

### Design Settings

|                       |                   |                                      |               |
|-----------------------|-------------------|--------------------------------------|---------------|
| Rainfall Methodology  | FSR               | Maximum Time of Concentration (mins) | 30.00         |
| Return Period (years) | 30                | Maximum Rainfall (mm/hr)             | 50.0          |
| Additional Flow (%)   | 0                 | Minimum Velocity (m/s)               | 1.00          |
| FSR Region            | England and Wales | Connection Type                      | Level Soffits |
| M5-60 (mm)            | 18.000            | Minimum Backdrop Height (m)          | 0.200         |
| Ratio-R               | 0.360             | Preferred Cover Depth (m)            | 1.200         |
| CV                    | 0.750             | Include Intermediate Ground          | ✓             |
| Time of Entry (mins)  | 5.00              | Enforce best practice design rules   | x             |

### Nodes

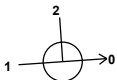
| Name | Area<br>(ha) | T of E<br>(mins) | Cover<br>Level<br>(m) | Diameter<br>(mm) | Easting<br>(m) | Northing<br>(m) | Depth<br>(m) | Invert<br>Level<br>(m) |
|------|--------------|------------------|-----------------------|------------------|----------------|-----------------|--------------|------------------------|
| RE1  | 0.053        | 5.00             | 87.200                | 22               | 387230.619     | 401496.031      | 0.575        | 86.625                 |
| SW1  |              |                  | 87.200                | 1200             | 387266.653     | 401498.568      | 1.450        | 85.750                 |
| RE2  | 0.068        | 5.00             | 87.200                | 225              | 387233.723     | 401472.935      | 0.575        | 86.625                 |
| SW2  |              |                  | 87.122                | 1200             | 387268.264     | 401475.334      | 1.605        | 85.517                 |
| SW3  | 0.067        | 5.00             | 86.545                | 1200             | 387258.619     | 401452.682      | 1.085        | 85.460                 |
| TANK |              |                  | 86.473                |                  | 387261.659     | 401469.612      | 1.200        | 85.273                 |
| SW4  |              |                  | 86.993                | 1200             | 387261.871     | 401470.793      | 1.732        | 85.261                 |
| SW5  |              |                  | 87.122                | 1200             | 387270.986     | 401475.523      | 1.964        | 85.158                 |
| SW6  |              |                  | 87.180                | 1500             | 387270.084     | 401488.507      | 2.157        | 85.023                 |
| C1   |              |                  | 87.180                | 1200             | 387269.717     | 401493.789      | 2.213        | 84.967                 |

### Pipeline Schedule

| Link  | Length<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | Link<br>Type | US CL<br>(m) | US IL<br>(m) | US Depth<br>(m) | DS CL<br>(m) | DS IL<br>(m) | DS Depth<br>(m) |
|-------|---------------|----------------|-------------|--------------|--------------|--------------|-----------------|--------------|--------------|-----------------|
| 1.000 | 36.121        | 41.3           | 225         | Circular     | 87.200       | 86.625       | 0.350           | 87.200       | 85.750       | 1.225           |
| 1.001 | 23.256        | 99.8           | 225         | Circular     | 87.200       | 85.750       | 1.225           | 87.122       | 85.517       | 1.380           |
| 2.000 | 34.624        | 31.2           | 225         | Circular     | 87.200       | 86.625       | 0.350           | 87.122       | 85.517       | 1.380           |
| 1.002 | 2.729         | 7.6            | 225         | Circular     | 87.122       | 85.517       | 1.380           | 87.122       | 85.158       | 1.739           |
| 3.000 | 1.200         | 100.0          | 225         | Circular     | 86.545       | 85.460       | 0.860           | 86.473       | 85.448       | 0.800           |
| 3.001 | 1.200         | 100.0          | 225         | Circular     | 86.473       | 85.273       | 0.975           | 86.993       | 85.261       | 1.507           |
| 3.002 | 10.269        | 99.7           | 225         | Circular     | 86.993       | 85.261       | 1.507           | 87.122       | 85.158       | 1.739           |
| 1.003 | 13.015        | 96.4           | 225         | Circular     | 87.122       | 85.158       | 1.739           | 87.180       | 85.023       | 1.932           |
| 1.004 | 5.295         | 94.6           | 225         | Circular     | 87.180       | 85.023       | 1.932           | 87.180       | 84.967       | 1.988           |

| Link  | US<br>Node | Dia<br>(mm) | Node<br>Type | DS<br>Node | Dia<br>(mm) | Node<br>Type |
|-------|------------|-------------|--------------|------------|-------------|--------------|
| 1.000 | RE1        | 22          | Manhole      | SW1        | 1200        | Manhole      |
| 1.001 | SW1        | 1200        | Manhole      | SW2        | 1200        | Manhole      |
| 2.000 | RE2        | 225         | Manhole      | SW2        | 1200        | Manhole      |
| 1.002 | SW2        | 1200        | Manhole      | SW5        | 1200        | Manhole      |
| 3.000 | SW3        | 1200        | Manhole      | TANK       |             | Junction     |
| 3.001 | TANK       |             | Junction     | SW4        | 1200        | Manhole      |
| 3.002 | SW4        | 1200        | Manhole      | SW5        | 1200        | Manhole      |
| 1.003 | SW5        | 1200        | Manhole      | SW6        | 1500        | Manhole      |
| 1.004 | SW6        | 1500        | Manhole      | C1         | 1200        | Manhole      |

### Manhole Schedule

| Node | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections                                                                          | Link  | IL (m) | Dia (mm) |
|------|-------------|--------------|--------|-----------|----------|--------------------------------------------------------------------------------------|-------|--------|----------|
| RE1  | 387230.619  | 401496.031   | 87.200 | 0.575     | 22       |    |       |        |          |
|      |             |              |        |           |          | 0                                                                                    | 1.000 | 86.625 | 225      |
| SW1  | 387266.653  | 401498.568   | 87.200 | 1.450     | 1200     |     | 1     | 1.000  | 85.750   |
|      |             |              |        |           |          | 0                                                                                    | 1.001 | 85.750 | 225      |
| RE2  | 387233.723  | 401472.935   | 87.200 | 0.575     | 225      |    |       |        |          |
|      |             |              |        |           |          | 0                                                                                    | 2.000 | 86.625 | 225      |
| SW2  | 387268.264  | 401475.334   | 87.122 | 1.605     | 1200     |    | 1     | 2.000  | 85.517   |
|      |             |              |        |           |          | 2                                                                                    | 1.001 | 85.517 | 225      |
|      |             |              |        |           |          | 0                                                                                    | 1.002 | 85.517 | 225      |
| SW3  | 387258.619  | 401452.682   | 86.545 | 1.085     | 1200     |     |       |        |          |
|      |             |              |        |           |          | 0                                                                                    | 3.000 | 85.460 | 225      |
| TANK | 387261.659  | 401469.612   | 86.473 | 1.200     |          |   | 1     | 3.000  | 85.448   |
|      |             |              |        |           |          | 0                                                                                    | 3.001 | 85.273 | 225      |
| SW4  | 387261.871  | 401470.793   | 86.993 | 1.732     | 1200     |  | 1     | 3.001  | 85.261   |
|      |             |              |        |           |          | 0                                                                                    | 3.002 | 85.261 | 225      |
| SW5  | 387270.986  | 401475.523   | 87.122 | 1.964     | 1200     |   | 1     | 3.002  | 85.158   |
|      |             |              |        |           |          | 2                                                                                    | 1.002 | 85.158 | 225      |
|      |             |              |        |           |          | 0                                                                                    | 1.003 | 85.158 | 225      |
| SW6  | 387270.084  | 401488.507   | 87.180 | 2.157     | 1500     |   | 1     | 1.003  | 85.023   |
|      |             |              |        |           |          | 0                                                                                    | 1.004 | 85.023 | 225      |
| C1   | 387269.717  | 401493.789   | 87.180 | 2.213     | 1200     |   | 1     | 1.004  | 84.967   |

### Simulation Settings

|                      |                   |                            |          |
|----------------------|-------------------|----------------------------|----------|
| Rainfall Methodology | FSR               | Analysis Speed             | Detailed |
| Rainfall Events      | Singular          | Skip Steady State          | x        |
| FSR Region           | England and Wales | Drain Down Time (mins)     | 1440     |
| M5-60 (mm)           | 18.000            | Additional Storage (m³/ha) | 0.0      |
| Ratio-R              | 0.360             | Starting Level (m)         |          |
| Summer CV            | 1.000             | Check Discharge Rate(s)    | x        |
| Winter CV            | 1.000             | Check Discharge Volume     | x        |

### Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

| Return Period<br>(years) | Climate Change<br>(CC %) | Additional Area<br>(A %) | Additional Flow<br>(Q %) |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 2                        | 0                        | 0                        | 0                        |
| 30                       | 40                       | 0                        | 0                        |
| 100                      | 45                       | 0                        | 0                        |

#### Node SW6 Online Hydro-Brake® Control

|                          |        |                         |                                |
|--------------------------|--------|-------------------------|--------------------------------|
| Flap Valve               | x      | Objective               | (HE) Minimise upstream storage |
| Downstream Link          | 1.004  | Sump Available          | ✓                              |
| Replaces Downstream Link | x      | Product Number          | CTL-SHE-0061-2000-1500-2000    |
| Invert Level (m)         | 85.023 | Min Outlet Diameter (m) | 0.075                          |
| Design Depth (m)         | 1.500  | Min Node Diameter (mm)  | 1200                           |
| Design Flow (l/s)        | 2.0    |                         |                                |

#### Node TANK Depth/Area Storage Structure

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 85.273 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 0.95 | Time to half empty (mins) | 776    |

| Depth<br>(m) | Area<br>(m²) | Inf Area<br>(m²) | Depth<br>(m) | Area<br>(m²) | Inf Area<br>(m²) | Depth<br>(m) | Area<br>(m²) | Inf Area<br>(m²) |
|--------------|--------------|------------------|--------------|--------------|------------------|--------------|--------------|------------------|
| 0.000        | 320.0        | 320.0            | 0.400        | 320.0        | 345.4            | 0.401        | 0.0          | 345.4            |

**Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer  | RE1     | 10          | 86.680    | 0.055     | 10.7         | 0.0000        | 0.0000     | OK         |
| 15 minute summer  | SW1     | 11          | 85.822    | 0.072     | 10.6         | 0.0817        | 0.0000     | OK         |
| 15 minute summer  | RE2     | 10          | 86.684    | 0.059     | 13.5         | 0.0024        | 0.0000     | OK         |
| 15 minute summer  | SW2     | 11          | 85.570    | 0.053     | 23.7         | 0.0603        | 0.0000     | OK         |
| 15 minute summer  | SW3     | 10          | 85.546    | 0.086     | 13.5         | 0.0974        | 0.0000     | OK         |
| 240 minute summer | TANK    | 184         | 85.348    | 0.075     | 9.1          | 22.8332       | 0.0000     | OK         |
| 15 minute summer  | SW4     | 11          | 85.377    | 0.116     | 22.2         | 0.1312        | 0.0000     | OK         |
| 15 minute summer  | SW5     | 11          | 85.433    | 0.275     | 23.6         | 0.3105        | 0.0000     | SURCHARGED |
| 15 minute summer  | SW6     | 11          | 85.433    | 0.410     | 5.4          | 0.7241        | 0.0000     | SURCHARGED |
| 15 minute summer  | C1      | 8           | 84.993    | 0.026     | 1.6          | 0.0000        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node | Link  | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|-------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | RE1     | 1.000 | SW1     | 10.6          | 1.170          | 0.131    | 0.3319        |                    |
| 15 minute summer               | SW1     | 1.001 | SW2     | 10.4          | 1.157          | 0.201    | 0.2110        |                    |
| 15 minute summer               | RE2     | 2.000 | SW2     | 13.4          | 1.728          | 0.144    | 0.2691        |                    |
| 15 minute summer               | SW2     | 1.002 | SW5     | 23.6          | 1.352          | 0.124    | 0.0640        |                    |
| 15 minute summer               | SW3     | 3.000 | TANK    | 13.4          | 1.032          | 0.259    | 0.0156        |                    |
| 240 minute summer              | TANK    | 3.001 | SW4     | -5.2          | -0.812         | -0.101   | 0.0155        |                    |
| 15 minute summer               | SW4     | 3.002 | SW5     | -22.2         | -0.646         | -0.427   | 0.3101        |                    |
| 15 minute summer               | SW5     | 1.003 | SW6     | 5.4           | 0.648          | 0.102    | 0.5176        |                    |
| 15 minute summer               | SW6     | 1.004 | C1      | 1.6           | 0.585          | 0.029    | 0.0141        | 15.6               |

**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event        | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status     |
|-------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|------------|
| 15 minute summer  | RE1        | 10             | 86.716       | 0.091        | 28.2            | 0.0000           | 0.0000        | OK         |
| 15 minute summer  | SW1        | 10             | 85.869       | 0.119        | 28.0            | 0.1350           | 0.0000        | OK         |
| 15 minute summer  | RE2        | 10             | 86.721       | 0.096        | 35.8            | 0.0038           | 0.0000        | OK         |
| 15 minute summer  | SW2        | 11             | 85.718       | 0.201        | 64.0            | 0.2278           | 0.0000        | OK         |
| 15 minute summer  | SW3        | 10             | 85.612       | 0.152        | 35.6            | 0.1719           | 0.0000        | OK         |
| 480 minute winter | TANK       | 464            | 85.559       | 0.286        | 9.6             | 87.0106          | 0.0000        | SURCHARGED |
| 360 minute winter | SW4        | 344            | 85.560       | 0.299        | 7.4             | 0.3378           | 0.0000        | SURCHARGED |
| 15 minute summer  | SW5        | 11             | 85.636       | 0.478        | 61.0            | 0.5405           | 0.0000        | SURCHARGED |
| 15 minute summer  | SW6        | 11             | 85.636       | 0.613        | 7.1             | 1.0835           | 0.0000        | SURCHARGED |
| 30 minute winter  | C1         | 8              | 84.993       | 0.026        | 1.6             | 0.0000           | 0.0000        | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link  | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|-------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 15 minute summer               | RE1        | 1.000 | SW1        | 28.0             | 1.546             | 0.345    | 0.6564           |                       |
| 15 minute summer               | SW1        | 1.001 | SW2        | 28.3             | 1.154             | 0.545    | 0.6741           |                       |
| 15 minute summer               | RE2        | 2.000 | SW2        | 35.6             | 1.924             | 0.382    | 0.9204           |                       |
| 15 minute summer               | SW2        | 1.002 | SW5        | 61.0             | 1.540             | 0.321    | 0.1055           |                       |
| 15 minute summer               | SW3        | 3.000 | TANK       | 35.5             | 1.328             | 0.683    | 0.0320           |                       |
| 480 minute winter              | TANK       | 3.001 | SW4        | -5.6             | 0.526             | -0.108   | 0.0477           |                       |
| 360 minute winter              | SW4        | 3.002 | SW5        | -7.4             | 0.476             | -0.142   | 0.4084           |                       |
| 15 minute summer               | SW5        | 1.003 | SW6        | 7.1              | 0.825             | 0.135    | 0.5176           |                       |
| 15 minute summer               | SW6        | 1.004 | C1         | 1.6              | 0.585             | 0.029    | 0.0141           | 42.2                  |

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.87%**

| Node Event        | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status     |
|-------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|------------|
| 15 minute summer  | RE1        | 10             | 86.732       | 0.107        | 37.7            | 0.0000           | 0.0000        | OK         |
| 480 minute winter | SW1        | 464            | 86.144       | 0.394        | 4.3             | 0.4458           | 0.0000        | SURCHARGED |
| 15 minute summer  | RE2        | 10             | 86.738       | 0.113        | 47.9            | 0.0045           | 0.0000        | OK         |
| 480 minute winter | SW2        | 464            | 86.144       | 0.627        | 9.7             | 0.7093           | 0.0000        | SURCHARGED |
| 480 minute winter | SW3        | 464            | 86.144       | 0.684        | 5.4             | 0.7737           | 0.0000        | SURCHARGED |
| 480 minute winter | TANK       | 464            | 86.144       | 0.871        | 13.5            | 121.7520         | 0.0000        | SURCHARGED |
| 480 minute winter | SW4        | 464            | 86.144       | 0.883        | 8.1             | 0.9988           | 0.0000        | SURCHARGED |
| 480 minute winter | SW5        | 464            | 86.144       | 0.986        | 24.7            | 1.1153           | 0.0000        | SURCHARGED |
| 480 minute winter | SW6        | 464            | 86.144       | 1.121        | 3.4             | 1.9806           | 0.0000        | SURCHARGED |
| 480 minute winter | C1         | 464            | 84.995       | 0.028        | 1.7             | 0.0000           | 0.0000        | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link  | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|-------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 15 minute summer               | RE1        | 1.000 | SW1        | 37.5             | 1.663             | 0.462    | 1.0443           |                       |
| 480 minute winter              | SW1        | 1.001 | SW2        | 4.3              | 0.898             | 0.083    | 0.9249           |                       |
| 15 minute summer               | RE2        | 2.000 | SW2        | 47.7             | 1.975             | 0.511    | 1.0348           |                       |
| 480 minute winter              | SW2        | 1.002 | SW5        | 21.8             | 0.872             | 0.115    | 0.1085           |                       |
| 480 minute winter              | SW3        | 3.000 | TANK       | 5.4              | 0.804             | 0.104    | 0.0477           |                       |
| 480 minute winter              | TANK       | 3.001 | SW4        | -9.3             | 0.536             | -0.180   | 0.0477           |                       |
| 480 minute winter              | SW4        | 3.002 | SW5        | -8.1             | -0.203            | -0.155   | 0.4084           |                       |
| 480 minute winter              | SW5        | 1.003 | SW6        | 3.4              | 0.227             | 0.065    | 0.5176           |                       |
| 480 minute winter              | SW6        | 1.004 | C1         | 1.7              | 0.603             | 0.032    | 0.0152           | 166.1                 |