

48 West End

61-65 Charlotte Street

Westbury

London W1

Wiltshire BA13 3JG

Attenuation Tank

Date January 2016

Designed by Peter White

File ATTENUATION + PUMPS.SRCX

Checked by

Micro Drainage

Source Control 2015.1



Summary of Results for 100 year Return Period (+30%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Control (l/s) | Max Volume (m ³) | Status |
|------------------|---------------|---------------|-------------------|------------------------------|--------|
| 15 min Summer | 22.634 | 1.134 | 5.0 | 6.2 | O K |
| 30 min Summer | 22.670 | 1.170 | 5.0 | 6.6 | O K |
| 60 min Summer | 22.562 | 1.062 | 5.0 | 5.6 | O K |
| 120 min Summer | 22.375 | 0.875 | 5.0 | 3.9 | O K |
| 180 min Summer | 22.188 | 0.688 | 5.0 | 2.2 | O K |
| 240 min Summer | 22.068 | 0.568 | 5.0 | 1.2 | O K |
| 360 min Summer | 22.012 | 0.512 | 5.0 | 0.7 | O K |
| 480 min Summer | 22.004 | 0.504 | 5.0 | 0.6 | O K |
| 600 min Summer | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 720 min Summer | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 960 min Summer | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 1440 min Summer | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 2160 min Summer | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 2880 min Summer | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 4320 min Summer | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 5760 min Summer | 21.999 | 0.499 | 0.5 | 0.5 | O K |
| 7200 min Summer | 21.998 | 0.498 | 0.4 | 0.5 | O K |
| 8640 min Summer | 21.999 | 0.499 | 0.3 | 0.5 | O K |
| 10080 min Summer | 21.999 | 0.499 | 0.3 | 0.5 | O K |
| 15 min Winter | 22.765 | 1.265 | 5.0 | 7.4 | O K |
| 30 min Winter | 22.760 | 1.260 | 5.0 | 7.4 | O K |
| 60 min Winter | 22.651 | 1.151 | 5.0 | 6.4 | O K |
| 120 min Winter | 22.354 | 0.854 | 5.0 | 3.7 | O K |
| 180 min Winter | 22.076 | 0.576 | 5.0 | 1.2 | O K |
| 240 min Winter | 22.010 | 0.510 | 5.0 | 0.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m ³) | Discharge Volume (m ³) | Time-Peak (mins) |
|------------------|--------------|----------------------------------|------------------------------------|------------------|
| 15 min Summer | 136.659 | 0.0 | 10.5 | 15 |
| 30 min Summer | 88.315 | 0.0 | 13.8 | 24 |
| 60 min Summer | 54.281 | 0.0 | 16.8 | 42 |
| 120 min Summer | 32.230 | 0.0 | 20.4 | 74 |
| 180 min Summer | 23.456 | 0.0 | 22.2 | 104 |
| 240 min Summer | 18.621 | 0.0 | 23.4 | 130 |
| 360 min Summer | 13.418 | 0.0 | 25.8 | 182 |
| 480 min Summer | 10.633 | 0.0 | 27.0 | 238 |
| 600 min Summer | 8.872 | 0.0 | 28.3 | 348 |
| 720 min Summer | 7.649 | 0.0 | 29.6 | 92 |
| 960 min Summer | 6.048 | 0.0 | 30.8 | 736 |
| 1440 min Summer | 4.339 | 0.0 | 33.3 | 1176 |
| 2160 min Summer | 3.108 | 0.0 | 28.3 | 1036 |
| 2880 min Summer | 2.451 | 0.0 | 25.2 | 2328 |
| 4320 min Summer | 1.752 | 0.0 | 22.1 | 1660 |
| 5760 min Summer | 1.379 | 0.0 | 6.8 | 5224 |
| 7200 min Summer | 1.145 | 0.0 | 6.1 | 4408 |
| 8640 min Summer | 0.983 | 0.0 | 5.5 | 360 |
| 10080 min Summer | 0.864 | 0.0 | 5.0 | 5336 |
| 15 min Winter | 136.659 | 0.0 | 11.7 | 16 |
| 30 min Winter | 88.315 | 0.0 | 15.3 | 26 |
| 60 min Winter | 54.281 | 0.0 | 19.2 | 44 |
| 120 min Winter | 32.230 | 0.0 | 22.8 | 78 |
| 180 min Winter | 23.456 | 0.0 | 25.2 | 104 |
| 240 min Winter | 18.621 | 0.0 | 26.4 | 116 |

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| Storm Event | Max Level (m) | Max Depth (m) | Max Control (l/s) | Max Volume (m ³) | Status |
|------------------|---------------|---------------|-------------------|------------------------------|--------|
| 360 min Winter | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 480 min Winter | 22.002 | 0.502 | 5.0 | 0.6 | O K |
| 600 min Winter | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 720 min Winter | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 960 min Winter | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 1440 min Winter | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 2160 min Winter | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 2880 min Winter | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 4320 min Winter | 22.000 | 0.500 | 5.0 | 0.5 | O K |
| 5760 min Winter | 21.999 | 0.499 | 0.4 | 0.5 | O K |
| 7200 min Winter | 21.999 | 0.499 | 0.3 | 0.5 | O K |
| 8640 min Winter | 21.999 | 0.499 | 0.2 | 0.5 | O K |
| 10080 min Winter | 21.999 | 0.499 | 0.2 | 0.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m ³) | Discharge Volume (m ³) | Time-Peak (mins) |
|------------------|--------------|----------------------------------|------------------------------------|------------------|
| 360 min Winter | 13.418 | 0.0 | 28.8 | 98 |
| 480 min Winter | 10.633 | 0.0 | 30.6 | 252 |
| 600 min Winter | 8.872 | 0.0 | 31.8 | 182 |
| 720 min Winter | 7.649 | 0.0 | 33.2 | 716 |
| 960 min Winter | 6.048 | 0.0 | 35.0 | 948 |
| 1440 min Winter | 4.339 | 0.0 | 37.6 | 160 |
| 2160 min Winter | 3.108 | 0.0 | 38.4 | 224 |
| 2880 min Winter | 2.451 | 0.0 | 29.4 | 2308 |
| 4320 min Winter | 1.752 | 0.0 | 17.8 | 1192 |
| 5760 min Winter | 1.379 | 0.0 | 7.4 | 4680 |
| 7200 min Winter | 1.145 | 0.0 | 6.5 | 648 |
| 8640 min Winter | 0.983 | 0.0 | 5.7 | 496 |
| 10080 min Winter | 0.864 | 0.0 | 5.3 | 1712 |

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Rainfall Details

| | | | |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.600 | Shortest Storm (mins) | 15 |
| Ratio R | 0.437 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +30 |

Time Area Diagram

Total Area (ha) 0.038

Time (mins) Area
From: To: (ha)

0 4 0.038

Green Roof

Area (m³) 53 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

| Time (mins) | Area | Time (mins) | Area | Time (mins) | Area | Time (mins) | Area |
|-------------|----------|-------------|----------|-------------|----------|-------------|----------|
| From: To: | (ha) | From: To: | (ha) | From: To: | (ha) | From: To: | (ha) |
| 0 4 | 0.000963 | 32 36 | 0.000194 | 64 68 | 0.000039 | 96 100 | 0.000008 |
| 4 8 | 0.000789 | 36 40 | 0.000159 | 68 72 | 0.000032 | 100 104 | 0.000006 |
| 8 12 | 0.000646 | 40 44 | 0.000130 | 72 76 | 0.000026 | 104 108 | 0.000005 |
| 12 16 | 0.000529 | 44 48 | 0.000107 | 76 80 | 0.000022 | 108 112 | 0.000004 |
| 16 20 | 0.000433 | 48 52 | 0.000087 | 80 84 | 0.000018 | 112 116 | 0.000004 |
| 20 24 | 0.000354 | 52 56 | 0.000072 | 84 88 | 0.000014 | 116 120 | 0.000003 |
| 24 28 | 0.000290 | 56 60 | 0.000059 | 88 92 | 0.000012 | | |
| 28 32 | 0.000238 | 60 64 | 0.000048 | 92 96 | 0.000010 | | |

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Model Details

Storage is Online Cover Level (m) 24.215

Tank or Pond Structure

Invert Level (m) 21.500

| Depth (m) | Area (m ²) | Depth (m) | Area (m ²) | Depth (m) | Area (m ²) | Depth (m) | Area (m ²) |
|-----------|------------------------|-----------|------------------------|-----------|------------------------|-----------|------------------------|
| 0.000 | 1.1 | 0.501 | 9.0 | 1.301 | 1.1 | 2.300 | 0.4 |
| 0.500 | 1.1 | 1.300 | 9.0 | 2.200 | 1.1 | | |

Level Controlled Pump Outflow Control

Invert Level (m) 21.500 Cut In Height (m) 0.500 Cut Out Height (m) 0.150

| Depth (m) | Outflow (l/s) | Depth (m) | Outflow (l/s) |
|-----------|---------------|-----------|---------------|
| 0.001 | 5.0000 | 10.000 | 5.0000 |