

|                                                            |                     |                                      |                             |                       |                                                                                     |
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| The Stables<br>High Cogges, Witney<br>Oxfordshire          |                     | Branch Hill<br>Green roof South East |                             |                       |  |
| Date 19/07/2017 09:34<br>File Greenroof SE lin30+CC.srcx   |                     | Designed by david<br>Checked by      |                             |                       |                                                                                     |
| Micro Drainage                                             |                     | Source Control 2015.1                |                             |                       |                                                                                     |
| <u>Summary of Results for 30 year Return Period (+40%)</u> |                     |                                      |                             |                       |                                                                                     |
| Storm<br>Event                                             | Max<br>Level<br>(m) | Max<br>Depth<br>(m)                  | Max<br>Control<br>(l/s)     | Max<br>Volume<br>(m³) | Status                                                                              |
| 15 min Summer                                              | 115.039             | 0.039                                | 0.9                         | 0.0                   | O K                                                                                 |
| 30 min Summer                                              | 115.041             | 0.041                                | 1.0                         | 0.0                   | O K                                                                                 |
| 60 min Summer                                              | 115.041             | 0.041                                | 1.0                         | 0.0                   | O K                                                                                 |
| 120 min Summer                                             | 115.037             | 0.037                                | 0.8                         | 0.0                   | O K                                                                                 |
| 180 min Summer                                             | 115.034             | 0.034                                | 0.7                         | 0.0                   | O K                                                                                 |
| 240 min Summer                                             | 115.032             | 0.032                                | 0.6                         | 0.0                   | O K                                                                                 |
| 360 min Summer                                             | 115.029             | 0.029                                | 0.5                         | 0.0                   | O K                                                                                 |
| 480 min Summer                                             | 115.026             | 0.026                                | 0.4                         | 0.0                   | O K                                                                                 |
| 600 min Summer                                             | 115.025             | 0.025                                | 0.4                         | 0.0                   | O K                                                                                 |
| 720 min Summer                                             | 115.023             | 0.023                                | 0.3                         | 0.0                   | O K                                                                                 |
| 960 min Summer                                             | 115.021             | 0.021                                | 0.3                         | 0.0                   | O K                                                                                 |
| 1440 min Summer                                            | 115.017             | 0.017                                | 0.2                         | 0.0                   | O K                                                                                 |
| 2160 min Summer                                            | 115.014             | 0.014                                | 0.1                         | 0.0                   | O K                                                                                 |
| 2880 min Summer                                            | 115.013             | 0.013                                | 0.1                         | 0.0                   | O K                                                                                 |
| 4320 min Summer                                            | 115.011             | 0.011                                | 0.1                         | 0.0                   | O K                                                                                 |
| 5760 min Summer                                            | 115.011             | 0.011                                | 0.1                         | 0.0                   | O K                                                                                 |
| 7200 min Summer                                            | 115.010             | 0.010                                | 0.1                         | 0.0                   | O K                                                                                 |
| 8640 min Summer                                            | 115.009             | 0.009                                | 0.1                         | 0.0                   | O K                                                                                 |
| 10080 min Summer                                           | 115.008             | 0.008                                | 0.0                         | 0.0                   | O K                                                                                 |
| 15 min Winter                                              | 115.041             | 0.041                                | 1.0                         | 0.0                   | O K                                                                                 |
| 30 min Winter                                              | 115.043             | 0.043                                | 1.1                         | 0.0                   | O K                                                                                 |
| Storm<br>Event                                             | Rain<br>(mm/hr)     | Flooded<br>Volume<br>(m³)            | Discharge<br>Volume<br>(m³) | Time-Peak<br>(mins)   |                                                                                     |
| 15 min Summer                                              | 115.658             | 0.0                                  | 1.1                         | 15                    |                                                                                     |
| 30 min Summer                                              | 74.099              | 0.0                                  | 1.5                         | 21                    |                                                                                     |
| 60 min Summer                                              | 45.320              | 0.0                                  | 1.9                         | 34                    |                                                                                     |
| 120 min Summer                                             | 26.893              | 0.0                                  | 2.4                         | 72                    |                                                                                     |
| 180 min Summer                                             | 19.614              | 0.0                                  | 2.6                         | 100                   |                                                                                     |
| 240 min Summer                                             | 15.614              | 0.0                                  | 2.8                         | 134                   |                                                                                     |
| 360 min Summer                                             | 11.313              | 0.0                                  | 3.1                         | 194                   |                                                                                     |
| 480 min Summer                                             | 8.994               | 0.0                                  | 3.3                         | 250                   |                                                                                     |
| 600 min Summer                                             | 7.524               | 0.0                                  | 3.4                         | 318                   |                                                                                     |
| 720 min Summer                                             | 6.501               | 0.0                                  | 3.5                         | 374                   |                                                                                     |
| 960 min Summer                                             | 5.159               | 0.0                                  | 3.7                         | 492                   |                                                                                     |
| 1440 min Summer                                            | 3.721               | 0.0                                  | 4.0                         | 738                   |                                                                                     |
| 2160 min Summer                                            | 2.681               | 0.0                                  | 4.3                         | 1096                  |                                                                                     |
| 2880 min Summer                                            | 2.124               | 0.0                                  | 4.4                         | 1468                  |                                                                                     |
| 4320 min Summer                                            | 1.528               | 0.0                                  | 4.7                         | 2132                  |                                                                                     |
| 5760 min Summer                                            | 1.209               | 0.0                                  | 4.8                         | 2864                  |                                                                                     |
| 7200 min Summer                                            | 1.008               | 0.0                                  | 4.8                         | 3592                  |                                                                                     |
| 8640 min Summer                                            | 0.868               | 0.0                                  | 4.8                         | 4400                  |                                                                                     |
| 10080 min Summer                                           | 0.766               | 0.0                                  | 4.8                         | 5112                  |                                                                                     |
| 15 min Winter                                              | 115.658             | 0.0                                  | 1.3                         | 14                    |                                                                                     |
| 30 min Winter                                              | 74.099              | 0.0                                  | 1.8                         | 22                    |                                                                                     |
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|                                                            |                     |                                      |                             |                                                                                     |        |
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| The Stables<br>High Cogges, Witney<br>Oxfordshire          |                     | Branch Hill<br>Green roof South East |                             |  |        |
| Date 19/07/2017 09:34<br>File Greenroof SE lin30+CC.srcx   |                     | Designed by david<br>Checked by      |                             |                                                                                     |        |
| Micro Drainage                                             |                     | Source Control 2015.1                |                             |                                                                                     |        |
| <u>Summary of Results for 30 year Return Period (+40%)</u> |                     |                                      |                             |                                                                                     |        |
| Storm<br>Event                                             | Max<br>Level<br>(m) | Max<br>Depth<br>(m)                  | Max<br>Control<br>(l/s)     | Max<br>Volume<br>(m³)                                                               | Status |
| 60 min Winter                                              | 115.041             | 0.041                                | 1.0                         | 0.0                                                                                 | O K    |
| 120 min Winter                                             | 115.036             | 0.036                                | 0.8                         | 0.0                                                                                 | O K    |
| 180 min Winter                                             | 115.033             | 0.033                                | 0.7                         | 0.0                                                                                 | O K    |
| 240 min Winter                                             | 115.030             | 0.030                                | 0.5                         | 0.0                                                                                 | O K    |
| 360 min Winter                                             | 115.026             | 0.026                                | 0.4                         | 0.0                                                                                 | O K    |
| 480 min Winter                                             | 115.024             | 0.024                                | 0.3                         | 0.0                                                                                 | O K    |
| 600 min Winter                                             | 115.022             | 0.022                                | 0.3                         | 0.0                                                                                 | O K    |
| 720 min Winter                                             | 115.020             | 0.020                                | 0.3                         | 0.0                                                                                 | O K    |
| 960 min Winter                                             | 115.017             | 0.017                                | 0.2                         | 0.0                                                                                 | O K    |
| 1440 min Winter                                            | 115.014             | 0.014                                | 0.1                         | 0.0                                                                                 | O K    |
| 2160 min Winter                                            | 115.012             | 0.012                                | 0.1                         | 0.0                                                                                 | O K    |
| 2880 min Winter                                            | 115.011             | 0.011                                | 0.1                         | 0.0                                                                                 | O K    |
| 4320 min Winter                                            | 115.010             | 0.010                                | 0.1                         | 0.0                                                                                 | O K    |
| 5760 min Winter                                            | 115.009             | 0.009                                | 0.1                         | 0.0                                                                                 | O K    |
| 7200 min Winter                                            | 115.008             | 0.008                                | 0.0                         | 0.0                                                                                 | O K    |
| 8640 min Winter                                            | 115.007             | 0.007                                | 0.0                         | 0.0                                                                                 | O K    |
| 10080 min Winter                                           | 115.007             | 0.007                                | 0.0                         | 0.0                                                                                 | O K    |
| Storm<br>Event                                             | Rain<br>(mm/hr)     | Flooded<br>Volume<br>(m³)            | Discharge<br>Volume<br>(m³) | Time-Peak<br>(mins)                                                                 |        |
| 60 min Winter                                              | 45.320              | 0.0                                  | 2.2                         | 40                                                                                  |        |
| 120 min Winter                                             | 26.893              | 0.0                                  | 2.7                         | 72                                                                                  |        |
| 180 min Winter                                             | 19.614              | 0.0                                  | 3.0                         | 102                                                                                 |        |
| 240 min Winter                                             | 15.614              | 0.0                                  | 3.2                         | 132                                                                                 |        |
| 360 min Winter                                             | 11.313              | 0.0                                  | 3.5                         | 204                                                                                 |        |
| 480 min Winter                                             | 8.994               | 0.0                                  | 3.7                         | 262                                                                                 |        |
| 600 min Winter                                             | 7.524               | 0.0                                  | 3.9                         | 320                                                                                 |        |
| 720 min Winter                                             | 6.501               | 0.0                                  | 4.0                         | 384                                                                                 |        |
| 960 min Winter                                             | 5.159               | 0.0                                  | 4.2                         | 502                                                                                 |        |
| 1440 min Winter                                            | 3.721               | 0.0                                  | 4.6                         | 726                                                                                 |        |
| 2160 min Winter                                            | 2.681               | 0.0                                  | 4.9                         | 1092                                                                                |        |
| 2880 min Winter                                            | 2.124               | 0.0                                  | 5.1                         | 1508                                                                                |        |
| 4320 min Winter                                            | 1.528               | 0.0                                  | 5.3                         | 2176                                                                                |        |
| 5760 min Winter                                            | 1.209               | 0.0                                  | 5.5                         | 2912                                                                                |        |
| 7200 min Winter                                            | 1.008               | 0.0                                  | 5.6                         | 3488                                                                                |        |
| 8640 min Winter                                            | 0.868               | 0.0                                  | 5.6                         | 4352                                                                                |        |
| 10080 min Winter                                           | 0.766               | 0.0                                  | 5.6                         | 4624                                                                                |        |
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| The Stables<br>High Cogges, Witney<br>Oxfordshire        | Branch Hill<br>Green roof South East |  |
| Date 19/07/2017 09:34<br>File Greenroof SE lin30+CC.srcx | Designed by david<br>Checked by      |                                                                                     |
| Micro Drainage                                           |                                      |                                                                                     |
| Source Control 2015.1                                    |                                      |                                                                                     |

### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 21.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.439             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

### Green Roof

|                         |    |                      |       |
|-------------------------|----|----------------------|-------|
| Area (m <sup>3</sup> )  | 68 | 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         | 0.001236 | 32 36       | 0.000249 | 64 68       | 0.000050 | 96 100      | 0.000010 |
| 4 8         | 0.001012 | 36 40       | 0.000204 | 68 72       | 0.000041 | 100 104     | 0.000008 |
| 8 12        | 0.000828 | 40 44       | 0.000167 | 72 76       | 0.000034 | 104 108     | 0.000007 |
| 12 16       | 0.000678 | 44 48       | 0.000137 | 76 80       | 0.000028 | 108 112     | 0.000006 |
| 16 20       | 0.000555 | 48 52       | 0.000112 | 80 84       | 0.000023 | 112 116     | 0.000005 |
| 20 24       | 0.000455 | 52 56       | 0.000092 | 84 88       | 0.000019 | 116 120     | 0.000004 |
| 24 28       | 0.000372 | 56 60       | 0.000075 | 88 92       | 0.000015 |             |          |
| 28 32       | 0.000305 | 60 64       | 0.000062 | 92 96       | 0.000012 |             |          |