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

Half Drain Time : 1367 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	9.898	0.048	0.0	0.1	0.1	4.9	Flood Risk
30 min Summer	9.912	0.062	0.0	0.1	0.1	6.3	Flood Risk
60 min Summer	9.925	0.075	0.0	0.1	0.1	7.7	Flood Risk
120 min Summer	9.938	0.088	0.0	0.1	0.1	9.0	Flood Risk
180 min Summer	9.944	0.094	0.0	0.1	0.1	9.7	Flood Risk
240 min Summer	9.948	0.098	0.0	0.1	0.1	10.1	Flood Risk
360 min Summer	9.953	0.103	0.0	0.1	0.1	10.6	Flood Risk
480 min Summer	9.956	0.106	0.0	0.1	0.1	10.8	Flood Risk
600 min Summer	9.957	0.107	0.0	0.1	0.1	11.0	Flood Risk
720 min Summer	9.958	0.108	0.0	0.1	0.1	11.1	Flood Risk
960 min Summer	9.958	0.108	0.0	0.1	0.1	11.0	Flood Risk
1440 min Summer	9.956	0.106	0.0	0.1	0.1	10.9	Flood Risk
2160 min Summer	9.953	0.103	0.0	0.1	0.1	10.6	Flood Risk
2880 min Summer	9.950	0.100	0.0	0.1	0.1	10.2	Flood Risk
4320 min Summer	9.943	0.093	0.0	0.1	0.1	9.5	Flood Risk
5760 min Summer	9.936	0.086	0.0	0.1	0.1	8.8	Flood Risk
7200 min Summer	9.929	0.079	0.0	0.1	0.1	8.1	Flood Risk
8640 min Summer	9.924	0.074	0.0	0.1	0.1	7.6	Flood Risk
10080 min Summer	9.919	0.069	0.0	0.1	0.1	7.0	Flood Risk
15 min Winter	9.898	0.048	0.0	0.1	0.1	4.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	149.324	0.0	3.3	19
30 min Summer	96.288	0.0	4.0	34
60 min Summer	59.033	0.0	6.9	64
120 min Summer	34.961	0.0	8.0	124
180 min Summer	25.405	0.0	8.6	184
240 min Summer	20.147	0.0	8.9	242
360 min Summer	14.505	0.0	9.4	362
480 min Summer	11.486	0.0	9.7	482
600 min Summer	9.578	0.0	9.8	602
720 min Summer	8.254	0.0	10.0	720
960 min Summer	6.522	0.0	10.1	934
1440 min Summer	4.674	0.0	10.0	1140
2160 min Summer	3.345	0.0	15.2	1532
2880 min Summer	2.636	0.0	15.8	1932
4320 min Summer	1.882	0.0	15.7	2764
5760 min Summer	1.481	0.0	18.7	3576
7200 min Summer	1.229	0.0	19.3	4392
8640 min Summer	1.055	0.0	19.9	5184
10080 min Summer	0.927	0.0	20.2	5944
15 min Winter	149.324	0.0	3.3	19

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	9.912	0.062	0.0	0.1	0.1	6.3	Flood Risk
60 min Winter	9.925	0.075	0.0	0.1	0.1	7.7	Flood Risk
120 min Winter	9.938	0.088	0.0	0.1	0.1	9.0	Flood Risk
180 min Winter	9.944	0.094	0.0	0.1	0.1	9.7	Flood Risk
240 min Winter	9.948	0.098	0.0	0.1	0.1	10.1	Flood Risk
360 min Winter	9.953	0.103	0.0	0.1	0.1	10.6	Flood Risk
480 min Winter	9.956	0.106	0.0	0.1	0.1	10.9	Flood Risk
600 min Winter	9.958	0.108	0.0	0.1	0.1	11.0	Flood Risk
720 min Winter	9.958	0.108	0.0	0.1	0.1	11.1	Flood Risk
960 min Winter	9.958	0.108	0.0	0.1	0.1	11.1	Flood Risk
1440 min Winter	9.956	0.106	0.0	0.1	0.1	10.9	Flood Risk
2160 min Winter	9.952	0.102	0.0	0.1	0.1	10.5	Flood Risk
2880 min Winter	9.948	0.098	0.0	0.1	0.1	10.0	Flood Risk
4320 min Winter	9.938	0.088	0.0	0.1	0.1	9.0	Flood Risk
5760 min Winter	9.929	0.079	0.0	0.1	0.1	8.1	Flood Risk
7200 min Winter	9.921	0.071	0.0	0.1	0.1	7.3	Flood Risk
8640 min Winter	9.914	0.064	0.0	0.1	0.1	6.6	Flood Risk
10080 min Winter	9.908	0.058	0.0	0.1	0.1	6.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	96.288	0.0	4.0	34
60 min Winter	59.033	0.0	6.9	64
120 min Winter	34.961	0.0	8.0	122
180 min Winter	25.405	0.0	8.6	180
240 min Winter	20.147	0.0	8.9	240
360 min Winter	14.505	0.0	9.4	356
480 min Winter	11.486	0.0	9.7	472
600 min Winter	9.578	0.0	9.9	584
720 min Winter	8.254	0.0	10.0	698
960 min Winter	6.522	0.0	10.1	914
1440 min Winter	4.674	0.0	10.0	1170
2160 min Winter	3.345	0.0	15.2	1620
2880 min Winter	2.636	0.0	15.8	2076
4320 min Winter	1.882	0.0	15.7	2944
5760 min Winter	1.481	0.0	18.7	3808
7200 min Winter	1.229	0.0	19.3	4616
8640 min Winter	1.055	0.0	19.9	5440
10080 min Winter	0.927	0.0	20.2	6160

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.442	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.014

Time From:	(mins) To:	Area (ha)
0	4	0.014

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 9.850 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)
0.000	108.0	0.0

Orifice Outflow Control

Diameter (m) 0.011 Discharge Coefficient 0.600 Invert Level (m) 9.850

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

Half Drain Time : 1725 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	9.906	0.056	0.0	0.1	0.1	6.7	Flood Risk
30 min Summer	9.923	0.073	0.0	0.1	0.1	8.6	Flood Risk
60 min Summer	9.938	0.088	0.0	0.1	0.1	10.5	Flood Risk
120 min Summer	9.953	0.103	0.0	0.1	0.1	12.3	Flood Risk
180 min Summer	9.961	0.111	0.0	0.1	0.1	13.2	Flood Risk
240 min Summer	9.966	0.116	0.0	0.1	0.1	13.8	Flood Risk
360 min Summer	9.973	0.123	0.0	0.1	0.1	14.6	Flood Risk
480 min Summer	9.977	0.127	0.0	0.1	0.1	15.1	Flood Risk
600 min Summer	9.979	0.129	0.0	0.1	0.1	15.4	Flood Risk
720 min Summer	9.981	0.131	0.0	0.1	0.1	15.5	Flood Risk
960 min Summer	9.982	0.132	0.0	0.1	0.1	15.7	Flood Risk
1440 min Summer	9.981	0.131	0.0	0.1	0.1	15.5	Flood Risk
2160 min Summer	9.978	0.128	0.0	0.1	0.1	15.2	Flood Risk
2880 min Summer	9.975	0.125	0.0	0.1	0.1	14.8	Flood Risk
4320 min Summer	9.968	0.118	0.0	0.1	0.1	14.0	Flood Risk
5760 min Summer	9.961	0.111	0.0	0.1	0.1	13.2	Flood Risk
7200 min Summer	9.954	0.104	0.0	0.1	0.1	12.4	Flood Risk
8640 min Summer	9.948	0.098	0.0	0.1	0.1	11.6	Flood Risk
10080 min Summer	9.942	0.092	0.0	0.1	0.1	10.9	Flood Risk
15 min Winter	9.906	0.056	0.0	0.1	0.1	6.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	149.324	0.0	3.9	19
30 min Summer	96.288	0.0	4.6	34
60 min Summer	59.033	0.0	8.6	64
120 min Summer	34.961	0.0	9.7	124
180 min Summer	25.405	0.0	10.3	184
240 min Summer	20.147	0.0	10.7	242
360 min Summer	14.505	0.0	11.1	362
480 min Summer	11.486	0.0	11.4	482
600 min Summer	9.578	0.0	11.6	602
720 min Summer	8.254	0.0	11.7	722
960 min Summer	6.522	0.0	11.7	960
1440 min Summer	4.674	0.0	11.5	1256
2160 min Summer	3.345	0.0	19.6	1624
2880 min Summer	2.636	0.0	19.7	2020
4320 min Summer	1.882	0.0	19.0	2852
5760 min Summer	1.481	0.0	25.3	3640
7200 min Summer	1.229	0.0	26.1	4472
8640 min Summer	1.055	0.0	26.7	5272
10080 min Summer	0.927	0.0	27.0	6056
15 min Winter	149.324	0.0	3.9	19

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	9.923	0.073	0.0	0.1	0.1	8.6	Flood Risk
60 min Winter	9.938	0.088	0.0	0.1	0.1	10.5	Flood Risk
120 min Winter	9.953	0.103	0.0	0.1	0.1	12.3	Flood Risk
180 min Winter	9.961	0.111	0.0	0.1	0.1	13.2	Flood Risk
240 min Winter	9.966	0.116	0.0	0.1	0.1	13.8	Flood Risk
360 min Winter	9.973	0.123	0.0	0.1	0.1	14.6	Flood Risk
480 min Winter	9.977	0.127	0.0	0.1	0.1	15.1	Flood Risk
600 min Winter	9.980	0.130	0.0	0.1	0.1	15.4	Flood Risk
720 min Winter	9.981	0.131	0.0	0.1	0.1	15.6	Flood Risk
960 min Winter	9.983	0.133	0.0	0.1	0.1	15.7	Flood Risk
1440 min Winter	9.981	0.131	0.0	0.1	0.1	15.6	Flood Risk
2160 min Winter	9.978	0.128	0.0	0.1	0.1	15.1	Flood Risk
2880 min Winter	9.973	0.123	0.0	0.1	0.1	14.7	Flood Risk
4320 min Winter	9.964	0.114	0.0	0.1	0.1	13.6	Flood Risk
5760 min Winter	9.955	0.105	0.0	0.1	0.1	12.4	Flood Risk
7200 min Winter	9.946	0.096	0.0	0.1	0.1	11.4	Flood Risk
8640 min Winter	9.938	0.088	0.0	0.1	0.1	10.5	Flood Risk
10080 min Winter	9.931	0.081	0.0	0.1	0.1	9.6	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	96.288	0.0	4.6	34
60 min Winter	59.033	0.0	8.6	64
120 min Winter	34.961	0.0	9.7	122
180 min Winter	25.405	0.0	10.3	180
240 min Winter	20.147	0.0	10.7	240
360 min Winter	14.505	0.0	11.1	356
480 min Winter	11.486	0.0	11.4	474
600 min Winter	9.578	0.0	11.6	590
720 min Winter	8.254	0.0	11.7	702
960 min Winter	6.522	0.0	11.7	926
1440 min Winter	4.674	0.0	11.5	1354
2160 min Winter	3.345	0.0	19.6	1684
2880 min Winter	2.636	0.0	19.8	2136
4320 min Winter	1.882	0.0	19.0	3028
5760 min Winter	1.481	0.0	25.3	3920
7200 min Winter	1.229	0.0	26.1	4760
8640 min Winter	1.055	0.0	26.7	5616
10080 min Winter	0.927	0.0	27.0	6360

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.442	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.019

Time From:	(mins) To:	Area (ha)
0	4	0.019

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 9.850 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)
0.000	125.0	0.0

Orifice Outflow Control

Diameter (m) 0.011 Discharge Coefficient 0.600 Invert Level (m) 9.850

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

Half Drain Time : 1162 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	9.897	0.047	0.0	0.1	0.1	9.9	Flood Risk
30 min Summer	9.911	0.061	0.0	0.1	0.1	12.7	Flood Risk
60 min Summer	9.924	0.074	0.0	0.2	0.2	15.4	Flood Risk
120 min Summer	9.936	0.086	0.0	0.2	0.2	17.9	Flood Risk
180 min Summer	9.942	0.092	0.0	0.2	0.2	19.2	Flood Risk
240 min Summer	9.946	0.096	0.0	0.2	0.2	20.0	Flood Risk
360 min Summer	9.950	0.100	0.0	0.2	0.2	20.9	Flood Risk
480 min Summer	9.953	0.103	0.0	0.2	0.2	21.4	Flood Risk
600 min Summer	9.954	0.104	0.0	0.2	0.2	21.6	Flood Risk
720 min Summer	9.954	0.104	0.0	0.2	0.2	21.6	Flood Risk
960 min Summer	9.953	0.103	0.0	0.2	0.2	21.5	Flood Risk
1440 min Summer	9.952	0.102	0.0	0.2	0.2	21.2	Flood Risk
2160 min Summer	9.949	0.099	0.0	0.2	0.2	20.6	Flood Risk
2880 min Summer	9.945	0.095	0.0	0.2	0.2	19.8	Flood Risk
4320 min Summer	9.938	0.088	0.0	0.2	0.2	18.3	Flood Risk
5760 min Summer	9.931	0.081	0.0	0.2	0.2	16.8	Flood Risk
7200 min Summer	9.924	0.074	0.0	0.2	0.2	15.4	Flood Risk
8640 min Summer	9.918	0.068	0.0	0.1	0.1	14.2	Flood Risk
10080 min Summer	9.913	0.063	0.0	0.1	0.1	13.2	Flood Risk
15 min Winter	9.897	0.047	0.0	0.1	0.1	9.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	149.324	0.0	6.8	19
30 min Summer	96.288	0.0	8.6	34
60 min Summer	59.033	0.0	13.7	64
120 min Summer	34.961	0.0	16.2	124
180 min Summer	25.405	0.0	17.6	182
240 min Summer	20.147	0.0	18.5	242
360 min Summer	14.505	0.0	19.7	362
480 min Summer	11.486	0.0	20.6	482
600 min Summer	9.578	0.0	21.1	600
720 min Summer	8.254	0.0	21.5	720
960 min Summer	6.522	0.0	21.9	838
1440 min Summer	4.674	0.0	21.9	1082
2160 min Summer	3.345	0.0	30.5	1472
2880 min Summer	2.636	0.0	31.7	1876
4320 min Summer	1.882	0.0	32.7	2720
5760 min Summer	1.481	0.0	37.2	3512
7200 min Summer	1.229	0.0	38.5	4256
8640 min Summer	1.055	0.0	39.5	5024
10080 min Summer	0.927	0.0	40.1	5840
15 min Winter	149.324	0.0	6.8	19

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	9.911	0.061	0.0	0.1	0.1	12.7	Flood Risk
60 min Winter	9.924	0.074	0.0	0.2	0.2	15.4	Flood Risk
120 min Winter	9.936	0.086	0.0	0.2	0.2	17.9	Flood Risk
180 min Winter	9.942	0.092	0.0	0.2	0.2	19.2	Flood Risk
240 min Winter	9.946	0.096	0.0	0.2	0.2	20.0	Flood Risk
360 min Winter	9.951	0.101	0.0	0.2	0.2	20.9	Flood Risk
480 min Winter	9.953	0.103	0.0	0.2	0.2	21.4	Flood Risk
600 min Winter	9.954	0.104	0.0	0.2	0.2	21.7	Flood Risk
720 min Winter	9.954	0.104	0.0	0.2	0.2	21.7	Flood Risk
960 min Winter	9.954	0.104	0.0	0.2	0.2	21.6	Flood Risk
1440 min Winter	9.951	0.101	0.0	0.2	0.2	21.1	Flood Risk
2160 min Winter	9.947	0.097	0.0	0.2	0.2	20.2	Flood Risk
2880 min Winter	9.942	0.092	0.0	0.2	0.2	19.1	Flood Risk
4320 min Winter	9.932	0.082	0.0	0.2	0.2	17.0	Flood Risk
5760 min Winter	9.923	0.073	0.0	0.2	0.2	15.1	Flood Risk
7200 min Winter	9.915	0.065	0.0	0.1	0.1	13.4	Flood Risk
8640 min Winter	9.908	0.058	0.0	0.1	0.1	12.0	Flood Risk
10080 min Winter	9.902	0.052	0.0	0.1	0.1	10.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	96.288	0.0	8.6	33
60 min Winter	59.033	0.0	13.7	62
120 min Winter	34.961	0.0	16.2	122
180 min Winter	25.405	0.0	17.6	180
240 min Winter	20.147	0.0	18.5	238
360 min Winter	14.505	0.0	19.7	354
480 min Winter	11.486	0.0	20.6	470
600 min Winter	9.578	0.0	21.2	582
720 min Winter	8.254	0.0	21.5	692
960 min Winter	6.522	0.0	21.9	904
1440 min Winter	4.674	0.0	21.9	1124
2160 min Winter	3.345	0.0	30.5	1580
2880 min Winter	2.636	0.0	31.7	2020
4320 min Winter	1.882	0.0	32.7	2896
5760 min Winter	1.481	0.0	37.2	3696
7200 min Winter	1.229	0.0	38.5	4536
8640 min Winter	1.055	0.0	39.5	5280
10080 min Winter	0.927	0.0	40.1	6048

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.442	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.028

Time From:	(mins) To:	Area (ha)
0	4	0.028

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 9.850 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)
0.000	219.0	0.0

Orifice Outflow Control

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 9.850

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: Carmel Lennon

Site name: Museum Street Site

Site location: Camden

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.51646° N
Longitude:	0.12522° W
Reference:	4097402026
Date:	Apr 21 2023 10:54

Runoff estimation approach IH124

Site characteristics

Total site area (ha): .327

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics

	Default	Edited
SAAR (mm):	611	611
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	0.51	0.51
1 in 1 year (l/s):	0.43	0.43
1 in 30 years (l/s):	1.17	1.17
1 in 100 year (l/s):	1.62	1.62
1 in 200 years (l/s):	1.9	1.9

Print | Close Report

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: Carmel Lennon

Site name: West Central Street Site

Site location: Camden

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude: 51.51646° N

Longitude: 0.12522° W

Reference: 661813575

Date: Apr 21 2023 09:54

Runoff estimation approach IH124

Site characteristics

Total site area (ha): .085

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

	Default	Edited
Soil characteristics		
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3
Hydrological characteristics		
SAAR (mm):	611	611
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	0.13	0.13
1 in 1 year (l/s):	0.11	0.11
1 in 30 years (l/s):	0.3	0.3
1 in 100 year (l/s):	0.42	0.42
1 in 200 years (l/s):	0.49	0.49

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

Half Drain Time : 310 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	9.347	0.947	0.0	3.9	3.9	81.4	O K
30 min Summer	9.598	1.198	0.0	3.9	3.9	103.0	O K
60 min Summer	9.812	1.412	0.0	4.1	4.1	121.4	Flood Risk
120 min Summer	9.953	1.553	0.0	4.2	4.2	133.6	Flood Risk
180 min Summer	9.974	1.574	0.0	4.3	4.3	135.4	Flood Risk
240 min Summer	9.949	1.549	0.0	4.2	4.2	133.2	Flood Risk
360 min Summer	9.884	1.484	0.0	4.1	4.1	127.6	Flood Risk
480 min Summer	9.822	1.422	0.0	4.1	4.1	122.3	Flood Risk
600 min Summer	9.764	1.364	0.0	4.0	4.0	117.3	Flood Risk
720 min Summer	9.709	1.309	0.0	3.9	3.9	112.5	Flood Risk
960 min Summer	9.606	1.206	0.0	3.9	3.9	103.7	O K
1440 min Summer	9.420	1.020	0.0	3.9	3.9	87.7	O K
2160 min Summer	9.128	0.728	0.0	3.9	3.9	62.6	O K
2880 min Summer	8.889	0.489	0.0	3.9	3.9	42.1	O K
4320 min Summer	8.646	0.246	0.0	3.8	3.8	21.2	O K
5760 min Summer	8.547	0.147	0.0	3.4	3.4	12.7	O K
7200 min Summer	8.509	0.109	0.0	3.0	3.0	9.4	O K
8640 min Summer	8.493	0.093	0.0	2.6	2.6	8.0	O K
10080 min Summer	8.482	0.082	0.0	2.3	2.3	7.1	O K
15 min Winter	9.347	0.947	0.0	3.9	3.9	81.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	149.324	0.0	84.2	19
30 min Summer	96.288	0.0	108.6	33
60 min Summer	59.033	0.0	133.4	62
120 min Summer	34.961	0.0	158.0	122
180 min Summer	25.405	0.0	172.2	180
240 min Summer	20.147	0.0	182.1	236
360 min Summer	14.505	0.0	196.7	290
480 min Summer	11.486	0.0	207.7	354
600 min Summer	9.578	0.0	216.5	422
720 min Summer	8.254	0.0	223.8	492
960 min Summer	6.522	0.0	235.8	628
1440 min Summer	4.674	0.0	253.5	908
2160 min Summer	3.345	0.0	272.2	1296
2880 min Summer	2.636	0.0	286.0	1616
4320 min Summer	1.882	0.0	306.2	2292
5760 min Summer	1.481	0.0	321.4	2952
7200 min Summer	1.229	0.0	333.4	3672
8640 min Summer	1.055	0.0	343.5	4400
10080 min Summer	0.927	0.0	352.0	5136
15 min Winter	149.324	0.0	84.2	18

Heyne Tillett Steel | Page 2
4 Pear Tree Court
London
EC1R 0DS
Date 25/04/2023 15:35
File Tank.SRCX
Designed by clennon
Checked by
XP Solutions
Source Control 2020.1

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	9.599	1.199	0.0	3.9	3.9	103.1	O K
60 min Winter	9.816	1.416	0.0	4.1	4.1	121.7	Flood Risk
120 min Winter	9.961	1.561	0.0	4.2	4.2	134.3	Flood Risk
180 min Winter	9.988	1.588	0.0	4.3	4.3	136.6	Flood Risk
240 min Winter	9.969	1.569	0.0	4.3	4.3	134.9	Flood Risk
360 min Winter	9.890	1.490	0.0	4.2	4.2	128.1	Flood Risk
480 min Winter	9.819	1.419	0.0	4.1	4.1	122.0	Flood Risk
600 min Winter	9.745	1.345	0.0	4.0	4.0	115.6	Flood Risk
720 min Winter	9.671	1.271	0.0	3.9	3.9	109.3	O K
960 min Winter	9.527	1.127	0.0	3.9	3.9	96.9	O K
1440 min Winter	9.241	0.841	0.0	3.9	3.9	72.3	O K
2160 min Winter	8.823	0.423	0.0	3.9	3.9	36.4	O K
2880 min Winter	8.629	0.229	0.0	3.7	3.7	19.7	O K
4320 min Winter	8.508	0.108	0.0	3.0	3.0	9.3	O K
5760 min Winter	8.485	0.085	0.0	2.4	2.4	7.3	O K
7200 min Winter	8.472	0.072	0.0	1.9	1.9	6.2	O K
8640 min Winter	8.465	0.065	0.0	1.7	1.7	5.6	O K
10080 min Winter	8.460	0.060	0.0	1.5	1.5	5.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	96.288	0.0	108.6	33
60 min Winter	59.033	0.0	133.4	62
120 min Winter	34.961	0.0	158.0	120
180 min Winter	25.405	0.0	172.2	176
240 min Winter	20.147	0.0	182.1	230
360 min Winter	14.505	0.0	196.7	298
480 min Winter	11.486	0.0	207.7	370
600 min Winter	9.578	0.0	216.5	448
720 min Winter	8.254	0.0	223.8	526
960 min Winter	6.522	0.0	235.8	676
1440 min Winter	4.674	0.0	253.5	980
2160 min Winter	3.345	0.0	272.2	1296
2880 min Winter	2.636	0.0	286.0	1588
4320 min Winter	1.882	0.0	306.2	2204
5760 min Winter	1.481	0.0	321.4	2936
7200 min Winter	1.229	0.0	333.4	3672
8640 min Winter	1.055	0.0	343.5	4400
10080 min Winter	0.927	0.0	352.0	5136

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.442	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.238

Time From:	(mins) To:	Area (ha)
0	4	0.238

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m)	8.400	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	86.0	0.0	1.601	0.0	0.0
1.600	86.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0089-4300-1600-4300
Design Head (m)	1.600
Design Flow (l/s)	4.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	89
Invert Level (m)	8.400
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	4.3
Flush-Flo™	0.388	3.9
Kick-Flo®	0.796	3.1
Mean Flow over Head Range	-	3.6

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	2.8	1.200	3.8	3.000	5.8	7.000	8.6
0.200	3.6	1.400	4.0	3.500	6.2	7.500	8.9
0.300	3.9	1.600	4.3	4.000	6.6	8.000	9.2
0.400	3.9	1.800	4.5	4.500	7.0	8.500	9.4
0.500	3.9	2.000	4.8	5.000	7.3	9.000	9.7
0.600	3.7	2.200	5.0	5.500	7.7	9.500	9.9
0.800	3.1	2.400	5.2	6.000	8.0		
1.000	3.5	2.600	5.4	6.500	8.3		

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

Half Drain Time : 46 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	9.831	0.831	0.0	4.4	4.4	17.0	Flood Risk
30 min Summer	9.965	0.965	0.0	4.4	4.4	19.8	Flood Risk
60 min Summer	9.983	0.983	0.0	4.4	4.4	20.2	Flood Risk
120 min Summer	9.902	0.902	0.0	4.4	4.4	18.5	Flood Risk
180 min Summer	9.801	0.801	0.0	4.4	4.4	16.4	Flood Risk
240 min Summer	9.696	0.696	0.0	4.4	4.4	14.3	O K
360 min Summer	9.470	0.470	0.0	4.4	4.4	9.6	O K
480 min Summer	9.321	0.321	0.0	4.4	4.4	6.6	O K
600 min Summer	9.226	0.226	0.0	4.3	4.3	4.6	O K
720 min Summer	9.168	0.168	0.0	4.2	4.2	3.4	O K
960 min Summer	9.115	0.115	0.0	3.7	3.7	2.4	O K
1440 min Summer	9.085	0.085	0.0	2.7	2.7	1.7	O K
2160 min Summer	9.068	0.068	0.0	2.0	2.0	1.4	O K
2880 min Summer	9.058	0.058	0.0	1.6	1.6	1.2	O K
4320 min Summer	9.048	0.048	0.0	1.1	1.1	1.0	O K
5760 min Summer	9.042	0.042	0.0	0.9	0.9	0.9	O K
7200 min Summer	9.038	0.038	0.0	0.7	0.7	0.8	O K
8640 min Summer	9.035	0.035	0.0	0.6	0.6	0.7	O K
10080 min Summer	9.033	0.033	0.0	0.6	0.6	0.7	O K
15 min Winter	9.831	0.831	0.0	4.4	4.4	17.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	149.324	0.0	20.2	17
30 min Summer	96.288	0.0	26.1	31
60 min Summer	59.033	0.0	32.0	48
120 min Summer	34.961	0.0	37.9	82
180 min Summer	25.405	0.0	41.3	118
240 min Summer	20.147	0.0	43.6	152
360 min Summer	14.505	0.0	47.1	212
480 min Summer	11.486	0.0	49.7	268
600 min Summer	9.578	0.0	51.9	322
720 min Summer	8.254	0.0	53.6	378
960 min Summer	6.522	0.0	56.5	490
1440 min Summer	4.674	0.0	60.7	734
2160 min Summer	3.345	0.0	65.2	1100
2880 min Summer	2.636	0.0	68.5	1432
4320 min Summer	1.882	0.0	73.4	2164
5760 min Summer	1.481	0.0	77.0	2912
7200 min Summer	1.229	0.0	79.8	3672
8640 min Summer	1.055	0.0	82.3	4400
10080 min Summer	0.927	0.0	84.3	5000
15 min Winter	149.324	0.0	20.2	17

Heyne Tillett Steel | Page 2
4 Pear Tree Court
London
EC1R 0DS
Date 25/04/2023 15:15
File Tank.SRCX
Designed by clennon
Checked by
XP Solutions
Source Control 2020.1

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	9.970	0.970	0.0	4.4	4.4	19.9	Flood Risk
60 min Winter	9.982	0.982	0.0	4.4	4.4	20.1	Flood Risk
120 min Winter	9.863	0.863	0.0	4.4	4.4	17.7	Flood Risk
180 min Winter	9.707	0.707	0.0	4.4	4.4	14.5	Flood Risk
240 min Winter	9.514	0.514	0.0	4.4	4.4	10.5	O K
360 min Winter	9.263	0.263	0.0	4.4	4.4	5.4	O K
480 min Winter	9.148	0.148	0.0	4.1	4.1	3.0	O K
600 min Winter	9.110	0.110	0.0	3.6	3.6	2.3	O K
720 min Winter	9.095	0.095	0.0	3.1	3.1	2.0	O K
960 min Winter	9.079	0.079	0.0	2.5	2.5	1.6	O K
1440 min Winter	9.063	0.063	0.0	1.8	1.8	1.3	O K
2160 min Winter	9.052	0.052	0.0	1.3	1.3	1.1	O K
2880 min Winter	9.045	0.045	0.0	1.0	1.0	0.9	O K
4320 min Winter	9.038	0.038	0.0	0.7	0.7	0.8	O K
5760 min Winter	9.033	0.033	0.0	0.6	0.6	0.7	O K
7200 min Winter	9.030	0.030	0.0	0.5	0.5	0.6	O K
8640 min Winter	9.028	0.028	0.0	0.4	0.4	0.6	O K
10080 min Winter	9.026	0.026	0.0	0.4	0.4	0.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	96.288	0.0	26.1	30
60 min Winter	59.033	0.0	32.0	50
120 min Winter	34.961	0.0	37.9	88
180 min Winter	25.405	0.0	41.3	126
240 min Winter	20.147	0.0	43.6	158
360 min Winter	14.505	0.0	47.1	212
480 min Winter	11.486	0.0	49.7	262
600 min Winter	9.578	0.0	51.9	312
720 min Winter	8.254	0.0	53.6	370
960 min Winter	6.522	0.0	56.5	490
1440 min Winter	4.674	0.0	60.7	736
2160 min Winter	3.345	0.0	65.2	1100
2880 min Winter	2.636	0.0	68.5	1456
4320 min Winter	1.882	0.0	73.4	2140
5760 min Winter	1.481	0.0	77.0	2848
7200 min Winter	1.229	0.0	79.8	3640
8640 min Winter	1.055	0.0	82.3	4448
10080 min Winter	0.927	0.0	84.3	4968

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.442	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.057

Time From:	(mins) To:	Area (ha)
0	4	0.057

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 9.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	20.5	0.0	1.001	0.0	0.0
1.000	20.5	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0099-4400-1000-4400
Design Head (m)	1.000
Design Flow (l/s)	4.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	99
Invert Level (m)	9.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.4
Flush-Flo™	0.297	4.4
Kick-Flo®	0.636	3.6
Mean Flow over Head Range	-	3.8

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	3.3	1.200	4.8	3.000	7.3	7.000	11.0
0.200	4.3	1.400	5.1	3.500	7.9	7.500	11.3
0.300	4.4	1.600	5.5	4.000	8.4	8.000	11.7
0.400	4.3	1.800	5.8	4.500	8.9	8.500	12.0
0.500	4.2	2.000	6.1	5.000	9.4	9.000	12.4
0.600	3.8	2.200	6.4	5.500	9.8	9.500	12.7
0.800	4.0	2.400	6.6	6.000	10.2		
1.000	4.4	2.600	6.9	6.500	10.6		

Appendix F

Correspondence with LBC and Thames Water

Craig Marchant

From: Craig Marchant
Sent: 13 August 2020 12:46
To: Berry-Khan, Gabriel
Cc: Fowler, David; Frost, Katherine; Chris Gearey; Alex Carvalho; Daniel Staddon; Cillian Ryan; ASnow@iceniprojects.com
Subject: RE: 2413 - Labs Holborn Proposed Surface Water Discharge Rate

Hi Gabriel,

Thank you for confirming this, I will ensure we design as much SuDS into the scheme as possible to ensure a sustainable drainage design for both sites.

Kind Regards

Craig Marchant MEng(Hons)
Senior Civil Engineer
Civil & Infrastructure

Meinhardt (UK) Ltd, 10 Aldersgate Street, London, EC1A 4HJ
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E: Craig.Marchant@meinhardt.co.uk | **W**: www.meinhardt.co.uk

From: Berry-Khan, Gabriel [mailto:Gabriel.Berry-Khan@camden.gov.uk]
Sent: 13 August 2020 12:43
To: Craig Marchant <Craig.Marchant@meinhardt.co.uk>
Cc: Fowler, David <David.Fowler@camden.gov.uk>; Frost, Katherine <Katherine.Frost@camden.gov.uk>; Chris Gearey <C.Gearey@Gardiner.com>; Alex Carvalho <alex.carvalho@meinhardt.co.uk>; Daniel Staddon <Daniel.Staddon@meinhardt.co.uk>; Cillian Ryan <cillian.ryan@meinhardt.co.uk>; ASnow@iceniprojects.com
Subject: RE: 2413 - Labs Holborn Proposed Surface Water Discharge Rate

Hi Craig

Thanks for this

You would need to demonstrate that you have exhausted the roof and landscape opportunities, regarding maximising SuDS to deal with extra volumes. If so, I think it would be reasonable to accept the approach below.

As mentioned this is subject to Thames Water approval, and so I would encourage at least initial correspondence with them on the matter at an early stage.

Thanks
Gabriel

Gabriel Berry-Khan
Senior Sustainability Officer (Planning)

Telephone: 020 7974 4550

The majority of Council staff are now working at home through remote, secure access to our systems.

Where possible please now communicate with us by telephone or email. We have limited staff in our offices to deal with post, but as most staff are homeworking due to the current situation with COVID-19, electronic communications will mean we can respond quickly.

From: Craig Marchant <Craig.Marchant@meinhardt.co.uk>
Sent: 13 August 2020 12:17
To: Berry-Khan, Gabriel <Gabriel.Berry-Khan@camden.gov.uk>
Cc: Fowler, David <David.Fowler@camden.gov.uk>; Frost, Katherine <Katherine.Frost@camden.gov.uk>; Chris Gearey <C.Gearey@Gardiner.com>; Alex Carvalho <alex.carvalho@meinhardt.co.uk>; Daniel Staddon <Daniel.Staddon@meinhardt.co.uk>; Cillian Ryan <cillian.ryan@meinhardt.co.uk>; ASnow@iceniprojects.com
Subject: FW: 2413 - Labs Holborn Proposed Surface Water Discharge Rate

Hi Gabriel,

Good speaking to you on the phone just now. Following that phone call, I just wanted to clarify our discussion

The Council are happy with the proposed drainage strategy to drain surface water from the proposed new developments West Central Street and the Museum Street, both at 5l/s into the Thames water public sewer. To achieve this we will provide a combination of blue roofs, green roofs, and attenuation tanks with flow controls as our proposed SuDS.

Also on the Museum Street site, the Council has no objection to the area shown hatched in orange on SK005 (attached) draining as it currently is, with surface water runoff draining into the highway drainage of West Central Street and Museum Street. As discussed with you, this is pending the approval of Thames Water.

Please can you send me an email confirming this and I will proceed with obtaining Thames Waters's approval, which will be included in our drainage strategy report we issue to Camden Council at Planning.

Kind Regards

Craig Marchant MEng(Hons)
Senior Civil Engineer
Civil & Infrastructure

Meinhardt (UK) Ltd, 10 Aldersgate Street, London, EC1A 4HJ
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Co. Reg. No. 4131858

Infrastructure & Environment | Structures | MEP | Project Management | Planning & Urban Development | Façade Engineering | Environmentally Sustainable Design | Specialist and Architectural Lighting | Fire Performance Engineering | Integrated Design Management | Mission Critical Facility Design

E: Craig.Marchant@meinhardt.co.uk | **W**: www.meinhardt.co.uk

---

From: Craig Marchant
Sent: 22 July 2020 14:08
To: Berry-Khan, Gabriel <Gabriel.Berry-Khan@camden.gov.uk>; Fowler, David <David.Fowler@camden.gov.uk>
Cc: Cillian Ryan <cillian.ryan@meinhardt.co.uk>; Daniel Staddon <Daniel.Staddon@meinhardt.co.uk>; Chris Gearey <C.Gearey@Gardiner.com>; Alex Carvalho <alex.carvalho@meinhardt.co.uk>; ASnow@iceniprojects.com; Frost, Katherine <Katherine.Frost@camden.gov.uk>
Subject: 2413 - Labs Holborn Proposed Surface Water Discharge Rate

Hi Gabriel,

It was good speaking to you on the phone, as discussed I have summaries my proposal in an email for you to review with your colleagues.

The proposed Labs Holborn Planning Application consists of two separate sites; 1 West Central Street and 1 Museum Street, which are separated by the Council owned West Central Street. Please see SK004 attached. As such we are proposing two separate drainage strategies.

1 West Central Street:
The existing West Central Street site is currently discharging surface water in the Thames Water combined sewer unrestricted at a rate of 38.6l/s. The proposed scheme is part refurbishment, part new build project and therefore there

are constraints as to where we can include SuDS due to an existing basement and some existing buildings which are not suitable for blue/green roof.

We have tried to develop a design that discharges at greenfield rates, however, this rate is so low we can't achieve this (0.16l/s). Therefore we have looked at the possibility of discharging at 2l/s, however, this is still very challenging due to the limited space for blue roof and the limited space for an attenuation tank in the basement. This being said we have been able to develop a SuDS strategy based on a proposed surface water discharge rate of 5l/s that uses a combination of blue and green roofs on three of the proposed roof area and the proposed courtyard, with a smaller attenuation tank in the existing basement. By discharging at 5l/s, we will be providing an 87% reduction compared to the existing site. Please can you review this strategy and let me know if it is acceptable to the Council?

1 Museum Street:
The existing Museum Street site is currently discharging surface water into the Thames Water combined sewer unrestricted at a rate of 127.2l/s. The proposed scheme is part refurbishment part, new build project and therefore there are constraints as to where we can include SuDS due to an existing basement and Root protection zones.

We have tried to develop a design that discharges at greenfield rates, however, this rate is so low we can't achieve this (0.35l/s). As we discussed on the phone there is an area of the private site that is shown hatched on SK005 attached. This area is currently used by the public and is draining surface water runoff into the highway drainage network on Museum Street. This area is also occupied by existing services and root protection zones that make it difficult to install drainage, let alone install any form of SuDS to provide attenuation. The proposed works in this area are only upgrades to the finishes and some S278 works that will be agreed with the Council at a later date. Therefore I would like to propose as there are no major changes, this area of the site continues to drain surface water runoff into the highway drainage, as existing.

By allowing this area to drain into the highway, we have been able to develop a SuDS strategy for the remaining site area that uses a combination of blue roofs and a below ground attenuation tank, that will discharge at 2l/s. Thus providing a 98% reduction compared to the existing site.

If it cannot be agreed that the hatched area on SK005 can drain into the highway drainage, we can accommodate this onsite, however, to do this we will require the larger discharge rate of 5l/s due to the limited space to install SuDS because of the existing basement, Root protection zones and existing services. By discharging at 5l/s we will be able to provide a 96% reduction compared to the existing site condition.

Please can you review my proposals and let me know if they would be acceptable to Camden Council?

Kind Regards

Craig Marchant MEng(Hons)
Senior Civil Engineer
Civil & Infrastructure

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Mr C Marchant
Meinhardt UK
10 Aldersgate Street
London EC1A 4HJ

Our ref: DS6076752

0800 009 3921
Monday to Friday, 8am to 5pm

18th August 2020

Pre-planning enquiry: Wastewater Capacity check

Dear Mr Marchant

Thank you for providing details of your development with the Pre-Planning application dated 19th Aug 20 for development @ 1 Museum St Holborn London WC1A 1JR

Existing brownfld site ,developed to { Commercial area consisting of Offices } as per your above application.

We have completed the current assessment of the foul water flows based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network, in liaison with TW Asset Planners.

Foul

If your proposals progress in line with the details you've provided as above, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent TW foul sewer networks to serve your foul discharges from your development, provided it is by gravity.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity and has to be investigated again.

Surface Water
When developing a site, policy 5.13 of the London Plan and Policy 3.4 of the Supplementary Planning Guidance (Sustainable Design And Construction) states that every attempt should be made to use flow attenuation and SuDS/Storage to reduce the surface water discharge from the site as much as possible.

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. Before we can consider your

surface water needs, you'll need written approval from the lead local flood authority that you have followed the sequential approach to the disposal of surface water and considered all practical means

The disposal hierarchy being:

1. store rainwater for later use.
2. use infiltration techniques where possible.
3. attenuate rainwater in ponds or open water features for gradual release.
4. attenuate rainwater by storing in tanks or sealed water features for gradual release.
5. discharge rainwater direct to a watercourse.;; *and if above cannot be achieved*
6. discharge rainwater to a surface water sewer/drain.
7. discharge rainwater to the combined sewer.
8. discharge rainwater to the foul sewer

Where connection to the public sewerage network is still required after examining the hierarchy {1-5} to manage surface water flows we will accept these flows at a discharge rate in line with ***CIRIA's best practice guide on SuDS or that stated within the sites planning approval.***

If the above surface water hierarchy has been followed and if the flows are restricted to a total of 5.0 l/s as per your application to TW sewer network, then we would not have any objections to the proposal. We note that you have liaised with the LA and agreed the surface water drainage strategy.

Please see the attached 'Planning your wastewater' leaflet for additional information. At the appropriate time, you will have to apply for a S106 connection application to DS Connection team

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

Please note that you must keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient sewerage capacity.

What happens next?

Please make sure you submit your connection application, when you are ready, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me.

Yours sincerely

Siva Sivarajan

Developer Services- Wastewater Adoptions Engineer
Office:0203 577 7752 Mobile: 07747842608
siva.sivarajan@thameswater.co.uk

Thames Water Utilities Ltd, Clearwater Court, Vastern Road, Reading, Berkshire, RG1 8DB
Find us online at developers.thameswater.co.uk

TW Int ref : DTS 66700

Craig Marchant

From: Craig Marchant
Sent: 26 August 2020 16:06
To: 'Siva Sivarajan'; Developer Services
Cc: Alan Dovey
Subject: RE: RE: 2413 - Museum Street, London - Pre Development Enquiry (1 of 2)

Hi Siva,

Thank you for confirming this,

Kind Regards

Craig Marchant MEng(Hons)
Senior Civil Engineer
Civil & Infrastructure

Meinhardt (UK) Ltd, 10 Aldersgate Street, London, EC1A 4HJ
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E: Craig.Marchant@meinhardt.co.uk | **W**: www.meinhardt.co.uk

From: Siva Sivarajan [mailto:Siva.Sivarajan@thameswater.co.uk]
Sent: 26 August 2020 16:05
To: Craig Marchant <Craig.Marchant@meinhardt.co.uk>; Developer Services <developer.services@thameswater.co.uk>
Cc: Alan Dovey <alan.dovey@thameswater.co.uk>
Subject: RE: RE: 2413 - Museum Street, London - Pre Development Enquiry (1 of 2)

Dear Sir

- Pre planning applications for capacity checks are for the 'new aspect' of the development;

- The application form and the attached letters indicate that the existing highway drainage remains the same. This is again confirmed below in your email as highlighted by me;
- As such it is only the 5 l/s that is related to this application and is approved
- As for the highway drainage , it is unaltered and you have agreed with the local LLFA as well;

The below is the extract from your application form under 'proposed' which further consolidates the situation:
'' The Total site area = 0.326 ha. Of this area 0.266 ha will be drained via an on site drainage network which will discharge at 5l/s into the Thames Water public sewer. A drainage network utilising Blue and green roofs with an attenuation tank is proposed

The remaining 0.06ha of the site is currently draining unrestricted in the the public highway sewer. It has been agreed with the LLFA Camden Borough Council that this area of the site can continue to drain into the highway drainage unrestricted. This has been estimated to be 36l/s''

As such the consent letter covers all areas as it is meant to be

Regards

Siva Sivarajan
Developer Services- Wastewater Adoptions Engineer
Mobile: 07747642603
siva.sivarajan@thameswater.co.uk

Thames Water Utilities Ltd, Clearwater Court, Vastern Road, Reading, Berkshire, RG1 8DB
Find us online at developers.thameswater.co.uk

Get advice on making your sewer connection correctly at connectright.org.uk

Sewers for Adoption (SFA) was replaced by the new Code for Adoptions on 1st April 2020, please use this link to find the new national standards and documents. Any applications made prior to 1st April will continue to be assessed against SFA.

From: Craig Marchant <Craig.Marchant@meinhardt.co.uk>
Sent: 26 August 2020 13:03
To: Developer Services <developer.services@thameswater.co.uk>
Cc: Siva Sivarajan <Siva.Sivarajan@thameswater.co.uk>
Subject: RE: RE: 2413 - Museum Street, London - Pre Development Enquiry (1 of 2)

FAO Siva Sivaranjan and Alan Doveys,

Hi Siva and Alan,

Thank you for confirming there is the capacity for the prospered site in the existing Thames Water combined sewer surrounding my site. In the pre development response you state you have no object to the 5l/s surface water discharge connection from the pipe connection, pending it has been agreed with the LLFA Camden Council, which is has.

However along with this piped connection, we are still proposing to drain an area of the private site into the public highway drainage connected to your combined sewer, this will be unrestricted as per the current arrangement. We have agreed with Camden that this area of the private site can discharge unrestricted into the highway drainage, as this is the current condition and we are not changing anything in this area. There are also lots of existing services and root protection zones that we are keen to avoid disrupting.

The private area of our site will discharge at 36l/s for a 1 in 100 +40% CC into the highway drainage, this doesn't include the 5l/s piped discharge rate. Please can you confirm you have no objection to this arrangement?

Kind Regards

Craig Marchant MEng(Hons)
Senior Civil Engineer
Civil & Infrastructure

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T: +44 (0) 207 831 7969

Co. Reg. No. 4131858

E: Craig.Marchant@meinhardt.co.uk | **W**: www.meinhardt.co.uk

From: DEVELOPER.SERVICES@THAMESWATER.CO.U [mailto:DEVELOPER.SERVICES@THAMESWATER.CO.UK]
Sent: 26 August 2020 12:44
To: Craig Marchant <Craig.Marchant@meinhardt.co.uk>
Subject: RE: RE: 2413 - Museum Street, London - Pre Development Enquiry (1 of 2)

response attched;please note this application is for Capacity check and the response relates to it;

please note that this is in Mr Alan Doveys area and as he is on leave i have responded; if you have further query please contact Alan D;

regards

Siva Sivarajan
Developer Services- Wastewater Adoptions Engineer
Mobile: 07747642603
siva.sivarajan@thameswater.co.uk

Thames Water Utilities Ltd, Clearwater Court, Vastern Road, Reading, Berkshire, RG1 8DB
Find us online at developers.thameswater.co.uk

Get advice on making your sewer connection correctly at connectright.org.uk

Original Text

From: Craig Marchant <Craig.Marchant@meinhardt.co.uk>
To: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
CC:
Sent: 19.08.20 18:42:49
Subject: RE: 2413 - Museum Street, London - Pre Development Enquiry (1 of 2)

To whom it may concern

RE: Pre-Development Enquiry, 1 Museum Street, London, WC1A 1JP

Please find attached our Application for a Pre-Development Enquiry for the abovementioned development.

Once reviewed could you please contact me to discuss servicing requirements for this site.

Please do not hesitate to contact me should you require any further information.

Kind Regards

Craig Marchant MEng(Hons)
Senior Civil Engineer
Civil & Infrastructure

Meinhardt (UK) Ltd, 10 Aldersgate Street, London, EC1A 4HJ
T: +44 (0) 207 831 7969

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Mr Craig Marchant

Meinhardt (UK) Ltd
10 Aldersgate Street,
London,
E1A 4HJ

Wastewater pre-planning
Our ref **DS6096361, DTS-65084**

06 July 2022

Pre-planning enquiry: Confirmation of sufficient capacity

Site: 1 West Central Street, London - WC1V6PJ

Dear Craig,

Thank you for providing information on your proposed development.

Existing site: Flats (2 units), Public House (889 people), Offices (733m2) and Shopping Centre (587m2).
Proposed site: Flats (26 units).
Proposed foul water discharge by gravity into manholes TQ30812410, TQ3081141B and TQ30811404
Proposed surface water discharge at 5.0 l/s for all storm events up to and including 1:100yr+40$CC into manhole TQ30811404.

We're pleased to confirm that there will be sufficient foul water and surface water capacity in our sewerage network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on 07747 647 155.

Kind Regards

Zaid Kazi
Developer Services – Major Projects, Project Engineer
zaid.kazi@thameswater.co.uk
Get advice on making your sewer connection correctly at connectright.org.uk
Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at developers.thameswater.co.uk

Ms Carmel Lennon – Heyne Tillett Steel
16 Chart Street
LONDON
N1 6DD

Wastewater pre-planning
Our ref DS6104828

02 June 2023

Pre-planning enquiry: Confirmation of sufficient capacity

Site address: **1 Museum Street, London WC1A 1JR**

Dear Ms Lennon,

Thank you for providing information on your development of 23 new houses and 23,625 m^2 office space with proposed foul water discharge via gravity and surface water discharge via gravity at max. 5.0 l/s to the 1676x914 mm combined water sewer in High Holborn.

We have completed the assessment of the foul water and surface water flows based on the information submitted in your application with the purpose of identifying sewerage capacity within the existing Thames Water sewer network.

Foul Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the nearby combined water sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, up to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number/density of units. Such changes could mean that there is no longer sufficient capacity.

Surface Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the nearby combined water sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, up to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase of the impermeable area. Such changes could mean that there is no longer sufficient capacity.

What happens next?

Please make sure to submit your sewer connection application, giving us at least 21 days' notice of the date you wish to make your new connection(s).

If you have any queries, please give me a call on 07747 644 979 (9am to 5pm, Monday to Friday) or email developer.services@thameswater.co.uk.

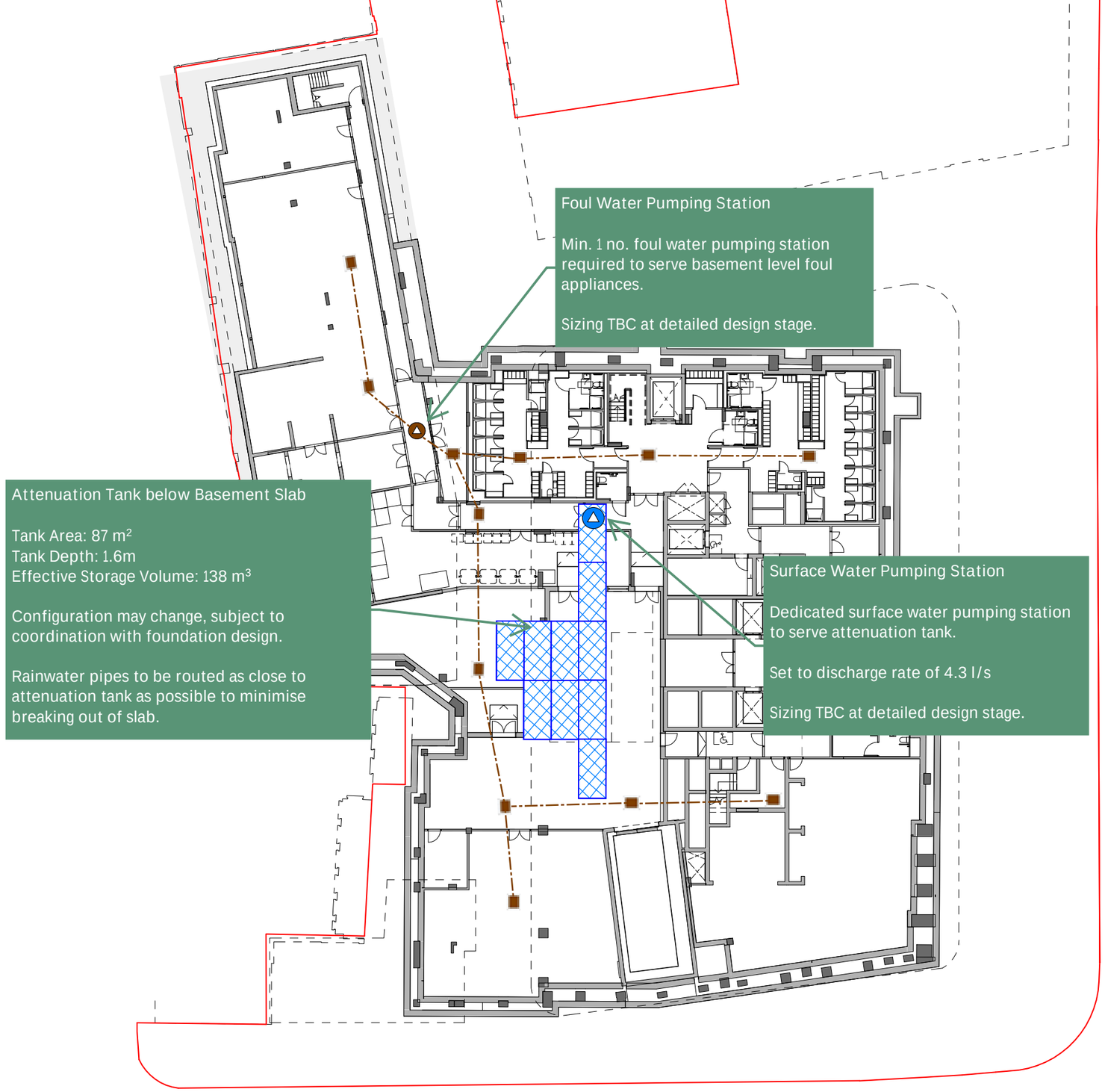
Yours sincerely,

Nicholas Short BSc (Hons)
Adoption & Pre-planning Engineer
Waste Connections Thames Valley & Home Counties
Service Delivery

Thames Water Utilities Limited – Registered Office: Clearwater Court, Vastern Road, Reading RG1 8DB
Company number 02366661. VAT registration no GB 537-4569-15

Appendix G

Preliminary SuDS Layouts & Exceedance Layouts



LEGEND

- Attenuation Tank
- Blue Roof
- Surface Water Drain Run
- Foul Water Drain Run
- Surface Water Manhole
- Foul Water Manhole
- Surface Water Pump
- Foul Water Pump
- Existing Manhole

Job	1 Museum Street	Date	02/05/2023
Title	Preliminary Drainage Layout: Museum Street Site - Basement	Eng.	CL
Job No.	2952	Sheet SK016	Rev. P1

HEYNE TILLETT STEEL

Blue Roof B1
Level 2 North

Blue roof area: 65 m²
Depth: 150mm
Run-off Rate: 0.10 l/s

Blue Roof B3
4th Floor Terrace

Blue roof area: 116 m²
Depth: 150mm
Run-off Rate: 0.10 l/s

Blue Roof B5
8th Floor Terrace

Blue roof area: 125 m²
Depth: 150mm
Run-off Rate: 0.10 l/s

Blue Roof B4
Vine Lane Roof

Blue roof area: 108 m²
Depth: 150mm
Run-off Rate: 0.10 l/s

Blue Roof B2
Level 2 South

Blue roof area: 37 m²
Depth: 150mm
Run-off Rate: 0.10 l/s

Blue Roof B6
11th Floor Terrace

Blue roof area: 219 m²
Depth: 150mm
Run-off Rate: 0.20 l/s

LEGEND

- Attenuation Tank
- Blue Roof
- Surface Water Drain Run
- Foul Water Drain Run
- Surface Water Manhole
- Foul Water Manhole
- Surface Water Pump
- Foul Water Pump
- Existing Manhole

Job	1 Museum Street	Date	02/05/2023
Title	Preliminary Drainage Layout: Museum Street Site - Roof	Eng.	CL
Job No.	2952	Sheet SK017	Rev. P1

HEYNE TILLETT STEEL

NOTES & KEY

+ Proposed finished floor levels are higher than adjacent existing ground levels.

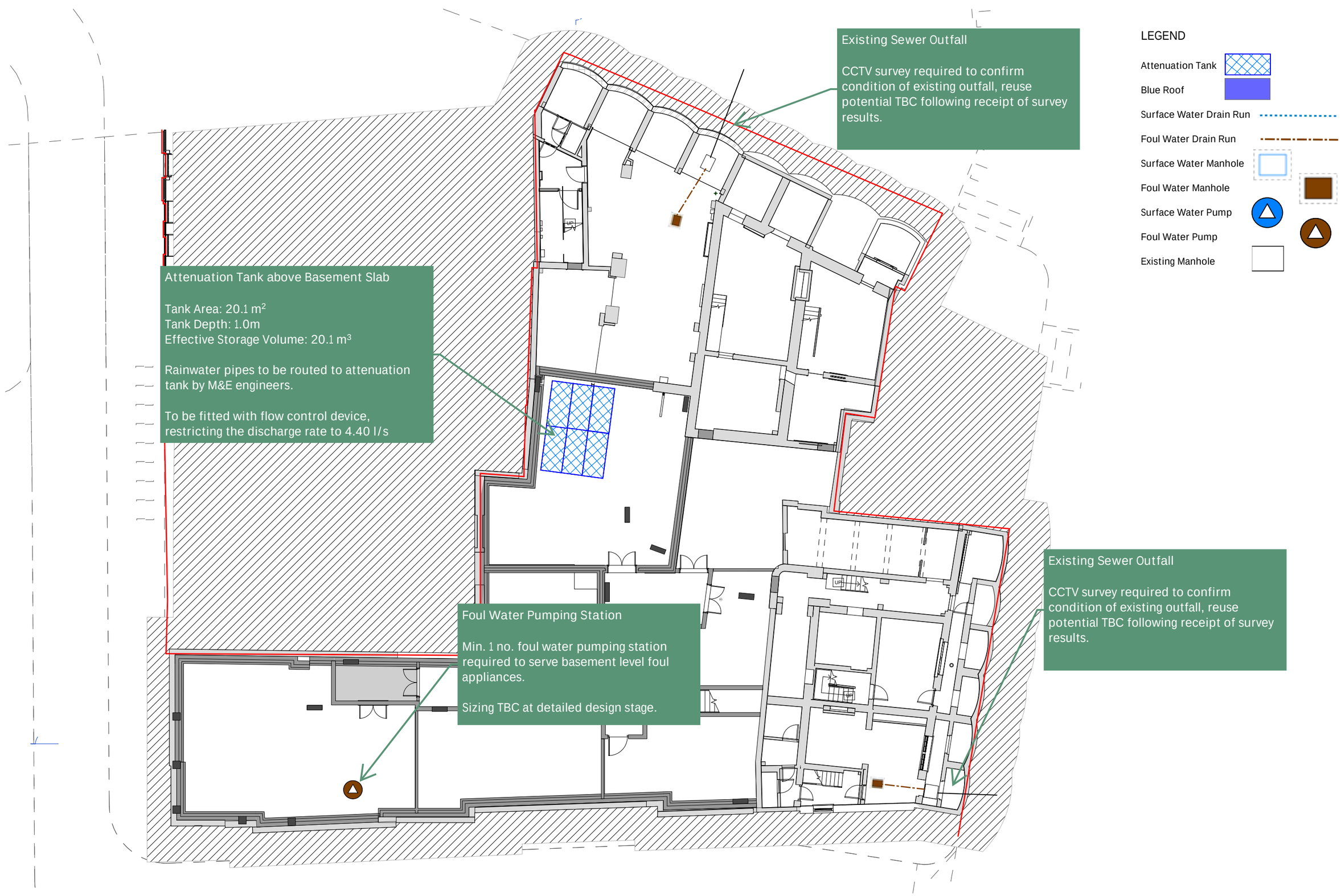
+ In an exceedance event, overland flows would not enter the buildings.

+ The proposed levels on Vine Street will be designed to ensure falls away from the buildings.

Proposed finished floor level: FFL: 25.350

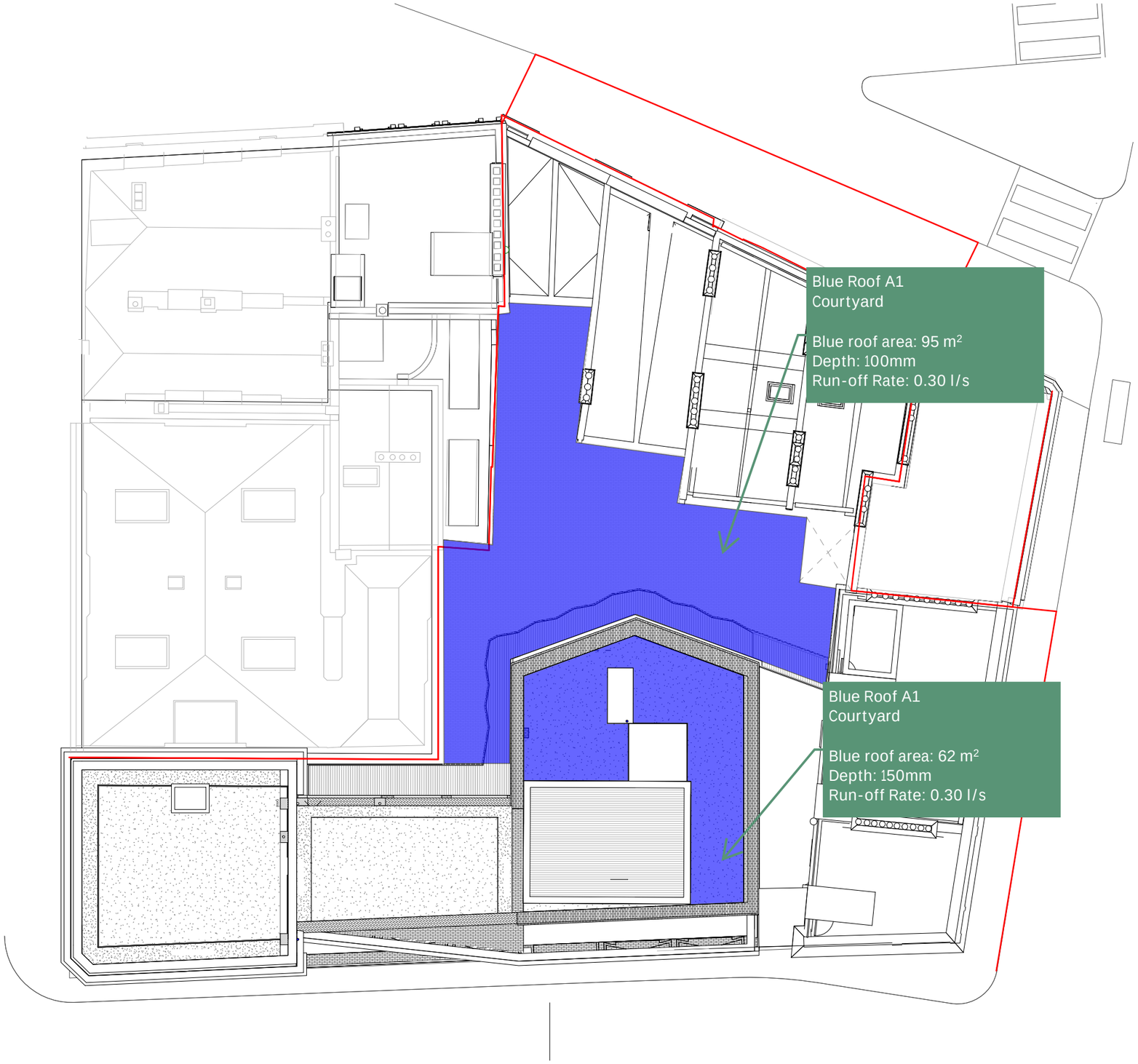
Existing ground level: EGL: 25.310

1 Museum Street - Exceedance Plan



Job	1 Museum Street	Date	02/05/2023
Title	Preliminary Drainage Layout: West Central Street Site - Basement	Eng.	CL
Job No.	2952 Sheet SK018	Rev.	P1

HEYNE TILLETT STEEL



LEGEND

- Attenuation Tank
- Blue Roof
- Surface Water Drain Run
- Foul Water Drain Run
- Surface Water Manhole
- Foul Water Manhole
- Surface Water Pump
- Foul Water Pump
- Existing Manhole

Job	1 Museum Street	Date	02/05/2023
Title	Preliminary Drainage Layout: West Central Street Site - Basement	Eng.	CL
Job No.	2952	Sheet SK019	Rev. P1

HEYNE TILLETT STEEL

Appendix H

Drainage Maintenance Plan

Job Number: 2952
Name: 1 Museum Street
Date: 04/05/2023

Drainage Inspection and Maintenance Strategy

This document has been prepared to support the inspection and maintenance of the proposed below ground drainage at Museum Street. The drainage network comprises surface and foul water drainage systems:

- Surface water networks will route all the rainwater towards the nearby public sewer network via blue roofs and attenuation tanks.
- Foul water network from above ground level will be routed towards the outfall manholes.

In accordance with CIRIA C625 it is recommended that a private SuDS maintenance agreement is undertaken as a simple contract between the property owner and the maintenance provider (the maintainer). It is mainly to facilitate continuing maintenance of the SuDS that are in private ownership. The maintenance requirements are in accordance with the CIRIA C753 SuDS Manual 2015 and product manufacturer's requirements.

The following Drainage / SuDS measures are proposed within the development:

- **General Drainage:**

Maintenance Period	Maintenance Task	Frequency
Regular maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action.	Monthly
	Inspect surface structures and covers removing obstructions and silt as necessary.	Monthly or as required
	Check there is no physical damage.	
	Remove overgrown vegetation 1m min. around structures and keep hard aprons free from silt and debris.	
Occasional Maintenance	Remove sediment from pre-treatment structures (e.g. gullies, channels silt traps).	Six-monthly or as required
	Remove cover and inspect inside, ensuring water is flowing freely and that the exit route for water is unobstructed.	Annually or as required
	Remove debris and silt.	
	Undertake inspection after leaf fall in autumn.	
Remedial Actions	Repair/rehabilitation of inlets, outlets, overflows and vents.	As required
Monitoring	Inspect all manholes, inspection chambers, inlets, outlets, overflows and vents to ensure they are in good condition and operating as designed.	Annually or after large storms.

- **Inlets, Outlets and Inspection Chambers:**

Maintenance Period	Maintenance Task	Frequency
Regular Maintenance	Inspect surface structures and covers removing obstructions and silt as necessary.	Monthly or as required
	Check there is no physical damage. Remove overgrown vegetation 1m min. around structures and keep hard aprons free from silt and debris.	
	Remove cover and inspect inside, ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn.	Annually
Occasional Maintenance	Check topsoil levels are 20mm above edges off baskets and chambers to avoid mower damage.	As necessary
Remedial Work	Unpack stone in basket features and unblock or repair and repack stone as design detail as necessary.	As required
	Repair physical damage is necessary.	

- **Green/Brown/Blue Roof**

Maintenance Period	Maintenance Task	Frequency
Regular Maintenance	During establishment, replace dead plants as required (for 12 months following installation) Mow grasses (where required) and remove resultant clippings	Monthly
Occasional Maintenance	Remove fallen leaves and debris from deciduous plant foliage Remove nuisance and invasive vegetation, including weeds Remove debris & litter to prevent clogging of inlet drains an interference with plant growth Noxious weed treatment (3 times a year)	Six Monthly
	Replace dead plants as required (typically in the Autumn) Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes, and roof structure for proper operation, integrity of waterproofing and structural stability, take action where required Inspect soil substrate for evidence of erosion channels and identify any sediment sources, take action where required Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system, take action where required Inspect underside of roof for evidence of leakage, take action where required Inspect and document the presence of wildlife	Annually
Remedial Action	Inspect and carry out essential recovery works to return the feature to full working order	Following all significant storm events
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth	Six monthly

- **Flow control Structures:**

Maintenance Period	Maintenance Task	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action (for 3 months following installation).	Monthly
	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Six Monthly
	Remove sediment from pre-treatment structures.	
Monitoring	Inspect and carry out essential recovery works to return the feature to full working order.	Following all significant storm events

- **Geocellular Storage Tank:**

Maintenance Period	Maintenance Task	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for three months, then every six months.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly.
Remedial Actions	Repair/rehabilitation of inlets, outlets, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually or after large storms.

- **Hydro-Brake (Flow Control):**

Maintenance Period	Maintenance Task	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for three months, then every six months.
	Remove sediment from pre-treatment structures.	
Remedial Actions	Repair/rehabilitation of Hydro-Brake.	As required
	If problems are experienced, please contact the company (Hydro International) so that an investigation may be made. Contact: enquiries@hydro-int.com (+44 (0)118 933 1325).	
Monitoring	Inspect and with a hose down if required.	Annually or after large storms.

- **Pump Installations:**

Maintenance Period	Maintenance Task	Frequency
Regular Maintenance	Visual inspection of the unit. Rise and inspection of the pump. Seal chamber oil check. Level control equipment cleaned and tested. Inspection and test of Control Panel functionality. Motor Insulation tested and recorded.	Annually or as agreed with manufacturer to maintain efficient and reliable system in operation
Remedial Action	Repair / rehabilitation of inlets, outlets, vents and other components.	As required or stated by manufacturer

Reference shall be made to CIRIA publication C753 (The SuDS Manual) and to the relevant maintenance guidance from the products manufacturers.

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