



**Soakaway 4 – 1 in 30 Year Cellular Crate**  
**Soakaway Calculations**  
**Willow Walk, Spalding**  
**Burmor Construction Limited**  
**5<sup>th</sup> May 2019**

|                                                                        |                                                                               |                                                                                     |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| G30 Consulting Ltd                                                     |                                                                               | Page 1                                                                              |
| Unit 6 Neepsend Triangle Business<br>1 Burton Road<br>Sheffield S3 8BW | Willow Walk, Spalding<br>Soakaway 4 - 1 in 30 Year<br>Cellular Crate Soakaway |  |
| Date 05/05/2019<br>File SOAKAWAY 4.SRCX                                | Designed by S. Griffiths<br>Checked by S. Griffiths                           |                                                                                     |
| XP Solutions                                                           | Source Control 2017.1.2                                                       |                                                                                     |

### Summary of Results for 30 year Return Period

Half Drain Time : 77 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status |
|------------------|---------------------|---------------------|------------------------------|-----------------------|--------|
| 15 min Summer    | 3.615               | 0.255               | 0.2                          | 1.2                   | O K    |
| 30 min Summer    | 3.673               | 0.313               | 0.2                          | 1.5                   | O K    |
| 60 min Summer    | 3.705               | 0.345               | 0.2                          | 1.6                   | O K    |
| 120 min Summer   | 3.713               | 0.353               | 0.2                          | 1.7                   | O K    |
| 180 min Summer   | 3.703               | 0.343               | 0.2                          | 1.6                   | O K    |
| 240 min Summer   | 3.689               | 0.329               | 0.2                          | 1.6                   | O K    |
| 360 min Summer   | 3.658               | 0.298               | 0.2                          | 1.4                   | O K    |
| 480 min Summer   | 3.630               | 0.270               | 0.2                          | 1.3                   | O K    |
| 600 min Summer   | 3.605               | 0.245               | 0.2                          | 1.2                   | O K    |
| 720 min Summer   | 3.583               | 0.223               | 0.2                          | 1.1                   | O K    |
| 960 min Summer   | 3.545               | 0.185               | 0.2                          | 0.9                   | O K    |
| 1440 min Summer  | 3.489               | 0.129               | 0.1                          | 0.6                   | O K    |
| 2160 min Summer  | 3.437               | 0.077               | 0.1                          | 0.4                   | O K    |
| 2880 min Summer  | 3.411               | 0.051               | 0.1                          | 0.2                   | O K    |
| 4320 min Summer  | 3.398               | 0.038               | 0.1                          | 0.2                   | O K    |
| 5760 min Summer  | 3.390               | 0.030               | 0.1                          | 0.1                   | O K    |
| 7200 min Summer  | 3.385               | 0.025               | 0.1                          | 0.1                   | O K    |
| 8640 min Summer  | 3.382               | 0.022               | 0.1                          | 0.1                   | O K    |
| 10080 min Summer | 3.379               | 0.019               | 0.0                          | 0.1                   | O K    |
| 15 min Winter    | 3.648               | 0.288               | 0.2                          | 1.4                   | O K    |
| 30 min Winter    | 3.715               | 0.355               | 0.2                          | 1.7                   | O K    |
| 60 min Winter    | 3.755               | 0.395               | 0.3                          | 1.9                   | O K    |
| 120 min Winter   | 3.760               | 0.400               | 0.3                          | 1.9                   | O K    |
| 180 min Winter   | 3.744               | 0.384               | 0.2                          | 1.8                   | O K    |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 15 min Summer    | 72.014          | 0.0                       | 18                  |
| 30 min Summer    | 46.909          | 0.0                       | 32                  |
| 60 min Summer    | 29.238          | 0.0                       | 56                  |
| 120 min Summer   | 17.704          | 0.0                       | 88                  |
| 180 min Summer   | 13.070          | 0.0                       | 122                 |
| 240 min Summer   | 10.495          | 0.0                       | 156                 |
| 360 min Summer   | 7.666           | 0.0                       | 224                 |
| 480 min Summer   | 6.135           | 0.0                       | 290                 |
| 600 min Summer   | 5.158           | 0.0                       | 356                 |
| 720 min Summer   | 4.475           | 0.0                       | 420                 |
| 960 min Summer   | 3.575           | 0.0                       | 544                 |
| 1440 min Summer  | 2.602           | 0.0                       | 784                 |
| 2160 min Summer  | 1.892           | 0.0                       | 1144                |
| 2880 min Summer  | 1.508           | 0.0                       | 1472                |
| 4320 min Summer  | 1.094           | 0.0                       | 2200                |
| 5760 min Summer  | 0.871           | 0.0                       | 2912                |
| 7200 min Summer  | 0.729           | 0.0                       | 3672                |
| 8640 min Summer  | 0.631           | 0.0                       | 4392                |
| 10080 min Summer | 0.558           | 0.0                       | 5136                |
| 15 min Winter    | 72.014          | 0.0                       | 18                  |
| 30 min Winter    | 46.909          | 0.0                       | 32                  |
| 60 min Winter    | 29.238          | 0.0                       | 58                  |
| 120 min Winter   | 17.704          | 0.0                       | 94                  |
| 180 min Winter   | 13.070          | 0.0                       | 132                 |

|                                                                        |                                                                               |                                                                                     |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| G30 Consulting Ltd                                                     |                                                                               | Page 2                                                                              |
| Unit 6 Neepsend Triangle Business<br>1 Burton Road<br>Sheffield S3 8BW | Willow Walk, Spalding<br>Soakaway 4 - 1 in 30 Year<br>Cellular Crate Soakaway |  |
| Date 05/05/2019<br>File SOAKAWAY 4.SRCX                                | Designed by S. Griffiths<br>Checked by S. Griffiths                           |                                                                                     |
| XP Solutions                                                           | Source Control 2017.1.2                                                       |                                                                                     |

Summary of Results for 30 year Return Period

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status |
|------------------|---------------------|---------------------|------------------------------|-----------------------|--------|
| 240 min Winter   | 3.722               | 0.362               | 0.2                          | 1.7                   | O K    |
| 360 min Winter   | 3.676               | 0.316               | 0.2                          | 1.5                   | O K    |
| 480 min Winter   | 3.636               | 0.276               | 0.2                          | 1.3                   | O K    |
| 600 min Winter   | 3.601               | 0.241               | 0.2                          | 1.1                   | O K    |
| 720 min Winter   | 3.570               | 0.210               | 0.2                          | 1.0                   | O K    |
| 960 min Winter   | 3.521               | 0.161               | 0.2                          | 0.8                   | O K    |
| 1440 min Winter  | 3.452               | 0.092               | 0.1                          | 0.4                   | O K    |
| 2160 min Winter  | 3.407               | 0.047               | 0.1                          | 0.2                   | O K    |
| 2880 min Winter  | 3.398               | 0.038               | 0.1                          | 0.2                   | O K    |
| 4320 min Winter  | 3.387               | 0.027               | 0.1                          | 0.1                   | O K    |
| 5760 min Winter  | 3.382               | 0.022               | 0.1                          | 0.1                   | O K    |
| 7200 min Winter  | 3.378               | 0.018               | 0.0                          | 0.1                   | O K    |
| 8640 min Winter  | 3.376               | 0.016               | 0.0                          | 0.1                   | O K    |
| 10080 min Winter | 3.374               | 0.014               | 0.0                          | 0.1                   | O K    |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 240 min Winter   | 10.495          | 0.0                       | 168                 |
| 360 min Winter   | 7.666           | 0.0                       | 240                 |
| 480 min Winter   | 6.135           | 0.0                       | 310                 |
| 600 min Winter   | 5.158           | 0.0                       | 376                 |
| 720 min Winter   | 4.475           | 0.0                       | 442                 |
| 960 min Winter   | 3.575           | 0.0                       | 568                 |
| 1440 min Winter  | 2.602           | 0.0                       | 808                 |
| 2160 min Winter  | 1.892           | 0.0                       | 1120                |
| 2880 min Winter  | 1.508           | 0.0                       | 1468                |
| 4320 min Winter  | 1.094           | 0.0                       | 2208                |
| 5760 min Winter  | 0.871           | 0.0                       | 2936                |
| 7200 min Winter  | 0.729           | 0.0                       | 3672                |
| 8640 min Winter  | 0.631           | 0.0                       | 4408                |
| 10080 min Winter | 0.558           | 0.0                       | 5040                |

|                                                                        |                                                                               |                                                                                     |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| G30 Consulting Ltd                                                     |                                                                               | Page 3                                                                              |
| Unit 6 Neepsend Triangle Business<br>1 Burton Road<br>Sheffield S3 8BW | Willow Walk, Spalding<br>Soakaway 4 - 1 in 30 Year<br>Cellular Crate Soakaway |  |
| Date 05/05/2019<br>File SOAKAWAY 4.SRCX                                | Designed by S. Griffiths<br>Checked by S. Griffiths                           |                                                                                     |
| XP Solutions                                                           | Source Control 2017.1.2                                                       |                                                                                     |

#### 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)            | 19.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.400             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +0    |

#### Time Area Diagram

Total Area (ha) 0.010

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

0 5 0.010

|                                                                        |                                                                               |                                                                                     |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| G30 Consulting Ltd                                                     |                                                                               | Page 4                                                                              |
| Unit 6 Neepsend Triangle Business<br>1 Burton Road<br>Sheffield S3 8BW | Willow Walk, Spalding<br>Soakaway 4 - 1 in 30 Year<br>Cellular Crate Soakaway |  |
| Date 05/05/2019<br>File SOAKAWAY 4.SRCX                                | Designed by S. Griffiths<br>Checked by S. Griffiths                           |                                                                                     |
| XP Solutions                                                           | Source Control 2017.1.2                                                       |                                                                                     |

Model Details

Storage is Online Cover Level (m) 4.470

Cellular Storage Structure

Invert Level (m) 3.360 Safety Factor 1.0

Infiltration Coefficient Base (m/hr) 0.07056 Porosity 0.95

Infiltration Coefficient Side (m/hr) 0.07056

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|
| 0.000     | 5.0       | 5.0            | 0.400     | 5.0       | 13.0           | 0.401     | 0.0       | 13.0           |