		24.2
Total	**677**	**146**	**24.2**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Para 4.14 of FRA and DS
Drainage hierarchy (2b)	Table 4.3 of FRA and DS
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 4 of FRA and DS Appendix C of FRA and DS Drawing 1126/02/001A
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Appendix F and G of FRA and DS Calcs appended to ProForma
Proposed SuDS measures & specifications (3b)	Para 4.16 of FRA and DS Table 4.3 of FRA and DS
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	Drawings 0390(20) 105J to 109G
Detailed drainage design drawings, including exceedance flow routes	1126/02/001A
Detailed landscaping plans	N/A
Maintenance strategy	Table 4.6 of FRA and DS
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	Para 4.18 to 4.24 of FRA and DS
b) biodiversity?	Permeable Paving and Green Roof
c) amenity?	Table 4.3 of FRA and DS

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	30.655	1.355	1.0	10.8	O K
30 min Summer	31.049	1.749	1.0	14.0	O K
60 min Summer	31.364	2.064	1.0	16.5	O K
120 min Summer	31.746	2.446	1.0	19.6	O K
180 min Summer	31.832	2.532	1.0	20.3	O K
240 min Summer	31.827	2.527	1.0	20.2	O K
360 min Summer	31.708	2.408	1.0	19.3	O K
480 min Summer	31.545	2.245	1.0	18.0	O K
600 min Summer	31.369	2.069	1.0	16.6	O K
720 min Summer	31.192	1.892	1.0	15.1	O K
960 min Summer	30.848	1.548	1.0	12.4	O K
1440 min Summer	30.248	0.948	1.0	7.6	O K
2160 min Summer	29.641	0.341	1.0	2.7	O K
2880 min Summer	29.348	0.048	1.0	0.4	O K
4320 min Summer	29.300	0.000	0.8	0.0	O K
5760 min Summer	29.300	0.000	0.6	0.0	O K
7200 min Summer	29.300	0.000	0.5	0.0	O K
8640 min Summer	29.300	0.000	0.4	0.0	O K
10080 min Summer	29.300	0.000	0.4	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	182.560	0.0	13.3	21
30 min Summer	117.600	0.0	17.1	34
60 min Summer	71.820	0.0	21.0	64
120 min Summer	46.270	0.0	27.2	122
180 min Summer	35.180	0.0	31.0	180
240 min Summer	28.665	0.0	33.7	208
360 min Summer	21.093	0.0	37.3	272
480 min Summer	16.740	0.0	39.5	336
600 min Summer	13.901	0.0	40.9	404
720 min Summer	11.900	0.0	42.1	470
960 min Summer	9.258	0.0	43.6	598
1440 min Summer	6.428	0.0	45.4	850
2160 min Summer	4.445	0.0	47.0	1188
2880 min Summer	3.424	0.0	48.2	1496
4320 min Summer	2.380	0.0	50.1	0
5760 min Summer	1.848	0.0	51.7	0
7200 min Summer	1.528	0.0	53.3	0
8640 min Summer	1.315	0.0	54.8	0
10080 min Summer	1.163	0.0	56.4	0

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 Winter	30.843	1.543	1.0	12.3	O K
30 min Winter	31.296	1.996	1.0	16.0	O K
60 min Winter	31.677	2.377	1.0	19.0	O K
120 min Winter	32.175	2.875	1.0	23.0	O K
180 min Winter	32.322	3.022	1.0	24.2	O K
240 min Winter	32.311	3.011	1.0	24.1	O K
360 min Winter	32.151	2.851	1.0	22.8	O K
480 min Winter	31.927	2.627	1.0	21.0	O K
600 min Winter	31.673	2.373	1.0	19.0	O K
720 min Winter	31.412	2.112	1.0	16.9	O K
960 min Winter	30.902	1.602	1.0	12.8	O K
1440 min Winter	30.039	0.739	1.0	5.9	O K
2160 min Winter	29.321	0.021	1.0	0.2	O K
2880 min Winter	29.300	0.000	0.8	0.0	O K
4320 min Winter	29.300	0.000	0.6	0.0	O K
5760 min Winter	29.300	0.000	0.4	0.0	O K
7200 min Winter	29.300	0.000	0.4	0.0	O K
8640 min Winter	29.300	0.000	0.3	0.0	O K
10080 min Winter	29.300	0.000	0.3	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Winter	182.560	0.0	14.9	23
30 min Winter	117.600	0.0	19.3	36
60 min Winter	71.820	0.0	23.6	62
120 min Winter	46.270	0.0	30.5	120
180 min Winter	35.180	0.0	34.8	176
240 min Winter	28.665	0.0	37.8	230
360 min Winter	21.093	0.0	41.8	290
480 min Winter	16.740	0.0	44.2	364
600 min Winter	13.901	0.0	45.9	438
720 min Winter	11.900	0.0	47.1	510
960 min Winter	9.258	0.0	49.0	646
1440 min Winter	6.428	0.0	50.9	892
2160 min Winter	4.445	0.0	52.7	1144
2880 min Winter	3.424	0.0	54.1	0
4320 min Winter	2.380	0.0	56.2	0
5760 min Winter	1.848	0.0	58.0	0
7200 min Winter	1.528	0.0	59.8	0
8640 min Winter	1.315	0.0	61.6	0
10080 min Winter	1.163	0.0	63.4	0

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 525350 183050 TQ 25350 83050
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.033

Time From: (mins)	To: (mins)	Area (ha)
0	4	0.033

Green Roof

Area (m^3) 67 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)
0	4	0.001218	32	36	0.000246	64	68	0.000050	96	100	0.000010
4	8	0.000997	36	40	0.000201	68	72	0.000041	100	104	0.000008
8	12	0.000816	40	44	0.000165	72	76	0.000033	104	108	0.000007
12	16	0.000668	44	48	0.000135	76	80	0.000027	108	112	0.000005
16	20	0.000547	48	52	0.000110	80	84	0.000022	112	116	0.000005
20	24	0.000448	52	56	0.000090	84	88	0.000018	116	120	0.000004
24	28	0.000367	56	60	0.000074	88	92	0.000015			
28	32	0.000300	60	64	0.000061	92	96	0.000012			

Time Area Diagram

Total Area (ha) 0.000

Time From: (mins)	To: (mins)	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 33.000

Tank or Pond Structure

Invert Level (m) 29.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	8.0	3.100	8.0	3.101	0.0

Pump Outflow Control

Invert Level (m) 29.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0000	0.900	1.0000	1.700	1.0000	2.500	1.0000
0.200	1.0000	1.000	1.0000	1.800	1.0000	2.600	1.0000
0.300	1.0000	1.100	1.0000	1.900	1.0000	2.700	1.0000
0.400	1.0000	1.200	1.0000	2.000	1.0000	2.800	1.0000
0.500	1.0000	1.300	1.0000	2.100	1.0000	2.900	1.0000
0.600	1.0000	1.400	1.0000	2.200	1.0000	3.000	1.0000
0.700	1.0000	1.500	1.0000	2.300	1.0000	3.100	1.0000
0.800	1.0000	1.600	1.0000	2.400	1.0000		

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	30.218	0.918	1.0	7.3	O K
30 min Summer	30.468	1.168	1.0	9.3	O K
60 min Summer	30.633	1.333	1.0	10.7	O K
120 min Summer	30.807	1.507	1.0	12.1	O K
180 min Summer	30.835	1.535	1.0	12.3	O K
240 min Summer	30.820	1.520	1.0	12.2	O K
360 min Summer	30.708	1.408	1.0	11.3	O K
480 min Summer	30.563	1.263	1.0	10.1	O K
600 min Summer	30.410	1.110	1.0	8.9	O K
720 min Summer	30.259	0.959	1.0	7.7	O K
960 min Summer	29.981	0.681	1.0	5.4	O K
1440 min Summer	29.566	0.266	1.0	2.1	O K
2160 min Summer	29.305	0.005	1.0	0.0	O K
2880 min Summer	29.300	0.000	0.8	0.0	O K
4320 min Summer	29.300	0.000	0.5	0.0	O K
5760 min Summer	29.300	0.000	0.4	0.0	O K
7200 min Summer	29.300	0.000	0.4	0.0	O K
8640 min Summer	29.300	0.000	0.3	0.0	O K
10080 min Summer	29.300	0.000	0.3	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	130.400	0.0	9.3	19
30 min Summer	84.000	0.0	12.1	33
60 min Summer	51.300	0.0	14.9	62
120 min Summer	33.050	0.0	19.3	120
180 min Summer	25.129	0.0	22.1	152
240 min Summer	20.475	0.0	23.9	184
360 min Summer	15.067	0.0	26.5	248
480 min Summer	11.957	0.0	28.1	316
600 min Summer	9.929	0.0	29.2	380
720 min Summer	8.500	0.0	29.9	446
960 min Summer	6.613	0.0	31.0	568
1440 min Summer	4.592	0.0	32.2	794
2160 min Summer	3.175	0.0	33.4	1104
2880 min Summer	2.446	0.0	34.2	0
4320 min Summer	1.700	0.0	35.5	0
5760 min Summer	1.320	0.0	36.6	0
7200 min Summer	1.092	0.0	37.7	0
8640 min Summer	0.939	0.0	38.7	0
10080 min Summer	0.831	0.0	39.8	0

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	30.350	1.050	1.0	8.4	O K
30 min Winter	30.646	1.346	1.0	10.8	O K
60 min Winter	30.862	1.562	1.0	12.5	O K
120 min Winter	31.104	1.804	1.0	14.4	O K
180 min Winter	31.131	1.831	1.0	14.6	O K
240 min Winter	31.096	1.796	1.0	14.4	O K
360 min Winter	30.936	1.636	1.0	13.1	O K
480 min Winter	30.715	1.415	1.0	11.3	O K
600 min Winter	30.482	1.182	1.0	9.5	O K
720 min Winter	30.256	0.956	1.0	7.6	O K
960 min Winter	29.852	0.552	1.0	4.4	O K
1440 min Winter	29.338	0.038	1.0	0.3	O K
2160 min Winter	29.300	0.000	0.7	0.0	O K
2880 min Winter	29.300	0.000	0.6	0.0	O K
4320 min Winter	29.300	0.000	0.4	0.0	O K
5760 min Winter	29.300	0.000	0.3	0.0	O K
7200 min Winter	29.300	0.000	0.3	0.0	O K
8640 min Winter	29.300	0.000	0.2	0.0	O K
10080 min Winter	29.300	0.000	0.2	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Winter	130.400	0.0	10.5	19
30 min Winter	84.000	0.0	13.7	33
60 min Winter	51.300	0.0	16.7	62
120 min Winter	33.050	0.0	21.7	118
180 min Winter	25.129	0.0	24.8	170
240 min Winter	20.475	0.0	27.0	196
360 min Winter	15.067	0.0	29.7	270
480 min Winter	11.957	0.0	31.5	342
600 min Winter	9.929	0.0	32.7	412
720 min Winter	8.500	0.0	33.6	478
960 min Winter	6.613	0.0	34.8	598
1440 min Winter	4.592	0.0	36.2	780
2160 min Winter	3.175	0.0	37.5	0
2880 min Winter	2.446	0.0	38.4	0
4320 min Winter	1.700	0.0	39.9	0
5760 min Winter	1.320	0.0	41.1	0
7200 min Winter	1.092	0.0	42.4	0
8640 min Winter	0.939	0.0	43.6	0
10080 min Winter	0.831	0.0	44.8	0

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 525350 183050 TQ 25350 83050
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.033

Time From: (mins)	To: (mins)	Area (ha)
0	4	0.033

Green Roof

Area (m^3) 67 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)
0	4	0.001218	32	36	0.000246	64	68	0.000050	96	100	0.000010
4	8	0.000997	36	40	0.000201	68	72	0.000041	100	104	0.000008
8	12	0.000816	40	44	0.000165	72	76	0.000033	104	108	0.000007
12	16	0.000668	44	48	0.000135	76	80	0.000027	108	112	0.000005
16	20	0.000547	48	52	0.000110	80	84	0.000022	112	116	0.000005
20	24	0.000448	52	56	0.000090	84	88	0.000018	116	120	0.000004
24	28	0.000367	56	60	0.000074	88	92	0.000015			
28	32	0.000300	60	64	0.000061	92	96	0.000012			

Time Area Diagram

Total Area (ha) 0.000

Time From: (mins)	To: (mins)	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 33.000

Tank or Pond Structure

Invert Level (m) 29.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	8.0	3.100	8.0	3.101	0.0

Pump Outflow Control

Invert Level (m) 29.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0000	0.900	1.0000	1.700	1.0000	2.500	1.0000
0.200	1.0000	1.000	1.0000	1.800	1.0000	2.600	1.0000
0.300	1.0000	1.100	1.0000	1.900	1.0000	2.700	1.0000
0.400	1.0000	1.200	1.0000	2.000	1.0000	2.800	1.0000
0.500	1.0000	1.300	1.0000	2.100	1.0000	2.900	1.0000
0.600	1.0000	1.400	1.0000	2.200	1.0000	3.000	1.0000
0.700	1.0000	1.500	1.0000	2.300	1.0000	3.100	1.0000
0.800	1.0000	1.600	1.0000	2.400	1.0000		

Summary of Results for 2 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	29.478	0.178	1.0	1.4	O K
30 min Summer	29.481	0.181	1.0	1.4	O K
60 min Summer	29.459	0.159	1.0	1.3	O K
120 min Summer	29.491	0.191	1.0	1.5	O K
180 min Summer	29.478	0.178	1.0	1.4	O K
240 min Summer	29.452	0.152	1.0	1.2	O K
360 min Summer	29.392	0.092	1.0	0.7	O K
480 min Summer	29.336	0.036	1.0	0.3	O K
600 min Summer	29.306	0.006	1.0	0.0	O K
720 min Summer	29.300	0.000	0.9	0.0	O K
960 min Summer	29.300	0.000	0.7	0.0	O K
1440 min Summer	29.300	0.000	0.5	0.0	O K
2160 min Summer	29.300	0.000	0.4	0.0	O K
2880 min Summer	29.300	0.000	0.3	0.0	O K
4320 min Summer	29.300	0.000	0.2	0.0	O K
5760 min Summer	29.300	0.000	0.2	0.0	O K
7200 min Summer	29.300	0.000	0.2	0.0	O K
8640 min Summer	29.300	0.000	0.1	0.0	O K
10080 min Summer	29.300	0.000	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	37.404	0.0	2.4	15
30 min Summer	23.756	0.0	3.2	24
60 min Summer	14.504	0.0	3.9	40
120 min Summer	10.400	0.0	5.9	80
180 min Summer	8.162	0.0	6.9	112
240 min Summer	6.756	0.0	7.7	146
360 min Summer	5.060	0.0	8.7	204
480 min Summer	4.061	0.0	9.3	260
600 min Summer	3.406	0.0	9.7	310
720 min Summer	2.942	0.0	10.1	0
960 min Summer	2.327	0.0	10.6	0
1440 min Summer	1.669	0.0	11.4	0
2160 min Summer	1.206	0.0	12.3	0
2880 min Summer	0.965	0.0	13.0	0
4320 min Summer	0.718	0.0	14.5	0
5760 min Summer	0.591	0.0	15.8	0
7200 min Summer	0.513	0.0	17.0	0
8640 min Summer	0.461	0.0	18.2	0
10080 min Summer	0.423	0.0	19.5	0

Summary of Results for 2 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	29.511	0.211	1.0	1.7	O K
30 min Winter	29.514	0.214	1.0	1.7	O K
60 min Winter	29.487	0.187	1.0	1.5	O K
120 min Winter	29.511	0.211	1.0	1.7	O K
180 min Winter	29.476	0.176	1.0	1.4	O K
240 min Winter	29.429	0.129	1.0	1.0	O K
360 min Winter	29.334	0.034	1.0	0.3	O K
480 min Winter	29.300	0.000	0.9	0.0	O K
600 min Winter	29.300	0.000	0.8	0.0	O K
720 min Winter	29.300	0.000	0.7	0.0	O K
960 min Winter	29.300	0.000	0.5	0.0	O K
1440 min Winter	29.300	0.000	0.4	0.0	O K
2160 min Winter	29.300	0.000	0.3	0.0	O K
2880 min Winter	29.300	0.000	0.2	0.0	O K
4320 min Winter	29.300	0.000	0.2	0.0	O K
5760 min Winter	29.300	0.000	0.1	0.0	O K
7200 min Winter	29.300	0.000	0.1	0.0	O K
8640 min Winter	29.300	0.000	0.1	0.0	O K
10080 min Winter	29.300	0.000	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Winter	37.404	0.0	2.8	16
30 min Winter	23.756	0.0	3.6	26
60 min Winter	14.504	0.0	4.5	46
120 min Winter	10.400	0.0	6.5	86
180 min Winter	8.162	0.0	7.8	120
240 min Winter	6.756	0.0	8.6	154
360 min Winter	5.060	0.0	9.7	208
480 min Winter	4.061	0.0	10.4	0
600 min Winter	3.406	0.0	10.9	0
720 min Winter	2.942	0.0	11.3	0
960 min Winter	2.327	0.0	11.9	0
1440 min Winter	1.669	0.0	12.8	0
2160 min Winter	1.206	0.0	13.8	0
2880 min Winter	0.965	0.0	14.7	0
4320 min Winter	0.718	0.0	16.3	0
5760 min Winter	0.591	0.0	17.8	0
7200 min Winter	0.513	0.0	19.2	0
8640 min Winter	0.461	0.0	20.6	0
10080 min Winter	0.423	0.0	22.0	0

Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 525350 183050 TQ 25350 83050
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.033

Time From: (mins)	To: (mins)	Area (ha)
0	4	0.033

Green Roof

Area (m^3) 67 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)
0	4	0.001218	32	36	0.000246	64	68	0.000050	96	100	0.000010
4	8	0.000997	36	40	0.000201	68	72	0.000041	100	104	0.000008
8	12	0.000816	40	44	0.000165	72	76	0.000033	104	108	0.000007
12	16	0.000668	44	48	0.000135	76	80	0.000027	108	112	0.000005
16	20	0.000547	48	52	0.000110	80	84	0.000022	112	116	0.000005
20	24	0.000448	52	56	0.000090	84	88	0.000018	116	120	0.000004
24	28	0.000367	56	60	0.000074	88	92	0.000015			
28	32	0.000300	60	64	0.000061	92	96	0.000012			

Time Area Diagram

Total Area (ha) 0.000

Time From: (mins)	To: (mins)	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 33.000

Tank or Pond Structure

Invert Level (m) 29.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	8.0	3.100	8.0	3.101	0.0

Pump Outflow Control

Invert Level (m) 29.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0000	0.900	1.0000	1.700	1.0000	2.500	1.0000
0.200	1.0000	1.000	1.0000	1.800	1.0000	2.600	1.0000
0.300	1.0000	1.100	1.0000	1.900	1.0000	2.700	1.0000
0.400	1.0000	1.200	1.0000	2.000	1.0000	2.800	1.0000
0.500	1.0000	1.300	1.0000	2.100	1.0000	2.900	1.0000
0.600	1.0000	1.400	1.0000	2.200	1.0000	3.000	1.0000
0.700	1.0000	1.500	1.0000	2.300	1.0000	3.100	1.0000
0.800	1.0000	1.600	1.0000	2.400	1.0000		

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	29.947	0.647	1.0	5.2	O K
30 min Summer	30.095	0.795	1.0	6.4	O K
60 min Summer	30.168	0.868	1.0	6.9	O K
120 min Summer	30.240	0.940	1.0	7.5	O K
180 min Summer	30.230	0.930	1.0	7.4	O K
240 min Summer	30.191	0.891	1.0	7.1	O K
360 min Summer	30.060	0.760	1.0	6.1	O K
480 min Summer	29.922	0.622	1.0	5.0	O K
600 min Summer	29.792	0.492	1.0	3.9	O K
720 min Summer	29.673	0.373	1.0	3.0	O K
960 min Summer	29.486	0.186	1.0	1.5	O K
1440 min Summer	29.308	0.008	1.0	0.1	O K
2160 min Summer	29.300	0.000	0.7	0.0	O K
2880 min Summer	29.300	0.000	0.6	0.0	O K
4320 min Summer	29.300	0.000	0.4	0.0	O K
5760 min Summer	29.300	0.000	0.3	0.0	O K
7200 min Summer	29.300	0.000	0.3	0.0	O K
8640 min Summer	29.300	0.000	0.2	0.0	O K
10080 min Summer	29.300	0.000	0.2	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	97.987	0.0	6.9	18
30 min Summer	62.263	0.0	8.9	33
60 min Summer	38.066	0.0	10.9	62
120 min Summer	24.342	0.0	14.1	102
180 min Summer	18.280	0.0	15.9	134
240 min Summer	14.746	0.0	17.2	168
360 min Summer	10.706	0.0	18.7	234
480 min Summer	8.451	0.0	19.8	298
600 min Summer	7.002	0.0	20.4	362
720 min Summer	5.989	0.0	20.9	420
960 min Summer	4.656	0.0	21.7	532
1440 min Summer	3.260	0.0	22.7	736
2160 min Summer	2.290	0.0	23.9	0
2880 min Summer	1.790	0.0	24.8	0
4320 min Summer	1.282	0.0	26.5	0
5760 min Summer	1.022	0.0	28.1	0
7200 min Summer	0.863	0.0	29.5	0
8640 min Summer	0.756	0.0	30.9	0
10080 min Summer	0.679	0.0	32.2	0

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	30.046	0.746	1.0	6.0	O K
30 min Winter	30.227	0.927	1.0	7.4	O K
60 min Winter	30.338	1.038	1.0	8.3	O K
120 min Winter	30.429	1.129	1.0	9.0	O K
180 min Winter	30.397	1.097	1.0	8.8	O K
240 min Winter	30.331	1.031	1.0	8.2	O K
360 min Winter	30.133	0.833	1.0	6.7	O K
480 min Winter	29.921	0.621	1.0	5.0	O K
600 min Winter	29.727	0.427	1.0	3.4	O K
720 min Winter	29.559	0.259	1.0	2.1	O K
960 min Winter	29.333	0.033	1.0	0.3	O K
1440 min Winter	29.300	0.000	0.8	0.0	O K
2160 min Winter	29.300	0.000	0.5	0.0	O K
2880 min Winter	29.300	0.000	0.4	0.0	O K
4320 min Winter	29.300	0.000	0.3	0.0	O K
5760 min Winter	29.300	0.000	0.2	0.0	O K
7200 min Winter	29.300	0.000	0.2	0.0	O K
8640 min Winter	29.300	0.000	0.2	0.0	O K
10080 min Winter	29.300	0.000	0.2	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Winter	97.987	0.0	7.8	18
30 min Winter	62.263	0.0	10.0	33
60 min Winter	38.066	0.0	12.3	60
120 min Winter	24.342	0.0	15.8	114
180 min Winter	18.280	0.0	17.9	144
240 min Winter	14.746	0.0	19.3	180
360 min Winter	10.706	0.0	21.0	252
480 min Winter	8.451	0.0	22.2	320
600 min Winter	7.002	0.0	22.9	382
720 min Winter	5.989	0.0	23.5	438
960 min Winter	4.656	0.0	24.4	528
1440 min Winter	3.260	0.0	25.6	0
2160 min Winter	2.290	0.0	26.9	0
2880 min Winter	1.790	0.0	27.9	0
4320 min Winter	1.282	0.0	29.9	0
5760 min Winter	1.022	0.0	31.6	0
7200 min Winter	0.863	0.0	33.2	0
8640 min Winter	0.756	0.0	34.8	0
10080 min Winter	0.679	0.0	36.4	0

Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 525350 183050 TQ 25350 83050
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.033

Time From: (mins)	To: (mins)	Area (ha)
0	4	0.033

Green Roof

Area (m^3) 67 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)
0	4	0.001218	32	36	0.000246	64	68	0.000050	96	100	0.000010
4	8	0.000997	36	40	0.000201	68	72	0.000041	100	104	0.000008
8	12	0.000816	40	44	0.000165	72	76	0.000033	104	108	0.000007
12	16	0.000668	44	48	0.000135	76	80	0.000027	108	112	0.000005
16	20	0.000547	48	52	0.000110	80	84	0.000022	112	116	0.000005
20	24	0.000448	52	56	0.000090	84	88	0.000018	116	120	0.000004
24	28	0.000367	56	60	0.000074	88	92	0.000015			
28	32	0.000300	60	64	0.000061	92	96	0.000012			

Time Area Diagram

Total Area (ha) 0.000

Time From: (mins)	To: (mins)	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 33.000

Tank or Pond Structure

Invert Level (m) 29.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	8.0	3.100	8.0	3.101	0.0

Pump Outflow Control

Invert Level (m) 29.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0000	0.900	1.0000	1.700	1.0000	2.500	1.0000
0.200	1.0000	1.000	1.0000	1.800	1.0000	2.600	1.0000
0.300	1.0000	1.100	1.0000	1.900	1.0000	2.700	1.0000
0.400	1.0000	1.200	1.0000	2.000	1.0000	2.800	1.0000
0.500	1.0000	1.300	1.0000	2.100	1.0000	2.900	1.0000
0.600	1.0000	1.400	1.0000	2.200	1.0000	3.000	1.0000
0.700	1.0000	1.500	1.0000	2.300	1.0000	3.100	1.0000
0.800	1.0000	1.600	1.0000	2.400	1.0000		