# APPENDIX D

Description

| Foul Water Flow Rate Based on Appliances - Existing/Proposed Site | | | | | |
|---|---|---|---|---|---|
| Stage: 4 - Tender | Design/Date | Checked/Date | Ref: | Rev | Suitability |
| | PL / 25-10-19 | | SE1612-ISS-XX-XX-CA-C-0002 | P01 | |

Formula for calculating Foul Water Flow rate:

$(Q_{ww}) = K\sqrt{\sum DU}$

$Q_{ww}$ = Foul water (waste water) flow in l/s

K = frequency factor

∑DU = Sum of discharge units (l/s)

Values and calculation taken from BS EN 12056-2:2000, Part 2 Sanitary Pipework, Layout and Calculation

Frequency Factor

| Usage of Appliances | | k |
|---|---|---|
| Intermittent | i.e. dwelling, guesthouse, office | 0.5 |
| Frequent | i.e. hospital, school, restaurant, hotel | 0.7 |
| Congested | i.e. toilets/showers open to public | 1 |
| Special | i.e. laboratory | 1.2 |

| Discharge Unit | DU |
|---|---|
| Bath | 0.8 |
| Dishwasher (household) | 0.8 |
| Floor gully DN50 | 0.8 |
| Floor gully DN70 | 1.5 |
| Floor gully DN100 | 2.0 |
| Kitchen sink | 0.8 |
| Shower with plug | 0.8 |
| Shower without plug | 0.6 |
| Slab urinal | 0.2 |
| Urinal with flushing valve | 0.5 |
| Urinal with cistern | 0.8 |
| Wash basin, bidet | 0.5 |
| Washing machine (0-6kg) | 0.8 |
| Washing machine (6-12kg) | 1.5 |
| WC with 6l cistern | 2.0 |
| WC with 7.5l cistern | 2.0 |
| WC with 9l cistern | 2.5 |
| None | |

| Location | Discharge Unit | Rate | No. of Units | Total DU |
|---|---|---|---|---|
| Main run along north side of the building and west side as well | Bath | 0.8 | 68 | 54.4 |
| | Shower without plug | 0.6 | 68 | 40.8 |
| | Wash basin, bidet | 0.5 | 68 | 34 |
| Main run along north side of the building and west side as well | Dishwasher (household) | 0.8 | 6 | 4.8 |
| | Kitchen sink | 0.8 | 7 | 5.6 |
| | None | 0 | | 0 |
| | | | Net discharge from Units (∑DU in l/s) = | 139.6 |

Calculate foul flow rate with a frequency of usage being: Intermittent

$(Q_{ww}) = K\sqrt{\sum DU}$ = 0.5 x ( 139.6 )$^{0.5}$ = 5.908 l/s

| Location | Discharge Unit | Rate | No. of Units | Total DU |
|---|---|---|---|---|
| Secondary run along south side, stacks at the start of the run | Bath | 0.8 | 7 | 5.6 |
| | Shower without plug | 0.6 | 7 | 4.2 |
| | Wash basin, bidet | 0.5 | 7 | 3.5 |
| | | | Net discharge from Units (∑DU in l/s) = | 13.3 |

Calculate foul flow rate with a frequency of usage being: Intermittent

$(Q_{ww}) = K\sqrt{\sum DU}$ = 0.5 x ( 13.3 )$^{0.5}$ = 1.823 l/s

| Description | | Design/Date | Checked/Date | Ref: | Rev | Suitability |
|---|---|---|---|---|---|---|
| Surface Water Infiltration Rates | | PL/05.02.20 | | SE1612-ISS-XX-XX-CA-C-0003 | P02 | |
| Stage | 3 - Prelminary | | | | | |

Agreed with Planners that the site investigation report by Ashdown Site Investigation Ltd. (ref R18-12844, dated April 2018) is to be used for the soakaways for the westerna area of the site

Test pit ref within the above document to be used is TP01

| | | |
|---|---|---|
| Rate to be used for western area of site = | 16.16 | m/hr |

| Test | 1 | 2 | 3 | m |
|---|---|---|---|---|
| Pit Length | 0.45 | 0.45 | 0.45 | m |
| Pit Width | 1.90 | 1.90 | 1.90 | m |
| Pit depth | 2.80 | 2.50 | 2.30 | m |
| | | | | |
| Volume 100% | 2.39 | 2.14 | 1.97 | $m^3$ |
| Volume 75% | 1.80 | 1.60 | 1.47 | $m^3$ |
| Volume 25% | 0.60 | 0.53 | 0.49 | $m^3$ |
| Volume 0% | 0 | 0 | 0 | $m^3$ |
| Volume 75%-25% | 1.20 | 1.07 | 0.98 | $m^3$ |
| | | | | |
| Time 100% | 0 | 0 | 0 | s |
| Time 75% | 37.5 | 37.5 | 52.5 | s |
| Time 25% | 12.5 | 12.5 | 17.5 | s |
| Time 0% | 50 | 50 | 70 | s |
| Time 75% - 25% | 25 | 25 | 35 | s |
| | | | | |
| Perimter at 50% | 7.435 | 6.730 | 6.260 | $m^2$ |
| Result | 0.01 | 0.01 | 0.00 | m/s |
| | 23.18 | 22.87 | 16.16 | m/hr |

Agreed with Planners that the site investigation report by Ashdown Site Investigation Ltd. (ref R14051, dated January 202) is to be used for the soakaways for the easterna area of the site

Test pit ref within the above document to be used is ST2

The report has caluclated the infiltration for the test pit and this value is to be used for the eastern area

| | | |
|---|---|---|
| Rate to be used for eastern area of site = | 3.60E-04 | m/s |

| | | |
|---|---|---|
| Convert as Microdrainage uses different rate, rate = | 1.296 | m/hr |

| Test | 1 | 2 | 3 | m |
|---|---|---|---|---|
| Pit Length | | | | m |
| Pit Width | | | | m |
| Pit depth | | | | m |
| | | | | |
| Volume 100% | 0.00 | 0.00 | 0.00 | $m^3$ |
| Volume 75% | 0.00 | 0.00 | 0.00 | $m^3$ |
| Volume 25% | 0.00 | 0.00 | 0.00 | $m^3$ |
| Volume 0% | 0 | 0 | 0 | $m^3$ |
| Volume 75%-25% | 0.00 | 0.00 | 0.00 | $m^3$ |
| | | | | |
| Time 100% | 0 | 0 | 0 | s |
| Time 75% | 0 | 0 | 0 | s |
| Time 25% | 0 | 0 | 0 | s |
| Time 0% | | | | s |
| Time 75% - 25% | 0 | 0 | 0 | s |
| | | | | |
| Perimter at 50% | 0.000 | 0.000 | 0.000 | $m^2$ |
| Result | | | | m/s |
| | | | | m/hr |


ARUN DISTRICT COUNCIL A/18/20/DOC

## FOUL SEWERAGE DESIGN

### Network Design Table for FW

| PN | Length (m) | Fall (m) | Slope (1:X) | Area (ha) | Houses | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F1.000 | 5.136 | 0.200 | 25.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F2.000 | 2.820 | 0.130 | 21.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.001 | 9.989 | 0.078 | 128.1 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F3.000 | 3.082 | 0.080 | 38.5 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F3.001 | 3.355 | 0.088 | 38.1 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.002 | 16.227 | 0.132 | 122.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F4.000 | 3.212 | 0.080 | 40.2 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F5.000 | 3.412 | 0.080 | 42.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F4.001 | 2.413 | 0.220 | 11.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.003 | 10.752 | 0.088 | 122.2 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F6.000 | 3.837 | 0.298 | 12.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.004 | 5.295 | 0.042 | 126.1 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F7.000 | 3.039 | 0.490 | 6.2 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | US/IL (m) | Σ Area (ha) | Σ Base Flow (l/s) | Σ Hse | Add Flow (l/s) | P.Dep (mm) | P.Vel (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| F1.000 | 14.000 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.73 | 30.6 | 0.0 |
| F2.000 | 14.000 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.89 | 33.3 | 0.0 |
| F1.001 | 13.800 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.77 | 13.7 | 0.0 |
| F3.000 | 13.960 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.41 | 25.0 | 0.0 |
| F3.001 | 13.810 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.42 | 25.1 | 0.0 |
| F1.002 | 13.722 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.79 | 14.0 | 0.0 |
| F4.000 | 13.960 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.39 | 24.5 | 0.0 |
| F5.000 | 13.960 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.34 | 23.7 | 0.0 |
| F4.001 | 13.810 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.66 | 46.9 | 0.0 |
| F1.003 | 13.590 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.79 | 14.0 | 0.0 |
| F6.000 | 13.800 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.45 | 43.3 | 0.0 |
| F1.004 | 13.502 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.78 | 13.8 | 0.0 |
| F7.000 | 13.950 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 3.53 | 62.4 | 0.0 |

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## FOUL SEWERAGE DESIGN

### Network Design Table for FW

| PN | Length (m) | Fall (m) | Slope (1:X) | Area (ha) | Houses | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F1.005 | 7.356 | 0.059 | 124.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F8.000 | 4.717 | 0.549 | 8.6 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.006 | 13.642 | 0.110 | 124.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F9.000 | 3.650 | 0.659 | 5.5 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.007 | 9.941 | 0.081 | 122.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F10.000 | 3.826 | 0.100 | 38.3 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F10.001 | 4.123 | 0.550 | 7.5 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.008 | 8.224 | 0.100 | 82.2 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.009 | 3.223 | 0.063 | 51.2 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F11.000 | 4.062 | 0.903 | 4.5 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.010 | 21.033 | 0.409 | 51.4 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F12.000 | 3.266 | 0.100 | 32.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F12.001 | 17.678 | 1.192 | 14.8 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.011 | 10.686 | 0.083 | 128.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | US/IL (m) | Σ Area (ha) | Σ Base Flow (l/s) | Σ Hse | Add Flow (l/s) | P.Dep (mm) | P.Vel (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| F1.005 | 13.460 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.78 | 13.9 | 0.0 |
| F8.000 | 13.950 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 3.00 | 53.0 | 0.0 |
| F1.006 | 13.401 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.79 | 13.9 | 0.0 |
| F9.000 | 13.950 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 3.74 | 66.1 | 0.0 |
| F1.007 | 13.291 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.79 | 14.0 | 0.0 |
| F10.000 | 14.000 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.42 | 25.1 | 0.0 |
| F10.001 | 13.830 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 3.21 | 56.8 | 0.0 |
| F1.008 | 13.210 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.97 | 17.1 | 0.0 |
| F1.009 | 13.110 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.23 | 21.7 | 0.0 |
| F11.000 | 13.950 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 4.15 | 73.3 | 0.0 |
| F1.010 | 13.047 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.22 | 21.6 | 0.0 |
| F12.000 | 14.000 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.54 | 27.2 | 0.0 |
| F12.001 | 13.830 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.28 | 40.3 | 0.0 |
| F1.011 | 12.638 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.77 | 13.6 | 0.0 |

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## FOUL SEWERAGE DESIGN

### Network Design Table for FW

| PN | Length (m) | Fall (m) | Slope (1:X) | Area (ha) | Houses | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F13.000 | 10.821 | 0.230 | 47.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F13.001 | 9.588 | 0.200 | 47.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F13.002 | 6.790 | 0.059 | 115.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F14.000 | 4.619 | 0.519 | 8.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F13.003 | 11.869 | 0.101 | 117.5 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F15.000 | 6.012 | 0.100 | 60.1 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F15.001 | 4.748 | 0.132 | 36.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F16.000 | 6.530 | 0.282 | 23.2 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F15.002 | 10.035 | 0.278 | 36.1 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F13.004 | 6.020 | 0.051 | 118.5 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F17.000 | 6.446 | 0.701 | 9.2 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F13.005 | 16.529 | 0.139 | 118.5 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F18.000 | 2.385 | 0.100 | 23.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F13.006 | 6.293 | 0.100 | 62.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | US/IL (m) | Σ Area (ha) | Σ Base Flow (l/s) | Σ Hse | Add Flow (l/s) | P.Dep (mm) | P.Vel (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| F13.000 | 13.940 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.28 | 22.6 | 0.0 |
| F13.001 | 13.710 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.27 | 22.4 | 0.0 |
| F13.002 | 13.510 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.82 | 14.4 | 0.0 |
| F14.000 | 13.970 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.95 | 52.1 | 0.0 |
| F13.003 | 13.451 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.81 | 14.3 | 0.0 |
| F15.000 | 14.000 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.13 | 20.0 | 0.0 |
| F15.001 | 13.830 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.46 | 25.9 | 0.0 |
| F16.000 | 13.980 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.83 | 32.3 | 0.0 |
| F15.002 | 13.698 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.46 | 25.8 | 0.0 |
| F13.004 | 13.350 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.80 | 14.2 | 0.0 |
| F17.000 | 14.000 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.90 | 51.3 | 0.0 |
| F13.005 | 13.299 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.80 | 14.2 | 0.0 |
| F18.000 | 13.970 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.80 | 31.8 | 0.0 |
| F13.006 | 13.160 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.11 | 19.5 | 0.0 |

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## FOUL SEWERAGE DESIGN

### Network Design Table for FW

| PN | Length (m) | Fall (m) | Slope (1:X) | Area (ha) | Houses | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F19.000 | 4.330 | 0.100 | 43.3 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F19.001 | 11.540 | 0.760 | 15.2 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F13.007 | 12.340 | 0.099 | 124.6 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F20.000 | 8.329 | 0.670 | 12.4 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F21.000 | 2.272 | 0.209 | 10.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F22.000 | 3.905 | 0.209 | 18.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F21.001 | 5.004 | 0.461 | 10.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F20.001 | 9.110 | 0.369 | 24.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F13.008 | 37.180 | 0.300 | 123.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F13.009 | 14.657 | 0.130 | 112.7 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.012 | 13.642 | 0.150 | 90.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F23.000 | 9.229 | 0.100 | 92.3 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.013 | 15.722 | 0.200 | 78.6 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.014 | 9.104 | 0.550 | 16.6 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |
| F1.015 | 24.000 | 0.200 | 120.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | US/IL (m) | Σ Area (ha) | Σ Base Flow (l/s) | Σ Hse | Add Flow (l/s) | P.Dep (mm) | P.Vel (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| F19.000 | 13.990 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.33 | 23.6 | 0.0 |
| F19.001 | 13.820 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.26 | 39.9 | 0.0 |
| F13.007 | 13.060 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.78 | 13.9 | 0.0 |
| F20.000 | 14.000 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.49 | 44.1 | 0.0 |
| F21.000 | 14.000 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.67 | 47.1 | 0.0 |
| F22.000 | 14.000 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.03 | 35.9 | 0.0 |
| F21.001 | 13.791 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.67 | 47.2 | 0.0 |
| F20.001 | 13.330 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 1.77 | 31.2 | 0.0 |
| F13.008 | 12.961 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.79 | 13.9 | 0.0 |
| F13.009 | 12.661 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.82 | 14.6 | 0.0 |
| F1.012 | 12.550 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.92 | 16.2 | 0.0 |
| F23.000 | 13.400 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.91 | 16.1 | 0.0 |
| F1.013 | 12.400 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.99 | 17.5 | 0.0 |
| F1.014 | 12.200 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.16 | 38.2 | 0.0 |
| F1.015 | 11.650 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 0.80 | 14.1 | 0.0 |

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## FOUL SEWERAGE DESIGN

### Network Design Table for FW

| PN | Length (m) | Fall (m) | Slope (1:X) | Area (ha) | Houses | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F1.016 | 9.082 | 0.650 | 14.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | US/IL (m) | Σ Area (ha) | Σ Base Flow (l/s) | Σ Hse | Add Flow (l/s) | P.Dep (mm) | P.Vel (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| F1.016 | 11.450 | 0.000 | 0.0 | 0 | 0.0 | 0 | 0.00 | 2.35 | 41.6 | 0.0 |

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## Manhole Schedules for FW

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | Pipe Out PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipes In PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F1.01 | 14.750 | 0.750 | Open Manhole | 450 | F1.000 | 14.000 | 150 | | | | |
| F1.11 | 14.750 | 0.750 | Open Manhole | 450 | F2.000 | 14.000 | 150 | | | | |
| F1.02 | 14.690 | 0.890 | Open Manhole | 450 | F1.001 | 13.800 | 150 | F1.000 | 13.800 | 150 | |
| | | | | | | | | F2.000 | 13.870 | 150 | 70 |
| F1.12 | 14.750 | 0.790 | Open Manhole | 450 | F3.000 | 13.960 | 150 | | | | |
| F1.13 | 14.690 | 0.880 | Open Manhole | 450 | F3.001 | 13.810 | 150 | F3.000 | 13.880 | 150 | 70 |
| FNODE | 14.690 | 0.968 | Junction | | F1.002 | 13.722 | 150 | F1.001 | 13.722 | 150 | |
| | | | | | | | | F3.001 | 13.722 | 150 | |
| F1.14 | 14.750 | 0.790 | Open Manhole | 450 | F4.000 | 13.960 | 150 | | | | |
| F1.16 | 14.750 | 0.790 | Open Manhole | 1200 | F5.000 | 13.960 | 150 | | | | |
| F1.15 | 14.750 | 0.940 | Open Manhole | 450 | F4.001 | 13.810 | 150 | F4.000 | 13.880 | 150 | 70 |
| | | | | | | | | F5.000 | 13.880 | 150 | 70 |
| FNODE | 14.690 | 1.100 | Junction | | F1.003 | 13.590 | 150 | F1.002 | 13.590 | 150 | |
| | | | | | | | | F4.001 | 13.590 | 150 | |
| F1.17 | 14.750 | 0.950 | Open Manhole | 450 | F6.000 | 13.800 | 150 | | | | |
| FNODE | 14.690 | 1.188 | Junction | | F1.004 | 13.502 | 150 | F1.003 | 13.502 | 150 | |
| | | | | | | | | F6.000 | 13.502 | 150 | |
| F1.18 | 14.750 | 0.800 | Open Manhole | 450 | F7.000 | 13.950 | 150 | | | | |
| F1.03 | 14.690 | 1.230 | Open Manhole | 450 | F1.005 | 13.460 | 150 | F1.004 | 13.460 | 150 | |
| | | | | | | | | F7.000 | 13.460 | 150 | |
| F1.19 | 14.750 | 0.800 | Open Manhole | 450 | F8.000 | 13.950 | 150 | | | | |
| FNODE | 14.705 | 1.304 | Junction | | F1.006 | 13.401 | 150 | F1.005 | 13.401 | 150 | |
| | | | | | | | | F8.000 | 13.401 | 150 | |
| F1.20 | 14.750 | 0.800 | Open Manhole | 450 | F9.000 | 13.950 | 150 | | | | |
| FNODE | 14.690 | 1.399 | Junction | | F1.007 | 13.291 | 150 | F1.006 | 13.291 | 150 | |
| | | | | | | | | F9.000 | 13.291 | 150 | |
| F1.21 | 14.750 | 0.750 | Open Manhole | 450 | F10.000 | 14.000 | 150 | | | | |
| F1.22 | 14.750 | 0.920 | Open Manhole | 450 | F10.001 | 13.830 | 150 | F10.000 | 13.900 | 150 | 70 |
| F1.04 | 14.720 | 1.510 | Open Manhole | 450 | F1.008 | 13.210 | 150 | F1.007 | 13.210 | 150 | |
| | | | | | | | | F10.001 | 13.280 | 150 | 70 |
| F1.05 | 14.720 | 1.610 | Open Manhole | 450 | F1.009 | 13.110 | 150 | F1.008 | 13.110 | 150 | |
| F1.23 | 14.750 | 0.800 | Open Manhole | 450 | F11.000 | 13.950 | 150 | | | | |
| FNODE | 14.750 | 1.703 | Junction | | F1.010 | 13.047 | 150 | F1.009 | 13.047 | 150 | |
| | | | | | | | | F11.000 | 13.047 | 150 | |
| F1.38 | 14.750 | 0.750 | Open Manhole | 450 | F12.000 | 14.000 | 150 | | | | |
| F1.39 | 14.750 | 0.920 | Open Manhole | 450 | F12.001 | 13.830 | 150 | F12.000 | 13.900 | 150 | 70 |
| FNODE | 14.700 | 2.062 | Junction | | F1.011 | 12.638 | 150 | F1.010 | 12.638 | 150 | |
| | | | | | | | | F12.001 | 12.638 | 150 | |
| F1.24 | 14.750 | 0.810 | Open Manhole | 450 | F13.000 | 13.940 | 150 | | | | |
| F1.25 | 14.740 | 1.030 | Open Manhole | 450 | F13.001 | 13.710 | 150 | F13.000 | 13.710 | 150 | |
| F1.26 | 14.650 | 1.140 | Open Manhole | 450 | F13.002 | 13.510 | 150 | F13.001 | 13.510 | 150 | |
| F1.26A | 14.750 | 0.780 | Open Manhole | 1200 | F14.000 | 13.970 | 150 | | | | |
| FNODE | 14.650 | 1.199 | Junction | | F13.003 | 13.451 | 150 | F13.002 | 13.451 | 150 | |
| | | | | | | | | F14.000 | 13.451 | 150 | |

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## Manhole Schedules for FW

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | PN | Pipe Out Invert Level (m) | Diameter (mm) | PN | Pipes In Invert Level (m) | Diameter (mm) | Backdrop (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F1.30 | 14.750 | 0.750 | Open Manhole | 450 | F15.000 | 14.000 | 150 | | | | |
| F1.31 | 14.750 | 0.920 | Open Manhole | 450 | F15.001 | 13.830 | 150 | F15.000 | 13.900 | 150 | 70 |
| F1.32 | 14.750 | 0.770 | Open Manhole | 450 | F16.000 | 13.980 | 150 | | | | |
| FNODE | 14.700 | 1.002 | Junction | | F15.002 | 13.698 | 150 | F15.001 | 13.698 | 150 | |
| | | | | | | | | F16.000 | 13.698 | 150 | |
| F1.27 | 14.650 | 1.300 | Open Manhole | 450 | F13.004 | 13.350 | 150 | F13.003 | 13.350 | 150 | |
| | | | | | | | | F15.002 | 13.420 | 150 | 70 |
| F1.33 | 14.750 | 0.750 | Open Manhole | 450 | F17.000 | 14.000 | 150 | | | | |
| FNODE | 14.620 | 1.321 | Junction | | F13.005 | 13.299 | 150 | F13.004 | 13.299 | 150 | |
| | | | | | | | | F17.000 | 13.299 | 150 | |
| F1.28A | 14.700 | 0.730 | Open Manhole | 1200 | F18.000 | 13.970 | 150 | | | | |
| F1.28 | 14.650 | 1.490 | Open Manhole | 450 x 600 | F13.006 | 13.160 | 150 | F13.005 | 13.160 | 150 | |
| | | | | | | | | F18.000 | 13.870 | 150 | 710 |
| F1.34 | 14.750 | 0.760 | Open Manhole | 450 | F19.000 | 13.990 | 150 | | | | |
| F1.35 | 14.750 | 0.930 | Open Manhole | 450 | F19.001 | 13.820 | 150 | F19.000 | 13.890 | 150 | 70 |
| FNODE | 14.530 | 1.470 | Junction | | F13.007 | 13.060 | 150 | F13.006 | 13.060 | 150 | |
| | | | | | | | | F19.001 | 13.060 | 150 | |
| F1.36 | 14.750 | 0.750 | Open Manhole | 450 | F20.000 | 14.000 | 150 | | | | |
| F1.38 | 14.750 | 0.750 | Open Manhole | 450 | F21.000 | 14.000 | 150 | | | | |
| F1.39 | 14.750 | 0.750 | Open Manhole | 450 | F22.000 | 14.000 | 150 | | | | |
| FNODE | 14.700 | 0.909 | Junction | | F21.001 | 13.791 | 150 | F21.000 | 13.791 | 150 | |
| | | | | | | | | F22.000 | 13.791 | 150 | |
| F1.37 | 14.650 | 1.320 | Open Manhole | 1200 | F20.001 | 13.330 | 150 | F20.000 | 13.330 | 150 | |
| | | | | | | | | F21.001 | 13.330 | 150 | |
| FNODE | 14.540 | 1.579 | Junction | | F13.008 | 12.961 | 150 | F13.007 | 12.961 | 150 | |
| | | | | | | | | F20.001 | 12.961 | 150 | |
| F1.29 | 14.550 | 1.889 | Open Manhole | 450 | F13.009 | 12.661 | 150 | F13.008 | 12.661 | 150 | |
| F1.06 | 14.600 | 2.069 | Open Manhole | 1200 | F1.012 | 12.550 | 150 | F1.011 | 12.555 | 150 | 5 |
| | | | | | | | | F13.009 | 12.531 | 150 | |
| F1.40 | 14.800 | 1.400 | Open Manhole | 1200 | F23.000 | 13.400 | 150 | | | | |
| F1.07 | 14.400 | 2.000 | Open Manhole | 1200 | F1.013 | 12.400 | 150 | F1.012 | 12.400 | 150 | |
| | | | | | | | | F23.000 | 13.300 | 150 | 900 |
| F1.08 | 13.725 | 1.525 | Open Manhole | 1200 | F1.014 | 12.200 | 150 | F1.013 | 12.200 | 150 | |
| F1.09 | 13.050 | 1.400 | Open Manhole | 1200 | F1.015 | 11.650 | 150 | F1.014 | 11.650 | 150 | |
| F1.10 | 13.500 | 2.050 | Open Manhole | 1200 | F1.016 | 11.450 | 150 | F1.015 | 11.450 | 150 | |
| F | 13.080 | 2.280 | Open Manhole | 0 | | OUTFALL | | F1.016 | 10.800 | 150 | |

## Free Flowing Outfall Details for FW

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---|---|---|---|---|---|---|
| F1.016 | F | 13.080 | 10.800 | 10.800 | 0 | 0 |

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## STORM SEWER DESIGN by the Modified Rational Method

### Network Design Table for SW1 - Main West

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 3.189 | 0.530 | 6.0 | 0.006 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.001 | 5.666 | 0.058 | 97.7 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S2.000 | 2.629 | 0.575 | 4.6 | 0.007 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.002 | 13.656 | 0.142 | 96.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.000 | 3.503 | 0.100 | 35.0 | 0.005 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.001 | 3.546 | 0.100 | 35.5 | 0.006 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.003 | 12.630 | 0.200 | 63.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.000 | 2.845 | 0.100 | 28.5 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.004 | 11.741 | 0.200 | 58.7 | 0.008 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.005 | 7.269 | 0.100 | 72.7 | 0.004 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S5.000 | 6.388 | 0.300 | 21.3 | 0.005 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S6.000 | 8.451 | 0.300 | 28.2 | 0.006 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.006 | 12.560 | 0.100 | 125.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S1.007 | 5.339 | 0.050 | 106.8 | 0.016 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 50.00 | 5.01 | 13.930 | 0.006 | 0.0 | 0.0 | 0.0 | 4.14 | 73.1 | 0.8 |
| S1.001 | 50.00 | 5.11 | 13.400 | 0.006 | 0.0 | 0.0 | 0.0 | 1.02 | 18.0 | 0.8 |
| S2.000 | 50.00 | 5.01 | 13.930 | 0.007 | 0.0 | 0.0 | 0.0 | 4.75 | 83.9 | 1.0 |
| S1.002 | 50.00 | 5.33 | 13.342 | 0.013 | 0.0 | 0.0 | 0.0 | 1.02 | 18.1 | 1.8 |
| S3.000 | 50.00 | 5.03 | 14.000 | 0.005 | 0.0 | 0.0 | 0.0 | 1.71 | 30.2 | 0.7 |
| S3.001 | 50.00 | 5.07 | 13.830 | 0.011 | 0.0 | 0.0 | 0.0 | 1.70 | 30.0 | 1.5 |
| S1.003 | 50.00 | 5.49 | 13.200 | 0.024 | 0.0 | 0.0 | 0.0 | 1.27 | 22.4 | 3.3 |
| S4.000 | 50.00 | 5.03 | 13.930 | 0.000 | 0.0 | 0.0 | 0.0 | 1.89 | 33.5 | 0.0 |
| S1.004 | 50.00 | 5.64 | 13.000 | 0.033 | 0.0 | 0.0 | 0.0 | 1.32 | 23.2 | 4.4 |
| S1.005 | 50.00 | 5.75 | 12.800 | 0.036 | 0.0 | 0.0 | 0.0 | 1.18 | 20.9 | 4.9 |
| S5.000 | 50.00 | 5.05 | 14.000 | 0.005 | 0.0 | 0.0 | 0.0 | 2.19 | 38.7 | 0.6 |
| S6.000 | 50.00 | 5.07 | 14.000 | 0.006 | 0.0 | 0.0 | 0.0 | 1.90 | 33.7 | 0.8 |
| S1.006 | 50.00 | 5.92 | 12.700 | 0.047 | 0.0 | 0.0 | 0.0 | 1.17 | 46.3 | 6.4 |
| S1.007 | 50.00 | 6.00 | 12.450 | 0.063 | 0.0 | 0.0 | 0.0 | 1.26 | 50.3 | 8.5 |

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## STORM SEWER DESIGN by the Modified Rational Method

### Network Design Table for SW1 - Main West

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S7.000 | 5.176 | 0.100 | 51.8 | 0.006 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S8.000 | 6.208 | 0.100 | 62.1 | 0.003 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S7.001 | 3.896 | 0.100 | 39.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S9.000 | 2.295 | 0.100 | 23.0 | 0.008 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S9.001 | 11.123 | 0.360 | 30.9 | 0.005 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S9.002 | 3.289 | 0.300 | 11.0 | 0.012 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S7.002 | 7.427 | 0.220 | 33.8 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S10.000 | 3.729 | 0.300 | 12.4 | 0.004 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S10.001 | 11.463 | 0.320 | 35.8 | 0.005 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S7.003 | 24.914 | 0.165 | 151.0 | 0.029 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S7.004 | 5.986 | 0.040 | 150.0 | 0.015 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S11.000 | 6.825 | 0.400 | 17.1 | 0.007 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S12.000 | 16.382 | 0.400 | 41.0 | 0.002 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S11.001 | 5.440 | 0.570 | 9.5 | 0.003 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S7.005 | 14.043 | 0.100 | 140.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S7.000 | 50.00 | 5.06 | 13.900 | 0.006 | 0.0 | 0.0 | 0.0 | 1.40 | 24.8 | 0.8 |
| S8.000 | 50.00 | 5.08 | 13.900 | 0.003 | 0.0 | 0.0 | 0.0 | 1.28 | 22.6 | 0.4 |
| S7.001 | 50.00 | 5.12 | 13.200 | 0.009 | 0.0 | 0.0 | 0.0 | 1.62 | 28.6 | 1.3 |
| S9.000 | 50.00 | 5.02 | 14.000 | 0.008 | 0.0 | 0.0 | 0.0 | 2.11 | 37.3 | 1.1 |
| S9.001 | 50.00 | 5.12 | 13.830 | 0.013 | 0.0 | 0.0 | 0.0 | 1.82 | 32.1 | 1.8 |
| S9.002 | 50.00 | 5.14 | 13.400 | 0.025 | 0.0 | 0.0 | 0.0 | 3.06 | 54.1 | 3.4 |
| S7.002 | 50.00 | 5.21 | 13.100 | 0.035 | 0.0 | 0.0 | 0.0 | 1.74 | 30.7 | 4.7 |
| S10.000 | 50.00 | 5.02 | 13.500 | 0.004 | 0.0 | 0.0 | 0.0 | 2.87 | 50.8 | 0.5 |
| S10.001 | 50.00 | 5.13 | 13.200 | 0.008 | 0.0 | 0.0 | 0.0 | 1.69 | 29.8 | 1.1 |
| S7.003 | 50.00 | 5.72 | 12.880 | 0.072 | 0.0 | 0.0 | 0.0 | 0.82 | 14.4 | 9.7 |
| S7.004 | 50.00 | 5.81 | 12.640 | 0.087 | 0.0 | 0.0 | 0.0 | 1.07 | 42.4 | 11.8 |
| S11.000 | 50.00 | 5.05 | 13.700 | 0.007 | 0.0 | 0.0 | 0.0 | 2.45 | 43.3 | 0.9 |
| S12.000 | 50.00 | 5.17 | 13.700 | 0.002 | 0.0 | 0.0 | 0.0 | 1.58 | 27.9 | 0.3 |
| S11.001 | 50.00 | 5.20 | 13.300 | 0.012 | 0.0 | 0.0 | 0.0 | 3.28 | 58.0 | 1.6 |
| S7.005 | 50.00 | 6.02 | 12.600 | 0.098 | 0.0 | 0.0 | 0.0 | 1.10 | 43.8 | 13.3 |

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## STORM SEWER DESIGN by the Modified Rational Method

### Network Design Table for SW1 - Main West

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S7.006 | 10.898 | 0.100 | 109.0 | 0.020 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S7.007 | 5.047 | 0.050 | 100.9 | 0.024 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S1.008 | 1.376 | -2.100 | -0.7 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S7.006 | 50.00 | 6.17 | 12.500 | 0.118 | 0.0 | 0.0 | 0.0 | 1.25 | 49.8 | 16.0 |
| S7.007 | 50.00 | 6.23 | 12.400 | 0.142 | 0.0 | 0.0 | 0.0 | 1.30 | 51.7 | 19.3 |
| S1.008 | 50.00 | 6.42 | 12.350 | 0.205 | 0.0 | 0.0 | 0.0 | 0.12 | 4.9« | 27.8 |

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## Manhole Schedules for SW1 - Main West

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | Pipe Out PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipes In PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.01 | 14.650 | 0.720 | Open Manhole | 450 | S1.000 | 13.930 | 150 | | | | |
| S1.02 | 14.650 | 1.250 | Open Manhole | 450 | S1.001 | 13.400 | 150 | S1.000 | 13.400 | 150 | |
| S1.08 | 14.750 | 0.820 | Open Manhole | 450 | S2.000 | 13.930 | 150 | | | | |
| SNODE | 14.650 | 1.308 | Junction | | S1.002 | 13.342 | 150 | S1.001 | 13.342 | 150 | |
| | | | | | | | | S2.000 | 13.355 | 150 | 13 |
| S1.09 | 14.750 | 0.750 | Open Manhole | 450 | S3.000 | 14.000 | 150 | | | | |
| S1.10 | 14.700 | 0.870 | Open Manhole | 450 | S3.001 | 13.830 | 150 | S3.000 | 13.900 | 150 | 70 |
| S1.03 | 14.650 | 1.450 | Open Manhole | 450 x 600 | S1.003 | 13.200 | 150 | S1.002 | 13.200 | 150 | |
| | | | | | | | | S3.001 | 13.730 | 150 | 530 |
| S1.11 | 14.750 | 0.820 | Open Manhole | 450 | S4.000 | 13.930 | 150 | | | | |
| S1.04 | 14.650 | 1.650 | Open Manhole | 450 x 600 | S1.004 | 13.000 | 150 | S1.003 | 13.000 | 150 | |
| | | | | | | | | S4.000 | 13.830 | 150 | 830 |
| S1.05 | 14.650 | 1.850 | Open Manhole | 450 | S1.005 | 12.800 | 150 | S1.004 | 12.800 | 150 | |
| S1.12 | 14.750 | 0.750 | Open Manhole | 450 | S5.000 | 14.000 | 150 | | | | |
| SRE1.1 | 14.730 | 0.730 | Junction | | S6.000 | 14.000 | 150 | | | | |
| S1.06 | 14.500 | 1.800 | Open Manhole | 1200 | S1.006 | 12.700 | 225 | S1.005 | 12.700 | 150 | |
| | | | | | | | | S5.000 | 13.700 | 150 | 925 |
| | | | | | | | | S6.000 | 13.700 | 150 | 925 |
| S1.07 | 14.500 | 2.050 | Open Manhole | 1200 | S1.007 | 12.450 | 225 | S1.006 | 12.600 | 225 | 150 |
| S1.13 | 14.750 | 0.850 | Open Manhole | 450 | S7.000 | 13.900 | 150 | | | | |
| S1.20 | 14.750 | 0.850 | Open Manhole | 450 | S8.000 | 13.900 | 150 | | | | |
| S1.14 | 14.710 | 1.510 | Open Manhole | 450 x 600 | S7.001 | 13.200 | 150 | S7.000 | 13.800 | 150 | 600 |
| | | | | | | | | S8.000 | 13.800 | 150 | 600 |
| S1.21 | 14.750 | 0.750 | Open Manhole | 450 | S9.000 | 14.000 | 150 | | | | |
| S1.22 | 14.700 | 0.870 | Open Manhole | 450 | S9.001 | 13.830 | 150 | S9.000 | 13.900 | 150 | 70 |
| S1.23 | 14.685 | 1.285 | Open Manhole | 450 | S9.002 | 13.400 | 150 | S9.001 | 13.470 | 150 | 70 |
| S1.15 | 14.670 | 1.570 | Open Manhole | 1200 | S7.002 | 13.100 | 150 | S7.001 | 13.100 | 150 | |
| | | | | | | | | S9.002 | 13.100 | 150 | |
| S1.24 | 14.750 | 1.250 | Open Manhole | 450 | S10.000 | 13.500 | 150 | | | | |
| S1.25 | 14.750 | 1.550 | Open Manhole | 450 | S10.001 | 13.200 | 150 | S10.000 | 13.200 | 150 | |
| S1.16 | 14.550 | 1.670 | Open Manhole | 1200 | S7.003 | 12.880 | 150 | S7.002 | 12.880 | 150 | |
| | | | | | | | | S10.001 | 12.880 | 150 | |
| S1.17 | 14.570 | 1.930 | Open Manhole | 1200 | S7.004 | 12.640 | 225 | S7.003 | 12.715 | 150 | |
| S1.26 | 14.750 | 1.050 | Open Manhole | 450 | S11.000 | 13.700 | 150 | | | | |
| SRE1.3 | 14.750 | 1.050 | Junction | | S12.000 | 13.700 | 150 | | | | |
| S1.27 | 14.750 | 1.450 | Open Manhole | 450 | S11.001 | 13.300 | 150 | S11.000 | 13.300 | 150 | |
| | | | | | | | | S12.000 | 13.300 | 150 | |
| SNODE | 14.560 | 1.960 | Junction | | S7.005 | 12.600 | 225 | S7.004 | 12.600 | 225 | |
| | | | | | | | | S11.001 | 12.730 | 150 | 55 |
| S1.18 | 14.550 | 2.050 | Open Manhole | 1200 | S7.006 | 12.500 | 225 | S7.005 | 12.500 | 225 | |
| S1.19 | 14.480 | 2.080 | Open Manhole | 1200 | S7.007 | 12.400 | 225 | S7.006 | 12.400 | 225 | |
| SCS1 | 14.500 | 2.150 | Open Manhole | 300 | S1.008 | 12.350 | 225 | S1.007 | 12.400 | 225 | 50 |
| | | | | | | | | S7.007 | 12.350 | 225 | |
| S | 15.000 | 0.550 | Open Manhole | 0 | | OUTFALL | | S1.008 | 14.450 | 225 | |

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## Storage Structures for SW1 - Main West

### Porous Car Park Manhole: S1.07, DS/PN: S1.007

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 4.8 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 18.0 |
| Max Percolation (l/s) | 24.0 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 12.050 | Cap Volume Depth (m) | 0.300 |

### Porous Car Park Manhole: S1.19, DS/PN: S7.007

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 4.8 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 18.0 |
| Max Percolation (l/s) | 24.0 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 13.930 | Cap Volume Depth (m) | 0.300 |

### Cellular Storage Manhole: SCS1, DS/PN: S1.008

| | | | |
|---|---|---|---|
| Invert Level (m) | 12.350 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.95 |
| Infiltration Coefficient Side (m/hr) | 16.16000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 18.0 | 18.0 | 1.200 | 18.0 | 39.6 | 1.201 | 0.0 | 39.6 |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - Main West

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

| | | | | | |
|---|---|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Offline Controls | 0 | Number of Time/Area Diagrams | 0 |
| Number of Online Controls | 0 | Number of Storage Structures | 3 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) | 20.000 |
| Region | England and Wales | Ratio R | 0.400 |
| Cv (Summer) | 0.750 | | |
| Cv (Winter) | 0.840 | | |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S1.01 | 15 Winter | 1 | +0% | | | | | 13.943 | -0.137 |
| S1.001 | S1.02 | 15 Winter | 1 | +0% | 100/30 Winter | | | | 13.423 | -0.127 |
| S2.000 | S1.08 | 15 Winter | 1 | +0% | | | | | 13.945 | -0.135 |
| S1.002 | SNODE | 15 Winter | 1 | +0% | 100/30 Winter | | | | 13.374 | -0.118 |
| S3.000 | S1.09 | 15 Winter | 1 | +0% | | | | | 14.018 | -0.132 |
| S3.001 | S1.10 | 15 Winter | 1 | +0% | | | | | 13.856 | -0.124 |
| S1.003 | S1.03 | 15 Winter | 1 | +0% | 100/15 Winter | | | | 13.240 | -0.110 |
| S4.000 | S1.11 | 60 Winter | 1 | +0% | | | | | 13.930 | -0.150 |
| S1.004 | S1.04 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.046 | -0.104 |
| S1.005 | S1.05 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 12.852 | -0.098 |
| S5.000 | S1.12 | 15 Winter | 1 | +0% | | | | | 14.014 | -0.136 |
| S6.000 | SRE1.1 | 15 Winter | 1 | +0% | | | | | 14.016 | -0.134 |
| S1.006 | S1.06 | 15 Winter | 1 | +0% | 30/30 Winter | | | | 12.759 | -0.166 |
| S1.007 | S1.07 | 360 Winter | 1 | +0% | 30/15 Summer | | | | 12.475 | -0.200 |
| S7.000 | S1.13 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.920 | -0.130 |
| S8.000 | S1.20 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.916 | -0.134 |
| S7.001 | S1.14 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.225 | -0.125 |
| S9.000 | S1.21 | 15 Winter | 1 | +0% | 100/15 Winter | | | | 14.023 | -0.127 |
| S9.001 | S1.22 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.854 | -0.126 |
| S9.002 | S1.23 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.431 | -0.119 |
| S7.002 | S1.15 | 15 Winter | 1 | +0% | 30/15 Summer | | | | 13.142 | -0.108 |
| S10.000 | S1.24 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.510 | -0.140 |
| S10.001 | S1.25 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.219 | -0.131 |
| S7.003 | S1.16 | 15 Winter | 1 | +0% | 30/15 Summer | | | | 12.969 | -0.061 |
| S7.004 | S1.17 | 15 Winter | 1 | +0% | 30/15 Summer | | | | 12.733 | -0.132 |
| S11.000 | S1.26 | 15 Winter | 1 | +0% | | | | | 13.716 | -0.134 |
| S12.000 | SRE1.3 | 15 Winter | 1 | +0% | | | | | 13.708 | -0.142 |
| S11.001 | S1.27 | 15 Winter | 1 | +0% | 100/15 Winter | | | | 13.318 | -0.132 |
| S7.005 | SNODE | 15 Winter | 1 | +0% | 30/15 Summer | | | | 12.680 | -0.145 |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - Main West

| PN | US/MH Name | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S1.000 | S1.01 | 0.000 | 0.02 | | 0.8 | OK | |
| S1.001 | S1.02 | 0.000 | 0.05 | | 0.8 | OK | |
| S2.000 | S1.08 | 0.000 | 0.02 | | 1.0 | OK | |
| S1.002 | SNODE | 0.000 | 0.10 | | 1.8 | OK* | |
| S3.000 | S1.09 | 0.000 | 0.03 | | 0.7 | OK | |
| S3.001 | S1.10 | 0.000 | 0.07 | | 1.4 | OK | |
| S1.003 | S1.03 | 0.000 | 0.16 | | 3.2 | OK | |
| S4.000 | S1.11 | 0.000 | 0.00 | | 0.0 | OK | |
| S1.004 | S1.04 | 0.000 | 0.20 | | 4.2 | OK | |
| S1.005 | S1.05 | 0.000 | 0.26 | | 4.7 | OK | |
| S5.000 | S1.12 | 0.000 | 0.02 | | 0.6 | OK | |
| S6.000 | SRE1.1 | 0.000 | 0.02 | | 0.8 | OK* | |
| S1.006 | S1.06 | 0.000 | 0.15 | | 6.1 | OK | |
| S1.007 | S1.07 | 0.000 | 0.03 | | 0.9 | OK | |
| S7.000 | S1.13 | 0.000 | 0.04 | | 0.9 | OK | |
| S8.000 | S1.20 | 0.000 | 0.02 | | 0.5 | OK | |
| S7.001 | S1.14 | 0.000 | 0.07 | | 1.3 | OK | |
| S9.000 | S1.21 | 0.000 | 0.05 | | 1.1 | OK | |
| S9.001 | S1.22 | 0.000 | 0.06 | | 1.7 | OK | |
| S9.002 | S1.23 | 0.000 | 0.09 | | 3.1 | OK | |
| S7.002 | S1.15 | 0.000 | 0.17 | | 4.5 | OK | |
| S10.000 | S1.24 | 0.000 | 0.01 | | 0.5 | OK | |
| S10.001 | S1.25 | 0.000 | 0.04 | | 1.1 | OK | |
| S7.003 | S1.16 | 0.000 | 0.65 | | 8.9 | OK | |
| S7.004 | S1.17 | 0.000 | 0.35 | | 10.6 | OK | |
| S11.000 | S1.26 | 0.000 | 0.02 | | 0.9 | OK | |
| S12.000 | SRE1.3 | 0.000 | 0.01 | | 0.3 | OK* | |
| S11.001 | S1.27 | 0.000 | 0.03 | | 1.5 | OK | |
| S7.005 | SNODE | 0.000 | 0.28 | | 12.1 | OK* | |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - Main West

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S7.006 | S1.18 | 15 Winter | 1 | +0% | 30/15 Summer | | | | 12.591 | -0.134 | 0.000 |
| S7.007 | S1.19 | 30 Winter | 1 | +0% | 30/15 Summer | | | | 12.561 | -0.064 | 0.000 |
| S1.008 | SCS1 | 30 Winter | 1 | +0% | 30/15 Summer | | | | 12.553 | -0.022 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|
| S7.006 | S1.18 | 0.34 | | 14.2 | OK | |
| S7.007 | S1.19 | 0.42 | | 13.3 | OK | |
| S1.008 | SCS1 | 0.00 | | 0.0 | OK | |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - Main West

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 3 Number of Real Time Controls 0

### Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S1.01 | 15 Winter | 30 | +0% | | | | | 13.950 | -0.130 |
| S1.001 | S1.02 | 15 Winter | 30 | +0% | 100/30 Winter | | | | 13.437 | -0.113 |
| S2.000 | S1.08 | 15 Winter | 30 | +0% | | | | | 13.952 | -0.128 |
| S1.002 | SNODE | 15 Winter | 30 | +0% | 100/30 Winter | | | | 13.393 | -0.099 |
| S3.000 | S1.09 | 15 Winter | 30 | +0% | | | | | 14.030 | -0.120 |
| S3.001 | S1.10 | 15 Winter | 30 | +0% | | | | | 13.875 | -0.105 |
| S1.003 | S1.03 | 15 Winter | 30 | +0% | 100/15 Winter | | | | 13.267 | -0.083 |
| S4.000 | S1.11 | 60 Winter | 30 | +0% | | | | | 13.930 | -0.150 |
| S1.004 | S1.04 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.079 | -0.071 |
| S1.005 | S1.05 | 30 Winter | 30 | +0% | 100/15 Summer | | | | 12.950 | 0.000 |
| S5.000 | S1.12 | 15 Winter | 30 | +0% | | | | | 14.021 | -0.129 |
| S6.000 | SRE1.1 | 15 Winter | 30 | +0% | | | | | 14.024 | -0.126 |
| S1.006 | S1.06 | 30 Winter | 30 | +0% | 30/30 Winter | | | | 12.939 | 0.014 |
| S1.007 | S1.07 | 30 Winter | 30 | +0% | 30/15 Summer | | | | 12.931 | 0.256 |
| S7.000 | S1.13 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.933 | -0.117 |
| S8.000 | S1.20 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.924 | -0.126 |
| S7.001 | S1.14 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.339 | -0.011 |
| S9.000 | S1.21 | 15 Winter | 30 | +0% | 100/15 Winter | | | | 14.037 | -0.113 |
| S9.001 | S1.22 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.870 | -0.110 |
| S9.002 | S1.23 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.452 | -0.098 |
| S7.002 | S1.15 | 15 Winter | 30 | +0% | 30/15 Summer | | | | 13.334 | 0.084 |
| S10.000 | S1.24 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.518 | -0.132 |
| S10.001 | S1.25 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.308 | -0.042 |
| S7.003 | S1.16 | 15 Winter | 30 | +0% | 30/15 Summer | | | | 13.299 | 0.269 |
| S7.004 | S1.17 | 30 Winter | 30 | +0% | 30/15 Summer | | | | 12.990 | 0.125 |
| S11.000 | S1.26 | 15 Winter | 30 | +0% | | | | | 13.724 | -0.126 |
| S12.000 | SRE1.3 | 15 Winter | 30 | +0% | | | | | 13.717 | -0.133 |
| S11.001 | S1.27 | 15 Winter | 30 | +0% | 100/15 Winter | | | | 13.329 | -0.121 |
| S7.005 | SNODE | 30 Winter | 30 | +0% | 30/15 Summer | | | | 12.880 | 0.055 |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - Main West

| PN | US/MH Name | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S1.000 | S1.01 | 0.000 | 0.04 | | 2.0 | OK | |
| S1.001 | S1.02 | 0.000 | 0.14 | | 2.0 | OK | |
| S2.000 | S1.08 | 0.000 | 0.05 | | 2.5 | OK | |
| S1.002 | SNODE | 0.000 | 0.25 | | 4.5 | OK* | |
| S3.000 | S1.09 | 0.000 | 0.09 | | 1.7 | OK | |
| S3.001 | S1.10 | 0.000 | 0.19 | | 3.8 | OK | |
| S1.003 | S1.03 | 0.000 | 0.40 | | 8.2 | OK | |
| S4.000 | S1.11 | 0.000 | 0.00 | | 0.0 | OK | |
| S1.004 | S1.04 | 0.000 | 0.53 | | 11.2 | OK | |
| S1.005 | S1.05 | 0.000 | 0.54 | | 9.7 | OK | |
| S5.000 | S1.12 | 0.000 | 0.05 | | 1.6 | OK | |
| S6.000 | SRE1.1 | 0.000 | 0.06 | | 2.0 | OK* | |
| S1.006 | S1.06 | 0.000 | 0.31 | | 12.5 | SURCHARGED | |
| S1.007 | S1.07 | 0.000 | 0.30 | | 9.5 | SURCHARGED | |
| S7.000 | S1.13 | 0.000 | 0.11 | | 2.1 | OK | |
| S8.000 | S1.20 | 0.000 | 0.06 | | 1.1 | OK | |
| S7.001 | S1.14 | 0.000 | 0.15 | | 3.0 | OK | |
| S9.000 | S1.21 | 0.000 | 0.13 | | 2.7 | OK | |
| S9.001 | S1.22 | 0.000 | 0.16 | | 4.5 | OK | |
| S9.002 | S1.23 | 0.000 | 0.26 | | 9.0 | OK | |
| S7.002 | S1.15 | 0.000 | 0.42 | | 11.0 | SURCHARGED | |
| S10.000 | S1.24 | 0.000 | 0.04 | | 1.2 | OK | |
| S10.001 | S1.25 | 0.000 | 0.10 | | 2.8 | OK | |
| S7.003 | S1.16 | 0.000 | 1.58 | | 21.6 | SURCHARGED | |
| S7.004 | S1.17 | 0.000 | 0.68 | | 20.3 | SURCHARGED | |
| S11.000 | S1.26 | 0.000 | 0.06 | | 2.2 | OK | |
| S12.000 | SRE1.3 | 0.000 | 0.03 | | 0.8 | OK* | |
| S11.001 | S1.27 | 0.000 | 0.08 | | 4.0 | OK | |
| S7.005 | SNODE | 0.000 | 0.51 | | 22.5 | SURCHARGED* | |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - Main West

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S7.006 | S1.18 | 30 Winter | 30 | +0% | 30/15 Summer | | | | 12.959 | 0.234 | 0.000 |
| S7.007 | S1.19 | 30 Winter | 30 | +0% | 30/15 Summer | | | | 12.938 | 0.313 | 0.000 |
| S1.008 | SCS1 | 30 Winter | 30 | +0% | 30/15 Summer | | | | 12.926 | 0.351 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|
| S7.006 | S1.18 | 0.62 | | 26.0 | SURCHARGED | |
| S7.007 | S1.19 | 0.98 | | 30.9 | SURCHARGED | |
| S1.008 | SCS1 | 0.00 | | 0.0 | SURCHARGED | |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - Main West

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 3 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) 20.000 | Cv (Summer) 0.750 |
| Region | England and Wales | Ratio R 0.400 | Cv (Winter) 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S1.01 | 15 Winter | 100 | +40% | | | | | 13.958 | -0.122 |
| S1.001 | S1.02 | 30 Winter | 100 | +40% | 100/30 Winter | | | | 13.573 | 0.023 |
| S2.000 | S1.08 | 15 Winter | 100 | +40% | | | | | 13.961 | -0.119 |
| S1.002 | SNODE | 30 Winter | 100 | +40% | 100/30 Winter | | | | 13.505 | 0.013 |
| S3.000 | S1.09 | 15 Winter | 100 | +40% | | | | | 14.039 | -0.111 |
| S3.001 | S1.10 | 15 Winter | 100 | +40% | | | | | 13.892 | -0.088 |
| S1.003 | S1.03 | 30 Winter | 100 | +40% | 100/15 Winter | | | | 13.559 | 0.209 |
| S4.000 | S1.11 | 60 Winter | 100 | +40% | | | | | 13.930 | -0.150 |
| S1.004 | S1.04 | 30 Winter | 100 | +40% | 100/15 Summer | | | | 13.539 | 0.389 |
| S1.005 | S1.05 | 30 Winter | 100 | +40% | 100/15 Summer | | | | 13.513 | 0.563 |
| S5.000 | S1.12 | 15 Winter | 100 | +40% | | | | | 14.030 | -0.120 |
| S6.000 | SRE1.1 | 15 Winter | 100 | +40% | | | | | 14.033 | -0.117 |
| S1.006 | S1.06 | 30 Winter | 100 | +40% | 30/30 Winter | | | | 13.492 | 0.567 |
| S1.007 | S1.07 | 30 Winter | 100 | +40% | 30/15 Summer | | | | 13.477 | 0.802 |
| S7.000 | S1.13 | 15 Winter | 100 | +40% | 100/15 Summer | | | | 14.210 | 0.160 |
| S8.000 | S1.20 | 15 Winter | 100 | +40% | 100/15 Summer | | | | 14.208 | 0.158 |
| S7.001 | S1.14 | 15 Winter | 100 | +40% | 100/15 Summer | | | | 14.204 | 0.854 |
| S9.000 | S1.21 | 15 Winter | 100 | +40% | 100/15 Winter | | | | 14.240 | 0.090 |
| S9.001 | S1.22 | 15 Winter | 100 | +40% | 100/15 Summer | | | | 14.236 | 0.256 |
| S9.002 | S1.23 | 15 Winter | 100 | +40% | 100/15 Summer | | | | 14.217 | 0.667 |
| S7.002 | S1.15 | 15 Winter | 100 | +40% | 30/15 Summer | | | | 14.198 | 0.948 |
| S10.000 | S1.24 | 15 Winter | 100 | +40% | 100/15 Summer | | | | 14.158 | 0.508 |
| S10.001 | S1.25 | 15 Winter | 100 | +40% | 100/15 Summer | | | | 14.156 | 0.806 |
| S7.003 | S1.16 | 15 Winter | 100 | +40% | 30/15 Summer | | | | 14.144 | 1.114 |
| S7.004 | S1.17 | 30 Winter | 100 | +40% | 30/15 Summer | | | | 13.638 | 0.773 |
| S11.000 | S1.26 | 15 Winter | 100 | +40% | | | | | 13.733 | -0.117 |
| S12.000 | SRE1.3 | 15 Winter | 100 | +40% | | | | | 13.722 | -0.128 |
| S11.001 | S1.27 | 30 Winter | 100 | +40% | 100/15 Winter | | | | 13.622 | 0.172 |
| S7.005 | SNODE | 240 Winter | 100 | +40% | 30/15 Summer | | | | 12.880 | 0.055 |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - Main West

| PN | US/MH Name | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S1.000 | S1.01 | 0.000 | 0.08 | | 3.7 | OK | |
| S1.001 | S1.02 | 0.000 | 0.19 | | 2.9 | SURCHARGED | |
| S2.000 | S1.08 | 0.000 | 0.10 | | 4.6 | OK | |
| S1.002 | SNODE | 0.000 | 0.36 | | 6.5 | SURCHARGED* | |
| S3.000 | S1.09 | 0.000 | 0.16 | | 3.1 | OK | |
| S3.001 | S1.10 | 0.000 | 0.35 | | 7.0 | OK | |
| S1.003 | S1.03 | 0.000 | 0.57 | | 11.5 | SURCHARGED | |
| S4.000 | S1.11 | 0.000 | 0.00 | | 0.0 | OK | |
| S1.004 | S1.04 | 0.000 | 0.68 | | 14.4 | SURCHARGED | |
| S1.005 | S1.05 | 0.000 | 0.86 | | 15.3 | SURCHARGED | |
| S5.000 | S1.12 | 0.000 | 0.09 | | 2.9 | OK | |
| S6.000 | SRE1.1 | 0.000 | 0.11 | | 3.7 | OK* | |
| S1.006 | S1.06 | 0.000 | 0.44 | | 17.7 | SURCHARGED | |
| S1.007 | S1.07 | 0.000 | 0.68 | | 21.3 | SURCHARGED | |
| S7.000 | S1.13 | 0.000 | 0.19 | | 3.7 | SURCHARGED | |
| S8.000 | S1.20 | 0.000 | 0.10 | | 1.9 | SURCHARGED | |
| S7.001 | S1.14 | 0.000 | 0.22 | | 4.4 | SURCHARGED | |
| S9.000 | S1.21 | 0.000 | 0.24 | | 4.8 | SURCHARGED | |
| S9.001 | S1.22 | 0.000 | 0.27 | | 7.7 | SURCHARGED | |
| S9.002 | S1.23 | 0.000 | 0.37 | | 12.7 | SURCHARGED | |
| S7.002 | S1.15 | 0.000 | 0.52 | | 13.8 | SURCHARGED | |
| S10.000 | S1.24 | 0.000 | 0.05 | | 1.7 | SURCHARGED | |
| S10.001 | S1.25 | 0.000 | 0.14 | | 3.7 | SURCHARGED | |
| S7.003 | S1.16 | 0.000 | 2.02 | | 27.7 | SURCHARGED | |
| S7.004 | S1.17 | 0.000 | 0.93 | | 27.8 | SURCHARGED | |
| S11.000 | S1.26 | 0.000 | 0.11 | | 4.1 | OK | |
| S12.000 | SRE1.3 | 0.000 | 0.05 | | 1.4 | OK* | |
| S11.001 | S1.27 | 0.000 | 0.12 | | 5.6 | SURCHARGED | |
| S7.005 | SNODE | 0.000 | 0.25 | | 11.0 | SURCHARGED* | |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - Main West

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S7.006 | S1.18 | 30 Winter | 100 | +40% | 30/15 Summer | | | | 13.576 | 0.851 | 0.000 |
| S7.007 | S1.19 | 30 Winter | 100 | +40% | 30/15 Summer | | | | 13.526 | 0.901 | 0.000 |
| S1.008 | SCS1 | 30 Winter | 100 | +40% | 30/15 Summer | | | | 13.468 | 0.893 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|
| S7.006 | S1.18 | 0.87 | | 36.6 | SURCHARGED | |
| S7.007 | S1.19 | 1.42 | | 44.9 | SURCHARGED | |
| S1.008 | SCS1 | 0.00 | | 0.0 | SURCHARGED | |

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## Summary of Results for 10 year Return Period (+40%)

Half Drain Time : 5 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 13.340 | 0.990 | 40.0 | 16.9 | O K |
| 30 min Summer | 13.338 | 0.988 | 39.9 | 16.9 | O K |
| 60 min Summer | 13.197 | 0.847 | 34.2 | 14.5 | O K |
| 120 min Summer | 12.993 | 0.643 | 26.0 | 11.0 | O K |
| 180 min Summer | 12.870 | 0.520 | 21.0 | 8.9 | O K |
| 240 min Summer | 12.790 | 0.440 | 17.8 | 7.5 | O K |
| 360 min Summer | 12.690 | 0.340 | 13.7 | 5.8 | O K |
| 480 min Summer | 12.631 | 0.281 | 11.3 | 4.8 | O K |
| 600 min Summer | 12.591 | 0.241 | 9.7 | 4.1 | O K |
| 720 min Summer | 12.562 | 0.212 | 8.6 | 3.6 | O K |
| 960 min Summer | 12.522 | 0.172 | 6.9 | 2.9 | O K |
| 1440 min Summer | 12.477 | 0.127 | 5.1 | 2.2 | O K |
| 2160 min Summer | 12.443 | 0.093 | 3.8 | 1.6 | O K |
| 2880 min Summer | 12.425 | 0.075 | 3.0 | 1.3 | O K |
| 4320 min Summer | 12.405 | 0.055 | 2.2 | 0.9 | O K |
| 5760 min Summer | 12.394 | 0.044 | 1.8 | 0.7 | O K |
| 7200 min Summer | 12.387 | 0.037 | 1.5 | 0.6 | O K |
| 8640 min Summer | 12.382 | 0.032 | 1.3 | 0.5 | O K |
| 10080 min Summer | 12.378 | 0.028 | 1.1 | 0.5 | O K |
| 15 min Winter | 13.413 | 1.063 | 43.0 | 18.2 | O K |
| 30 min Winter | 13.359 | 1.009 | 40.8 | 17.3 | O K |
| 60 min Winter | 13.146 | 0.796 | 32.1 | 13.6 | O K |
| 120 min Winter | 12.903 | 0.553 | 22.4 | 9.5 | O K |
| 180 min Winter | 12.776 | 0.426 | 17.2 | 7.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 83.912 | 0.0 | 12 |
| 30 min Summer | 54.206 | 0.0 | 20 |
| 60 min Summer | 33.604 | 0.0 | 36 |
| 120 min Summer | 20.311 | 0.0 | 66 |
| 180 min Summer | 15.011 | 0.0 | 96 |
| 240 min Summer | 12.078 | 0.0 | 126 |
| 360 min Summer | 8.874 | 0.0 | 186 |
| 480 min Summer | 7.126 | 0.0 | 248 |
| 600 min Summer | 6.008 | 0.0 | 308 |
| 720 min Summer | 5.225 | 0.0 | 368 |
| 960 min Summer | 4.190 | 0.0 | 490 |
| 1440 min Summer | 3.067 | 0.0 | 734 |
| 2160 min Summer | 2.244 | 0.0 | 1092 |
| 2880 min Summer | 1.797 | 0.0 | 1452 |
| 4320 min Summer | 1.313 | 0.0 | 2184 |
| 5760 min Summer | 1.051 | 0.0 | 2936 |
| 7200 min Summer | 0.884 | 0.0 | 3648 |
| 8640 min Summer | 0.767 | 0.0 | 4296 |
| 10080 min Summer | 0.681 | 0.0 | 5072 |
| 15 min Winter | 83.912 | 0.0 | 13 |
| 30 min Winter | 54.206 | 0.0 | 21 |
| 60 min Winter | 33.604 | 0.0 | 36 |
| 120 min Winter | 20.311 | 0.0 | 68 |
| 180 min Winter | 15.011 | 0.0 | 98 |

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## Summary of Results for 10 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 240 min Winter | 12.700 | 0.350 | 14.1 | 6.0 | O K |
| 360 min Winter | 12.611 | 0.261 | 10.6 | 4.5 | O K |
| 480 min Winter | 12.561 | 0.211 | 8.5 | 3.6 | O K |
| 600 min Winter | 12.529 | 0.179 | 7.2 | 3.1 | O K |
| 720 min Winter | 12.506 | 0.156 | 6.3 | 2.7 | O K |
| 960 min Winter | 12.475 | 0.125 | 5.1 | 2.1 | O K |
| 1440 min Winter | 12.442 | 0.092 | 3.7 | 1.6 | O K |
| 2160 min Winter | 12.417 | 0.067 | 2.7 | 1.1 | O K |
| 2880 min Winter | 12.404 | 0.054 | 2.2 | 0.9 | O K |
| 4320 min Winter | 12.390 | 0.040 | 1.6 | 0.7 | O K |
| 5760 min Winter | 12.382 | 0.032 | 1.3 | 0.5 | O K |
| 7200 min Winter | 12.377 | 0.027 | 1.1 | 0.5 | O K |
| 8640 min Winter | 12.373 | 0.023 | 0.9 | 0.4 | O K |
| 10080 min Winter | 12.371 | 0.021 | 0.8 | 0.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 240 min Winter | 12.078 | 0.0 | 128 |
| 360 min Winter | 8.874 | 0.0 | 188 |
| 480 min Winter | 7.126 | 0.0 | 248 |
| 600 min Winter | 6.008 | 0.0 | 308 |
| 720 min Winter | 5.225 | 0.0 | 368 |
| 960 min Winter | 4.190 | 0.0 | 490 |
| 1440 min Winter | 3.067 | 0.0 | 734 |
| 2160 min Winter | 2.244 | 0.0 | 1076 |
| 2880 min Winter | 1.797 | 0.0 | 1468 |
| 4320 min Winter | 1.313 | 0.0 | 2160 |
| 5760 min Winter | 1.051 | 0.0 | 2888 |
| 7200 min Winter | 0.884 | 0.0 | 3656 |
| 8640 min Winter | 0.767 | 0.0 | 4336 |
| 10080 min Winter | 0.681 | 0.0 | 4984 |

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## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 10 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.400 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.205

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.205 |

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## Model Details

Storage is Online Cover Level (m) 14.500

## Cellular Storage Structure

Invert Level (m) 12.350 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 16.16000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 18.0 | 18.0 | 1.200 | 18.0 | 39.6 | 1.201 | 0.0 | 39.6 |

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## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 8 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 14.508 | 2.158 | 48.5 | 29.8 | FLOOD |
| 30 min Summer | 14.510 | 2.160 | 48.5 | 31.1 | FLOOD |
| 60 min Summer | 14.504 | 2.154 | 48.5 | 25.8 | FLOOD |
| 120 min Summer | 13.434 | 1.084 | 43.8 | 18.5 | O K |
| 180 min Summer | 13.222 | 0.872 | 35.2 | 14.9 | O K |
| 240 min Summer | 13.081 | 0.731 | 29.5 | 12.5 | O K |
| 360 min Summer | 12.909 | 0.559 | 22.6 | 9.6 | O K |
| 480 min Summer | 12.808 | 0.458 | 18.5 | 7.8 | O K |
| 600 min Summer | 12.741 | 0.391 | 15.8 | 6.7 | O K |
| 720 min Summer | 12.691 | 0.341 | 13.8 | 5.8 | O K |
| 960 min Summer | 12.625 | 0.275 | 11.1 | 4.7 | O K |
| 1440 min Summer | 12.550 | 0.200 | 8.1 | 3.4 | O K |
| 2160 min Summer | 12.495 | 0.145 | 5.8 | 2.5 | O K |
| 2880 min Summer | 12.465 | 0.115 | 4.6 | 2.0 | O K |
| 4320 min Summer | 12.433 | 0.083 | 3.3 | 1.4 | O K |
| 5760 min Summer | 12.415 | 0.065 | 2.6 | 1.1 | O K |
| 7200 min Summer | 12.405 | 0.055 | 2.2 | 0.9 | O K |
| 8640 min Summer | 12.397 | 0.047 | 1.9 | 0.8 | O K |
| 10080 min Summer | 12.391 | 0.041 | 1.7 | 0.7 | O K |
| 15 min Winter | 14.512 | 2.162 | 48.5 | 33.5 | FLOOD |
| 30 min Winter | 14.512 | 2.162 | 48.5 | 33.3 | FLOOD |
| 60 min Winter | 14.503 | 2.153 | 48.5 | 24.4 | FLOOD |
| 120 min Winter | 13.283 | 0.933 | 37.7 | 15.9 | O K |
| 180 min Winter | 13.064 | 0.714 | 28.9 | 12.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.153 | 9.3 | 13 |
| 30 min Summer | 90.705 | 10.6 | 21 |
| 60 min Summer | 56.713 | 5.3 | 36 |
| 120 min Summer | 34.246 | 0.0 | 66 |
| 180 min Summer | 25.149 | 0.0 | 96 |
| 240 min Summer | 20.078 | 0.0 | 126 |
| 360 min Summer | 14.585 | 0.0 | 186 |
| 480 min Summer | 11.622 | 0.0 | 248 |
| 600 min Summer | 9.738 | 0.0 | 308 |
| 720 min Summer | 8.424 | 0.0 | 368 |
| 960 min Summer | 6.697 | 0.0 | 490 |
| 1440 min Summer | 4.839 | 0.0 | 734 |
| 2160 min Summer | 3.490 | 0.0 | 1092 |
| 2880 min Summer | 2.766 | 0.0 | 1444 |
| 4320 min Summer | 1.989 | 0.0 | 2176 |
| 5760 min Summer | 1.573 | 0.0 | 2936 |
| 7200 min Summer | 1.311 | 0.0 | 3616 |
| 8640 min Summer | 1.129 | 0.0 | 4400 |
| 10080 min Summer | 0.994 | 0.0 | 5120 |
| 15 min Winter | 138.153 | 13.0 | 13 |
| 30 min Winter | 90.705 | 12.8 | 22 |
| 60 min Winter | 56.713 | 3.8 | 38 |
| 120 min Winter | 34.246 | 0.0 | 68 |
| 180 min Winter | 25.149 | 0.0 | 98 |

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## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 240 min Winter | 12.931 | 0.581 | 23.5 | 9.9 | O K |
| 360 min Winter | 12.779 | 0.429 | 17.3 | 7.3 | O K |
| 480 min Winter | 12.694 | 0.344 | 13.9 | 5.9 | O K |
| 600 min Winter | 12.640 | 0.290 | 11.7 | 5.0 | O K |
| 720 min Winter | 12.601 | 0.251 | 10.2 | 4.3 | O K |
| 960 min Winter | 12.550 | 0.200 | 8.1 | 3.4 | O K |
| 1440 min Winter | 12.495 | 0.145 | 5.8 | 2.5 | O K |
| 2160 min Winter | 12.455 | 0.105 | 4.2 | 1.8 | O K |
| 2880 min Winter | 12.433 | 0.083 | 3.3 | 1.4 | O K |
| 4320 min Winter | 12.410 | 0.060 | 2.4 | 1.0 | O K |
| 5760 min Winter | 12.397 | 0.047 | 1.9 | 0.8 | O K |
| 7200 min Winter | 12.389 | 0.039 | 1.6 | 0.7 | O K |
| 8640 min Winter | 12.384 | 0.034 | 1.4 | 0.6 | O K |
| 10080 min Winter | 12.380 | 0.030 | 1.2 | 0.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 240 min Winter | 20.078 | 0.0 | 128 |
| 360 min Winter | 14.585 | 0.0 | 188 |
| 480 min Winter | 11.622 | 0.0 | 248 |
| 600 min Winter | 9.738 | 0.0 | 308 |
| 720 min Winter | 8.424 | 0.0 | 368 |
| 960 min Winter | 6.697 | 0.0 | 490 |
| 1440 min Winter | 4.839 | 0.0 | 734 |
| 2160 min Winter | 3.490 | 0.0 | 1088 |
| 2880 min Winter | 2.766 | 0.0 | 1468 |
| 4320 min Winter | 1.989 | 0.0 | 2164 |
| 5760 min Winter | 1.573 | 0.0 | 2928 |
| 7200 min Winter | 1.311 | 0.0 | 3576 |
| 8640 min Winter | 1.129 | 0.0 | 4392 |
| 10080 min Winter | 0.994 | 0.0 | 5072 |

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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) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.400 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.205

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.205 |

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## Model Details

Storage is Online Cover Level (m) 14.500

## Cellular Storage Structure

Invert Level (m) 12.350 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 16.16000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 18.0 | 18.0 | 1.200 | 18.0 | 39.6 | 1.201 | 0.0 | 39.6 |

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## STORM SEWER DESIGN by the Modified Rational Method

### Network Design Table for SW2 - Main East N

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 1.874 | 0.370 | 5.1 | 0.009 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.001 | 17.986 | 0.120 | 149.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S2.000 | 2.772 | 0.550 | 5.0 | 0.013 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.002 | 9.266 | 0.100 | 92.7 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.000 | 1.999 | 0.100 | 20.0 | 0.006 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.003 | 6.928 | 0.060 | 115.5 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.004 | 6.753 | 0.200 | 33.8 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.000 | 5.594 | 0.350 | 16.0 | 0.003 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S5.000 | 6.274 | 0.300 | 20.9 | 0.004 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.005 | 12.493 | 0.100 | 124.9 | 0.003 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.006 | 0.509 | -2.100 | -0.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 50.00 | 5.01 | 13.970 | 0.009 | 0.0 | 0.0 | 0.0 | 4.51 | 79.7 | 1.3 |
| S1.001 | 50.00 | 5.37 | 13.500 | 0.009 | 0.0 | 0.0 | 0.0 | 0.82 | 14.5 | 1.3 |
| S2.000 | 50.00 | 5.01 | 13.930 | 0.013 | 0.0 | 0.0 | 0.0 | 4.52 | 79.9 | 1.8 |
| S1.002 | 50.00 | 5.52 | 13.380 | 0.022 | 0.0 | 0.0 | 0.0 | 1.04 | 18.5 | 3.0 |
| S3.000 | 50.00 | 5.01 | 13.930 | 0.006 | 0.0 | 0.0 | 0.0 | 2.26 | 40.0 | 0.9 |
| S1.003 | 50.00 | 5.64 | 13.280 | 0.029 | 0.0 | 0.0 | 0.0 | 0.93 | 16.5 | 3.9 |
| S1.004 | 50.00 | 5.71 | 13.220 | 0.029 | 0.0 | 0.0 | 0.0 | 1.74 | 30.7 | 3.9 |
| S4.000 | 50.00 | 5.04 | 14.050 | 0.003 | 0.0 | 0.0 | 0.0 | 2.53 | 44.8 | 0.4 |
| S5.000 | 50.00 | 5.05 | 14.000 | 0.004 | 0.0 | 0.0 | 0.0 | 2.21 | 39.1 | 0.5 |
| S1.005 | 50.00 | 5.94 | 13.020 | 0.038 | 0.0 | 0.0 | 0.0 | 0.90 | 15.9 | 5.1 |
| S1.006 | 50.00 | 6.01 | 12.200 | 0.038 | 0.0 | 0.0 | 0.0 | 0.12 | 4.9« | 5.1 |

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## Manhole Schedules for SW2 - Main East N

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | Pipe Out PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipes In PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S2.01 | 14.750 | 0.780 | Open Manhole | 450 | S1.000 | 13.970 | 150 | | | | |
| S2.02 | 14.650 | 1.150 | Open Manhole | 450 | S1.001 | 13.500 | 150 | S1.000 | 13.600 | 150 | 100 |
| S2.07 | 14.750 | 0.820 | Open Manhole | 450 | S2.000 | 13.930 | 150 | | | | |
| SNODE | 14.650 | 1.270 | Junction | | S1.002 | 13.380 | 150 | S1.001 | 13.380 | 150 | |
| | | | | | | | | S2.000 | 13.380 | 150 | |
| S2.08 | 14.750 | 0.820 | Open Manhole | 450 | S3.000 | 13.930 | 150 | | | | |
| S2.04 | 14.650 | 1.370 | Open Manhole | 450 x 600 | S1.003 | 13.280 | 150 | S1.002 | 13.280 | 150 | |
| | | | | | | | | S3.000 | 13.830 | 150 | 550 |
| S2.05 | 14.650 | 1.430 | Open Manhole | 450 | S1.004 | 13.220 | 150 | S1.003 | 13.220 | 150 | |
| SRE2.1 | 14.750 | 0.700 | Junction | | S4.000 | 14.050 | 150 | | | | |
| S2.09 | 14.750 | 0.750 | Open Manhole | 450 | S5.000 | 14.000 | 150 | | | | |
| S2.06 | 14.650 | 1.630 | Open Manhole | 1200 | S1.005 | 13.020 | 150 | S1.004 | 13.020 | 150 | |
| | | | | | | | | S4.000 | 13.700 | 150 | 680 |
| | | | | | | | | S5.000 | 13.700 | 150 | 680 |
| SCS2 | 14.640 | 2.440 | Open Manhole | 300 | S1.006 | 12.200 | 225 | S1.005 | 12.920 | 150 | 645 |
| S | 15.200 | 0.900 | Open Manhole | 0 | | OUTFALL | | S1.006 | 14.300 | 225 | |

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## Storage Structures for SW2 - Main East N

### Cellular Storage Manhole: SCS2, DS/PN: S1.006

Invert Level (m) 12.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 1.29600

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 4.0 | 4.0 | 1.600 | 4.0 | 20.0 | 1.601 | 0.0 | 20.0 |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW2 - Main East N

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 1 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) | 20.000 |
| Region | England and Wales | Ratio R | 0.400 |
| Cv (Summer) | 0.750 | | |
| Cv (Winter) | 0.840 | | |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S2.01 | 15 Winter | 1 | +0% | 100/30 Winter | | | | 13.988 | -0.132 |
| S1.001 | S2.02 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.531 | -0.119 |
| S2.000 | S2.07 | 15 Winter | 1 | +0% | 100/30 Winter | | | | 13.949 | -0.131 |
| S1.002 | SNODE | 15 Winter | 1 | +0% | | | | | 13.421 | -0.109 |
| S3.000 | S2.08 | 15 Winter | 1 | +0% | 100/30 Summer | | | | 13.951 | -0.129 |
| S1.003 | S2.04 | 15 Winter | 1 | +0% | 30/60 Winter | | | | 13.334 | -0.096 |
| S1.004 | S2.05 | 15 Winter | 1 | +0% | 30/30 Winter | | | | 13.259 | -0.111 |
| S4.000 | SRE2.1 | 15 Winter | 1 | +0% | | | | | 14.057 | -0.143 |
| S5.000 | S2.09 | 15 Winter | 1 | +0% | 100/30 Winter | | | | 14.011 | -0.139 |
| S1.005 | S2.06 | 15 Winter | 1 | +0% | 30/15 Summer | | | | 13.082 | -0.088 |
| S1.006 | SCS2 | 60 Winter | 1 | +0% | 1/15 Summer | | | | 12.807 | 0.382 |

| PN | US/MH Name | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S1.000 | S2.01 | 0.000 | 0.03 | | 1.3 | OK | |
| S1.001 | S2.02 | 0.000 | 0.09 | | 1.3 | OK | |
| S2.000 | S2.07 | 0.000 | 0.04 | | 1.8 | OK | |
| S1.002 | SNODE | 0.000 | 0.17 | | 3.1 | OK* | |
| S3.000 | S2.08 | 0.000 | 0.05 | | 0.9 | OK | |
| S1.003 | S2.04 | 0.000 | 0.28 | | 4.0 | OK | |
| S1.004 | S2.05 | 0.000 | 0.15 | | 4.0 | OK | |
| S4.000 | SRE2.1 | 0.000 | 0.01 | | 0.4 | OK* | |
| S5.000 | S2.09 | 0.000 | 0.01 | | 0.5 | OK | |
| S1.005 | S2.06 | 0.000 | 0.36 | | 5.2 | OK | |
| S1.006 | SCS2 | 0.000 | 0.00 | | 0.0 | SURCHARGED | |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW2 - Main East N

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 1 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) | 20.000 |
| Region | England and Wales | Ratio R | 0.400 |
| Cv (Summer) | 0.750 | | |
| Cv (Winter) | 0.840 | | |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S2.01 | 15 Winter | 30 | +0% | 100/30 Winter | | | | 13.999 | -0.121 |
| S1.001 | S2.02 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.549 | -0.101 |
| S2.000 | S2.07 | 15 Winter | 30 | +0% | 100/30 Winter | | | | 13.961 | -0.119 |
| S1.002 | SNODE | 60 Winter | 30 | +0% | | | | | 13.457 | -0.073 |
| S3.000 | S2.08 | 15 Winter | 30 | +0% | 100/30 Summer | | | | 13.963 | -0.117 |
| S1.003 | S2.04 | 60 Winter | 30 | +0% | 30/60 Winter | | | | 13.453 | 0.023 |
| S1.004 | S2.05 | 60 Winter | 30 | +0% | 30/30 Winter | | | | 13.448 | 0.078 |
| S4.000 | SRE2.1 | 15 Winter | 30 | +0% | | | | | 14.066 | -0.134 |
| S5.000 | S2.09 | 15 Winter | 30 | +0% | 100/30 Winter | | | | 14.019 | -0.131 |
| S1.005 | S2.06 | 60 Winter | 30 | +0% | 30/15 Summer | | | | 13.444 | 0.274 |
| S1.006 | SCS2 | 60 Winter | 30 | +0% | 1/15 Summer | | | | 13.435 | 1.010 |

| PN | US/MH Name | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S1.000 | S2.01 | 0.000 | 0.08 | | 3.2 | OK | |
| S1.001 | S2.02 | 0.000 | 0.23 | | 3.1 | OK | |
| S2.000 | S2.07 | 0.000 | 0.10 | | 4.5 | OK | |
| S1.002 | SNODE | 0.000 | 0.21 | | 3.9 | OK* | |
| S3.000 | S2.08 | 0.000 | 0.11 | | 2.2 | OK | |
| S1.003 | S2.04 | 0.000 | 0.36 | | 5.1 | SURCHARGED | |
| S1.004 | S2.05 | 0.000 | 0.19 | | 5.1 | SURCHARGED | |
| S4.000 | SRE2.1 | 0.000 | 0.02 | | 0.9 | OK* | |
| S5.000 | S2.09 | 0.000 | 0.04 | | 1.2 | OK | |
| S1.005 | S2.06 | 0.000 | 0.45 | | 6.5 | SURCHARGED | |
| S1.006 | SCS2 | 0.000 | 0.00 | | 0.0 | SURCHARGED | |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW2 - Main East N

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 1 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) 20.000 | Cv (Summer) 0.750 |
| Region | England and Wales | Ratio R 0.400 | Cv (Winter) 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S2.01 | 60 Winter | 100 | +40% | 100/30 Winter | | | | 14.405 | 0.285 |
| S1.001 | S2.02 | 60 Winter | 100 | +40% | 100/15 Summer | | | | 14.404 | 0.754 |
| S2.000 | S2.07 | 60 Winter | 100 | +40% | 100/30 Winter | | | | 14.401 | 0.321 |
| S1.002 | SNODE | 240 Winter | 100 | +40% | | | | | 13.530 | 0.000 |
| S3.000 | S2.08 | 60 Winter | 100 | +40% | 100/30 Summer | | | | 14.393 | 0.313 |
| S1.003 | S2.04 | 60 Winter | 100 | +40% | 30/60 Winter | | | | 14.393 | 0.963 |
| S1.004 | S2.05 | 60 Winter | 100 | +40% | 30/30 Winter | | | | 14.385 | 1.015 |
| S4.000 | SRE2.1 | 30 Winter | 100 | +40% | | | | | 14.200 | 0.000 |
| S5.000 | S2.09 | 60 Winter | 100 | +40% | 100/30 Winter | | | | 14.378 | 0.228 |
| S1.005 | S2.06 | 60 Winter | 100 | +40% | 30/15 Summer | | | | 14.378 | 1.208 |
| S1.006 | SCS2 | 60 Winter | 100 | +40% | 1/15 Summer | | | | 14.391 | 1.966 |

| PN | US/MH Name | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S1.000 | S2.01 | 0.000 | 0.08 | | 3.0 | SURCHARGED | |
| S1.001 | S2.02 | 0.000 | 0.21 | | 2.9 | FLOOD RISK | |
| S2.000 | S2.07 | 0.000 | 0.09 | | 4.2 | SURCHARGED | |
| S1.002 | SNODE | 0.000 | 0.13 | | 2.5 | SURCHARGED* | |
| S3.000 | S2.08 | 0.000 | 0.11 | | 2.1 | SURCHARGED | |
| S1.003 | S2.04 | 0.000 | 0.55 | | 7.7 | FLOOD RISK | |
| S1.004 | S2.05 | 0.000 | 0.28 | | 7.2 | FLOOD RISK | |
| S4.000 | SRE2.1 | 0.000 | 0.03 | | 1.3 | SURCHARGED* | |
| S5.000 | S2.09 | 0.000 | 0.03 | | 1.1 | SURCHARGED | |
| S1.005 | S2.06 | 0.000 | 0.55 | | 8.0 | FLOOD RISK | |
| S1.006 | SCS2 | 0.000 | 0.03 | | 0.9 | FLOOD RISK | |

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## Summary of Results for 10 year Return Period (+40%)

Half Drain Time : 25 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 13.470 | 1.270 | 2.3 | 4.8 | O K |
| 30 min Summer | 13.638 | 1.438 | 2.6 | 5.5 | O K |
| 60 min Summer | 13.696 | 1.496 | 2.7 | 5.7 | O K |
| 120 min Summer | 13.611 | 1.411 | 2.5 | 5.4 | O K |
| 180 min Summer | 13.490 | 1.290 | 2.3 | 4.9 | O K |
| 240 min Summer | 13.382 | 1.182 | 2.1 | 4.5 | O K |
| 360 min Summer | 13.214 | 1.014 | 1.8 | 3.9 | O K |
| 480 min Summer | 13.092 | 0.892 | 1.6 | 3.4 | O K |
| 600 min Summer | 12.999 | 0.799 | 1.4 | 3.0 | O K |
| 720 min Summer | 12.925 | 0.725 | 1.3 | 2.8 | O K |
| 960 min Summer | 12.816 | 0.616 | 1.1 | 2.3 | O K |
| 1440 min Summer | 12.679 | 0.479 | 0.9 | 1.8 | O K |
| 2160 min Summer | 12.567 | 0.367 | 0.7 | 1.4 | O K |
| 2880 min Summer | 12.500 | 0.300 | 0.5 | 1.1 | O K |
| 4320 min Summer | 12.424 | 0.224 | 0.4 | 0.9 | O K |
| 5760 min Summer | 12.380 | 0.180 | 0.3 | 0.7 | O K |
| 7200 min Summer | 12.352 | 0.152 | 0.3 | 0.6 | O K |
| 8640 min Summer | 12.332 | 0.132 | 0.2 | 0.5 | O K |
| 10080 min Summer | 12.317 | 0.117 | 0.2 | 0.4 | O K |
| 15 min Winter | 13.627 | 1.427 | 2.6 | 5.4 | O K |
| 30 min Winter | 13.813 | 1.613 | 2.9 | 6.1 | O K |
| 60 min Winter | 13.902 | 1.702 | 2.9 | 6.2 | O K |
| 120 min Winter | 13.653 | 1.453 | 2.6 | 5.5 | O K |
| 180 min Winter | 13.478 | 1.278 | 2.3 | 4.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 83.912 | 0.0 | 16 |
| 30 min Summer | 54.206 | 0.0 | 24 |
| 60 min Summer | 33.604 | 0.0 | 40 |
| 120 min Summer | 20.311 | 0.0 | 74 |
| 180 min Summer | 15.011 | 0.0 | 106 |
| 240 min Summer | 12.078 | 0.0 | 138 |
| 360 min Summer | 8.874 | 0.0 | 200 |
| 480 min Summer | 7.126 | 0.0 | 262 |
| 600 min Summer | 6.008 | 0.0 | 322 |
| 720 min Summer | 5.225 | 0.0 | 384 |
| 960 min Summer | 4.190 | 0.0 | 502 |
| 1440 min Summer | 3.067 | 0.0 | 748 |
| 2160 min Summer | 2.244 | 0.0 | 1104 |
| 2880 min Summer | 1.797 | 0.0 | 1468 |
| 4320 min Summer | 1.313 | 0.0 | 2204 |
| 5760 min Summer | 1.051 | 0.0 | 2936 |
| 7200 min Summer | 0.884 | 0.0 | 3672 |
| 8640 min Summer | 0.767 | 0.0 | 4400 |
| 10080 min Summer | 0.681 | 0.0 | 5136 |
| 15 min Winter | 83.912 | 0.0 | 16 |
| 30 min Winter | 54.206 | 0.0 | 25 |
| 60 min Winter | 33.604 | 0.0 | 44 |
| 120 min Winter | 20.311 | 0.0 | 78 |
| 180 min Winter | 15.011 | 0.0 | 112 |

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## Summary of Results for 10 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 240 min Winter | 13.334 | 1.134 | 2.0 | 4.3 | O K |
| 360 min Winter | 13.125 | 0.925 | 1.7 | 3.5 | O K |
| 480 min Winter | 12.984 | 0.784 | 1.4 | 3.0 | O K |
| 600 min Winter | 12.883 | 0.683 | 1.2 | 2.6 | O K |
| 720 min Winter | 12.806 | 0.606 | 1.1 | 2.3 | O K |
| 960 min Winter | 12.698 | 0.498 | 0.9 | 1.9 | O K |
| 1440 min Winter | 12.573 | 0.373 | 0.7 | 1.4 | O K |
| 2160 min Winter | 12.476 | 0.276 | 0.5 | 1.0 | O K |
| 2880 min Winter | 12.422 | 0.222 | 0.4 | 0.8 | O K |
| 4320 min Winter | 12.363 | 0.163 | 0.3 | 0.6 | O K |
| 5760 min Winter | 12.331 | 0.131 | 0.2 | 0.5 | O K |
| 7200 min Winter | 12.310 | 0.110 | 0.2 | 0.4 | O K |
| 8640 min Winter | 12.296 | 0.096 | 0.2 | 0.4 | O K |
| 10080 min Winter | 12.285 | 0.085 | 0.2 | 0.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 240 min Winter | 12.078 | 0.0 | 144 |
| 360 min Winter | 8.874 | 0.0 | 208 |
| 480 min Winter | 7.126 | 0.0 | 268 |
| 600 min Winter | 6.008 | 0.0 | 330 |
| 720 min Winter | 5.225 | 0.0 | 390 |
| 960 min Winter | 4.190 | 0.0 | 512 |
| 1440 min Winter | 3.067 | 0.0 | 750 |
| 2160 min Winter | 2.244 | 0.0 | 1108 |
| 2880 min Winter | 1.797 | 0.0 | 1472 |
| 4320 min Winter | 1.313 | 0.0 | 2204 |
| 5760 min Winter | 1.051 | 0.0 | 2936 |
| 7200 min Winter | 0.884 | 0.0 | 3624 |
| 8640 min Winter | 0.767 | 0.0 | 4400 |
| 10080 min Winter | 0.681 | 0.0 | 5136 |

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## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 10 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.400 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.038

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.038 |

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## Model Details

Storage is Online Cover Level (m) 14.640

## Cellular Storage Structure

Invert Level (m) 12.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 1.29600

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 4.0 | 4.0 | 1.600 | 4.0 | 20.0 | 1.601 | 0.0 | 20.0 |

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## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 43 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 14.641 | 2.441 | 2.9 | 8.2 | FLOOD |
| 30 min Summer | 14.643 | 2.443 | 2.9 | 9.7 | FLOOD |
| 60 min Summer | 14.644 | 2.444 | 2.9 | 10.4 | FLOOD |
| 120 min Summer | 14.643 | 2.443 | 2.9 | 10.0 | FLOOD |
| 180 min Summer | 14.642 | 2.442 | 2.9 | 9.0 | FLOOD |
| 240 min Summer | 14.641 | 2.441 | 2.9 | 8.0 | FLOOD |
| 360 min Summer | 14.105 | 1.905 | 2.9 | 6.4 | O K |
| 480 min Summer | 13.654 | 1.454 | 2.6 | 5.5 | O K |
| 600 min Summer | 13.495 | 1.295 | 2.3 | 4.9 | O K |
| 720 min Summer | 13.370 | 1.170 | 2.1 | 4.4 | O K |
| 960 min Summer | 13.185 | 0.985 | 1.8 | 3.7 | O K |
| 1440 min Summer | 12.956 | 0.756 | 1.4 | 2.9 | O K |
| 2160 min Summer | 12.770 | 0.570 | 1.0 | 2.2 | O K |
| 2880 min Summer | 12.662 | 0.462 | 0.8 | 1.8 | O K |
| 4320 min Summer | 12.539 | 0.339 | 0.6 | 1.3 | O K |
| 5760 min Summer | 12.470 | 0.270 | 0.5 | 1.0 | O K |
| 7200 min Summer | 12.426 | 0.226 | 0.4 | 0.9 | O K |
| 8640 min Summer | 12.394 | 0.194 | 0.3 | 0.7 | O K |
| 10080 min Summer | 12.371 | 0.171 | 0.3 | 0.7 | O K |
| 15 min Winter | 14.642 | 2.442 | 2.9 | 9.3 | FLOOD |
| 30 min Winter | 14.644 | 2.444 | 2.9 | 11.1 | FLOOD |
| 60 min Winter | 14.645 | 2.445 | 2.9 | 11.8 | FLOOD |
| 120 min Winter | 14.644 | 2.444 | 2.9 | 10.8 | FLOOD |
| 180 min Winter | 14.642 | 2.442 | 2.9 | 9.3 | FLOOD |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.153 | 2.1 | 16 |
| 30 min Summer | 90.705 | 3.6 | 28 |
| 60 min Summer | 56.713 | 4.3 | 44 |
| 120 min Summer | 34.246 | 3.9 | 78 |
| 180 min Summer | 25.149 | 2.9 | 112 |
| 240 min Summer | 20.078 | 1.9 | 144 |
| 360 min Summer | 14.585 | 0.0 | 202 |
| 480 min Summer | 11.622 | 0.0 | 262 |
| 600 min Summer | 9.738 | 0.0 | 322 |
| 720 min Summer | 8.424 | 0.0 | 384 |
| 960 min Summer | 6.697 | 0.0 | 502 |
| 1440 min Summer | 4.839 | 0.0 | 748 |
| 2160 min Summer | 3.490 | 0.0 | 1104 |
| 2880 min Summer | 2.766 | 0.0 | 1468 |
| 4320 min Summer | 1.989 | 0.0 | 2204 |
| 5760 min Summer | 1.573 | 0.0 | 2936 |
| 7200 min Summer | 1.311 | 0.0 | 3672 |
| 8640 min Summer | 1.129 | 0.0 | 4400 |
| 10080 min Summer | 0.994 | 0.0 | 5136 |
| 15 min Winter | 138.153 | 3.2 | 16 |
| 30 min Winter | 90.705 | 5.0 | 30 |
| 60 min Winter | 56.713 | 5.7 | 48 |
| 120 min Winter | 34.246 | 4.8 | 86 |
| 180 min Winter | 25.149 | 3.2 | 120 |

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## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 240 min Winter | 14.641 | 2.441 | 2.9 | 7.7 | FLOOD |
| 360 min Winter | 13.720 | 1.520 | 2.7 | 5.8 | O K |
| 480 min Winter | 13.479 | 1.279 | 2.3 | 4.9 | O K |
| 600 min Winter | 13.307 | 1.107 | 2.0 | 4.2 | O K |
| 720 min Winter | 13.178 | 0.978 | 1.8 | 3.7 | O K |
| 960 min Winter | 12.997 | 0.797 | 1.4 | 3.0 | O K |
| 1440 min Winter | 12.789 | 0.589 | 1.1 | 2.2 | O K |
| 2160 min Winter | 12.630 | 0.430 | 0.8 | 1.6 | O K |
| 2880 min Winter | 12.542 | 0.342 | 0.6 | 1.3 | O K |
| 4320 min Winter | 12.447 | 0.247 | 0.4 | 0.9 | O K |
| 5760 min Winter | 12.396 | 0.196 | 0.4 | 0.7 | O K |
| 7200 min Winter | 12.363 | 0.163 | 0.3 | 0.6 | O K |
| 8640 min Winter | 12.341 | 0.141 | 0.3 | 0.5 | O K |
| 10080 min Winter | 12.324 | 0.124 | 0.2 | 0.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 240 min Winter | 20.078 | 1.6 | 152 |
| 360 min Winter | 14.585 | 0.0 | 208 |
| 480 min Winter | 11.622 | 0.0 | 268 |
| 600 min Winter | 9.738 | 0.0 | 330 |
| 720 min Winter | 8.424 | 0.0 | 390 |
| 960 min Winter | 6.697 | 0.0 | 510 |
| 1440 min Winter | 4.839 | 0.0 | 750 |
| 2160 min Winter | 3.490 | 0.0 | 1108 |
| 2880 min Winter | 2.766 | 0.0 | 1472 |
| 4320 min Winter | 1.989 | 0.0 | 2204 |
| 5760 min Winter | 1.573 | 0.0 | 2936 |
| 7200 min Winter | 1.311 | 0.0 | 3672 |
| 8640 min Winter | 1.129 | 0.0 | 4368 |
| 10080 min Winter | 0.994 | 0.0 | 5136 |

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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) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.400 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.038

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.038 |

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## Model Details

Storage is Online Cover Level (m) 14.640

## Cellular Storage Structure

Invert Level (m) 12.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 1.29600

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 4.0 | 4.0 | 1.600 | 4.0 | 20.0 | 1.601 | 0.0 | 20.0 |

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## STORM SEWER DESIGN by the Modified Rational Method

### Network Design Table for SW3 - Main East S

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 10.715 | 0.150 | 71.4 | 0.005 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S2.000 | 11.130 | 0.100 | 111.3 | 0.020 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S2.001 | 3.895 | 0.100 | 39.0 | 0.003 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.001 | 8.583 | 0.090 | 95.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.000 | 4.921 | 0.100 | 49.2 | 0.013 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.000 | 3.872 | 0.470 | 8.2 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.001 | 7.120 | 0.050 | 142.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S5.000 | 6.522 | 0.420 | 15.5 | 0.003 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.002 | 3.696 | 0.320 | 11.6 | 0.003 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.002 | 15.184 | 0.160 | 94.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.003 | 5.511 | 0.100 | 55.1 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S6.000 | 5.966 | 0.280 | 21.3 | 0.003 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.004 | 10.721 | 0.195 | 55.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 50.00 | 5.15 | 13.800 | 0.005 | 0.0 | 0.0 | 0.0 | 1.19 | 21.0 | 0.6 |
| S2.000 | 50.00 | 5.19 | 13.850 | 0.020 | 0.0 | 0.0 | 0.0 | 0.95 | 16.8 | 2.7 |
| S2.001 | 50.00 | 5.24 | 13.750 | 0.023 | 0.0 | 0.0 | 0.0 | 1.62 | 28.6 | 3.1 |
| S1.001 | 50.00 | 5.37 | 13.150 | 0.027 | 0.0 | 0.0 | 0.0 | 1.03 | 18.2 | 3.7 |
| S3.000 | 50.00 | 5.06 | 13.600 | 0.013 | 0.0 | 0.0 | 0.0 | 1.44 | 25.4 | 1.7 |
| S4.000 | 50.00 | 5.02 | 13.900 | 0.000 | 0.0 | 0.0 | 0.0 | 3.53 | 62.4 | 0.0 |
| S3.001 | 50.00 | 5.20 | 13.430 | 0.013 | 0.0 | 0.0 | 0.0 | 0.84 | 14.8 | 1.7 |
| S5.000 | 50.00 | 5.04 | 13.800 | 0.003 | 0.0 | 0.0 | 0.0 | 2.57 | 45.4 | 0.5 |
| S3.002 | 50.00 | 5.22 | 13.380 | 0.019 | 0.0 | 0.0 | 0.0 | 2.98 | 52.7 | 2.6 |
| S1.002 | 50.00 | 5.62 | 13.060 | 0.046 | 0.0 | 0.0 | 0.0 | 1.03 | 18.2 | 6.3 |
| S1.003 | 50.00 | 5.69 | 12.900 | 0.046 | 0.0 | 0.0 | 0.0 | 1.36 | 24.0 | 6.3 |
| S6.000 | 50.00 | 5.05 | 14.000 | 0.003 | 0.0 | 0.0 | 0.0 | 2.19 | 38.7 | 0.4 |
| S1.004 | 50.00 | 5.82 | 12.800 | 0.049 | 0.0 | 0.0 | 0.0 | 1.36 | 24.0 | 6.6 |

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## STORM SEWER DESIGN by the Modified Rational Method

### Network Design Table for SW3 - Main East S

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S7.000 | 3.907 | 0.300 | 13.0 | 0.003 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.005 | 16.357 | 0.300 | 54.5 | 0.012 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S1.006 | 0.510 | -2.400 | -0.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S7.000 | 50.00 | 5.02 | 14.000 | 0.003 | 0.0 | 0.0 | 0.0 | 2.81 | 49.6 | 0.4 |
| S1.005 | 50.00 | 5.97 | 12.530 | 0.064 | 0.0 | 0.0 | 0.0 | 1.78 | 70.6 | 8.7 |
| S1.006 | 50.00 | 6.04 | 12.230 | 0.064 | 0.0 | 0.0 | 0.0 | 0.12 | 4.9« | 8.7 |

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## Manhole Schedules for SW3 - Main East S

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | PN | Pipe Out Invert Level (m) | Diameter (mm) | PN | Pipes In Invert Level (m) | Diameter (mm) | Backdrop (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S3.01 | 14.740 | 0.940 | Open Manhole | 450 | S1.000 | 13.800 | 150 | | | | |
| S3.08 | 14.740 | 0.890 | Open Manhole | 450 | S2.000 | 13.850 | 150 | | | | |
| S3.09 | 14.740 | 0.990 | Open Manhole | 450 | S2.001 | 13.750 | 150 | S2.000 | 13.750 | 150 | |
| S3.02 | 14.700 | 1.550 | Open Manhole | 450 x 600 | S1.001 | 13.150 | 150 | S1.000 | 13.650 | 150 | 500 |
| | | | | | | | | S2.001 | 13.650 | 150 | 500 |
| S3.10 | 14.740 | 1.140 | Open Manhole | 450 | S3.000 | 13.600 | 150 | | | | |
| S3.13 | 14.750 | 0.850 | Open Manhole | 450 | S4.000 | 13.900 | 150 | | | | |
| S3.11 | 14.740 | 1.310 | Open Manhole | 450 | S3.001 | 13.430 | 150 | S3.000 | 13.500 | 150 | 70 |
| | | | | | | | | S4.000 | 13.430 | 150 | |
| SRE3.1 | 14.740 | 0.940 | Junction | | S5.000 | 13.800 | 150 | | | | |
| S3.12 | 14.740 | 1.360 | Open Manhole | 450 | S3.002 | 13.380 | 150 | S3.001 | 13.380 | 150 | |
| | | | | | | | | S5.000 | 13.380 | 150 | |
| SNODE | 14.670 | 1.610 | Junction | | S1.002 | 13.060 | 150 | S1.001 | 13.060 | 150 | |
| | | | | | | | | S3.002 | 13.060 | 150 | |
| S3.03 | 14.670 | 1.770 | Open Manhole | 450 | S1.003 | 12.900 | 150 | S1.002 | 12.900 | 150 | |
| SRE3.2 | 14.750 | 0.750 | Open Manhole | 1200 | S6.000 | 14.000 | 150 | | | | |
| S3.04 | 14.670 | 1.870 | Open Manhole | 1200 | S1.004 | 12.800 | 150 | S1.003 | 12.800 | 150 | |
| | | | | | | | | S6.000 | 13.720 | 150 | 920 |
| S3.14 | 14.740 | 0.740 | Open Manhole | 450 | S7.000 | 14.000 | 150 | | | | |
| S3.05 | 14.740 | 2.210 | Open Manhole | 1200 | S1.005 | 12.530 | 225 | S1.004 | 12.605 | 150 | |
| | | | | | | | | S7.000 | 13.700 | 150 | 1095 |
| SCS3 | 14.740 | 2.510 | Open Manhole | 300 | S1.006 | 12.230 | 225 | S1.005 | 12.230 | 225 | |
| S | 15.200 | 0.570 | Open Manhole | 0 | | OUTFALL | | S1.006 | 14.630 | 225 | |

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## Storage Structures for SW3 - Main East S

### Cellular Storage Manhole: SCS3, DS/PN: S1.006

Invert Level (m) 12.230 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 1.29600

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 8.0 | 8.0 | 1.600 | 8.0 | 27.2 | 1.601 | 0.0 | 27.2 |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 - Main East S

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 1 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) 20.000 | Cv (Summer) 0.750 |
| Region | England and Wales | Ratio R 0.400 | Cv (Winter) 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S3.01 | 15 Winter | 1 | +0% | 100/30 Winter | | | | 13.818 | -0.132 |
| S2.000 | S3.08 | 15 Winter | 1 | +0% | 100/30 Winter | | | | 13.893 | -0.107 |
| S2.001 | S3.09 | 15 Winter | 1 | +0% | 100/30 Winter | | | | 13.790 | -0.110 |
| S1.001 | S3.02 | 15 Winter | 1 | +0% | 30/60 Winter | | | | 13.200 | -0.100 |
| S3.000 | S3.10 | 15 Winter | 1 | +0% | 100/15 Winter | | | | 13.630 | -0.120 |
| S4.000 | S3.13 | 60 Winter | 1 | +0% | 100/30 Winter | | | | 13.900 | -0.150 |
| S3.001 | S3.11 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.467 | -0.113 |
| S5.000 | SRE3.1 | 15 Winter | 1 | +0% | | | | | 13.809 | -0.141 |
| S3.002 | S3.12 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 13.407 | -0.123 |
| S1.002 | SNODE | 15 Winter | 1 | +0% | | | | | 13.121 | -0.089 |
| S1.003 | S3.03 | 15 Winter | 1 | +0% | 30/15 Winter | | | | 12.958 | -0.092 |
| S6.000 | SRE3.2 | 15 Winter | 1 | +0% | 100/60 Winter | | | | 14.008 | -0.142 |
| S1.004 | S3.04 | 15 Winter | 1 | +0% | 30/15 Summer | | | | 12.857 | -0.093 |
| S7.000 | S3.14 | 15 Winter | 1 | +0% | 100/60 Winter | | | | 14.008 | -0.142 |
| S1.005 | S3.05 | 120 Winter | 1 | +0% | 30/15 Summer | | | | 12.750 | -0.005 |
| S1.006 | SCS3 | 120 Winter | 1 | +0% | 1/15 Summer | 100/60 Winter | | | 12.747 | 0.292 |

| PN | US/MH Name | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S1.000 | S3.01 | 0.000 | 0.03 | | 0.6 | OK | |
| S2.000 | S3.08 | 0.000 | 0.18 | | 2.7 | OK | |
| S2.001 | S3.09 | 0.000 | 0.15 | | 3.1 | OK | |
| S1.001 | S3.02 | 0.000 | 0.23 | | 3.7 | OK | |
| S3.000 | S3.10 | 0.000 | 0.09 | | 1.8 | OK | |
| S4.000 | S3.13 | 0.000 | 0.00 | | 0.0 | OK | |
| S3.001 | S3.11 | 0.000 | 0.14 | | 1.8 | OK | |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 - Main East S

| PN | US/MH Name | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S5.000 | SRE3.1 | 0.000 | 0.01 | | 0.5 | OK* | |
| S3.002 | S3.12 | 0.000 | 0.07 | | 2.6 | OK | |
| S1.002 | SNODE | 0.000 | 0.35 | | 6.3 | OK* | |
| S1.003 | S3.03 | 0.000 | 0.32 | | 6.3 | OK | |
| S6.000 | SRE3.2 | 0.000 | 0.01 | | 0.4 | OK | |
| S1.004 | S3.04 | 0.000 | 0.31 | | 6.6 | OK | |
| S7.000 | S3.14 | 0.000 | 0.01 | | 0.4 | OK | |
| S1.005 | S3.05 | 0.000 | 0.04 | | 2.8 | OK | |
| S1.006 | SCS3 | 0.000 | 0.00 | | 0.0 | SURCHARGED | 2 |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 - Main East S

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 1 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) | 20.000 |
| Region | England and Wales | Ratio R | 0.400 |
| Cv (Summer) | 0.750 | | |
| Cv (Winter) | 0.840 | | |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S3.01 | 15 Winter | 30 | +0% | 100/30 Winter | | | | 13.829 | -0.121 |
| S2.000 | S3.08 | 15 Winter | 30 | +0% | 100/30 Winter | | | | 13.920 | -0.080 |
| S2.001 | S3.09 | 15 Winter | 30 | +0% | 100/30 Winter | | | | 13.816 | -0.084 |
| S1.001 | S3.02 | 120 Winter | 30 | +0% | 30/60 Winter | | | | 13.377 | 0.077 |
| S3.000 | S3.10 | 15 Winter | 30 | +0% | 100/15 Winter | | | | 13.648 | -0.102 |
| S4.000 | S3.13 | 60 Winter | 30 | +0% | 100/30 Winter | | | | 13.900 | -0.150 |
| S3.001 | S3.11 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.491 | -0.089 |
| S5.000 | SRE3.1 | 15 Winter | 30 | +0% | | | | | 13.817 | -0.133 |
| S3.002 | S3.12 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 13.424 | -0.106 |
| S1.002 | SNODE | 240 Winter | 30 | +0% | | | | | 13.210 | 0.000 |
| S1.003 | S3.03 | 120 Winter | 30 | +0% | 30/15 Winter | | | | 13.366 | 0.316 |
| S6.000 | SRE3.2 | 15 Winter | 30 | +0% | 100/60 Winter | | | | 14.017 | -0.133 |
| S1.004 | S3.04 | 120 Winter | 30 | +0% | 30/15 Summer | | | | 13.362 | 0.412 |
| S7.000 | S3.14 | 15 Winter | 30 | +0% | 100/60 Winter | | | | 14.017 | -0.133 |
| S1.005 | S3.05 | 120 Winter | 30 | +0% | 30/15 Summer | | | | 13.355 | 0.600 |
| S1.006 | SCS3 | 120 Winter | 30 | +0% | 1/15 Summer | 100/60 Winter | | | 13.351 | 0.896 |

| PN | US/MH Name | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S1.000 | S3.01 | 0.000 | 0.08 | | 1.6 | OK | |
| S2.000 | S3.08 | 0.000 | 0.45 | | 6.7 | OK | |
| S2.001 | S3.09 | 0.000 | 0.39 | | 7.8 | OK | |
| S1.001 | S3.02 | 0.000 | 0.19 | | 3.0 | SURCHARGED | |
| S3.000 | S3.10 | 0.000 | 0.22 | | 4.4 | OK | |
| S4.000 | S3.13 | 0.000 | 0.00 | | 0.0 | OK | |
| S3.001 | S3.11 | 0.000 | 0.34 | | 4.3 | OK | |

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 - Main East S

| PN | US/MH Name | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S5.000 | SRE3.1 | 0.000 | 0.03 | | 1.2 | OK* | |
| S3.002 | S3.12 | 0.000 | 0.18 | | 6.4 | OK | |
| S1.002 | SNODE | 0.000 | 0.16 | | 3.0 | SURCHARGED* | |
| S1.003 | S3.03 | 0.000 | 0.24 | | 4.7 | SURCHARGED | |
| S6.000 | SRE3.2 | 0.000 | 0.03 | | 0.9 | OK | |
| S1.004 | S3.04 | 0.000 | 0.21 | | 4.5 | SURCHARGED | |
| S7.000 | S3.14 | 0.000 | 0.03 | | 1.0 | OK | |
| S1.005 | S3.05 | 0.000 | 0.08 | | 5.1 | SURCHARGED | |
| S1.006 | SCS3 | 0.000 | 0.00 | | 0.0 | SURCHARGED | 2 |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 - Main East S

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 1 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) 20.000 | Cv (Summer) 0.750 |
| Region | England and Wales | Ratio R 0.400 | Cv (Winter) 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S3.01 | 120 Winter | 100 | +40% | 100/30 Winter | | | | 14.353 | 0.403 |
| S2.000 | S3.08 | 120 Winter | 100 | +40% | 100/30 Winter | | | | 14.359 | 0.359 |
| S2.001 | S3.09 | 120 Winter | 100 | +40% | 100/30 Winter | | | | 14.356 | 0.456 |
| S1.001 | S3.02 | 120 Winter | 100 | +40% | 30/60 Winter | | | | 14.354 | 1.054 |
| S3.000 | S3.10 | 120 Winter | 100 | +40% | 100/15 Winter | | | | 14.353 | 0.603 |
| S4.000 | S3.13 | 120 Winter | 100 | +40% | 100/30 Winter | | | | 14.352 | 0.302 |
| S3.001 | S3.11 | 120 Winter | 100 | +40% | 100/15 Summer | | | | 14.354 | 0.774 |
| S5.000 | SRE3.1 | 240 Winter | 100 | +40% | | | | | 13.950 | 0.000 |
| S3.002 | S3.12 | 120 Winter | 100 | +40% | 100/15 Summer | | | | 14.353 | 0.823 |
| S1.002 | SNODE | 30 Winter | 100 | +40% | | | | | 13.210 | 0.000 |
| S1.003 | S3.03 | 120 Winter | 100 | +40% | 30/15 Winter | | | | 14.356 | 1.306 |
| S6.000 | SRE3.2 | 120 Winter | 100 | +40% | 100/60 Winter | | | | 14.329 | 0.179 |
| S1.004 | S3.04 | 120 Winter | 100 | +40% | 30/15 Summer | | | | 14.349 | 1.399 |
| S7.000 | S3.14 | 120 Winter | 100 | +40% | 100/60 Winter | | | | 14.397 | 0.247 |
| S1.005 | S3.05 | 120 Winter | 100 | +40% | 30/15 Summer | | | | 14.425 | 1.670 |
| S1.006 | SCS3 | 120 Winter | 100 | +40% | 1/15 Summer | 100/60 Winter | | | 14.740 | 2.285 |

| PN | US/MH Name | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S1.000 | S3.01 | 0.000 | 0.05 | | 0.9 | SURCHARGED | |
| S2.000 | S3.08 | 0.000 | 0.26 | | 4.0 | SURCHARGED | |
| S2.001 | S3.09 | 0.000 | 0.23 | | 4.6 | SURCHARGED | |
| S1.001 | S3.02 | 0.000 | 0.33 | | 5.2 | SURCHARGED | |
| S3.000 | S3.10 | 0.000 | 0.13 | | 2.5 | SURCHARGED | |
| S4.000 | S3.13 | 0.000 | 0.00 | | 0.2 | SURCHARGED | |
| S3.001 | S3.11 | 0.000 | 0.19 | | 2.4 | SURCHARGED | |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 - Main East S

| PN | US/MH Name | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|
| S5.000 | SRE3.1 | 0.000 | 0.02 | | 1.0 | SURCHARGED* | |
| S3.002 | S3.12 | 0.000 | 0.10 | | 3.4 | SURCHARGED | |
| S1.002 | SNODE | 0.000 | 0.93 | | 16.9 | SURCHARGED* | |
| S1.003 | S3.03 | 0.000 | 0.36 | | 7.2 | SURCHARGED | |
| S6.000 | SRE3.2 | 0.000 | 0.02 | | 0.5 | SURCHARGED | |
| S1.004 | S3.04 | 0.000 | 0.32 | | 6.9 | SURCHARGED | |
| S7.000 | S3.14 | 0.000 | 0.02 | | 0.6 | SURCHARGED | |
| S1.005 | S3.05 | 0.000 | 0.16 | | 9.9 | SURCHARGED | |
| S1.006 | SCS3 | 0.029 | 0.03 | | 0.9 | FLOOD | 2 |

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## Summary of Results for 10 year Return Period (+40%)

Half Drain Time : 45 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 13.382 | 1.152 | 2.5 | 8.8 | O K |
| 30 min Summer | 13.571 | 1.341 | 2.9 | 10.2 | O K |
| 60 min Summer | 13.675 | 1.445 | 3.1 | 11.0 | O K |
| 120 min Summer | 13.675 | 1.445 | 3.1 | 11.0 | O K |
| 180 min Summer | 13.609 | 1.379 | 3.0 | 10.5 | O K |
| 240 min Summer | 13.534 | 1.304 | 2.8 | 9.9 | O K |
| 360 min Summer | 13.395 | 1.165 | 2.5 | 8.9 | O K |
| 480 min Summer | 13.284 | 1.054 | 2.3 | 8.0 | O K |
| 600 min Summer | 13.194 | 0.964 | 2.1 | 7.3 | O K |
| 720 min Summer | 13.119 | 0.889 | 1.9 | 6.8 | O K |
| 960 min Summer | 13.004 | 0.774 | 1.7 | 5.9 | O K |
| 1440 min Summer | 12.850 | 0.620 | 1.3 | 4.7 | O K |
| 2160 min Summer | 12.716 | 0.486 | 1.0 | 3.7 | O K |
| 2880 min Summer | 12.633 | 0.403 | 0.9 | 3.1 | O K |
| 4320 min Summer | 12.536 | 0.306 | 0.7 | 2.3 | O K |
| 5760 min Summer | 12.479 | 0.249 | 0.5 | 1.9 | O K |
| 7200 min Summer | 12.442 | 0.212 | 0.5 | 1.6 | O K |
| 8640 min Summer | 12.414 | 0.184 | 0.4 | 1.4 | O K |
| 10080 min Summer | 12.394 | 0.164 | 0.4 | 1.2 | O K |
| 15 min Winter | 13.523 | 1.293 | 2.8 | 9.8 | O K |
| 30 min Winter | 13.740 | 1.510 | 3.3 | 11.5 | O K |
| 60 min Winter | 13.859 | 1.629 | 3.5 | 12.2 | O K |
| 120 min Winter | 13.778 | 1.548 | 3.3 | 11.8 | O K |
| 180 min Winter | 13.663 | 1.433 | 3.1 | 10.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 83.912 | 0.0 | 17 |
| 30 min Summer | 54.206 | 0.0 | 28 |
| 60 min Summer | 33.604 | 0.0 | 44 |
| 120 min Summer | 20.311 | 0.0 | 78 |
| 180 min Summer | 15.011 | 0.0 | 112 |
| 240 min Summer | 12.078 | 0.0 | 144 |
| 360 min Summer | 8.874 | 0.0 | 208 |
| 480 min Summer | 7.126 | 0.0 | 270 |
| 600 min Summer | 6.008 | 0.0 | 332 |
| 720 min Summer | 5.225 | 0.0 | 394 |
| 960 min Summer | 4.190 | 0.0 | 518 |
| 1440 min Summer | 3.067 | 0.0 | 762 |
| 2160 min Summer | 2.244 | 0.0 | 1124 |
| 2880 min Summer | 1.797 | 0.0 | 1472 |
| 4320 min Summer | 1.313 | 0.0 | 2204 |
| 5760 min Summer | 1.051 | 0.0 | 2936 |
| 7200 min Summer | 0.884 | 0.0 | 3672 |
| 8640 min Summer | 0.767 | 0.0 | 4400 |
| 10080 min Summer | 0.681 | 0.0 | 5136 |
| 15 min Winter | 83.912 | 0.0 | 17 |
| 30 min Winter | 54.206 | 0.0 | 29 |
| 60 min Winter | 33.604 | 0.0 | 46 |
| 120 min Winter | 20.311 | 0.0 | 84 |
| 180 min Winter | 15.011 | 0.0 | 118 |

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## Summary of Results for 10 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 240 min Winter | 13.549 | 1.319 | 2.8 | 10.0 | O K |
| 360 min Winter | 13.361 | 1.131 | 2.4 | 8.6 | O K |
| 480 min Winter | 13.219 | 0.989 | 2.1 | 7.5 | O K |
| 600 min Winter | 13.109 | 0.879 | 1.9 | 6.7 | O K |
| 720 min Winter | 13.023 | 0.793 | 1.7 | 6.0 | O K |
| 960 min Winter | 12.895 | 0.665 | 1.4 | 5.1 | O K |
| 1440 min Winter | 12.738 | 0.508 | 1.1 | 3.9 | O K |
| 2160 min Winter | 12.611 | 0.381 | 0.8 | 2.9 | O K |
| 2880 min Winter | 12.539 | 0.309 | 0.7 | 2.3 | O K |
| 4320 min Winter | 12.458 | 0.228 | 0.5 | 1.7 | O K |
| 5760 min Winter | 12.413 | 0.183 | 0.4 | 1.4 | O K |
| 7200 min Winter | 12.384 | 0.154 | 0.3 | 1.2 | O K |
| 8640 min Winter | 12.364 | 0.134 | 0.3 | 1.0 | O K |
| 10080 min Winter | 12.349 | 0.119 | 0.3 | 0.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 240 min Winter | 12.078 | 0.0 | 152 |
| 360 min Winter | 8.874 | 0.0 | 218 |
| 480 min Winter | 7.126 | 0.0 | 282 |
| 600 min Winter | 6.008 | 0.0 | 344 |
| 720 min Winter | 5.225 | 0.0 | 406 |
| 960 min Winter | 4.190 | 0.0 | 530 |
| 1440 min Winter | 3.067 | 0.0 | 768 |
| 2160 min Winter | 2.244 | 0.0 | 1128 |
| 2880 min Winter | 1.797 | 0.0 | 1496 |
| 4320 min Winter | 1.313 | 0.0 | 2204 |
| 5760 min Winter | 1.051 | 0.0 | 2936 |
| 7200 min Winter | 0.884 | 0.0 | 3672 |
| 8640 min Winter | 0.767 | 0.0 | 4392 |
| 10080 min Winter | 0.681 | 0.0 | 5136 |

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## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 10 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.400 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.064

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.064 |

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## Model Details

Storage is Online Cover Level (m) 14.740

## Cellular Storage Structure

Invert Level (m) 12.230 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 1.29600

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 8.0 | 8.0 | 1.600 | 8.0 | 27.2 | 1.601 | 0.0 | 27.2 |

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## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 60 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 14.742 | 2.512 | 3.5 | 14.6 | FLOOD |
| 30 min Summer | 14.745 | 2.515 | 3.5 | 17.9 | FLOOD |
| 60 min Summer | 14.747 | 2.517 | 3.5 | 19.7 | FLOOD |
| 120 min Summer | 14.747 | 2.517 | 3.5 | 20.0 | FLOOD |
| 180 min Summer | 14.746 | 2.516 | 3.5 | 19.1 | FLOOD |
| 240 min Summer | 14.745 | 2.515 | 3.5 | 17.8 | FLOOD |
| 360 min Summer | 14.742 | 2.512 | 3.5 | 15.3 | FLOOD |
| 480 min Summer | 14.740 | 2.510 | 3.5 | 13.3 | FLOOD |
| 600 min Summer | 13.792 | 1.562 | 3.4 | 11.9 | O K |
| 720 min Summer | 13.664 | 1.434 | 3.1 | 10.9 | O K |
| 960 min Summer | 13.466 | 1.236 | 2.7 | 9.4 | O K |
| 1440 min Summer | 13.208 | 0.978 | 2.1 | 7.4 | O K |
| 2160 min Summer | 12.986 | 0.756 | 1.6 | 5.7 | O K |
| 2880 min Summer | 12.850 | 0.620 | 1.3 | 4.7 | O K |
| 4320 min Summer | 12.694 | 0.464 | 1.0 | 3.5 | O K |
| 5760 min Summer | 12.603 | 0.373 | 0.8 | 2.8 | O K |
| 7200 min Summer | 12.544 | 0.314 | 0.7 | 2.4 | O K |
| 8640 min Summer | 12.501 | 0.271 | 0.6 | 2.1 | O K |
| 10080 min Summer | 12.470 | 0.240 | 0.5 | 1.8 | O K |
| 15 min Winter | 14.743 | 2.513 | 3.5 | 16.5 | FLOOD |
| 30 min Winter | 14.747 | 2.517 | 3.5 | 20.4 | FLOOD |
| 60 min Winter | 14.749 | 2.519 | 3.5 | 22.5 | FLOOD |
| 120 min Winter | 14.749 | 2.519 | 3.5 | 22.4 | FLOOD |
| 180 min Winter | 14.748 | 2.518 | 3.5 | 20.8 | FLOOD |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.153 | 2.4 | 17 |
| 30 min Summer | 90.705 | 5.7 | 31 |
| 60 min Summer | 56.713 | 7.6 | 50 |
| 120 min Summer | 34.246 | 7.9 | 84 |
| 180 min Summer | 25.149 | 7.0 | 118 |
| 240 min Summer | 20.078 | 5.7 | 150 |
| 360 min Summer | 14.585 | 3.2 | 214 |
| 480 min Summer | 11.622 | 1.1 | 274 |
| 600 min Summer | 9.738 | 0.0 | 332 |
| 720 min Summer | 8.424 | 0.0 | 394 |
| 960 min Summer | 6.697 | 0.0 | 518 |
| 1440 min Summer | 4.839 | 0.0 | 762 |
| 2160 min Summer | 3.490 | 0.0 | 1124 |
| 2880 min Summer | 2.766 | 0.0 | 1472 |
| 4320 min Summer | 1.989 | 0.0 | 2204 |
| 5760 min Summer | 1.573 | 0.0 | 2936 |
| 7200 min Summer | 1.311 | 0.0 | 3672 |
| 8640 min Summer | 1.129 | 0.0 | 4400 |
| 10080 min Summer | 0.994 | 0.0 | 5136 |
| 15 min Winter | 138.153 | 4.3 | 17 |
| 30 min Winter | 90.705 | 8.2 | 31 |
| 60 min Winter | 56.713 | 10.4 | 56 |
| 120 min Winter | 34.246 | 10.3 | 90 |
| 180 min Winter | 25.149 | 8.7 | 128 |

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## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 240 min Winter | 14.746 | 2.516 | 3.5 | 18.8 | FLOOD |
| 360 min Winter | 14.742 | 2.512 | 3.5 | 15.0 | FLOOD |
| 480 min Winter | 13.934 | 1.704 | 3.5 | 12.3 | O K |
| 600 min Winter | 13.655 | 1.425 | 3.1 | 10.8 | O K |
| 720 min Winter | 13.508 | 1.278 | 2.8 | 9.7 | O K |
| 960 min Winter | 13.293 | 1.063 | 2.3 | 8.1 | O K |
| 1440 min Winter | 13.031 | 0.801 | 1.7 | 6.1 | O K |
| 2160 min Winter | 12.823 | 0.593 | 1.3 | 4.5 | O K |
| 2880 min Winter | 12.705 | 0.475 | 1.0 | 3.6 | O K |
| 4320 min Winter | 12.575 | 0.345 | 0.7 | 2.6 | O K |
| 5760 min Winter | 12.504 | 0.274 | 0.6 | 2.1 | O K |
| 7200 min Winter | 12.459 | 0.229 | 0.5 | 1.7 | O K |
| 8640 min Winter | 12.427 | 0.197 | 0.4 | 1.5 | O K |
| 10080 min Winter | 12.404 | 0.174 | 0.4 | 1.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 240 min Winter | 20.078 | 6.6 | 162 |
| 360 min Winter | 14.585 | 2.8 | 226 |
| 480 min Winter | 11.622 | 0.0 | 282 |
| 600 min Winter | 9.738 | 0.0 | 344 |
| 720 min Winter | 8.424 | 0.0 | 406 |
| 960 min Winter | 6.697 | 0.0 | 530 |
| 1440 min Winter | 4.839 | 0.0 | 768 |
| 2160 min Winter | 3.490 | 0.0 | 1128 |
| 2880 min Winter | 2.766 | 0.0 | 1496 |
| 4320 min Winter | 1.989 | 0.0 | 2204 |
| 5760 min Winter | 1.573 | 0.0 | 2936 |
| 7200 min Winter | 1.311 | 0.0 | 3672 |
| 8640 min Winter | 1.129 | 0.0 | 4400 |
| 10080 min Winter | 0.994 | 0.0 | 5136 |

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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) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.400 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.064

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.064 |

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## Model Details

Storage is Online Cover Level (m) 14.740

## Cellular Storage Structure

Invert Level (m) 12.230 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 1.29600

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 8.0 | 8.0 | 1.600 | 8.0 | 27.2 | 1.601 | 0.0 | 27.2 |

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## STORM SEWER DESIGN by the Modified Rational Method

### Network Design Table for SW4 - Entrance

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 13.308 | 0.180 | 73.9 | 0.008 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.001 | 17.414 | 0.150 | 116.1 | 0.009 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.002 | 5.087 | 0.100 | 50.9 | 0.027 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.003 | 0.720 | -3.000 | -0.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 50.00 | 5.19 | 12.300 | 0.008 | 0.0 | 0.0 | 0.0 | 1.17 | 20.7 | 1.0 |
| S1.001 | 50.00 | 5.50 | 12.120 | 0.017 | 0.0 | 0.0 | 0.0 | 0.93 | 16.5 | 2.3 |
| S1.002 | 50.00 | 5.56 | 11.970 | 0.044 | 0.0 | 0.0 | 0.0 | 1.41 | 25.0 | 6.0 |
| S1.003 | 50.00 | 5.69 | 11.870 | 0.044 | 0.0 | 0.0 | 0.0 | 0.09 | 1.6« | 6.0 |

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## Manhole Schedules for SW4 - Entrance

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | Pipe Out PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipes In PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S4.01 | 13.390 | 1.090 | Open Manhole | 1200 | S1.000 | 12.300 | 150 | | | | |
| S4.02 | 14.000 | 1.880 | Open Manhole | 1200 | S1.001 | 12.120 | 150 | S1.000 | 12.120 | 150 | |
| S4.03 | 14.700 | 2.730 | Open Manhole | 1200 | S1.002 | 11.970 | 150 | S1.001 | 11.970 | 150 | |
| SCS3 | 14.700 | 2.830 | Open Manhole | 300 | S1.003 | 11.870 | 150 | S1.002 | 11.870 | 150 | |
| S | 15.200 | 0.330 | Open Manhole | 0 | | OUTFALL | | S1.003 | 14.870 | 150 | |

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## Storage Structures for SW4 - Entrance

### Porous Car Park Manhole: S4.03, DS/PN: S1.002

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 4.8 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 14.4 |
| Max Percolation (l/s) | 19.2 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 14.150 | Cap Volume Depth (m) | 0.300 |

### Cellular Storage Manhole: SCS3, DS/PN: S1.003

| | | | |
|---|---|---|---|
| Invert Level (m) | 11.870 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.95 |
| Infiltration Coefficient Side (m/hr) | 16.16000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 2.0 | 2.0 | 0.800 | 2.0 | 6.8 | 0.801 | 0.0 | 6.8 |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW4 - Entrance

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) | 20.000 |
| Region | England and Wales | Ratio R | 0.400 |
| Cv (Summer) | 0.750 | | |
| Cv (Winter) | 0.840 | | |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S4.01 | 15 Winter | 1 | +0% | 30/15 Summer | | | | 12.323 | -0.127 | 0.000 |
| S1.001 | S4.02 | 15 Winter | 1 | +0% | 30/15 Summer | | | | 12.158 | -0.112 | 0.000 |
| S1.002 | S4.03 | 15 Winter | 1 | +0% | 1/15 Winter | | | | 12.134 | 0.014 | 0.000 |
| S1.003 | SCS3 | 15 Winter | 1 | +0% | 1/15 Summer | | | | 12.127 | 0.107 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|
| S1.000 | S4.01 | 0.06 | | 1.1 | OK | |
| S1.001 | S4.02 | 0.14 | | 2.2 | OK | |
| S1.002 | S4.03 | 0.23 | | 4.6 | SURCHARGED | |
| S1.003 | SCS3 | 0.00 | | 0.0 | SURCHARGED | |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW4 - Entrance

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) | 20.000 |
| Region | England and Wales | Ratio R | 0.400 |
| Cv (Summer) | 0.750 | | |
| Cv (Winter) | 0.840 | | |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S4.01 | 15 Winter | 30 | +0% | 30/15 Summer | | | | 12.525 | 0.075 | 0.000 |
| S1.001 | S4.02 | 15 Winter | 30 | +0% | 30/15 Summer | | | | 12.518 | 0.248 | 0.000 |
| S1.002 | S4.03 | 15 Winter | 30 | +0% | 1/15 Winter | | | | 12.503 | 0.383 | 0.000 |
| S1.003 | SCS3 | 15 Winter | 30 | +0% | 1/15 Summer | | | | 12.484 | 0.464 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|
| S1.000 | S4.01 | 0.12 | | 2.3 | SURCHARGED | |
| S1.001 | S4.02 | 0.22 | | 3.4 | SURCHARGED | |
| S1.002 | S4.03 | 0.47 | | 9.3 | SURCHARGED | |
| S1.003 | SCS3 | 0.00 | | 0.0 | SURCHARGED | |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW4 - Entrance

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) | 20.000 |
| Region | England and Wales | Ratio R | 0.400 |
| Cv (Summer) | 0.750 | | |
| Cv (Winter) | 0.840 | | |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| DVD Status | OFF |
| Inertia Status | OFF |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 240, 360, 480, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S4.01 | 15 Winter | 100 | +40% | 30/15 Summer | | | | 13.315 | 0.865 | 0.000 |
| S1.001 | S4.02 | 15 Winter | 100 | +40% | 30/15 Summer | | | | 13.301 | 1.031 | 0.000 |
| S1.002 | S4.03 | 30 Winter | 100 | +40% | 1/15 Winter | | | | 13.332 | 1.212 | 0.000 |
| S1.003 | SCS3 | 30 Winter | 100 | +40% | 1/15 Summer | | | | 13.657 | 1.637 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|
| S1.000 | S4.01 | 0.20 | | 3.9 | FLOOD RISK | |
| S1.001 | S4.02 | 0.45 | | 6.8 | SURCHARGED | |
| S1.002 | S4.03 | 0.65 | | 12.9 | SURCHARGED | |
| S1.003 | SCS3 | 0.00 | | 0.0 | SURCHARGED | |

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## Summary of Results for 10 year Return Period (+40%)

Half Drain Time : 2 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 13.417 | 1.547 | 10.8 | 2.3 | O K |
| 30 min Summer | 13.108 | 1.238 | 10.8 | 2.0 | O K |
| 60 min Summer | 12.588 | 0.718 | 9.7 | 1.4 | O K |
| 120 min Summer | 12.361 | 0.491 | 6.6 | 0.9 | O K |
| 180 min Summer | 12.250 | 0.380 | 5.1 | 0.7 | O K |
| 240 min Summer | 12.182 | 0.312 | 4.2 | 0.6 | O K |
| 360 min Summer | 12.104 | 0.234 | 3.1 | 0.4 | O K |
| 480 min Summer | 12.059 | 0.189 | 2.5 | 0.4 | O K |
| 600 min Summer | 12.030 | 0.160 | 2.2 | 0.3 | O K |
| 720 min Summer | 12.009 | 0.139 | 1.9 | 0.3 | O K |
| 960 min Summer | 11.982 | 0.112 | 1.5 | 0.2 | O K |
| 1440 min Summer | 11.952 | 0.082 | 1.1 | 0.2 | O K |
| 2160 min Summer | 11.930 | 0.060 | 0.8 | 0.1 | O K |
| 2880 min Summer | 11.918 | 0.048 | 0.6 | 0.1 | O K |
| 4320 min Summer | 11.905 | 0.035 | 0.5 | 0.1 | O K |
| 5760 min Summer | 11.898 | 0.028 | 0.4 | 0.1 | O K |
| 7200 min Summer | 11.894 | 0.024 | 0.3 | 0.0 | O K |
| 8640 min Summer | 11.891 | 0.021 | 0.3 | 0.0 | O K |
| 10080 min Summer | 11.888 | 0.018 | 0.2 | 0.0 | O K |
| 15 min Winter | 13.645 | 1.775 | 10.8 | 2.5 | O K |
| 30 min Winter | 12.919 | 1.049 | 10.8 | 1.8 | O K |
| 60 min Winter | 12.477 | 0.607 | 8.2 | 1.2 | O K |
| 120 min Winter | 12.253 | 0.383 | 5.2 | 0.7 | O K |
| 180 min Winter | 12.157 | 0.287 | 3.9 | 0.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 83.912 | 0.0 | 12 |
| 30 min Summer | 54.206 | 0.0 | 19 |
| 60 min Summer | 33.604 | 0.0 | 34 |
| 120 min Summer | 20.311 | 0.0 | 64 |
| 180 min Summer | 15.011 | 0.0 | 94 |
| 240 min Summer | 12.078 | 0.0 | 124 |
| 360 min Summer | 8.874 | 0.0 | 184 |
| 480 min Summer | 7.126 | 0.0 | 244 |
| 600 min Summer | 6.008 | 0.0 | 306 |
| 720 min Summer | 5.225 | 0.0 | 366 |
| 960 min Summer | 4.190 | 0.0 | 488 |
| 1440 min Summer | 3.067 | 0.0 | 726 |
| 2160 min Summer | 2.244 | 0.0 | 1096 |
| 2880 min Summer | 1.797 | 0.0 | 1456 |
| 4320 min Summer | 1.313 | 0.0 | 2172 |
| 5760 min Summer | 1.051 | 0.0 | 2904 |
| 7200 min Summer | 0.884 | 0.0 | 3664 |
| 8640 min Summer | 0.767 | 0.0 | 4248 |
| 10080 min Summer | 0.681 | 0.0 | 4968 |
| 15 min Winter | 83.912 | 0.0 | 12 |
| 30 min Winter | 54.206 | 0.0 | 20 |
| 60 min Winter | 33.604 | 0.0 | 34 |
| 120 min Winter | 20.311 | 0.0 | 64 |
| 180 min Winter | 15.011 | 0.0 | 94 |

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## Summary of Results for 10 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 240 min Winter | 12.101 | 0.231 | 3.1 | 0.4 | O K |
| 360 min Winter | 12.041 | 0.171 | 2.3 | 0.3 | O K |
| 480 min Winter | 12.007 | 0.137 | 1.8 | 0.3 | O K |
| 600 min Winter | 11.986 | 0.116 | 1.6 | 0.2 | O K |
| 720 min Winter | 11.971 | 0.101 | 1.4 | 0.2 | O K |
| 960 min Winter | 11.951 | 0.081 | 1.1 | 0.2 | O K |
| 1440 min Winter | 11.929 | 0.059 | 0.8 | 0.1 | O K |
| 2160 min Winter | 11.913 | 0.043 | 0.6 | 0.1 | O K |
| 2880 min Winter | 11.905 | 0.035 | 0.5 | 0.1 | O K |
| 4320 min Winter | 11.896 | 0.026 | 0.3 | 0.0 | O K |
| 5760 min Winter | 11.890 | 0.020 | 0.3 | 0.0 | O K |
| 7200 min Winter | 11.887 | 0.017 | 0.2 | 0.0 | O K |
| 8640 min Winter | 11.885 | 0.015 | 0.2 | 0.0 | O K |
| 10080 min Winter | 11.883 | 0.013 | 0.2 | 0.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 240 min Winter | 12.078 | 0.0 | 124 |
| 360 min Winter | 8.874 | 0.0 | 184 |
| 480 min Winter | 7.126 | 0.0 | 244 |
| 600 min Winter | 6.008 | 0.0 | 306 |
| 720 min Winter | 5.225 | 0.0 | 360 |
| 960 min Winter | 4.190 | 0.0 | 488 |
| 1440 min Winter | 3.067 | 0.0 | 728 |
| 2160 min Winter | 2.244 | 0.0 | 1100 |
| 2880 min Winter | 1.797 | 0.0 | 1440 |
| 4320 min Winter | 1.313 | 0.0 | 2172 |
| 5760 min Winter | 1.051 | 0.0 | 2776 |
| 7200 min Winter | 0.884 | 0.0 | 3616 |
| 8640 min Winter | 0.767 | 0.0 | 4280 |
| 10080 min Winter | 0.681 | 0.0 | 5136 |

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## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 10 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.400 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.044

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.044 |

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## Model Details

Storage is Online Cover Level (m) 14.700

## Cellular Storage Structure

Invert Level (m) 11.870 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 16.16000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 2.0 | 2.0 | 0.800 | 2.0 | 6.8 | 0.801 | 0.0 | 6.8 |

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## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 6 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 14.702 | 2.832 | 10.8 | 5.2 | FLOOD |
| 30 min Summer | 14.702 | 2.832 | 10.8 | 5.1 | FLOOD |
| 60 min Summer | 14.700 | 2.830 | 10.8 | 3.6 | FLOOD |
| 120 min Summer | 12.748 | 0.878 | 10.8 | 1.6 | O K |
| 180 min Summer | 12.506 | 0.636 | 8.6 | 1.2 | O K |
| 240 min Summer | 12.388 | 0.518 | 7.0 | 1.0 | O K |
| 360 min Summer | 12.254 | 0.384 | 5.2 | 0.7 | O K |
| 480 min Summer | 12.178 | 0.308 | 4.2 | 0.6 | O K |
| 600 min Summer | 12.130 | 0.260 | 3.5 | 0.5 | O K |
| 720 min Summer | 12.095 | 0.225 | 3.0 | 0.4 | O K |
| 960 min Summer | 12.049 | 0.179 | 2.4 | 0.3 | O K |
| 1440 min Summer | 11.999 | 0.129 | 1.7 | 0.2 | O K |
| 2160 min Summer | 11.963 | 0.093 | 1.3 | 0.2 | O K |
| 2880 min Summer | 11.944 | 0.074 | 1.0 | 0.1 | O K |
| 4320 min Summer | 11.923 | 0.053 | 0.7 | 0.1 | O K |
| 5760 min Summer | 11.912 | 0.042 | 0.6 | 0.1 | O K |
| 7200 min Summer | 11.906 | 0.036 | 0.5 | 0.1 | O K |
| 8640 min Summer | 11.900 | 0.030 | 0.4 | 0.1 | O K |
| 10080 min Summer | 11.897 | 0.027 | 0.4 | 0.1 | O K |
| 15 min Winter | 14.702 | 2.832 | 10.8 | 6.0 | FLOOD |
| 30 min Winter | 14.702 | 2.832 | 10.8 | 5.4 | FLOOD |
| 60 min Winter | 14.103 | 2.233 | 10.8 | 3.0 | O K |
| 120 min Winter | 12.516 | 0.646 | 8.7 | 1.2 | O K |
| 180 min Winter | 12.350 | 0.480 | 6.5 | 0.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.153 | 3.7 | 13 |
| 30 min Summer | 90.705 | 3.6 | 21 |
| 60 min Summer | 56.713 | 2.1 | 36 |
| 120 min Summer | 34.246 | 0.0 | 64 |
| 180 min Summer | 25.149 | 0.0 | 94 |
| 240 min Summer | 20.078 | 0.0 | 124 |
| 360 min Summer | 14.585 | 0.0 | 184 |
| 480 min Summer | 11.622 | 0.0 | 244 |
| 600 min Summer | 9.738 | 0.0 | 306 |
| 720 min Summer | 8.424 | 0.0 | 366 |
| 960 min Summer | 6.697 | 0.0 | 484 |
| 1440 min Summer | 4.839 | 0.0 | 732 |
| 2160 min Summer | 3.490 | 0.0 | 1088 |
| 2880 min Summer | 2.766 | 0.0 | 1436 |
| 4320 min Summer | 1.989 | 0.0 | 2140 |
| 5760 min Summer | 1.573 | 0.0 | 2840 |
| 7200 min Summer | 1.311 | 0.0 | 3656 |
| 8640 min Summer | 1.129 | 0.0 | 4272 |
| 10080 min Summer | 0.994 | 0.0 | 4976 |
| 15 min Winter | 138.153 | 4.5 | 13 |
| 30 min Winter | 90.705 | 3.9 | 22 |
| 60 min Winter | 56.713 | 0.0 | 38 |
| 120 min Winter | 34.246 | 0.0 | 64 |
| 180 min Winter | 25.149 | 0.0 | 94 |

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## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 240 min Winter | 12.255 | 0.385 | 5.2 | 0.7 | O K |
| 360 min Winter | 12.150 | 0.280 | 3.8 | 0.5 | O K |
| 480 min Winter | 12.094 | 0.224 | 3.0 | 0.4 | O K |
| 600 min Winter | 12.058 | 0.188 | 2.5 | 0.4 | O K |
| 720 min Winter | 12.033 | 0.163 | 2.2 | 0.3 | O K |
| 960 min Winter | 11.999 | 0.129 | 1.7 | 0.2 | O K |
| 1440 min Winter | 11.963 | 0.093 | 1.3 | 0.2 | O K |
| 2160 min Winter | 11.938 | 0.068 | 0.9 | 0.1 | O K |
| 2880 min Winter | 11.924 | 0.054 | 0.7 | 0.1 | O K |
| 4320 min Winter | 11.909 | 0.039 | 0.5 | 0.1 | O K |
| 5760 min Winter | 11.901 | 0.031 | 0.4 | 0.1 | O K |
| 7200 min Winter | 11.896 | 0.026 | 0.3 | 0.0 | O K |
| 8640 min Winter | 11.892 | 0.022 | 0.3 | 0.0 | O K |
| 10080 min Winter | 11.890 | 0.020 | 0.3 | 0.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 240 min Winter | 20.078 | 0.0 | 124 |
| 360 min Winter | 14.585 | 0.0 | 184 |
| 480 min Winter | 11.622 | 0.0 | 244 |
| 600 min Winter | 9.738 | 0.0 | 306 |
| 720 min Winter | 8.424 | 0.0 | 364 |
| 960 min Winter | 6.697 | 0.0 | 488 |
| 1440 min Winter | 4.839 | 0.0 | 734 |
| 2160 min Winter | 3.490 | 0.0 | 1080 |
| 2880 min Winter | 2.766 | 0.0 | 1448 |
| 4320 min Winter | 1.989 | 0.0 | 2156 |
| 5760 min Winter | 1.573 | 0.0 | 2848 |
| 7200 min Winter | 1.311 | 0.0 | 3576 |
| 8640 min Winter | 1.129 | 0.0 | 4336 |
| 10080 min Winter | 0.994 | 0.0 | 5128 |

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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) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.400 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.044

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.044 |

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## Model Details

Storage is Online Cover Level (m) 14.700

## Cellular Storage Structure

Invert Level (m) 11.870 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 16.16000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 2.0 | 2.0 | 0.800 | 2.0 | 6.8 | 0.801 | 0.0 | 6.8 |

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