

**SUMMARY OF CALCULATIONS**

|                                                    |             |            |
|----------------------------------------------------|-------------|------------|
| critical design rainfall duration ' $t_{crit}$ ' = | 60          | min        |
| required storage volume ' $V_{req}$ ' =            | 5.02        | $m^3$      |
| provided storage volume ' $V_{prov}$ ' =           | 9.60        | $m^3$      |
| utilisation factor =                               | <b>0.52</b> | <b>.OK</b> |
| required time to discharge 50% ' $t_{50}$ ' =      | 2.86        | hours      |
| utilisation factor =                               | <b>0.12</b> | <b>.OK</b> |

**GENERAL DATA**

|                                                                        |
|------------------------------------------------------------------------|
| site location: <b>England and Wales</b>                                |
| soakaway type: <b>infilled pit or trench</b>                           |
| impermeable area drained to soakaway ' $A$ ' [ $m^2$ ] = <b>150</b>    |
| 60 min rainfall depth of 5 year return period ' $R$ ' [mm] = <b>20</b> |
| M5-60 to M5-2d rainfall ratio ' $r$ ' = <b>0.35</b>                    |
| allowance for climate change: <b>10%</b>                               |

**SOAKAWAY DATA**

|                                                           |
|-----------------------------------------------------------|
| soakaway width ' $W$ ' [m] = <b>2.50</b>                  |
| soakaway length ' $L$ ' [m] = <b>6.00</b>                 |
| total depth from ground level ' $D_b$ ' [m] = <b>3.00</b> |
| depth to drain invert level ' $D_d$ ' [m] = <b>1.40</b>   |
| soakaway effective depth ' $D_{eff}$ ' [m] = 1.60         |
| free volume in infill aggregate [%] = <b>40</b>           |

**SOIL INFILTRATION DATA**

|                                                                                                            |
|------------------------------------------------------------------------------------------------------------|
| allowance for infiltration through soakaway base: <b>No</b>                                                |
| available on-site infiltration test results: <input checked="" type="radio"/> Yes <input type="radio"/> No |
| use soakage trial pit table below                                                                          |
| internal surface area of trial pit ' $a_{p50}$ ' [ $m^2$ ] = 2.92                                          |
| storage volume between 75-25% ' $V_p$ ' [ $m^3$ ] = 0.36                                                   |
| time for water to fall from 75-25% ' $t_p$ ' [min] = 60.00                                                 |
| soil infiltration rate ' $f$ ' [m/s] = 3.42E-05                                                            |

**SOAKAGE TRIAL PIT DATA**

|                                                              |
|--------------------------------------------------------------|
| soakage trial pit width ' $W_i$ ' [m] = <b>1.00</b>          |
| soakage trial pit length ' $L_i$ ' [m] = <b>1.80</b>         |
| total depth from ground level ' $D_{ib}$ ' [m] = <b>1.60</b> |
| depth to pipe invert level ' $D_{ip}$ ' [m] = <b>1.20</b>    |
| soakage trial pit effective depth ' $D_{ieff}$ ' [m] = 0.40  |
| free volume in infill aggregate [%] = <b>100</b>             |

NOTE: faces of excavation assumed to be vertical

**REQUIRED STORAGE CAPACITY PER RAINFALL DURATION**

| rainfall duration [min] | rainfall factor Z1 | M5-D rainfalls [mm] | M100-D      |                |                  | ignore |                |                  | ignore |                |                  | outflow from soakaway [ $m^3$ ] | required storage [ $m^3$ ] |
|-------------------------|--------------------|---------------------|-------------|----------------|------------------|--------|----------------|------------------|--------|----------------|------------------|---------------------------------|----------------------------|
|                         |                    |                     | Z2          | rainfalls [mm] | inflow [ $m^3$ ] | Z2     | rainfalls [mm] | inflow [ $m^3$ ] | Z2     | rainfalls [mm] | inflow [ $m^3$ ] |                                 |                            |
| 5                       | 0.36               | 7.13                | 1.84        | 14.45          | 2.17             |        |                |                  |        |                |                  | 0.14                            | 2.03                       |
| 10                      | 0.51               | 10.13               | 1.91        | 21.31          | 3.20             |        |                |                  |        |                |                  | 0.28                            | 2.92                       |
| 15                      | 0.62               | 12.33               | 1.95        | 26.42          | 3.96             |        |                |                  |        |                |                  | 0.42                            | 3.54                       |
| 30                      | 0.79               | 15.73               | 2.00        | 34.54          | 5.18             |        |                |                  |        |                |                  | 0.84                            | 4.34                       |
| <b>60</b>               | <b>1.00</b>        | <b>20.00</b>        | <b>2.03</b> | <b>44.66</b>   | <b>6.70</b>      |        |                |                  |        |                |                  | <b>1.68</b>                     | <b>5.02</b>                |
| 120                     | 1.22               | 24.47               | 2.01        | 54.15          | 8.12             |        |                |                  |        |                |                  | 3.35                            | 4.77                       |
| 240                     | 1.50               | 29.93               | 1.97        | 64.88          | 9.73             |        |                |                  |        |                |                  | 6.71                            | 3.03                       |
| 360                     | 1.69               | 33.80               | 1.94        | 72.11          | 10.82            |        |                |                  |        |                |                  | 10.06                           | 0.76                       |
| 600                     | 1.95               | 38.93               | 1.90        | 81.31          | 12.20            |        |                |                  |        |                |                  | 16.77                           | 0.00                       |
| 1440                    | 2.48               | 49.60               | 1.81        | 98.93          | 14.84            |        |                |                  |        |                |                  | 40.24                           | 0.00                       |

\* Z2 is a growth factor from M5 rainfalls

**SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS**

| water level measurement N°: |                      | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|-----------------------------|----------------------|------|------|------|------|------|------|------|------|------|----|----|----|----|----|----|----|----|----|----|
| Soakage Trial 1             | time [min] =         | 0    | 15   | 30   | 45   | 60   | 75   | 90   | 105  | 110  |    |    |    |    |    |    |    |    |    |    |
|                             | depth to water [m] = | 1.20 | 1.25 | 1.30 | 1.35 | 1.40 | 1.45 | 1.50 | 1.55 | 1.60 |    |    |    |    |    |    |    |    |    |    |
| Soakage Trial 2             | time [min] =         | 0    | 15   | 30   | 45   | 60   | 75   | 90   | 105  | 120  |    |    |    |    |    |    |    |    |    |    |
|                             | depth to water [m] = | 1.20 | 1.25 | 1.30 | 1.35 | 1.40 | 1.45 | 1.50 | 1.55 | 1.60 |    |    |    |    |    |    |    |    |    |    |
| Soakage Trial 3             | time [min] =         | 0    | 15   | 30   | 45   | 60   | 75   | 90   | 105  | 120  |    |    |    |    |    |    |    |    |    |    |
|                             | depth to water [m] = | 1.20 | 1.25 | 1.30 | 1.35 | 1.40 | 1.45 | 1.50 | 1.55 | 1.60 |    |    |    |    |    |    |    |    |    |    |