

Our Ref: 6/2019/1788/COND

28/11/2019

Dear Thames Water

Re: FORMER SHREDDED WHEAT FACTORY, BRIDGE ROAD, WELWYN GARDEN CITY, HERTFORDSHIRE, AL8 6UN

In response to your letter from the Development Planning Department (Ref: 26322) regarding the additional information requested in relation to the site noted above, please find the below summary of calculations for the Shredded Wheat proposed development. The output from the MicroDrainage Model has been appended to this letter.

Phase 1

Attenuation Volume: 635m³

| Return Period | Peak Discharge Rate (l/s) | Volume (m ³) |
|---------------|---------------------------|--------------------------|
| 1 | 5.9 | 99.1 |
| 10 | 6.1 | 146.7 |
| 30 | 6.1 | 147.1 |
| 100+40%CC | 6.1 | 229.0 |

Phase 2

Attenuation Volume: 486m³

| Return Period | Peak Discharge Rate (l/s) | Volume (m ³) |
|---------------|---------------------------|--------------------------|
| 1 | 5.0 | 13.8 |
| 10 | 5.1 | 28.3 |
| 30 | 5.1 | 56.8 |
| 100+40%CC | 5.8 | 144.0 |

Phase 3

Attenuation Volume: 965m³


| Return Period | Peak Discharge Rate (l/s) | Volume (m ³) |
|---------------|---------------------------|--------------------------|
| 1 | 6.2 | 18.7 |
| 10 | 6.2 | 152.9 |
| 30 | 6.2 | 228.5 |
| 100+40%CC | 7.4 | 187.6 |



Yours faithfully,

Merlin Davis
Infrastructure Engineer
For and on behalf of
Curtins Consulting Ltd

Enclosed: Microdrainage Calculations

| | | |
|---|--|---|
| Curtins Consulting Engineers | | Page 1 |
| 26-29 Saint Cross St London EC1N 8UH | 066571 - Shredded Wheat |  |
| Date 14/10/2019 File SW NETWORK 2019.10.14.MDX | Designed by Merlin Davis Checked by | |
| Micro Drainage | Network 2019.1 | |

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm 1

Pipe Sizes BR Manhole Sizes STANDARD








FSR Rainfall Model - England and Wales

| | | | |
|--------------------------------------|--------|---------------------------------------|--------|
| Return Period (years) | 100 | PIMP (%) | 100 |
| M5-60 (mm) | 20.000 | Add Flow / Climate Change (%) | 0 |
| Ratio R | 0.434 | Minimum Backdrop Height (m) | 19.000 |
| Maximum Rainfall (mm/hr) | 50 | Maximum Backdrop Height (m) | 20.000 |
| Maximum Time of Concentration (mins) | 30 | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha) | 0.000 | Min Vel for Auto Design only (m/s) | 1.00 |
| Volumetric Runoff Coeff. | 0.750 | Min Slope for Optimisation (1:X) | 250 |

Designed with Level Soffits

Network Design Table for Storm 1

- Indicates pipe length does not match coordinates
 <- 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 |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---|
| 1.000 | 21.282 | 0.142 | 149.9 | 0.055 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit |  |
| 1.001 | 39.398 | 0.145 | 271.7 | 0.042 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit |  |
| 2.000 | 44.851 | 0.345 | 130.0 | 0.047 | 5.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 1.002 | 10.623 | 0.071 | 150.0 | 0.012 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit |  |
| 1.003 | 19.943 | 0.130 | 153.4 | 0.037 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit |  |
| 3.000 | 29.723 | 0.200 | 148.6 | 0.066 | 5.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 3.001 | 6.505 | 0.055 | 118.3 | 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) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 50.00 | 5.43 | 84.350 | 0.055 | 0.0 | 0.0 | 0.0 | 0.82 | 14.5 | 7.5 |
| 1.001 | 50.00 | 6.13 | 83.700 | 0.098 | 0.0 | 0.0 | 0.0 | 0.95 | 67.1 | 13.2 |
| 2.000 | 50.00 | 5.65 | 83.900 | 0.047 | 0.0 | 0.0 | 0.0 | 1.15 | 45.5 | 6.4 |
| 1.002 | 50.00 | 6.26 | 83.480 | 0.157 | 0.0 | 0.0 | 0.0 | 1.28 | 90.6 | 21.2 |
| 1.003 | 50.00 | 6.53 | 83.400 | 0.194 | 0.0 | 0.0 | 0.0 | 1.27 | 89.6 | 26.3 |
| 3.000 | 50.00 | 5.46 | 83.600 | 0.066 | 0.0 | 0.0 | 0.0 | 1.07 | 42.6 | 8.9 |
| 3.001 | 50.00 | 5.55 | 83.400 | 0.066 | 0.0 | 0.0 | 0.0 | 1.20 | 47.8 | 8.9 |

Network Design Table for Storm 1

| 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 |
|-------|------------|----------|-------------|-------------|-------------|-----------------|--------|----------|----------|--------------|-------------|
| 1.004 | 24.251 | 0.160 | 151.6 | 0.054 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 1.005 | 47.066 | 0.320 | 147.1 | 0.038 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 4.000 | 17.414 | 0.095 | 183.3 | 0.011 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 5.000 | 13.251 | 0.095 | 139.5 | 0.012 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 4.001 | 21.334 | 0.140 | 152.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | 🔒 |
| 1.006 | 24.745 | 0.170 | 145.6 | 0.030 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 1.007 | 6.401 | 0.028 | 225.0 | 0.008 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 6.000 | 32.240 | 0.215 | 150.0 | 0.057 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 6.001 | 43.000# | 0.213 | 201.5 | 0.167 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | 🔒 |
| 1.008 | 31.447 | 0.210 | 149.7 | 0.042 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 1.009 | 7.873 | 0.930 | 8.5 | 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) |
|-------|--------------|-------------|-----------|---------------|-------------------|------------|----------------|-----------|-----------|------------|
| 1.004 | 50.00 | 6.84 | 83.270 | 0.314 | 0.0 | 0.0 | 0.0 | 1.27 | 90.1 | 42.5 |
| 1.005 | 50.00 | 7.45 | 83.110 | 0.352 | 0.0 | 0.0 | 0.0 | 1.29 | 91.5 | 47.6 |
| 4.000 | 50.00 | 5.39 | 84.350 | 0.011 | 0.0 | 0.0 | 0.0 | 0.74 | 13.1 | 1.5 |
| 5.000 | 50.00 | 5.26 | 84.350 | 0.012 | 0.0 | 0.0 | 0.0 | 0.85 | 15.0 | 1.7 |
| 4.001 | 50.00 | 5.73 | 84.180 | 0.024 | 0.0 | 0.0 | 0.0 | 1.06 | 42.0 | 3.2 |
| 1.006 | 50.00 | 7.77 | 82.170 | 0.405 | 0.0 | 0.0 | 0.0 | 1.30 | 92.0 | 54.9 |
| 1.007 | 50.00 | 7.87 | 82.000 | 0.413 | 0.0 | 0.0 | 0.0 | 1.04 | 73.8 | 55.9 |
| 6.000 | 50.00 | 5.66 | 83.410 | 0.057 | 0.0 | 0.0 | 0.0 | 0.82 | 14.5 | 7.7 |
| 6.001 | 50.00 | 6.44 | 82.260 | 0.224 | 0.0 | 0.0 | 0.0 | 0.92 | 36.5 | 30.3 |
| 1.008 | 50.00 | 8.28 | 81.960 | 0.678 | 0.0 | 0.0 | 0.0 | 1.28 | 90.7< | 91.8 |
| 1.009 | 50.00 | 8.31 | 81.750 | 0.678 | 0.0 | 0.0 | 0.0 | 3.48 | 61.6< | 91.8 |

Manhole Schedules for Storm 1


| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | Pipe Out | | | Pipes In | | | Backdrop (mm) |
|-----------|-----------|--------------|---------------|-------------------|----------|------------------|---------------|----------|------------------|---------------|---------------|
| | | | | | PN | Invert Level (m) | Diameter (mm) | PN | Invert Level (m) | Diameter (mm) | |
| RE | 85.000 | 0.650 | Junction | | 1.000 | 84.350 | 150 | | | | |
| SW01 | 84.800 | 1.100 | Open Manhole | 1200 | 1.001 | 83.700 | 300 | 1.000 | 84.208 | 150 | 358 |
| RE | 85.000 | 1.100 | Junction | | 2.000 | 83.900 | 225 | | | | |
| SW02 | 84.800 | 1.320 | Open Manhole | 1200 | 1.002 | 83.480 | 300 | 1.001 | 83.555 | 300 | 75 |
| | | | | | | | | 2.000 | 83.555 | 225 | |
| SW03 | 84.800 | 1.400 | Open Manhole | 1200 | 1.003 | 83.400 | 300 | 1.002 | 83.409 | 300 | 9 |
| RE | 84.800 | 1.200 | Junction | | 3.000 | 83.600 | 225 | | | | |
| SW39 | 85.000 | 1.600 | Open Manhole | 1200 | 3.001 | 83.400 | 225 | 3.000 | 83.400 | 225 | |
| Junction | 84.800 | 1.530 | Junction | | 1.004 | 83.270 | 300 | 1.003 | 83.270 | 300 | |
| | | | | | | | | 3.001 | 83.345 | 225 | |
| SW04 | 84.800 | 1.690 | Open Manhole | 1200 | 1.005 | 83.110 | 300 | 1.004 | 83.110 | 300 | |
| RE | 85.000 | 0.650 | Junction | | 4.000 | 84.350 | 150 | | | | |
| RE | 85.000 | 0.650 | Junction | | 5.000 | 84.350 | 150 | | | | |
| SW10 | 84.800 | 0.620 | Open Manhole | 1200 | 4.001 | 84.180 | 225 | 4.000 | 84.255 | 150 | |
| | | | | | | | | 5.000 | 84.255 | 150 | |
| SW05 | 84.800 | 2.630 | Open Manhole | 1200 | 1.006 | 82.170 | 300 | 1.005 | 82.790 | 300 | 620 |
| | | | | | | | | 4.001 | 84.040 | 225 | 1795 |
| SW06 | 84.800 | 2.800 | Open Manhole | 1200 | 1.007 | 82.000 | 300 | 1.006 | 82.000 | 300 | |
| RE | 84.760 | 1.350 | Junction | | 6.000 | 83.410 | 150 | | | | |
| SW09 | 84.800 | 2.540 | Open Manhole | 1200 | 6.001 | 82.260 | 225 | 6.000 | 83.195 | 150 | 860 |
| SW07 | 84.800 | 2.840 | Open Manhole | 1200 | 1.008 | 81.960 | 300 | 1.007 | 81.972 | 300 | 12 |
| | | | | | | | | 6.001 | 82.047 | 225 | 12 |
| SW08 | 84.400 | 2.650 | Open Manhole | 1200 | 1.009 | 81.750 | 150 | 1.008 | 81.750 | 300 | |
| Outfall 1 | 84.290 | 3.470 | Open Manhole | 0 | | OUTFALL | | 1.009 | 80.820 | 150 | |

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|----------------|
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|----------------|

| | | | | | | |
|----|------------|------------|--|--|----------|--|
| RE | 524050.202 | 212713.507 | | | No Entry | |
|----|------------|------------|--|--|----------|--|

| | | | | | | |
|------|------------|------------|------------|------------|----------|---|
| SW01 | 524044.336 | 212693.049 | 524044.336 | 212693.049 | Required |  |
|------|------------|------------|------------|------------|----------|---|

| | | | | | | |
|----|------------|------------|--|--|----------|---|
| RE | 524021.018 | 212612.091 | | | No Entry |  |
|----|------------|------------|--|--|----------|---|

| | | | | | | |
|------|------------|------------|------------|------------|----------|---|
| SW02 | 524033.476 | 212655.177 | 524033.476 | 212655.177 | Required |  |
|------|------------|------------|------------|------------|----------|---|

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Manhole Schedules for Storm 1

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|-----------|---------------------|----------------------|--------------------------|---------------------------|----------------|----------------|
| SW03 | 524043.652 | 212652.129 | 524043.652 | 212652.129 | Required | |
| RE | 524072.428 | 212681.550 | | | No Entry | |
| SW39 | 524064.185 | 212652.993 | 524064.185 | 212652.993 | Required | |
| Junction | 524062.822 | 212646.632 | | | No Entry | |
| SW04 | 524086.134 | 212639.948 | 524086.134 | 212639.948 | Required | |
| RE | 524118.105 | 212662.956 | | | No Entry | |
| RE | 524108.359 | 212643.583 | | | No Entry | |
| SW10 | 524121.413 | 212645.859 | 524121.413 | 212645.859 | Required | |
| SW05 | 524131.384 | 212626.999 | 524131.384 | 212626.999 | Required | |
| SW06 | 524146.185 | 212646.829 | 524146.185 | 212646.829 | Required | |
| RE | 524195.991 | 212680.381 | | | No Entry | |
| SW09 | 524164.755 | 212688.366 | 524164.755 | 212688.366 | Required | |
| SW07 | 524152.338 | 212645.064 | 524152.338 | 212645.064 | Required | |
| SW08 | 524182.567 | 212636.396 | 524182.567 | 212636.396 | Required | |
| Outfall 1 | 524190.149 | 212634.277 | | | No Entry | |

| | | |
|---|--|---|
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Free Flowing Outfall Details for Storm 1

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|------------------------|-----------------|-----------------|-----------------|------------------------|-------------|-----------|
| 1.009 | Outfall 1 | 84.290 | 80.820 | 80.820 | 0 | 0 |

Simulation Criteria for Storm 1

| | | | |
|---------------------------------|-------|--|-------|
| Volumetric Runoff Coeff | 0.750 | Additional Flow - % of Total Flow | 0.000 |
| Areal Reduction Factor | 1.000 | MADD Factor * 10m ³ /ha Storage | 2.000 |
| Hot Start (mins) | 0 | Inlet Coefficient | 0.800 |
| Hot Start Level (mm) | 0 | Flow per Person per Day (l/per/day) | 0.000 |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins) | 60 |
| Foul Sewage per hectare (l/s) | 0.000 | Output Interval (mins) | 1 |
| Number of Input Hydrographs | 0 | Number of Offline Controls | 0 |
| Number of Online Controls | 1 | Number of Storage Structures | 11 |
| | | Number of Time/Area Diagrams | 0 |
| | | Number of Real Time Controls | 0 |

Synthetic Rainfall Details

| | | | |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model | FSR | Profile Type | Summer |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Storm Duration (mins) | 30 |
| Ratio R | 0.434 | | |

Online Controls for Storm 1

Hydro-Brake® Optimum Manhole: SW08, DS/PN: 1.009, Volume (m³): 5.1

| | |
|-----------------------------------|----------------------------|
| Unit Reference | MD-SHE-0108-6900-2000-6900 |
| Design Head (m) | 2.000 |
| Design Flow (l/s) | 6.9 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 108 |
| Invert Level (m) | 81.750 |
| Minimum Outlet Pipe Diameter (mm) | 150 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|---------------------------|----------|------------|
| Design Point (Calculated) | 2.000 | 6.9 | Kick-Flo® | 0.966 | 4.9 |
| Flush-Flo™ | 0.471 | 6.2 | Mean Flow over Head Range | - | 5.7 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100 | 3.7 | 0.800 | 5.8 | 2.000 | 6.9 | 4.000 | 9.6 | 7.000 | 12.5 |
| 0.200 | 5.5 | 1.000 | 5.0 | 2.200 | 7.2 | 4.500 | 10.1 | 7.500 | 12.9 |
| 0.300 | 6.0 | 1.200 | 5.4 | 2.400 | 7.5 | 5.000 | 10.6 | 8.000 | 13.3 |
| 0.400 | 6.2 | 1.400 | 5.8 | 2.600 | 7.8 | 5.500 | 11.1 | 8.500 | 13.7 |
| 0.500 | 6.2 | 1.600 | 6.2 | 3.000 | 8.3 | 6.000 | 11.6 | 9.000 | 14.1 |
| 0.600 | 6.1 | 1.800 | 6.6 | 3.500 | 9.0 | 6.500 | 12.0 | 9.500 | 14.4 |

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Storage Structures for Storm 1

Porous Car Park Manhole: RE, DS/PN: 1.000

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 5.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 46.0 |
| Max Percolation (l/s) | 63.9 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 84.350 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: SW01, DS/PN: 1.001

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 5.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 42.0 |
| Max Percolation (l/s) | 58.3 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 83.700 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: RE, DS/PN: 2.000

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 5.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 40.0 |
| Max Percolation (l/s) | 55.6 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 83.900 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: SW03, DS/PN: 1.003

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 5.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 26.0 |
| Max Percolation (l/s) | 36.1 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 83.400 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: SW04, DS/PN: 1.005

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 5.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 45.0 |
| Max Percolation (l/s) | 62.5 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 83.110 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: RE, DS/PN: 4.000

| | | | |
|--------------------------------------|---------|------------------|--------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.30 |
| Membrane Percolation (mm/hr) | 1000 | Invert Level (m) | 84.350 |
| Max Percolation (l/s) | 8.3 | Width (m) | 5.0 |
| Safety Factor | 2.0 | Length (m) | 6.0 |

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Porous Car Park Manhole: RE, DS/PN: 4.000

Slope (1:X) 0.0 Evaporation (mm/day) 3
Depression Storage (mm) 5 Cap Volume Depth (m) 0.450

Cellular Storage Manhole: SW05, DS/PN: 1.006

Invert Level (m) 82.170 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000 | 110.0 | 0.0 | 1.600 | 110.0 | 0.0 | 1.601 | 0.0 | 0.0 |

Porous Car Park Manhole: SW06, DS/PN: 1.007

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 3.7
Membrane Percolation (mm/hr) 1000 Length (m) 30.0
Max Percolation (l/s) 30.8 Slope (1:X) 0.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 82.000 Cap Volume Depth (m) 0.450

Porous Car Park Manhole: RE, DS/PN: 6.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 5.0
Membrane Percolation (mm/hr) 1000 Length (m) 15.0
Max Percolation (l/s) 20.8 Slope (1:X) 0.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 83.410 Cap Volume Depth (m) 0.450

Complex Manhole: SW07, DS/PN: 1.008


Cellular Storage

Invert Level (m) 81.960 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000 | 112.0 | 0.0 | 1.600 | 112.0 | 0.0 | 1.601 | 0.0 | 0.0 |

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 7.0
Membrane Percolation (mm/hr) 1000 Length (m) 37.5
Max Percolation (l/s) 72.9 Slope (1:X) 0.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 81.960 Cap Volume Depth (m) 0.450

| | | |
|---|--|---|
| Curtins Consulting Engineers | | Page 9 |
| 26-29 Saint Cross St London EC1N 8UH | 066571 - Shredded Wheat |  |
| Date 14/10/2019 File SW NETWORK 2019.10.14.MDX | Designed by Merlin Davis Checked by | |
| Micro Drainage | Network 2019.1 | |

Tank or Pond Manhole: SW08, DS/PN: 1.009

Invert Level (m) 83.775

| Depth (m) | Area (m ²) | Depth (m) | Area (m ²) |
|-----------|------------------------|-----------|------------------------|
| 0.000 | 75.0 | 0.625 | 75.0 |

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 1

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 (1/per/day) 0.000
 Foul Sewage per hectare (1/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 11 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 0, 0, 40

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Surcharged | |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|------------------|-----------|
| | | | | | | | | | Level (m) | Depth (m) |
| 1.000 | RE | 60 Winter | 1 | +0% | | | | | 84.387 | -0.113 |
| 1.001 | SW01 | 60 Winter | 1 | +0% | | | | | 83.741 | -0.259 |
| 2.000 | RE | 60 Winter | 1 | +0% | | | | | 83.931 | -0.194 |
| 1.002 | SW02 | 60 Winter | 1 | +0% | | | | | 83.535 | -0.245 |
| 1.003 | SW03 | 60 Winter | 1 | +0% | | | | | 83.456 | -0.244 |
| 3.000 | RE | 15 Winter | 1 | +0% | | | | | 83.672 | -0.153 |
| 3.001 | SW39 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 83.482 | -0.143 |
| 1.004 | Junction | 15 Winter | 1 | +0% | | | | | 83.357 | -0.213 |
| 1.005 | SW04 | 30 Winter | 1 | +0% | 100/30 Winter | | | | 83.192 | -0.218 |
| 4.000 | RE | 15 Winter | 1 | +0% | | | | | 84.378 | -0.122 |
| 5.000 | RE | 15 Winter | 1 | +0% | | | | | 84.384 | -0.116 |
| 4.001 | SW10 | 15 Winter | 1 | +0% | | | | | 84.217 | -0.188 |
| 1.006 | SW05 | 60 Winter | 1 | +0% | 30/120 Winter | | | | 82.251 | -0.219 |
| 1.007 | SW06 | 240 Winter | 1 | +0% | 10/60 Winter | | | | 82.150 | -0.150 |
| 6.000 | RE | 15 Winter | 1 | +0% | 100/15 Summer | | | | 83.475 | -0.085 |
| 6.001 | SW09 | 15 Winter | 1 | +0% | 10/15 Summer | | | | 82.399 | -0.086 |
| 1.008 | SW07 | 240 Winter | 1 | +0% | 10/30 Winter | | | | 82.148 | -0.112 |
| 1.009 | SW08 | 240 Winter | 1 | +0% | 1/15 Summer | | | | 82.141 | 0.241 |

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 1

| PN | US/MH Name | Flooded | | Pipe | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|--------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | | |
| 1.000 | RE | 0.000 | 0.14 | | 2.0 | OK* |
| 1.001 | SW01 | 0.000 | 0.05 | | 2.9 | OK |
| 2.000 | RE | 0.000 | 0.05 | | 2.1 | OK* |
| 1.002 | SW02 | 0.000 | 0.08 | | 5.1 | OK |
| 1.003 | SW03 | 0.000 | 0.08 | | 6.2 | OK |
| 3.000 | RE | 0.000 | 0.22 | | 9.2 | OK* |
| 3.001 | SW39 | 0.000 | 0.28 | | 9.3 | OK |
| 1.004 | Junction | 0.000 | 0.19 | | 16.7 | OK* |
| 1.005 | SW04 | 0.000 | 0.17 | | 14.5 | OK |
| 4.000 | RE | 0.000 | 0.08 | | 1.0 | OK* |
| 5.000 | RE | 0.000 | 0.12 | | 1.7 | OK* |
| 4.001 | SW10 | 0.000 | 0.07 | | 2.5 | OK |
| 1.006 | SW05 | 0.000 | 0.16 | | 13.4 | OK |
| 1.007 | SW06 | 0.000 | 0.16 | | 8.4 | OK |
| 6.000 | RE | 0.000 | 0.39 | | 5.6 | OK* |
| 6.001 | SW09 | 0.000 | 0.68 | | 23.8 | OK |
| 1.008 | SW07 | 0.000 | 0.09 | | 7.1 | OK |
| 1.009 | SW08 | 0.000 | 0.11 | | 5.9 | SURCHARGED |

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 1

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 (1/per/day) 0.000
 Foul Sewage per hectare (1/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 11 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 0, 0, 40

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Surcharged | |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|------------------|-----------|
| | | | | | | | | | Level (m) | Depth (m) |
| 1.000 | RE | 30 Winter | 10 | +0% | | | | | 84.414 | -0.086 |
| 1.001 | SW01 | 60 Winter | 10 | +0% | | | | | 83.771 | -0.229 |
| 2.000 | RE | 30 Winter | 10 | +0% | | | | | 83.955 | -0.170 |
| 1.002 | SW02 | 30 Winter | 10 | +0% | | | | | 83.574 | -0.206 |
| 1.003 | SW03 | 30 Winter | 10 | +0% | | | | | 83.494 | -0.206 |
| 3.000 | RE | 15 Winter | 10 | +0% | | | | | 83.703 | -0.122 |
| 3.001 | SW39 | 15 Winter | 10 | +0% | 100/15 Summer | | | | 83.519 | -0.106 |
| 1.004 | Junction | 15 Winter | 10 | +0% | | | | | 83.412 | -0.158 |
| 1.005 | SW04 | 15 Winter | 10 | +0% | 100/30 Winter | | | | 83.248 | -0.162 |
| 4.000 | RE | 15 Winter | 10 | +0% | | | | | 84.395 | -0.105 |
| 5.000 | RE | 15 Winter | 10 | +0% | | | | | 84.398 | -0.102 |
| 4.001 | SW10 | 15 Winter | 10 | +0% | | | | | 84.238 | -0.167 |
| 1.006 | SW05 | 240 Winter | 10 | +0% | 30/120 Winter | | | | 82.375 | -0.095 |
| 1.007 | SW06 | 240 Winter | 10 | +0% | 10/60 Winter | | | | 82.371 | 0.071 |
| 6.000 | RE | 15 Winter | 10 | +0% | 100/15 Summer | | | | 83.517 | -0.043 |
| 6.001 | SW09 | 15 Winter | 10 | +0% | 10/15 Summer | | | | 82.809 | 0.324 |
| 1.008 | SW07 | 240 Winter | 10 | +0% | 10/30 Winter | | | | 82.371 | 0.111 |
| 1.009 | SW08 | 240 Winter | 10 | +0% | 1/15 Summer | | | | 82.518 | 0.618 |

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 1

| PN | US/MH Name | Flooded | | Pipe | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|--------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | | |
| 1.000 | RE | 0.000 | 0.38 | | 5.6 | OK* |
| 1.001 | SW01 | 0.000 | 0.13 | | 8.1 | OK |
| 2.000 | RE | 0.000 | 0.13 | | 6.1 | OK* |
| 1.002 | SW02 | 0.000 | 0.21 | | 14.3 | OK |
| 1.003 | SW03 | 0.000 | 0.22 | | 17.0 | OK |
| 3.000 | RE | 0.000 | 0.42 | | 17.9 | OK* |
| 3.001 | SW39 | 0.000 | 0.55 | | 18.0 | OK |
| 1.004 | Junction | 0.000 | 0.44 | | 39.9 | OK* |
| 1.005 | SW04 | 0.000 | 0.43 | | 37.1 | OK |
| 4.000 | RE | 0.000 | 0.20 | | 2.6 | OK* |
| 5.000 | RE | 0.000 | 0.23 | | 3.4 | OK* |
| 4.001 | SW10 | 0.000 | 0.15 | | 5.7 | OK |
| 1.006 | SW05 | 0.000 | 0.22 | | 17.9 | OK |
| 1.007 | SW06 | 0.000 | 0.27 | | 14.1 | SURCHARGED |
| 6.000 | RE | 0.000 | 0.85 | | 12.2 | OK* |
| 6.001 | SW09 | 0.000 | 1.57 | | 54.4 | SURCHARGED |
| 1.008 | SW07 | 0.000 | 0.13 | | 10.6 | SURCHARGED |
| 1.009 | SW08 | 0.000 | 0.11 | | 6.1 | SURCHARGED |

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 1

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 (1/per/day) 0.000
 Foul Sewage per hectare (1/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 11 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 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) |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 30 Winter | 30 | +0% | | | | | 84.430 | -0.070 |
| 1.001 | SW01 | 30 Winter | 30 | +0% | | | | | 83.787 | -0.213 |
| 2.000 | RE | 30 Winter | 30 | +0% | | | | | 83.966 | -0.159 |
| 1.002 | SW02 | 30 Winter | 30 | +0% | | | | | 83.595 | -0.185 |
| 1.003 | SW03 | 30 Winter | 30 | +0% | | | | | 83.516 | -0.184 |
| 3.000 | RE | 15 Winter | 30 | +0% | | | | | 83.719 | -0.106 |
| 3.001 | SW39 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 83.538 | -0.087 |
| 1.004 | Junction | 15 Winter | 30 | +0% | | | | | 83.439 | -0.131 |
| 1.005 | SW04 | 15 Winter | 30 | +0% | 100/30 Winter | | | | 83.277 | -0.133 |
| 4.000 | RE | 15 Winter | 30 | +0% | | | | | 84.403 | -0.097 |
| 5.000 | RE | 15 Winter | 30 | +0% | | | | | 84.405 | -0.095 |
| 4.001 | SW10 | 15 Winter | 30 | +0% | | | | | 84.248 | -0.157 |
| 1.006 | SW05 | 240 Winter | 30 | +0% | 30/120 Winter | | | | 82.573 | 0.103 |
| 1.007 | SW06 | 240 Winter | 30 | +0% | 10/60 Winter | | | | 82.573 | 0.273 |
| 6.000 | RE | 15 Winter | 30 | +0% | 100/15 Summer | | | | 83.544 | -0.016 |
| 6.001 | SW09 | 15 Winter | 30 | +0% | 10/15 Summer | | | | 83.128 | 0.643 |
| 1.008 | SW07 | 240 Winter | 30 | +0% | 10/30 Winter | | | | 82.571 | 0.311 |
| 1.009 | SW08 | 240 Winter | 30 | +0% | 1/15 Summer | | | | 82.772 | 0.872 |

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 1

| PN | US/MH Name | Flooded | | Pipe | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|--------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | | |
| 1.000 | RE | 0.000 | 0.55 | | 8.0 | OK* |
| 1.001 | SW01 | 0.000 | 0.19 | | 11.6 | OK |
| 2.000 | RE | 0.000 | 0.19 | | 8.5 | OK* |
| 1.002 | SW02 | 0.000 | 0.31 | | 20.9 | OK |
| 1.003 | SW03 | 0.000 | 0.32 | | 24.7 | OK |
| 3.000 | RE | 0.000 | 0.53 | | 22.7 | OK* |
| 3.001 | SW39 | 0.000 | 0.69 | | 22.9 | OK |
| 1.004 | Junction | 0.000 | 0.59 | | 53.3 | OK* |
| 1.005 | SW04 | 0.000 | 0.60 | | 51.2 | OK |
| 4.000 | RE | 0.000 | 0.27 | | 3.5 | OK* |
| 5.000 | RE | 0.000 | 0.29 | | 4.3 | OK* |
| 4.001 | SW10 | 0.000 | 0.19 | | 7.4 | OK |
| 1.006 | SW05 | 0.000 | 0.25 | | 20.7 | SURCHARGED |
| 1.007 | SW06 | 0.000 | 0.30 | | 15.7 | SURCHARGED |
| 6.000 | RE | 0.000 | 1.00 | | 14.5 | OK* |
| 6.001 | SW09 | 0.000 | 1.97 | | 68.4 | SURCHARGED |
| 1.008 | SW07 | 0.000 | 0.14 | | 11.3 | SURCHARGED |
| 1.009 | SW08 | 0.000 | 0.11 | | 6.1 | SURCHARGED |

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 1

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 (1/per/day) 0.000
 Foul Sewage per hectare (1/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 11 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 0, 0, 40

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|-------|------------|------------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 30 Winter | 100 | +40% | | | | | 84.488 | -0.012 |
| 1.001 | SW01 | 30 Winter | 100 | +40% | | | | | 83.836 | -0.164 |
| 2.000 | RE | 15 Winter | 100 | +40% | | | | | 84.004 | -0.121 |
| 1.002 | SW02 | 30 Winter | 100 | +40% | | | | | 83.669 | -0.111 |
| 1.003 | SW03 | 30 Winter | 100 | +40% | | | | | 83.636 | -0.064 |
| 3.000 | RE | 15 Winter | 100 | +40% | | | | | 83.825 | 0.000 |
| 3.001 | SW39 | 15 Winter | 100 | +40% | 100/15 Summer | | | | 83.650 | 0.025 |
| 1.004 | Junction | 30 Winter | 100 | +40% | | | | | 83.570 | 0.000 |
| 1.005 | SW04 | 30 Winter | 100 | +40% | 100/30 Winter | | | | 83.418 | 0.008 |
| 4.000 | RE | 15 Winter | 100 | +40% | | | | | 84.427 | -0.073 |
| 5.000 | RE | 15 Winter | 100 | +40% | | | | | 84.428 | -0.072 |
| 4.001 | SW10 | 15 Winter | 100 | +40% | | | | | 84.275 | -0.130 |
| 1.006 | SW05 | 360 Winter | 100 | +40% | 30/120 Winter | | | | 83.370 | 0.900 |
| 1.007 | SW06 | 360 Winter | 100 | +40% | 10/60 Winter | | | | 83.370 | 1.070 |
| 6.000 | RE | 15 Winter | 100 | +40% | 100/15 Summer | | | | 83.860 | 0.300 |
| 6.001 | SW09 | 15 Winter | 100 | +40% | 10/15 Summer | | | | 84.014 | 1.529 |
| 1.008 | SW07 | 360 Winter | 100 | +40% | 10/30 Winter | | | | 83.368 | 1.108 |
| 1.009 | SW08 | 360 Winter | 100 | +40% | 1/15 Summer | | | | 83.535 | 1.635 |

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 1

| PN | US/MH Name | Flooded | | Pipe | | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|---------------|-------------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | Flow (l/s) | | |
| 1.000 | RE | 0.000 | 1.00 | | 14.5 | OK* | |
| 1.001 | SW01 | 0.000 | 0.42 | | 26.2 | OK | |
| 2.000 | RE | 0.000 | 0.43 | | 19.4 | OK* | |
| 1.002 | SW02 | 0.000 | 0.71 | | 47.7 | OK | |
| 1.003 | SW03 | 0.000 | 0.74 | | 57.3 | OK | |
| 3.000 | RE | 0.000 | 0.96 | | 40.7 | SURCHARGED* | |
| 3.001 | SW39 | 0.000 | 1.23 | | 40.5 | SURCHARGED | |
| 1.004 | Junction | 0.000 | 1.02 | | 91.7 | SURCHARGED* | |
| 1.005 | SW04 | 0.000 | 1.03 | | 88.8 | SURCHARGED | |
| 4.000 | RE | 0.000 | 0.51 | | 6.6 | OK* | |
| 5.000 | RE | 0.000 | 0.52 | | 7.8 | OK* | |
| 4.001 | SW10 | 0.000 | 0.37 | | 14.2 | OK | |
| 1.006 | SW05 | 0.000 | 0.20 | | 16.7 | SURCHARGED | |
| 1.007 | SW06 | 0.000 | 0.26 | | 13.6 | SURCHARGED | |
| 6.000 | RE | 0.000 | 1.75 | | 25.4 | SURCHARGED* | |
| 6.001 | SW09 | 0.000 | 2.82 | | 97.9 | SURCHARGED | |
| 1.008 | SW07 | 0.000 | 0.14 | | 11.2 | SURCHARGED | |
| 1.009 | SW08 | 0.000 | 0.12 | | 6.1 | SURCHARGED | |

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm 2

Pipe Sizes BR Manhole Sizes STANDARD









FSR Rainfall Model - England and Wales

| | | | |
|--------------------------------------|--------|---------------------------------------|--------|
| Return Period (years) | 100 | PIMP (%) | 100 |
| M5-60 (mm) | 20.000 | Add Flow / Climate Change (%) | 0 |
| Ratio R | 0.434 | Minimum Backdrop Height (m) | 19.000 |
| Maximum Rainfall (mm/hr) | 50 | Maximum Backdrop Height (m) | 20.000 |
| Maximum Time of Concentration (mins) | 30 | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha) | 0.000 | Min Vel for Auto Design only (m/s) | 1.00 |
| Volumetric Runoff Coeff. | 0.750 | Min Slope for Optimisation (1:X) | 250 |

Designed with Level Soffits

Network Design Table for Storm 2

- Indicates pipe length does not match coordinates
 < - 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 |
|-------|------------|----------|-------------|-------------|-------------|-----------------|--------|----------|----------|--------------|---|
| 1.000 | 24.942 | 0.250 | 99.8 | 0.051 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit |  |
| 1.001 | 36.796 | 0.220 | 167.3 | 0.013 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 1.002 | 7.800# | 0.039 | 200.0 | 0.003 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 1.003 | 21.626 | 0.144 | 150.0 | 0.072 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit |  |
| 2.000 | 34.518 | 0.250 | 138.1 | 0.063 | 10.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 2.001 | 9.128 | 0.061 | 149.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 1.004 | 18.658 | 0.093 | 200.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit |  |
| 3.000 | 33.369 | 0.150 | 222.5 | 0.164 | 5.00 | 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) |
|-------|--------------|-------------|-----------|---------------|-------------------|------------|----------------|-----------|-----------|------------|
| 1.000 | 50.00 | 5.41 | 84.425 | 0.051 | 0.0 | 0.0 | 0.0 | 1.01 | 17.8 | 6.9 |
| 1.001 | 50.00 | 6.02 | 84.100 | 0.064 | 0.0 | 0.0 | 0.0 | 1.01 | 40.1 | 8.7 |
| 1.002 | 50.00 | 6.16 | 83.880 | 0.067 | 0.0 | 0.0 | 0.0 | 0.92 | 36.6 | 9.1 |
| 1.003 | 50.00 | 6.44 | 83.820 | 0.139 | 0.0 | 0.0 | 0.0 | 1.28 | 90.6 | 18.8 |
| 2.000 | 50.00 | 10.52 | 84.250 | 0.063 | 0.0 | 0.0 | 0.0 | 1.11 | 44.2 | 8.5 |
| 2.001 | 50.00 | 10.66 | 84.000 | 0.063 | 0.0 | 0.0 | 0.0 | 1.07 | 42.4 | 8.5 |
| 1.004 | 50.00 | 10.94 | 83.676 | 0.202 | 0.0 | 0.0 | 0.0 | 1.11 | 78.2 | 27.3 |
| 3.000 | 50.00 | 5.64 | 84.150 | 0.164 | 0.0 | 0.0 | 0.0 | 0.87 | 34.7 | 22.2 |

Network Design Table for Storm 2

| 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 |
|-------|------------|----------|-------------|-------------|-------------|-----------------|--------|----------|----------|--------------|-------------|
| 3.001 | 8.821 | 0.365 | 24.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | 🔒 |
| 4.000 | 40.115 | 0.250 | 160.5 | 0.087 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 1.005 | 35.378 | 0.350 | 101.1 | 0.030 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 5.000 | 27.993 | 0.187 | 150.0 | 0.009 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 1.006 | 15.840 | 0.150 | 105.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 6.000 | 24.176 | 0.280 | 86.3 | 0.001 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 6.001 | 11.526 | 0.080 | 144.1 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 1.007 | 12.834 | 0.130 | 98.7 | 0.033 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 1.008 | 24.643 | 0.120 | 205.4 | 0.043 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 7.000 | 30.950 | 0.165 | 187.6 | 0.085 | 5.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | 🔒 |
| 7.001 | 37.070# | 0.175 | 211.8 | 0.097 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | 🔒 |
| 1.009 | 22.240# | 0.154 | 144.4 | 0.120 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 1.010 | 5.060 | 0.020 | 253.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 1.011 | 3.985 | 0.340 | 11.7 | 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) |
|-------|--------------|-------------|-----------|---------------|-------------------|------------|----------------|-----------|-----------|------------|
| 3.001 | 50.00 | 5.69 | 84.000 | 0.164 | 0.0 | 0.0 | 0.0 | 2.67 | 106.3 | 22.2 |
| 4.000 | 50.00 | 5.85 | 83.960 | 0.087 | 0.0 | 0.0 | 0.0 | 0.79 | 14.0 | 11.7 |
| 1.005 | 50.00 | 11.32 | 83.560 | 0.483 | 0.0 | 0.0 | 0.0 | 1.56 | 110.5 | 65.4 |
| 5.000 | 50.00 | 5.57 | 84.350 | 0.009 | 0.0 | 0.0 | 0.0 | 0.82 | 14.5 | 1.3 |
| 1.006 | 50.00 | 11.49 | 83.210 | 0.492 | 0.0 | 0.0 | 0.0 | 1.53 | 108.1 | 66.6 |
| 6.000 | 50.00 | 5.37 | 84.350 | 0.001 | 0.0 | 0.0 | 0.0 | 1.08 | 19.1 | 0.1 |
| 6.001 | 50.00 | 5.60 | 84.070 | 0.001 | 0.0 | 0.0 | 0.0 | 0.84 | 14.8 | 0.1 |
| 1.007 | 50.00 | 11.63 | 82.330 | 0.526 | 0.0 | 0.0 | 0.0 | 1.58 | 111.9 | 71.3 |
| 1.008 | 50.00 | 12.00 | 82.200 | 0.569 | 0.0 | 0.0 | 0.0 | 1.09 | 77.3 | 77.1 |
| 7.000 | 50.00 | 5.54 | 82.570 | 0.085 | 0.0 | 0.0 | 0.0 | 0.95 | 37.8 | 11.5 |
| 7.001 | 50.00 | 6.23 | 82.330 | 0.182 | 0.0 | 0.0 | 0.0 | 0.89 | 35.6 | 24.6 |
| 1.009 | 50.00 | 12.29 | 82.080 | 0.871 | 0.0 | 0.0 | 0.0 | 1.31 | 92.3< | 118.0 |
| 1.010 | 50.00 | 12.42 | 81.840 | 0.871 | 0.0 | 0.0 | 0.0 | 0.63 | 11.1< | 118.0 |
| 1.011 | 50.00 | 12.44 | 81.270 | 0.871 | 0.0 | 0.0 | 0.0 | 2.96 | 52.3< | 118.0 |

Manhole Schedules for Storm 2

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | Pipe Out | | | Pipes In | | | Backdrop (mm) |
|-----------|-----------|--------------|---------------|--------------------|----------|------------------|---------------|----------|------------------|---------------|---------------|
| | | | | | PN | Invert Level (m) | Diameter (mm) | PN | Invert Level (m) | Diameter (mm) | |
| RE | 84.800 | 0.375 | Junction | | 1.000 | 84.425 | 150 | | | | |
| SW11 | 84.800 | 0.700 | Open Manhole | 1200 | 1.001 | 84.100 | 225 | 1.000 | 84.175 | 150 | |
| SW12 | 84.800 | 0.920 | Open Manhole | 1200 | 1.002 | 83.880 | 225 | 1.001 | 83.880 | 225 | |
| SW13 | 84.800 | 0.980 | Open Manhole | 1200 | 1.003 | 83.820 | 300 | 1.002 | 83.841 | 225 | |
| RE | 85.250 | 1.000 | Junction | | 2.000 | 84.250 | 225 | | | | |
| SW14 | 85.220 | 1.220 | Open Manhole | 450 | 2.001 | 84.000 | 225 | 2.000 | 84.000 | 225 | |
| Junction | 84.800 | 1.124 | Junction | | 1.004 | 83.676 | 300 | 1.003 | 83.676 | 300 | |
| | | | | | | | | 2.001 | 83.939 | 225 | 188 |
| RE | 84.800 | 0.650 | Junction | | 3.000 | 84.150 | 225 | | | | |
| SW15 | 85.220 | 1.220 | Open Manhole | 450 | 3.001 | 84.000 | 225 | 3.000 | 84.000 | 225 | |
| RE | 84.800 | 0.840 | Junction | | 4.000 | 83.960 | 150 | | | | |
| SW16 | 84.800 | 1.240 | Open Manhole | 1200 | 1.005 | 83.560 | 300 | 1.004 | 83.583 | 300 | 23 |
| | | | | | | | | 3.001 | 83.635 | 225 | |
| | | | | | | | | 4.000 | 83.710 | 150 | |
| RE | 85.000 | 0.650 | Junction | | 5.000 | 84.350 | 150 | | | | |
| SW17 | 84.800 | 1.590 | Open Manhole | 1200 | 1.006 | 83.210 | 300 | 1.005 | 83.210 | 300 | |
| | | | | | | | | 5.000 | 84.163 | 150 | 803 |
| RE | 85.200 | 0.850 | Junction | | 6.000 | 84.350 | 150 | | | | |
| SW41 | 84.800 | 0.730 | Open Manhole | 450 | 6.001 | 84.070 | 150 | 6.000 | 84.070 | 150 | |
| SW18 | 84.800 | 2.470 | Open Manhole | 1200 | 1.007 | 82.330 | 300 | 1.006 | 83.060 | 300 | 730 |
| | | | | | | | | 6.001 | 83.990 | 150 | 1510 |
| SW19 | 84.800 | 2.600 | Open Manhole | 1200 | 1.008 | 82.200 | 300 | 1.007 | 82.200 | 300 | |
| RE | 85.050 | 2.480 | Junction | | 7.000 | 82.570 | 225 | | | | |
| SW21 | 85.000 | 2.670 | Open Manhole | 1200 | 7.001 | 82.330 | 225 | 7.000 | 82.405 | 225 | 75 |
| SW20 | 84.800 | 2.720 | Open Manhole | 1200 | 1.009 | 82.080 | 300 | 1.008 | 82.080 | 300 | |
| | | | | | | | | 7.001 | 82.155 | 225 | |
| SW22 | 84.800 | 2.960 | Open Manhole | 1200 | 1.010 | 81.840 | 150 | 1.009 | 81.926 | 300 | 236 |
| SW23 | 84.800 | 3.530 | Open Manhole | 1200 | 1.011 | 81.270 | 150 | 1.010 | 81.820 | 150 | 550 |
| Outfall 2 | 84.650 | 3.720 | Open Manhole | 0 | | OUTFALL | | 1.011 | 80.930 | 150 | |

| | | | | | | |
|----------------|----------------------------|-----------------------------|---------------------------------|----------------------------------|-----------------------|-----------------------|
| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|----------------|----------------------------|-----------------------------|---------------------------------|----------------------------------|-----------------------|-----------------------|

RE 524069.109 212781.746 No Entry

SW11 524062.267 212757.761 524062.267 212757.761 Required



26-29 Saint Cross St
London
EC1N 8UH

066571 - Shredded Wheat



Date 14/10/2019
File SW NETWORK 2019.10.14.MDX

Designed by Merlin Davis
Checked by

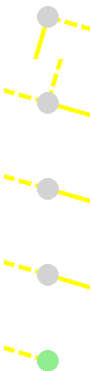
Micro Drainage

Network 2019.1

Manhole Schedules for Storm 2

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|----------|---------------------|----------------------|--------------------------|---------------------------|----------------|----------------|
| SW12 | 524052.125 | 212722.390 | 524052.125 | 212722.390 | Required | |
| SW13 | 524059.464 | 212717.957 | 524059.464 | 212717.957 | Required | |
| RE | 524091.892 | 212754.041 | | | No Entry | |
| SW14 | 524082.377 | 212720.860 | 524082.377 | 212720.860 | Required | |
| Junction | 524080.248 | 212711.983 | | | No Entry | |
| RE | 524107.366 | 212747.807 | | | No Entry | |
| SW15 | 524098.168 | 212715.731 | 524098.168 | 212715.731 | Required | |
| RE | 524087.045 | 212668.377 | | | No Entry | |
| SW16 | 524098.203 | 212706.909 | 524098.203 | 212706.909 | Required | |
| RE | 524119.928 | 212671.939 | | | No Entry | |
| SW17 | 524132.194 | 212697.102 | 524132.194 | 212697.102 | Required | |
| RE | 524129.302 | 212745.397 | | | No Entry | |
| SW41 | 524133.522 | 212721.592 | 524133.522 | 212721.592 | Required | |
| SW18 | 524138.954 | 212711.427 | 524138.954 | 212711.427 | Required | |
| SW19 | 524148.237 | 212720.290 | 524148.237 | 212720.290 | Required | |
| RE | 524212.618 | 212741.929 | | | No Entry | |

Manhole Schedules for Storm 2

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|-----------|---------------------|----------------------|--------------------------|---------------------------|----------------|---|
| SW21 | 524182.865 | 212750.454 | 524182.865 | 212750.454 | Required |  |
| SW20 | 524171.929 | 212713.510 | 524171.929 | 212713.510 | Required | |
| SW22 | 524201.449 | 212705.044 | 524201.449 | 212705.044 | Required | |
| SW23 | 524206.312 | 212703.645 | 524206.312 | 212703.645 | Required | |
| Outfall 2 | 524210.133 | 212702.515 | | | No Entry | |

Free Flowing Outfall Details for Storm 2

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D, L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|-----------|--------|
| 1.011 | Outfall 2 | 84.650 | 80.930 | 80.930 | 0 | 0 |

Simulation Criteria for Storm 2

| | | | |
|---------------------------------|-------|--|-------|
| Volumetric Runoff Coeff | 0.750 | Additional Flow - % of Total Flow | 0.000 |
| Areal Reduction Factor | 1.000 | MADD Factor * 10m ³ /ha Storage | 2.000 |
| Hot Start (mins) | 0 | Inlet Coefficient | 0.800 |
| Hot Start Level (mm) | 0 | Flow per Person per Day (l/per/day) | 0.000 |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins) | 60 |
| Foul Sewage per hectare (l/s) | 0.000 | Output Interval (mins) | 1 |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details

| | | | |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model | FSR | Profile Type | Summer |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Storm Duration (mins) | 30 |
| Ratio R | 0.434 | | |

Online Controls for Storm 2


Hydro-Brake® Optimum Manhole: SW22, DS/PN: 1.010, Volume (m³): 4.8

| | |
|-----------------------------------|----------------------------|
| Unit Reference | MD-SHE-0100-5900-2000-5900 |
| Design Head (m) | 2.000 |
| Design Flow (l/s) | 5.9 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 100 |
| Invert Level (m) | 81.840 |
| Minimum Outlet Pipe Diameter (mm) | 150 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|---------------------------|----------|------------|
| Design Point (Calculated) | 2.000 | 5.9 | Kick-Flo® | 0.890 | 4.0 |
| Flush-Flo™ | 0.435 | 5.1 | Mean Flow over Head Range | - | 4.7 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100 | 3.3 | 0.800 | 4.5 | 2.000 | 5.9 | 4.000 | 8.2 | 7.000 | 10.6 |
| 0.200 | 4.6 | 1.000 | 4.3 | 2.200 | 6.2 | 4.500 | 8.6 | 7.500 | 11.0 |
| 0.300 | 5.0 | 1.200 | 4.6 | 2.400 | 6.4 | 5.000 | 9.1 | 8.000 | 11.3 |
| 0.400 | 5.1 | 1.400 | 5.0 | 2.600 | 6.7 | 5.500 | 9.5 | 8.500 | 11.7 |
| 0.500 | 5.1 | 1.600 | 5.3 | 3.000 | 7.1 | 6.000 | 9.9 | 9.000 | 12.0 |
| 0.600 | 5.0 | 1.800 | 5.6 | 3.500 | 7.7 | 6.500 | 10.3 | 9.500 | 12.3 |

| | | |
|---|--|---|
| Curtins Consulting Engineers | | Page 7 |
| 26-29 Saint Cross St London EC1N 8UH | 066571 - Shredded Wheat |  |
| Date 14/10/2019 File SW NETWORK 2019.10.14.MDX | Designed by Merlin Davis Checked by | |
| Micro Drainage | Network 2019.1 | |

Storage Structures for Storm 2

Porous Car Park Manhole: RE, DS/PN: 1.000

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 5.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 32.0 |
| Max Percolation (l/s) | 44.4 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 84.425 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: SW11, DS/PN: 1.001

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 5.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 50.0 |
| Max Percolation (l/s) | 69.4 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 84.100 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: SW13, DS/PN: 1.003

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 5.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 24.0 |
| Max Percolation (l/s) | 33.3 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 83.820 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: Junction, DS/PN: 1.004

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 5.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 16.0 |
| Max Percolation (l/s) | 22.2 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 83.676 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: SW16, DS/PN: 1.005

| | | | |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 10.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 35.5 |
| Max Percolation (l/s) | 98.6 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 83.560 | Cap Volume Depth (m) | 0.450 |

Porous Car Park Manhole: RE, DS/PN: 5.000

| | | | |
|--------------------------------------|---------|------------------|--------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.30 |
| Membrane Percolation (mm/hr) | 1000 | Invert Level (m) | 84.350 |
| Max Percolation (l/s) | 7.8 | Width (m) | 4.0 |
| Safety Factor | 2.0 | Length (m) | 7.0 |

Porous Car Park Manhole: RE, DS/PN: 5.000

Slope (1:X) 0.0 Evaporation (mm/day) 3
 Depression Storage (mm) 5 Cap Volume Depth (m) 0.450

Complex Manhole: SW18, DS/PN: 1.007

Tank or Pond

Invert Level (m) 83.500

| Depth (m) | Area (m ²) | Depth (m) | Area (m ²) |
|-----------|------------------------|-----------|------------------------|
| 0.000 | 0.0 | 1.500 | 250.0 |

Porous Car Park

| | |
|--|----------------------------|
| Infiltration Coefficient Base (m/hr) 0.00000 | Width (m) 5.0 |
| Membrane Percolation (mm/hr) 1000 | Length (m) 8.4 |
| Max Percolation (l/s) 11.7 | Slope (1:X) 0.0 |
| Safety Factor 2.0 | Depression Storage (mm) 5 |
| Porosity 0.30 | Evaporation (mm/day) 3 |
| Invert Level (m) 82.330 | Cap Volume Depth (m) 0.450 |

Complex Manhole: SW19, DS/PN: 1.008

Cellular Storage

Invert Level (m) 82.200 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000 | 64.0 | 0.0 | 2.000 | 64.0 | 0.0 | 2.001 | 0.0 | 0.0 |

Porous Car Park

| | |
|--|----------------------------|
| Infiltration Coefficient Base (m/hr) 0.00000 | Width (m) 5.0 |
| Membrane Percolation (mm/hr) 1000 | Length (m) 18.0 |
| Max Percolation (l/s) 25.0 | Slope (1:X) 0.0 |
| Safety Factor 2.0 | Depression Storage (mm) 5 |
| Porosity 0.30 | Evaporation (mm/day) 3 |
| Invert Level (m) 82.200 | Cap Volume Depth (m) 0.450 |

Porous Car Park Manhole: RE, DS/PN: 7.000

| | |
|--|---------------------------|
| Infiltration Coefficient Base (m/hr) 0.00000 | Invert Level (m) 82.570 |
| Membrane Percolation (mm/hr) 1000 | Width (m) 5.0 |
| Max Percolation (l/s) 17.5 | Length (m) 12.6 |
| Safety Factor 2.0 | Slope (1:X) 0.0 |
| Porosity 0.30 | Depression Storage (mm) 5 |

Porous Car Park Manhole: RE, DS/PN: 7.000

Evaporation (mm/day) 3 Cap Volume Depth (m) 0.450

Complex Manhole: SW20, DS/PN: 1.009

Cellular Storage

Invert Level (m) 82.080 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000 | 112.0 | 0.0 | 2.000 | 112.0 | 0.0 | 2.001 | 0.0 | 0.0 |

Porous Car Park

| | |
|--|----------------------------|
| Infiltration Coefficient Base (m/hr) 0.00000 | Width (m) 15.0 |
| Membrane Percolation (mm/hr) 1000 | Length (m) 30.0 |
| Max Percolation (l/s) 125.0 | Slope (1:X) 0.0 |
| Safety Factor 2.0 | Depression Storage (mm) 5 |
| Porosity 0.30 | Evaporation (mm/day) 3 |
| Invert Level (m) 82.080 | Cap Volume Depth (m) 0.450 |

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

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 1 Number of Storage Structures 10 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 0, 0, 40

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) |
|-------|------------|------------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 30 Winter | 1 | +0% | | | | | 84.464 | -0.111 |
| 1.001 | SW11 | 120 Winter | 1 | +0% | | | | | 84.129 | -0.196 |
| 1.002 | SW12 | 120 Winter | 1 | +0% | 100/30 Winter | | | | 83.913 | -0.192 |
| 1.003 | SW13 | 30 Winter | 1 | +0% | | | | | 83.874 | -0.246 |
| 2.000 | RE | 15 Winter | 1 | +0% | | | | | 84.306 | -0.169 |
| 2.001 | SW14 | 15 Winter | 1 | +0% | | | | | 84.063 | -0.162 |
| 1.004 | Junction | 30 Winter | 1 | +0% | 100/15 Summer | | | | 83.752 | -0.224 |
| 3.000 | RE | 15 Winter | 1 | +0% | | | | | 84.286 | -0.089 |
| 3.001 | SW15 | 15 Winter | 1 | +0% | 100/15 Winter | | | | 84.079 | -0.146 |
| 4.000 | RE | 15 Winter | 1 | +0% | | | | | 84.070 | -0.040 |
| 1.005 | SW16 | 30 Winter | 1 | +0% | 100/15 Summer | | | | 83.666 | -0.194 |
| 5.000 | RE | 15 Winter | 1 | +0% | | | | | 84.374 | -0.126 |
| 1.006 | SW17 | 30 Winter | 1 | +0% | 100/15 Summer | | | | 83.324 | -0.186 |
| 6.000 | RE | 15 Winter | 1 | +0% | | | | | 84.355 | -0.145 |
| 6.001 | SW41 | 15 Winter | 1 | +0% | | | | | 84.077 | -0.143 |
| 1.007 | SW18 | 30 Winter | 1 | +0% | 10/240 Winter | | | | 82.449 | -0.181 |
| 1.008 | SW19 | 240 Winter | 1 | +0% | 10/60 Winter | | | | 82.337 | -0.163 |
| 7.000 | RE | 15 Winter | 1 | +0% | 30/120 Winter | | | | 82.652 | -0.143 |
| 7.001 | SW21 | 15 Winter | 1 | +0% | 10/15 Summer | | | | 82.461 | -0.094 |
| 1.009 | SW20 | 240 Winter | 1 | +0% | 10/30 Summer | | | | 82.334 | -0.046 |
| 1.010 | SW22 | 240 Winter | 1 | +0% | 1/15 Summer | | | | 82.336 | 0.346 |
| 1.011 | SW23 | 240 Winter | 1 | +0% | | | | | 81.307 | -0.113 |

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

| PN | US/MH Name | Flooded | | Pipe | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|--------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | | |
| 1.000 | RE | 0.000 | 0.15 | | 2.7 | OK* |
| 1.001 | SW11 | 0.000 | 0.04 | | 1.5 | OK |
| 1.002 | SW12 | 0.000 | 0.05 | | 1.6 | OK |
| 1.003 | SW13 | 0.000 | 0.08 | | 6.0 | OK |
| 2.000 | RE | 0.000 | 0.14 | | 6.2 | OK* |
| 2.001 | SW14 | 0.000 | 0.18 | | 6.2 | OK |
| 1.004 | Junction | 0.000 | 0.15 | | 11.2 | OK* |
| 3.000 | RE | 0.000 | 0.66 | | 22.8 | OK* |
| 3.001 | SW15 | 0.000 | 0.27 | | 22.8 | OK |
| 4.000 | RE | 0.000 | 0.88 | | 12.3 | OK* |
| 1.005 | SW16 | 0.000 | 0.27 | | 27.7 | OK |
| 5.000 | RE | 0.000 | 0.06 | | 0.9 | OK* |
| 1.006 | SW17 | 0.000 | 0.31 | | 28.3 | OK |
| 6.000 | RE | 0.000 | 0.01 | | 0.1 | OK* |
| 6.001 | SW41 | 0.000 | 0.01 | | 0.1 | OK |
| 1.007 | SW18 | 0.000 | 0.33 | | 30.0 | OK |
| 1.008 | SW19 | 0.000 | 0.20 | | 13.5 | OK |
| 7.000 | RE | 0.000 | 0.28 | | 10.5 | OK* |
| 7.001 | SW21 | 0.000 | 0.63 | | 21.1 | OK |
| 1.009 | SW20 | 0.000 | 0.08 | | 6.3 | OK |
| 1.010 | SW22 | 0.000 | 0.56 | | 5.1 | SURCHARGED |
| 1.011 | SW23 | 0.000 | 0.14 | | 5.1 | OK |

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

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 1 Number of Storage Structures 10 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 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) |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 30 Winter | 10 | +0% | | | | | 84.492 | -0.083 |
| 1.001 | SW11 | 60 Winter | 10 | +0% | | | | | 84.153 | -0.172 |
| 1.002 | SW12 | 60 Winter | 10 | +0% | 100/30 Winter | | | | 83.941 | -0.164 |
| 1.003 | SW13 | 15 Winter | 10 | +0% | | | | | 83.914 | -0.206 |
| 2.000 | RE | 15 Winter | 10 | +0% | | | | | 84.329 | -0.146 |
| 2.001 | SW14 | 15 Winter | 10 | +0% | | | | | 84.091 | -0.134 |
| 1.004 | Junction | 15 Winter | 10 | +0% | 100/15 Summer | | | | 83.797 | -0.179 |
| 3.000 | RE | 15 Winter | 10 | +0% | | | | | 84.375 | 0.000 |
| 3.001 | SW15 | 15 Winter | 10 | +0% | 100/15 Winter | | | | 84.112 | -0.113 |
| 4.000 | RE | 15 Winter | 10 | +0% | | | | | 84.110 | 0.000 |
| 1.005 | SW16 | 15 Winter | 10 | +0% | 100/15 Summer | | | | 83.739 | -0.121 |
| 5.000 | RE | 15 Winter | 10 | +0% | | | | | 84.389 | -0.111 |
| 1.006 | SW17 | 15 Winter | 10 | +0% | 100/15 Summer | | | | 83.405 | -0.105 |
| 6.000 | RE | 15 Winter | 10 | +0% | | | | | 84.359 | -0.141 |
| 6.001 | SW41 | 15 Winter | 10 | +0% | | | | | 84.082 | -0.138 |
| 1.007 | SW18 | 240 Winter | 10 | +0% | 10/240 Winter | | | | 82.670 | 0.040 |
| 1.008 | SW19 | 240 Winter | 10 | +0% | 10/60 Winter | | | | 82.667 | 0.167 |
| 7.000 | RE | 15 Winter | 10 | +0% | 30/120 Winter | | | | 82.701 | -0.094 |
| 7.001 | SW21 | 240 Winter | 10 | +0% | 10/15 Summer | | | | 82.665 | 0.110 |
| 1.009 | SW20 | 360 Winter | 10 | +0% | 10/30 Summer | | | | 82.666 | 0.286 |
| 1.010 | SW22 | 360 Winter | 10 | +0% | 1/15 Summer | | | | 82.847 | 0.857 |
| 1.011 | SW23 | 120 Winter | 10 | +0% | | | | | 81.307 | -0.113 |

26-29 Saint Cross St
London
EC1N 8UH

066571 - Shredded Wheat



Date 14/10/2019

Designed by Merlin Davis

File SW NETWORK 2019.10.14.MDX

Checked by

Micro Drainage

Network 2019.1

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

| PN | US/MH Name | Flooded | | Pipe | | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|---------------|-------------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | Flow (l/s) | | |
| 1.000 | RE | 0.000 | 0.41 | | 7.2 | OK* | |
| 1.001 | SW11 | 0.000 | 0.13 | | 4.8 | OK | |
| 1.002 | SW12 | 0.000 | 0.17 | | 4.9 | OK | |
| 1.003 | SW13 | 0.000 | 0.21 | | 16.7 | OK | |
| 2.000 | RE | 0.000 | 0.27 | | 11.9 | OK* | |
| 2.001 | SW14 | 0.000 | 0.34 | | 11.9 | OK | |
| 1.004 | Junction | 0.000 | 0.34 | | 26.0 | OK* | |
| 3.000 | RE | 0.000 | 1.21 | | 41.9 | SURCHARGED* | |
| 3.001 | SW15 | 0.000 | 0.49 | | 42.1 | OK | |
| 4.000 | RE | 0.000 | 1.45 | | 20.3 | SURCHARGED* | |
| 1.005 | SW16 | 0.000 | 0.66 | | 67.0 | OK | |
| 5.000 | RE | 0.000 | 0.15 | | 2.1 | OK* | |
| 1.006 | SW17 | 0.000 | 0.75 | | 68.1 | OK | |
| 6.000 | RE | 0.000 | 0.01 | | 0.2 | OK* | |
| 6.001 | SW41 | 0.000 | 0.02 | | 0.2 | OK | |
| 1.007 | SW18 | 0.000 | 0.27 | | 24.3 | SURCHARGED | |
| 1.008 | SW19 | 0.000 | 0.30 | | 20.5 | SURCHARGED | |
| 7.000 | RE | 0.000 | 0.54 | | 20.6 | OK* | |
| 7.001 | SW21 | 0.000 | 0.27 | | 8.9 | SURCHARGED | |
| 1.009 | SW20 | 0.000 | 0.07 | | 6.0 | SURCHARGED | |
| 1.010 | SW22 | 0.000 | 0.56 | | 5.1 | SURCHARGED | |
| 1.011 | SW23 | 0.000 | 0.14 | | 5.1 | OK | |

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

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 1 Number of Storage Structures 10 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 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) |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 15 Winter | 30 | +0% | | | | | 84.505 | -0.070 |
| 1.001 | SW11 | 60 Winter | 30 | +0% | | | | | 84.165 | -0.160 |
| 1.002 | SW12 | 60 Winter | 30 | +0% | 100/30 Winter | | | | 83.955 | -0.150 |
| 1.003 | SW13 | 15 Winter | 30 | +0% | | | | | 83.930 | -0.190 |
| 2.000 | RE | 15 Winter | 30 | +0% | | | | | 84.341 | -0.134 |
| 2.001 | SW14 | 15 Winter | 30 | +0% | | | | | 84.104 | -0.121 |
| 1.004 | Junction | 15 Winter | 30 | +0% | 100/15 Summer | | | | 83.820 | -0.156 |
| 3.000 | RE | 15 Winter | 30 | +0% | | | | | 84.375 | 0.000 |
| 3.001 | SW15 | 15 Winter | 30 | +0% | 100/15 Winter | | | | 84.128 | -0.097 |
| 4.000 | RE | 15 Winter | 30 | +0% | | | | | 84.110 | 0.000 |
| 1.005 | SW16 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 83.775 | -0.085 |
| 5.000 | RE | 15 Winter | 30 | +0% | | | | | 84.395 | -0.105 |
| 1.006 | SW17 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 83.447 | -0.063 |
| 6.000 | RE | 15 Winter | 30 | +0% | | | | | 84.361 | -0.139 |
| 6.001 | SW41 | 15 Winter | 30 | +0% | | | | | 84.085 | -0.135 |
| 1.007 | SW18 | 360 Winter | 30 | +0% | 10/240 Winter | | | | 83.000 | 0.370 |
| 1.008 | SW19 | 360 Winter | 30 | +0% | 10/60 Winter | | | | 82.997 | 0.497 |
| 7.000 | RE | 360 Winter | 30 | +0% | 30/120 Winter | | | | 82.995 | 0.200 |
| 7.001 | SW21 | 360 Winter | 30 | +0% | 10/15 Summer | | | | 83.000 | 0.445 |
| 1.009 | SW20 | 360 Winter | 30 | +0% | 10/30 Summer | | | | 82.996 | 0.616 |
| 1.010 | SW22 | 360 Winter | 30 | +0% | 1/15 Summer | | | | 83.173 | 1.183 |
| 1.011 | SW23 | 30 Winter | 30 | +0% | | | | | 81.307 | -0.113 |

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

| PN | US/MH Name | Flooded | | Pipe | | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|---------------|-------------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | Flow (l/s) | | |
| 1.000 | RE | 0.000 | 0.56 | | 9.9 | FLOOD RISK* | |
| 1.001 | SW11 | 0.000 | 0.18 | | 7.0 | OK | |
| 1.002 | SW12 | 0.000 | 0.25 | | 7.2 | OK | |
| 1.003 | SW13 | 0.000 | 0.28 | | 22.3 | OK | |
| 2.000 | RE | 0.000 | 0.34 | | 15.2 | OK* | |
| 2.001 | SW14 | 0.000 | 0.43 | | 15.1 | OK | |
| 1.004 | Junction | 0.000 | 0.45 | | 34.2 | OK* | |
| 3.000 | RE | 0.000 | 1.52 | | 52.6 | SURCHARGED* | |
| 3.001 | SW15 | 0.000 | 0.62 | | 52.7 | OK | |
| 4.000 | RE | 0.000 | 1.75 | | 24.5 | SURCHARGED* | |
| 1.005 | SW16 | 0.000 | 0.86 | | 87.4 | OK | |
| 5.000 | RE | 0.000 | 0.20 | | 2.8 | OK* | |
| 1.006 | SW17 | 0.000 | 0.97 | | 89.0 | OK | |
| 6.000 | RE | 0.000 | 0.02 | | 0.3 | OK* | |
| 6.001 | SW41 | 0.000 | 0.02 | | 0.3 | OK | |
| 1.007 | SW18 | 0.000 | 0.25 | | 22.7 | SURCHARGED | |
| 1.008 | SW19 | 0.000 | 0.30 | | 20.5 | SURCHARGED | |
| 7.000 | RE | 0.000 | 0.10 | | 3.9 | SURCHARGED* | |
| 7.001 | SW21 | 0.000 | 0.24 | | 8.2 | SURCHARGED | |
| 1.009 | SW20 | 0.000 | 0.08 | | 6.3 | SURCHARGED | |
| 1.010 | SW22 | 0.000 | 0.56 | | 5.1 | SURCHARGED | |
| 1.011 | SW23 | 0.000 | 0.14 | | 5.1 | OK | |

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

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 1 Number of Storage Structures 10 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 0.434 Cv (Winter) 0.840


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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 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) |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 15 Winter | 100 | +40% | | | | | 84.564 | -0.011 |
| 1.001 | SW11 | 30 Winter | 100 | +40% | | | | | 84.206 | -0.119 |
| 1.002 | SW12 | 30 Winter | 100 | +40% | 100/30 Winter | | | | 84.118 | 0.013 |
| 1.003 | SW13 | 30 Winter | 100 | +40% | | | | | 84.101 | -0.019 |
| 2.000 | RE | 15 Winter | 100 | +40% | | | | | 84.379 | -0.096 |
| 2.001 | SW14 | 15 Winter | 100 | +40% | | | | | 84.152 | -0.073 |
| 1.004 | Junction | 30 Winter | 100 | +40% | 100/15 Summer | | | | 84.055 | 0.079 |
| 3.000 | RE | 60 Winter | 100 | +40% | | | | | 84.375 | 0.000 |
| 3.001 | SW15 | 15 Winter | 100 | +40% | 100/15 Winter | | | | 84.255 | 0.030 |
| 4.000 | RE | 120 Winter | 100 | +40% | | | | | 84.110 | 0.000 |
| 1.005 | SW16 | 480 Winter | 100 | +40% | 100/15 Summer | | | | 84.048 | 0.188 |
| 5.000 | RE | 15 Winter | 100 | +40% | | | | | 84.414 | -0.086 |
| 1.006 | SW17 | 480 Winter | 100 | +40% | 100/15 Summer | | | | 84.043 | 0.533 |
| 6.000 | RE | 15 Winter | 100 | +40% | | | | | 84.367 | -0.133 |
| 6.001 | SW41 | 15 Winter | 100 | +40% | | | | | 84.089 | -0.131 |
| 1.007 | SW18 | 480 Winter | 100 | +40% | 10/240 Winter | | | | 84.039 | 1.409 |
| 1.008 | SW19 | 480 Winter | 100 | +40% | 10/60 Winter | | | | 84.036 | 1.536 |
| 7.000 | RE | 60 Winter | 100 | +40% | 30/120 Winter | | | | 83.020 | 0.225 |
| 7.001 | SW21 | 480 Winter | 100 | +40% | 10/15 Summer | | | | 84.037 | 1.482 |
| 1.009 | SW20 | 480 Winter | 100 | +40% | 10/30 Summer | | | | 84.035 | 1.655 |
| 1.010 | SW22 | 480 Winter | 100 | +40% | 1/15 Summer | | | | 84.200 | 2.210 |
| 1.011 | SW23 | 480 Winter | 100 | +40% | | | | | 81.312 | -0.108 |

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

| PN | US/MH Name | Flooded | | Pipe | | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|---------------|-------------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | Flow (l/s) | | |
| 1.000 | RE | 0.000 | 1.00 | | 17.8 | FLOOD RISK* | |
| 1.001 | SW11 | 0.000 | 0.45 | | 17.0 | OK | |
| 1.002 | SW12 | 0.000 | 0.56 | | 16.4 | SURCHARGED | |
| 1.003 | SW13 | 0.000 | 0.48 | | 38.4 | OK | |
| 2.000 | RE | 0.000 | 0.62 | | 27.6 | OK* | |
| 2.001 | SW14 | 0.000 | 0.79 | | 27.5 | OK | |
| 1.004 | Junction | 0.000 | 0.79 | | 60.6 | SURCHARGED* | |
| 3.000 | RE | 0.000 | 1.50 | | 52.1 | SURCHARGED* | |
| 3.001 | SW15 | 0.000 | 1.00 | | 85.0 | SURCHARGED | |
| 4.000 | RE | 0.000 | 1.20 | | 16.8 | SURCHARGED* | |
| 1.005 | SW16 | 0.000 | 0.31 | | 31.5 | SURCHARGED | |
| 5.000 | RE | 0.000 | 0.38 | | 5.5 | OK* | |
| 1.006 | SW17 | 0.000 | 0.35 | | 32.1 | SURCHARGED | |
| 6.000 | RE | 0.000 | 0.03 | | 0.5 | OK* | |
| 6.001 | SW41 | 0.000 | 0.04 | | 0.5 | OK | |
| 1.007 | SW18 | 0.000 | 0.37 | | 33.6 | SURCHARGED | |
| 1.008 | SW19 | 0.000 | 0.31 | | 21.1 | SURCHARGED | |
| 7.000 | RE | 0.000 | 0.51 | | 19.5 | SURCHARGED* | |
| 7.001 | SW21 | 0.000 | 0.32 | | 10.7 | SURCHARGED | |
| 1.009 | SW20 | 0.000 | 0.09 | | 7.6 | SURCHARGED | |
| 1.010 | SW22 | 0.000 | 0.67 | | 6.1 | SURCHARGED | |
| 1.011 | SW23 | 0.000 | 0.17 | | 6.1 | OK | |

| | | |
|---|--|---|
| Curtins Consulting Engineers | | Page 1 |
| 26-29 Saint Cross St London EC1N 8UH | 066571 - Shredded Wheat |  |
| Date 14/10/2019 File SW NETWORK 2019.10.14.MDX | Designed by Merlin Davis Checked by | |
| Micro Drainage | Network 2019.1 | |

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm 3

Pipe Sizes BR Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales









| | | | |
|--------------------------------------|--------|---------------------------------------|--------|
| Return Period (years) | 100 | PIMP (%) | 100 |
| M5-60 (mm) | 20.000 | Add Flow / Climate Change (%) | 0 |
| Ratio R | 0.434 | Minimum Backdrop Height (m) | 19.000 |
| Maximum Rainfall (mm/hr) | 50 | Maximum Backdrop Height (m) | 20.000 |
| Maximum Time of Concentration (mins) | 30 | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha) | 0.000 | Min Vel for Auto Design only (m/s) | 1.00 |
| Volumetric Runoff Coeff. | 0.750 | Min Slope for Optimisation (1:X) | 250 |

Designed with Level Soffits

Network Design Table for Storm 3

- Indicates pipe length does not match coordinates

< - 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 |
|-------|------------|----------|-------------|-------------|-------------|-----------------|--------|----------|----------|--------------|---|
| 1.000 | 45.477 | 0.440 | 103.4 | 0.062 | 5.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 1.001 | 12.989 | 0.070 | 185.6 | 0.008 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 1.002 | 36.956 | 0.175 | 211.2 | 0.085 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 2.000 | 17.315 | 0.115 | 150.6 | 0.063 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit |  |
| 2.001 | 31.183 | 0.225 | 138.6 | 0.063 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit |  |
| 1.003 | 21.502 | 0.070 | 307.2 | 0.055 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit |  |
| 1.004 | 18.919 | 0.150 | 126.1 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit |  |
| 3.000 | 23.230 | 0.230 | 101.0 | 0.064 | 5.00 | 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) |
|-------|--------------|-------------|-----------|---------------|-------------------|------------|----------------|-----------|-----------|------------|
| 1.000 | 50.00 | 5.59 | 83.810 | 0.062 | 0.0 | 0.0 | 0.0 | 1.29 | 51.1 | 8.4 |
| 1.001 | 50.00 | 5.82 | 83.370 | 0.070 | 0.0 | 0.0 | 0.0 | 0.96 | 38.0 | 9.5 |
| 1.002 | 50.00 | 6.50 | 83.300 | 0.155 | 0.0 | 0.0 | 0.0 | 0.90 | 35.6 | 21.0 |
| 2.000 | 50.00 | 5.35 | 83.540 | 0.063 | 0.0 | 0.0 | 0.0 | 0.82 | 14.4 | 8.5 |
| 2.001 | 50.00 | 5.82 | 83.350 | 0.126 | 0.0 | 0.0 | 0.0 | 1.11 | 44.1 | 17.1 |
| 1.003 | 50.00 | 6.91 | 83.050 | 0.336 | 0.0 | 0.0 | 0.0 | 0.89 | 63.0 | 45.6 |
| 1.004 | 50.00 | 7.13 | 82.980 | 0.336 | 0.0 | 0.0 | 0.0 | 1.40 | 98.9 | 45.6 |
| 3.000 | 50.00 | 5.30 | 84.350 | 0.064 | 0.0 | 0.0 | 0.0 | 1.30 | 51.7 | 8.6 |

Network Design Table for Storm 3

| 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 |
|-------|------------|----------|-------------|-------------|-------------|-----------------|--------|----------|----------|--------------|-------------|
| 4.000 | 37.044 | 0.255 | 145.3 | 0.015 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 3.001 | 14.846 | 0.150 | 99.0 | 0.005 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | 🔒 |
| 3.002 | 31.712 | 0.260 | 122.0 | 0.040 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | 🔒 |
| 1.005 | 2.100# | 0.011 | 200.0 | 0.027 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 5.000 | 43.849 | 0.292 | 150.0 | 0.032 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 1.006 | 22.867 | 0.152 | 150.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 1.007 | 24.063 | 0.120 | 200.5 | 0.050 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 6.000 | 24.371 | 0.085 | 286.7 | 0.052 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 7.000 | 17.151 | 0.035 | 490.0 | 0.035 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| 6.001 | 8.548 | 0.050 | 171.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | 🔒 |
| 6.002 | 42.420# | 0.205 | 206.9 | 0.171 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | 🔒 |
| 1.008 | 27.300# | 0.160 | 170.6 | 0.122 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 1.009 | 4.757 | 0.024 | 200.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | 🔒 |
| 1.010 | 4.284 | 1.560 | 2.7 | 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) | E I.Area (ha) | E Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|-------|--------------|-------------|-----------|---------------|-------------------|------------|----------------|-----------|-----------|------------|
| 4.000 | 50.00 | 5.74 | 84.450 | 0.015 | 0.0 | 0.0 | 0.0 | 0.83 | 14.7 | 2.0 |
| 3.001 | 50.00 | 5.93 | 84.120 | 0.084 | 0.0 | 0.0 | 0.0 | 1.31 | 52.3 | 11.4 |
| 3.002 | 50.00 | 6.38 | 83.970 | 0.124 | 0.0 | 0.0 | 0.0 | 1.18 | 47.0 | 16.8 |
| 1.005 | 50.00 | 7.16 | 82.755 | 0.487 | 0.0 | 0.0 | 0.0 | 1.11 | 78.3 | 66.0 |
| 5.000 | 50.00 | 5.89 | 84.550 | 0.032 | 0.0 | 0.0 | 0.0 | 0.82 | 14.5 | 4.3 |
| 1.006 | 50.00 | 7.46 | 82.810 | 0.519 | 0.0 | 0.0 | 0.0 | 1.28 | 90.4 | 70.3 |
| 1.007 | 50.00 | 7.82 | 82.200 | 0.569 | 0.0 | 0.0 | 0.0 | 1.11 | 78.2 | 77.1 |
| 6.000 | 50.00 | 5.69 | 82.570 | 0.052 | 0.0 | 0.0 | 0.0 | 0.59 | 10.4 | 7.1 |
| 7.000 | 50.00 | 5.64 | 82.520 | 0.035 | 0.0 | 0.0 | 0.0 | 0.45 | 7.9 | 4.8 |
| 6.001 | 50.00 | 5.83 | 82.410 | 0.088 | 0.0 | 0.0 | 0.0 | 1.00 | 39.6 | 11.9 |
| 6.002 | 50.00 | 6.61 | 82.360 | 0.259 | 0.0 | 0.0 | 0.0 | 0.91 | 36.0 | 35.0 |
| 1.008 | 50.00 | 8.20 | 82.080 | 0.950 | 0.0 | 0.0 | 0.0 | 1.20 | 84.9« | 128.6 |
| 1.009 | 50.00 | 8.27 | 81.850 | 0.950 | 0.0 | 0.0 | 0.0 | 1.11 | 78.3« | 128.6 |
| 1.010 | 50.00 | 8.28 | 81.810 | 0.950 | 0.0 | 0.0 | 0.0 | 6.13 | 108.3« | 128.6 |

Manhole Schedules for Storm 3

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | Pipe Out | | | Pipes In | | | Backdrop (mm) |
|-----------|-----------|--------------|---------------|-------------------|----------|------------------|---------------|----------|------------------|---------------|---------------|
| | | | | | PN | Invert Level (m) | Diameter (mm) | PN | Invert Level (m) | Diameter (mm) | |
| RE | 85.280 | 1.470 | Junction | | 1.000 | 83.810 | 225 | | | | |
| SW24 | 84.800 | 1.430 | Open Manhole | 1200 | 1.001 | 83.370 | 225 | 1.000 | 83.370 | 225 | |
| SW25 | 84.800 | 1.500 | Open Manhole | 1200 | 1.002 | 83.300 | 225 | 1.001 | 83.300 | 225 | |
| RE | 85.050 | 1.510 | Junction | | 2.000 | 83.540 | 150 | | | | |
| SW26A | 85.050 | 1.700 | Open Manhole | 1200 | 2.001 | 83.350 | 225 | 2.000 | 83.425 | 150 | |
| SW26 | 84.800 | 1.750 | Open Manhole | 1200 | 1.003 | 83.050 | 300 | 1.002 | 83.125 | 225 | |
| | | | | | | | | 2.001 | 83.125 | 225 | |
| SW29 | 84.800 | 1.820 | Open Manhole | 1200 | 1.004 | 82.980 | 300 | 1.003 | 82.980 | 300 | |
| RE | 85.000 | 0.650 | Junction | | 3.000 | 84.350 | 225 | | | | |
| RE | 85.000 | 0.550 | Junction | | 4.000 | 84.450 | 150 | | | | |
| Junction | 85.000 | 0.880 | Junction | | 3.001 | 84.120 | 225 | 3.000 | 84.120 | 225 | |
| | | | | | | | | 4.000 | 84.195 | 150 | |
| SW31 | 85.000 | 1.030 | Open Manhole | 1200 | 3.002 | 83.970 | 225 | 3.001 | 83.970 | 225 | |
| SW30 | 85.000 | 2.245 | Open Manhole | 1200 | 1.005 | 82.755 | 300 | 1.004 | 82.830 | 300 | 75 |
| | | | | | | | | 3.002 | 83.710 | 225 | 880 |
| RE | 85.000 | 0.450 | Junction | | 5.000 | 84.550 | 150 | | | | |
| SW32 | 85.000 | 2.256 | Open Manhole | 1200 | 1.006 | 82.810 | 300 | 1.005 | 82.745 | 300 | |
| | | | | | | | | 5.000 | 84.258 | 150 | 1298 |
| SW33 | 84.800 | 2.600 | Open Manhole | 1200 | 1.007 | 82.200 | 300 | 1.006 | 82.658 | 300 | 458 |
| RE | 84.800 | 2.230 | Junction | | 6.000 | 82.570 | 150 | | | | |
| RE | 84.800 | 2.280 | Junction | | 7.000 | 82.520 | 150 | | | | |
| SW35 | 85.250 | 2.840 | Open Manhole | 1200 | 6.001 | 82.410 | 225 | 6.000 | 82.485 | 150 | |
| | | | | | | | | 7.000 | 82.485 | 150 | |
| SW36 | 85.250 | 2.890 | Open Manhole | 1200 | 6.002 | 82.360 | 225 | 6.001 | 82.360 | 225 | |
| SW34 | 84.800 | 2.720 | Open Manhole | 1200 | 1.008 | 82.080 | 300 | 1.007 | 82.080 | 300 | |
| | | | | | | | | 6.002 | 82.155 | 225 | |
| SW37 | 84.800 | 2.950 | Open Manhole | 1200 | 1.009 | 81.850 | 300 | 1.008 | 81.920 | 300 | 70 |
| SW38 | 84.800 | 2.990 | Open Manhole | 1200 | 1.010 | 81.810 | 150 | 1.009 | 81.826 | 300 | 166 |
| Outfall 3 | 85.030 | 4.780 | Open Manhole | 0 | | OUTFALL | | 1.010 | 80.250 | 150 | |

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|----------------|
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|----------------|

| | | | | | | |
|----|------------|------------|--|--|----------|--|
| RE | 524084.423 | 212844.482 | | | No Entry | |
|----|------------|------------|--|--|----------|--|

| | | | | | | |
|------|------------|------------|------------|------------|----------|--|
| SW24 | 524071.898 | 212800.764 | 524071.898 | 212800.764 | Required | |
|------|------------|------------|------------|------------|----------|--|



26-29 Saint Cross St
London
EC1N 8UH

066571 - Shredded Wheat



Date 14/10/2019
File SW NETWORK 2019.10.14.MDX

Designed by Merlin Davis
Checked by






Micro Drainage

Network 2019.1

Manhole Schedules for Storm 3

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|----------|---------------------|----------------------|--------------------------|---------------------------|----------------|----------------|
| SW25 | 524068.427 | 212788.248 | 524068.427 | 212788.248 | Required | |
| RE | 524117.333 | 212824.681 | | | No Entry | |
| SW26A | 524112.557 | 212808.038 | 524112.557 | 212808.038 | Required | |
| SW26 | 524103.953 | 212778.066 | 524103.953 | 212778.066 | Required | |
| SW29 | 524124.638 | 212772.195 | 524124.638 | 212772.195 | Required | |
| RE | 524151.782 | 212853.639 | | | No Entry | |
| RE | 524109.869 | 212842.156 | | | No Entry | |
| Junction | 524145.297 | 212831.332 | | | No Entry | |
| SW31 | 524140.964 | 212817.133 | 524140.964 | 212817.133 | Required | |
| SW30 | 524138.032 | 212785.557 | 524138.032 | 212785.557 | Required | |
| RE | 524146.901 | 212741.933 | | | No Entry | |
| SW32 | 524144.611 | 212785.723 | 524144.611 | 212785.723 | Required | |
| SW33 | 524167.393 | 212787.695 | 524167.393 | 212787.695 | Required | |
| RE | 524234.191 | 212813.929 | | | No Entry | |
| RE | 524215.489 | 212837.275 | | | No Entry | |
| SW35 | 524210.802 | 212820.777 | 524210.802 | 212820.777 | Required | |

Manhole Schedules for Storm 3

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|-----------|---------------------|----------------------|--------------------------|---------------------------|----------------|---|
| SW36 | 524202.599 | 212823.179 | 524202.599 | 212823.179 | Required |  |
| SW34 | 524190.526 | 212781.070 | 524190.526 | 212781.070 | Required |  |
| SW37 | 524221.327 | 212772.227 | 524221.327 | 212772.227 | Required |  |
| SW38 | 524225.899 | 212770.913 | 524225.899 | 212770.913 | Required |  |
| Outfall 3 | 524230.009 | 212769.707 | | | No Entry |  |

Free Flowing Outfall Details for Storm 3

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
| 1.010 | Outfall 3 | 85.030 | 80.250 | 80.250 | 0 | 0 |

Simulation Criteria for Storm 3

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 2.000
 Hot Start (mins) 0 Inlet Coefficient 0.800
 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000
 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60
 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Profile Type Summer
 Return Period (years) 100 Cv (Summer) 0.750
 Region England and Wales Cv (Winter) 0.840
 M5-60 (mm) 20.000 Storm Duration (mins) 30
 Ratio R 0.434

Online Controls for Storm 3

Hydro-Brake® Optimum Manhole: SW37, DS/PN: 1.009, Volume (m³): 5.2

| | |
|-----------------------------------|----------------------------|
| Unit Reference | MD-SHE-0108-6900-2000-6900 |
| Design Head (m) | 2.000 |
| Design Flow (l/s) | 6.9 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 108 |
| Invert Level (m) | 81.850 |
| Minimum Outlet Pipe Diameter (mm) | 150 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|---------------------------|----------|------------|
| Design Point (Calculated) | 2.000 | 6.9 | Kick-Flo® | 0.966 | 4.9 |
| Flush-Flo™ | 0.471 | 6.2 | Mean Flow over Head Range | - | 5.7 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100 | 3.7 | 0.800 | 5.8 | 2.000 | 6.9 | 4.000 | 9.6 | 7.000 | 12.5 |
| 0.200 | 5.5 | 1.000 | 5.0 | 2.200 | 7.2 | 4.500 | 10.1 | 7.500 | 12.9 |
| 0.300 | 6.0 | 1.200 | 5.4 | 2.400 | 7.5 | 5.000 | 10.6 | 8.000 | 13.3 |
| 0.400 | 6.2 | 1.400 | 5.8 | 2.600 | 7.8 | 5.500 | 11.1 | 8.500 | 13.7 |
| 0.500 | 6.2 | 1.600 | 6.2 | 3.000 | 8.3 | 6.000 | 11.6 | 9.000 | 14.1 |
| 0.600 | 6.1 | 1.800 | 6.6 | 3.500 | 9.0 | 6.500 | 12.0 | 9.500 | 14.4 |

Storage Structures for Storm 3

Tank or Pond Manhole: SW30, DS/PN: 1.005

Invert Level (m) 83.500

| Depth (m) | Area (m ²) | Depth (m) | Area (m ²) |
|-----------|------------------------|-----------|------------------------|
| 0.000 | 0.0 | 1.500 | 300.0 |

Cellular Storage Manhole: SW33, DS/PN: 1.007

Invert Level (m) 82.200 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000 | 80.0 | 0.0 | 2.000 | 80.0 | 0.0 | 2.001 | 0.0 | 0.0 |

Cellular Storage Manhole: SW34, DS/PN: 1.008

Invert Level (m) 82.080 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000 | 130.0 | 0.0 | 2.000 | 130.0 | 0.0 | 2.001 | 0.0 | 0.0 |

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 3

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 1 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 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) |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 15 Winter | 1 | +0% | | | | | 83.873 | -0.162 |
| 1.001 | SW24 | 15 Winter | 1 | +0% | 10/15 Summer | 100/15 Summer | | | 83.459 | -0.136 |
| 1.002 | SW25 | 15 Winter | 1 | +0% | 10/15 Summer | 100/15 Summer | | | 83.424 | -0.101 |
| 2.000 | RE | 15 Winter | 1 | +0% | | | | | 83.626 | -0.064 |
| 2.001 | SW26A | 15 Winter | 1 | +0% | 10/15 Summer | 100/15 Winter | | | 83.450 | -0.125 |
| 1.003 | SW26 | 15 Winter | 1 | +0% | 10/15 Summer | | | | 83.246 | -0.104 |
| 1.004 | SW29 | 15 Winter | 1 | +0% | 10/15 Summer | | | | 83.154 | -0.126 |
| 3.000 | RE | 15 Winter | 1 | +0% | | | | | 84.414 | -0.161 |
| 4.000 | RE | 15 Winter | 1 | +0% | | | | | 84.488 | -0.112 |
| 3.001 | Junction | 15 Winter | 1 | +0% | | | | | 84.193 | -0.152 |
| 3.002 | SW31 | 15 Winter | 1 | +0% | 100/15 Summer | | | | 84.066 | -0.129 |
| 1.005 | SW30 | 15 Winter | 1 | +0% | 1/15 Summer | | | | 83.108 | 0.053 |
| 5.000 | RE | 15 Winter | 1 | +0% | | | | | 84.608 | -0.092 |
| 1.006 | SW32 | 15 Winter | 1 | +0% | 10/15 Summer | | | | 83.013 | -0.097 |
| 1.007 | SW33 | 120 Winter | 1 | +0% | 1/60 Winter | | | | 82.542 | 0.042 |
| 6.000 | RE | 15 Winter | 1 | +0% | | | | | 82.665 | -0.055 |
| 7.000 | RE | 15 Winter | 1 | +0% | | | | | 82.608 | -0.062 |
| 6.001 | SW35 | 15 Winter | 1 | +0% | 10/15 Summer | | | | 82.547 | -0.088 |
| 6.002 | SW36 | 120 Winter | 1 | +0% | 10/15 Summer | | | | 82.544 | -0.041 |
| 1.008 | SW34 | 120 Winter | 1 | +0% | 1/15 Winter | | | | 82.541 | 0.161 |
| 1.009 | SW37 | 120 Winter | 1 | +0% | 1/15 Summer | | | | 82.694 | 0.544 |
| 1.010 | SW38 | 120 Winter | 1 | +0% | | | | | 81.838 | -0.122 |

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 3

| PN | US/MH Name | Flooded | | Pipe | Status | Level Exceeded | |
|-------|---------------|-----------------------------|----------------|-------------------|--------|-------------------|---------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | | | Flow (l/s) |
| 1.000 | RE | 0.000 | 0.17 | | 8.7 | OK* | |
| 1.001 | SW24 | 0.000 | 0.30 | | 9.7 | OK | 4 |
| 1.002 | SW25 | 0.000 | 0.57 | | 19.3 | OK | 4 |
| 2.000 | RE | 0.000 | 0.61 | | 8.8 | OK* | |
| 2.001 | SW26A | 0.000 | 0.40 | | 16.5 | OK | 1 |
| 1.003 | SW26 | 0.000 | 0.75 | | 41.6 | OK | |
| 1.004 | SW29 | 0.000 | 0.49 | | 41.7 | OK | |
| 3.000 | RE | 0.000 | 0.17 | | 8.9 | OK* | |
| 4.000 | RE | 0.000 | 0.15 | | 2.1 | OK* | |
| 3.001 | Junction | 0.000 | 0.23 | | 11.8 | OK* | |
| 3.002 | SW31 | 0.000 | 0.38 | | 16.6 | OK | |
| 1.005 | SW30 | 0.000 | 1.11 | | 59.9 | SURCHARGED | |
| 5.000 | RE | 0.000 | 0.32 | | 4.6 | OK* | |
| 1.006 | SW32 | 0.000 | 0.80 | | 63.8 | OK | |
| 1.007 | SW33 | 0.000 | 0.25 | | 17.4 | SURCHARGED | |
| 6.000 | RE | 0.000 | 0.71 | | 7.4 | OK* | |
| 7.000 | RE | 0.000 | 0.63 | | 5.0 | OK* | |
| 6.001 | SW35 | 0.000 | 0.39 | | 12.3 | OK | |
| 6.002 | SW36 | 0.000 | 0.34 | | 11.7 | OK | |
| 1.008 | SW34 | 0.000 | 0.14 | | 10.3 | SURCHARGED | |
| 1.009 | SW37 | 0.000 | 0.12 | | 6.2 | SURCHARGED | |
| 1.010 | SW38 | 0.000 | 0.08 | | 6.2 | OK | |

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 3

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 (1/per/day) 0.000
 Foul Sewage per hectare (1/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 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) |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 15 Winter | 10 | +0% | | | | | 83.900 | -0.135 |
| 1.001 | SW24 | 15 Winter | 10 | +0% | 10/15 Summer | 100/15 Summer | | | 83.796 | 0.201 |
| 1.002 | SW25 | 15 Winter | 10 | +0% | 10/15 Summer | 100/15 Summer | | | 83.766 | 0.241 |
| 2.000 | RE | 15 Winter | 10 | +0% | | | | | 83.690 | 0.000 |
| 2.001 | SW26A | 15 Winter | 10 | +0% | 10/15 Summer | 100/15 Winter | | | 83.727 | 0.152 |
| 1.003 | SW26 | 15 Winter | 10 | +0% | 10/15 Summer | | | | 83.630 | 0.280 |
| 1.004 | SW29 | 15 Winter | 10 | +0% | 10/15 Summer | | | | 83.528 | 0.248 |
| 3.000 | RE | 15 Winter | 10 | +0% | | | | | 84.441 | -0.134 |
| 4.000 | RE | 15 Winter | 10 | +0% | | | | | 84.504 | -0.096 |
| 3.001 | Junction | 15 Winter | 10 | +0% | | | | | 84.225 | -0.120 |
| 3.002 | SW31 | 15 Winter | 10 | +0% | 100/15 Summer | | | | 84.121 | -0.074 |
| 1.005 | SW30 | 15 Winter | 10 | +0% | 1/15 Summer | | | | 83.407 | 0.352 |
| 5.000 | RE | 15 Winter | 10 | +0% | | | | | 84.636 | -0.064 |
| 1.006 | SW32 | 15 Winter | 10 | +0% | 10/15 Summer | | | | 83.235 | 0.125 |
| 1.007 | SW33 | 240 Winter | 10 | +0% | 1/60 Winter | | | | 83.028 | 0.528 |
| 6.000 | RE | 30 Winter | 10 | +0% | | | | | 82.720 | 0.000 |
| 7.000 | RE | 30 Winter | 10 | +0% | | | | | 82.670 | 0.000 |
| 6.001 | SW35 | 15 Winter | 10 | +0% | 10/15 Summer | | | | 83.080 | 0.445 |
| 6.002 | SW36 | 240 Winter | 10 | +0% | 10/15 Summer | | | | 83.032 | 0.447 |
| 1.008 | SW34 | 240 Winter | 10 | +0% | 1/15 Winter | | | | 83.028 | 0.648 |
| 1.009 | SW37 | 240 Winter | 10 | +0% | 1/15 Summer | | | | 83.175 | 1.025 |
| 1.010 | SW38 | 120 Summer | 10 | +0% | | | | | 81.838 | -0.122 |

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 3

| PN | US/MH Name | Flooded | | Pipe | | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|---------------|-------------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | Flow (l/s) | | |
| 1.000 | RE | 0.000 | 0.33 | | 16.8 | OK* | |
| 1.001 | SW24 | 0.000 | 0.56 | | 18.6 | SURCHARGED | 4 |
| 1.002 | SW25 | 0.000 | 0.93 | | 31.4 | SURCHARGED | 4 |
| 2.000 | RE | 0.000 | 1.11 | | 16.0 | SURCHARGED* | |
| 2.001 | SW26A | 0.000 | 0.73 | | 30.2 | SURCHARGED | 1 |
| 1.003 | SW26 | 0.000 | 1.18 | | 65.4 | SURCHARGED | |
| 1.004 | SW29 | 0.000 | 0.78 | | 66.6 | SURCHARGED | |
| 3.000 | RE | 0.000 | 0.33 | | 17.3 | OK* | |
| 4.000 | RE | 0.000 | 0.27 | | 4.0 | OK* | |
| 3.001 | Junction | 0.000 | 0.44 | | 22.9 | OK* | |
| 3.002 | SW31 | 0.000 | 0.78 | | 34.2 | OK | |
| 1.005 | SW30 | 0.000 | 1.90 | | 102.5 | SURCHARGED | |
| 5.000 | RE | 0.000 | 0.61 | | 8.9 | OK* | |
| 1.006 | SW32 | 0.000 | 1.38 | | 110.7 | SURCHARGED | |
| 1.007 | SW33 | 0.000 | 0.27 | | 18.5 | SURCHARGED | |
| 6.000 | RE | 0.000 | 0.95 | | 9.9 | SURCHARGED* | |
| 7.000 | RE | 0.000 | 0.83 | | 6.6 | SURCHARGED* | |
| 6.001 | SW35 | 0.000 | 0.78 | | 24.6 | SURCHARGED | |
| 6.002 | SW36 | 0.000 | 0.32 | | 11.1 | SURCHARGED | |
| 1.008 | SW34 | 0.000 | 0.14 | | 10.8 | SURCHARGED | |
| 1.009 | SW37 | 0.000 | 0.12 | | 6.2 | SURCHARGED | |
| 1.010 | SW38 | 0.000 | 0.08 | | 6.2 | OK | |

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 3

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 1 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 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) |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 15 Winter | 30 | +0% | | | | | 84.035 | 0.000 |
| 1.001 | SW24 | 15 Winter | 30 | +0% | 10/15 Summer | 100/15 Summer | | | 84.157 | 0.562 |
| 1.002 | SW25 | 15 Winter | 30 | +0% | 10/15 Summer | 100/15 Summer | | | 84.110 | 0.585 |
| 2.000 | RE | 15 Winter | 30 | +0% | | | | | 83.690 | 0.000 |
| 2.001 | SW26A | 15 Winter | 30 | +0% | 10/15 Summer | 100/15 Winter | | | 84.038 | 0.463 |
| 1.003 | SW26 | 15 Winter | 30 | +0% | 10/15 Summer | | | | 83.901 | 0.551 |
| 1.004 | SW29 | 15 Winter | 30 | +0% | 10/15 Summer | | | | 83.753 | 0.473 |
| 3.000 | RE | 15 Winter | 30 | +0% | | | | | 84.454 | -0.121 |
| 4.000 | RE | 15 Winter | 30 | +0% | | | | | 84.512 | -0.088 |
| 3.001 | Junction | 15 Winter | 30 | +0% | | | | | 84.241 | -0.104 |
| 3.002 | SW31 | 15 Winter | 30 | +0% | 100/15 Summer | | | | 84.150 | -0.045 |
| 1.005 | SW30 | 15 Winter | 30 | +0% | 1/15 Summer | | | | 83.619 | 0.564 |
| 5.000 | RE | 15 Winter | 30 | +0% | | | | | 84.651 | -0.049 |
| 1.006 | SW32 | 15 Winter | 30 | +0% | 10/15 Summer | | | | 83.374 | 0.264 |
| 1.007 | SW33 | 240 Winter | 30 | +0% | 1/60 Winter | | | | 83.337 | 0.837 |
| 6.000 | RE | 60 Winter | 30 | +0% | | | | | 82.720 | 0.000 |
| 7.000 | RE | 60 Winter | 30 | +0% | | | | | 82.670 | 0.000 |
| 6.001 | SW35 | 15 Winter | 30 | +0% | 10/15 Summer | | | | 83.427 | 0.792 |
| 6.002 | SW36 | 15 Winter | 30 | +0% | 10/15 Summer | | | | 83.362 | 0.777 |
| 1.008 | SW34 | 240 Winter | 30 | +0% | 1/15 Winter | | | | 83.336 | 0.956 |
| 1.009 | SW37 | 60 Winter | 30 | +0% | 1/15 Summer | | | | 83.535 | 1.385 |
| 1.010 | SW38 | 240 Winter | 30 | +0% | | | | | 81.838 | -0.122 |

26-29 Saint Cross St
London
EC1N 8UH

066571 - Shredded Wheat



Date 14/10/2019

Designed by Merlin Davis

File SW NETWORK 2019.10.14.MDX

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Network 2019.1

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 3

| PN | US/MH Name | Flooded | | Pipe | | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|---------------|-------------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | Flow (l/s) | | |
| 1.000 | RE | 0.000 | 0.40 | | 20.4 | SURCHARGED* | |
| 1.001 | SW24 | 0.000 | 0.68 | | 22.4 | SURCHARGED | 4 |
| 1.002 | SW25 | 0.000 | 1.07 | | 36.0 | SURCHARGED | 4 |
| 2.000 | RE | 0.000 | 1.19 | | 17.2 | SURCHARGED* | |
| 2.001 | SW26A | 0.000 | 0.80 | | 32.8 | SURCHARGED | 1 |
| 1.003 | SW26 | 0.000 | 1.43 | | 79.0 | SURCHARGED | |
| 1.004 | SW29 | 0.000 | 0.94 | | 80.3 | SURCHARGED | |
| 3.000 | RE | 0.000 | 0.43 | | 22.0 | OK* | |
| 4.000 | RE | 0.000 | 0.35 | | 5.1 | OK* | |
| 3.001 | Junction | 0.000 | 0.56 | | 29.1 | OK* | |
| 3.002 | SW31 | 0.000 | 0.98 | | 43.2 | OK | |
| 1.005 | SW30 | 0.000 | 2.31 | | 124.1 | SURCHARGED | |
| 5.000 | RE | 0.000 | 0.78 | | 11.3 | OK* | |
| 1.006 | SW32 | 0.000 | 1.68 | | 134.3 | SURCHARGED | |
| 1.007 | SW33 | 0.000 | 0.27 | | 19.0 | SURCHARGED | |
| 6.000 | RE | 0.000 | 0.77 | | 8.0 | SURCHARGED* | |
| 7.000 | RE | 0.000 | 0.65 | | 5.2 | SURCHARGED* | |
| 6.001 | SW35 | 0.000 | 0.95 | | 29.8 | SURCHARGED | |
| 6.002 | SW36 | 0.000 | 2.12 | | 72.5 | SURCHARGED | |
| 1.008 | SW34 | 0.000 | 0.16 | | 12.6 | SURCHARGED | |
| 1.009 | SW37 | 0.000 | 0.12 | | 6.2 | SURCHARGED | |
| 1.010 | SW38 | 0.000 | 0.08 | | 6.2 | OK | |

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 3

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 1 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 0.434 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 10, 30, 100
 Climate Change (%) 0, 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) |
|-------|------------|------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|-----------------|----------------------|
| 1.000 | RE | 60 Winter | 100 | +40% | | | | | 84.035 | 0.000 |
| 1.001 | SW24 | 15 Winter | 100 | +40% | 10/15 Summer | 100/15 Summer | | | 84.809 | 1.214 |
| 1.002 | SW25 | 15 Winter | 100 | +40% | 10/15 Summer | 100/15 Summer | | | 84.802 | 1.277 |
| 2.000 | RE | 60 Winter | 100 | +40% | | | | | 83.690 | 0.000 |
| 2.001 | SW26A | 15 Winter | 100 | +40% | 10/15 Summer | 100/15 Winter | | | 85.051 | 1.476 |
| 1.003 | SW26 | 360 Winter | 100 | +40% | 10/15 Summer | | | | 84.669 | 1.319 |
| 1.004 | SW29 | 360 Winter | 100 | +40% | 10/15 Summer | | | | 84.666 | 1.386 |
| 3.000 | RE | 15 Winter | 100 | +40% | | | | | 84.575 | 0.000 |
| 4.000 | RE | 15 Winter | 100 | +40% | | | | | 84.600 | 0.000 |
| 3.001 | Junction | 30 Winter | 100 | +40% | | | | | 84.345 | 0.000 |
| 3.002 | SW31 | 360 Winter | 100 | +40% | 100/15 Summer | | | | 84.666 | 0.471 |
| 1.005 | SW30 | 360 Winter | 100 | +40% | 1/15 Summer | | | | 84.664 | 1.609 |
| 5.000 | RE | 15 Winter | 100 | +40% | | | | | 84.700 | 0.000 |
| 1.006 | SW32 | 360 Winter | 100 | +40% | 10/15 Summer | | | | 84.679 | 1.569 |
| 1.007 | SW33 | 360 Winter | 100 | +40% | 1/60 Winter | | | | 84.711 | 2.211 |
| 6.000 | RE | 60 Winter | 100 | +40% | | | | | 82.720 | 0.000 |
| 7.000 | RE | 60 Winter | 100 | +40% | | | | | 82.670 | 0.000 |
| 6.001 | SW35 | 15 Winter | 100 | +40% | 10/15 Summer | | | | 85.108 | 2.473 |
| 6.002 | SW36 | 15 Winter | 100 | +40% | 10/15 Summer | | | | 85.038 | 2.453 |
| 1.008 | SW34 | 360 Winter | 100 | +40% | 1/15 Winter | | | | 84.722 | 2.342 |
| 1.009 | SW37 | 360 Winter | 100 | +40% | 1/15 Summer | | | | 84.719 | 2.569 |
| 1.010 | SW38 | 360 Winter | 100 | +40% | | | | | 81.842 | -0.118 |

26-29 Saint Cross St
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066571 - Shredded Wheat



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Micro Drainage

Network 2019.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 3

| PN | US/MH Name | Flooded | | Pipe | | Status | Level Exceeded |
|-------|---------------|-----------------------------|----------------|-------------------|---------------|-------------|-------------------|
| | | Volume (m ³) | Flow / Cap. | Overflow (l/s) | Flow (l/s) | | |
| 1.000 | RE | 0.000 | 0.34 | | 17.3 | SURCHARGED* | |
| 1.001 | SW24 | 9.324 | 1.41 | | 46.2 | FLOOD | 4 |
| 1.002 | SW25 | 2.086 | 1.48 | | 49.7 | FLOOD | 4 |
| 2.000 | RE | 0.000 | 1.21 | | 17.4 | SURCHARGED* | |
| 2.001 | SW26A | 0.525 | 1.41 | | 58.0 | FLOOD | 1 |
| 1.003 | SW26 | 0.000 | 0.43 | | 23.8 | FLOOD RISK | |
| 1.004 | SW29 | 0.000 | 0.27 | | 23.1 | FLOOD RISK | |
| 3.000 | RE | 0.000 | 0.67 | | 34.8 | SURCHARGED* | |
| 4.000 | RE | 0.000 | 0.55 | | 8.0 | SURCHARGED* | |
| 3.001 | Junction | 0.000 | 0.70 | | 36.5 | SURCHARGED* | |
| 3.002 | SW31 | 0.000 | 0.23 | | 10.3 | SURCHARGED | |
| 1.005 | SW30 | 0.000 | 0.64 | | 34.7 | SURCHARGED | |
| 5.000 | RE | 0.000 | 1.27 | | 18.4 | FLOOD RISK* | |
| 1.006 | SW32 | 0.000 | 0.46 | | 37.0 | SURCHARGED | |
| 1.007 | SW33 | 0.000 | 0.24 | | 16.9 | FLOOD RISK | |
| 6.000 | RE | 0.000 | 1.39 | | 14.5 | SURCHARGED* | |
| 7.000 | RE | 0.000 | 1.20 | | 9.5 | SURCHARGED* | |
| 6.001 | SW35 | 0.000 | 1.59 | | 50.1 | FLOOD RISK | |
| 6.002 | SW36 | 0.000 | 3.36 | | 115.0 | FLOOD RISK | |
| 1.008 | SW34 | 0.000 | 0.19 | | 14.2 | FLOOD RISK | |
| 1.009 | SW37 | 0.000 | 0.16 | | 8.1 | FLOOD RISK | |
| 1.010 | SW38 | 0.000 | 0.10 | | 8.1 | OK | |