

|                                                          |                                   |                                                                                     |
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| 54 Hagley Road<br>Birmingham<br>West Midlands B16 8PE    |                                   |  |
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| XP Solutions                                             | Network 2020.1.3                  |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 100    | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 18.000 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.340  | Minimum Backdrop Height (m)           | 2.000 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 2.000 |
| 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)      | 500   |

Designed with Level Soffits

#### Network Design Table for Storm

« - Indicates pipe capacity < flow

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | n     | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| S1.000 | 10.437        | 0.265       | 39.4           | 0.017          | 5.00           | 0.0                |           | 0.075 | o           | 225         | Pipe/Conduit |  |
| S1.001 | 5.712         | 0.164       | 34.8           | 0.000          | 0.00           | 0.0                |           | 0.075 | o           | 225         | Pipe/Conduit |  |
| S2.000 | 10.371        | 0.429       | 24.2           | 0.028          | 5.00           | 0.0                |           | 0.075 | o           | 225         | Pipe/Conduit |  |
| S3.000 | 4.861         | 0.429       | 11.3           | 0.009          | 5.00           | 0.0                |           | 0.075 | o           | 225         | Pipe/Conduit |  |
| S1.002 | 13.049        | 0.079       | 165.2          | 0.000          | 0.00           | 0.0                |           | 0.075 | o           | 375         | Pipe/Conduit |  |
| S1.003 | 12.461        | 0.096       | 129.8          | 0.028          | 0.00           | 0.0                |           | 0.075 | o           | 375         | Pipe/Conduit |  |
| S4.000 | 6.348         | 0.083       | 76.5           | 0.009          | 5.00           | 0.0                |           | 0.075 | o           | 150         | Pipe/Conduit |  |

#### Network Results Table

| PN     | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S1.000 | 50.00           | 5.56           | 75.375       | 0.017            | 0.0                  | 0.0           | 0.0               | 0.31         | 12.4         | 2.3           |
| S1.001 | 50.00           | 5.84           | 75.110       | 0.017            | 0.0                  | 0.0           | 0.0               | 0.33         | 13.2         | 2.3           |
| S2.000 | 50.00           | 5.43           | 75.375       | 0.028            | 0.0                  | 0.0           | 0.0               | 0.40         | 15.8         | 3.8           |
| S3.000 | 50.00           | 5.14           | 75.375       | 0.009            | 0.0                  | 0.0           | 0.0               | 0.58         | 23.1         | 1.2           |
| S1.002 | 50.00           | 6.86           | 74.946       | 0.054            | 0.0                  | 0.0           | 0.0               | 0.21         | 23.6         | 7.3           |
| S1.003 | 50.00           | 7.72           | 74.867       | 0.082            | 0.0                  | 0.0           | 0.0               | 0.24         | 26.7         | 11.1          |
| S4.000 | 50.00           | 5.62           | 75.150       | 0.009            | 0.0                  | 0.0           | 0.0               | 0.17         | 3.0          | 1.2           |

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| Network Design Table for Storm |               |             |                |                |                |                    |           |       |             |             |              |                                                                                     |
|--------------------------------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| PN                             | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | n     | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                      |
| S5.000                         | 20.812        | 0.158       | 131.7          | 0.039          | 5.00           | 0.0                |           | 0.075 | o           | 225         | Pipe/Conduit |  |
| S4.001                         | 21.614        | 0.221       | 97.8           | 0.000          | 0.00           | 0.0                |           | 0.075 | o           | 300         | Pipe/Conduit |  |
| S1.004                         | 22.032        | 0.001       | 22032.0        | 0.052          | 0.00           | 0.0                |           | 0.075 | o           | 225         | Pipe/Conduit |  |
| S1.005                         | 28.172        | 0.480       | 58.7           | 0.000          | 0.00           | 0.0                |           | 0.075 | o           | 150         | Pipe/Conduit |  |
| S1.006                         | 4.937         | 0.338       | 14.6           | 0.000          | 0.00           | 0.0                |           | 0.075 | o           | 150         | Pipe/Conduit |  |
| S1.007                         | 39.917        | 0.480       | 83.2           | 0.000          | 0.00           | 0.0                | 0.600     |       | o           | 150         | Pipe/Conduit |  |
| S1.008                         | 40.467        | 0.350       | 115.6          | 0.000          | 0.00           | 0.0                | 0.600     |       | o           | 150         | Pipe/Conduit |  |

| Network Results Table |                 |                |              |                  |                      |               |                   |              |              |               |  |
|-----------------------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|--|
| PN                    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |  |
| S5.000                | 50.00           | 7.03           | 75.150       | 0.039            | 0.0                  | 0.0           | 0.0               | 0.17         | 6.8          | 5.3           |  |
| S4.001                | 50.00           | 8.54           | 74.992       | 0.048            | 0.0                  | 0.0           | 0.0               | 0.24         | 16.9         | 6.5           |  |
| S1.004                | 50.00           | 30.00          | 73.771       | 0.182            | 0.0                  | 0.0           | 0.0               | 0.01         | 0.5«         | 24.6          |  |
| S1.005                | 50.00           | 30.00          | 74.770       | 0.182            | 0.0                  | 0.0           | 0.0               | 0.19         | 3.4«         | 24.6          |  |
| S1.006                | 50.00           | 30.00          | 74.290       | 0.182            | 0.0                  | 0.0           | 0.0               | 0.39         | 6.9«         | 24.6          |  |
| S1.007                | 50.00           | 30.00          | 73.300       | 0.182            | 0.0                  | 0.0           | 0.0               | 1.10         | 19.5«        | 24.6          |  |
| S1.008                | 50.00           | 30.00          | 72.820       | 0.182            | 0.0                  | 0.0           | 0.0               | 0.93         | 16.5«        | 24.6          |  |

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Manhole Schedules for Storm

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | PN     | Pipe Out Invert Level (m) | Diameter (mm) | PN     | Pipes In Invert Level (m) | Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|--------|---------------------------|---------------|--------|---------------------------|---------------|---------------|
| SRE1    | 76.100    | 0.725        | Open Manhole  | 225                | S1.000 | 75.375                    | 225           |        |                           |               |               |
| SWMH1   | 76.100    | 0.990        | Open Manhole  | 600                | S1.001 | 75.110                    | 225           | S1.000 | 75.110                    | 225           |               |
| SRE2    | 76.100    | 0.725        | Open Manhole  | 225                | S2.000 | 75.375                    | 225           |        |                           |               |               |
| SRE3    | 76.100    | 0.725        | Open Manhole  | 225                | S3.000 | 75.375                    | 225           |        |                           |               |               |
| SWMH2   | 76.100    | 1.154        | Open Manhole  | 600                | S1.002 | 74.946                    | 375           | S1.001 | 74.946                    | 225           |               |
|         |           |              |               |                    |        |                           |               | S2.000 | 74.946                    | 225           |               |
|         |           |              |               |                    |        |                           |               | S3.000 | 74.946                    | 225           |               |
| SWMH3   | 76.100    | 1.233        | Open Manhole  | 600                | S1.003 | 74.867                    | 375           | S1.002 | 74.867                    | 375           |               |
| SWMH4   | 76.100    | 0.950        | Open Manhole  | 600                | S4.000 | 75.150                    | 150           |        |                           |               |               |
| SRE4    | 76.100    | 0.950        | Open Manhole  | 225                | S5.000 | 75.150                    | 225           |        |                           |               |               |
| SWMH5   | 76.100    | 1.108        | Open Manhole  | 1200               | S4.001 | 74.992                    | 300           | S4.000 | 75.067                    | 150           |               |
|         |           |              |               |                    |        |                           |               | S5.000 | 74.992                    | 225           |               |
| SWMH6   | 76.100    | 2.329        | Open Manhole  | 1500               | S1.004 | 73.771                    | 225           | S1.003 | 74.771                    | 375           | 1150          |
|         |           |              |               |                    |        |                           |               | S4.001 | 74.771                    | 300           | 1075          |
| SWMH7   | 76.100    | 2.330        | Open Manhole  | 1200               | S1.005 | 74.770                    | 150           | S1.004 | 73.770                    | 225           |               |
| SWMH8   | 76.100    | 1.810        | Open Manhole  | 1200               | S1.006 | 74.290                    | 150           | S1.005 | 74.290                    | 150           |               |
| SCWMH1  | 75.500    | 2.200        | Open Manhole  | 1200               | S1.007 | 73.300                    | 150           | S1.006 | 73.952                    | 150           | 652           |
| SCWHM2  | 75.900    | 3.080        | Open Manhole  | 1200               | S1.008 | 72.820                    | 150           | S1.007 | 72.820                    | 150           |               |
| S6500   | 75.210    | 2.740        | Open Manhole  | 1200               |        | OUTFALL                   |               | S1.008 | 72.470                    | 150           |               |

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|----------------|
| SRE1    | 388649.359          | 397465.739           | 388649.359               | 397465.739                | Required       |                |
| SWMH1   | 388652.473          | 397455.777           | 388652.473               | 397455.777                | Required       |                |
| SRE2    | 388642.687          | 397463.111           | 388642.687               | 397463.111                | Required       |                |
| SRE3    | 388642.485          | 397452.327           | 388642.485               | 397452.327                | Required       |                |
| SWMH2   | 388647.135          | 397453.742           | 388647.135               | 397453.742                | Required       |                |





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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
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   |       |              |      |        |        |       |       |        |        |       |              |      |
| <p style="text-align: center;"><u>PIPELINE SCHEDULES for Storm</u></p> <p style="text-align: center;"><u>Upstream Manhole</u></p> <table><tr><th>PN</th><th>Hyd Sect</th><th>Diam (mm)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>S1.000</td><td>o</td><td>225</td><td>SRE1</td><td>76.100</td><td>75.375</td><td>0.500</td><td>Open Manhole</td><td>225</td></tr><tr><td>S1.001</td><td>o</td><td>225</td><td>SWMH1</td><td>76.100</td><td>75.110</td><td>0.765</td><td>Open Manhole</td><td>600</td></tr><tr><td>S2.000</td><td>o</td><td>225</td><td>SRE2</td><td>76.100</td><td>75.375</td><td>0.500</td><td>Open Manhole</td><td>225</td></tr><tr><td>S3.000</td><td>o</td><td>225</td><td>SRE3</td><td>76.100</td><td>75.375</td><td>0.500</td><td>Open Manhole</td><td>225</td></tr><tr><td>S1.002</td><td>o</td><td>375</td><td>SWMH2</td><td>76.100</td><td>74.946</td><td>0.779</td><td>Open Manhole</td><td>600</td></tr><tr><td>S1.003</td><td>o</td><td>375</td><td>SWMH3</td><td>76.100</td><td>74.867</td><td>0.858</td><td>Open Manhole</td><td>600</td></tr><tr><td>S4.000</td><td>o</td><td>150</td><td>SWMH4</td><td>76.100</td><td>75.150</td><td>0.800</td><td>Open Manhole</td><td>600</td></tr><tr><td>S5.000</td><td>o</td><td>225</td><td>SRE4</td><td>76.100</td><td>75.150</td><td>0.725</td><td>Open Manhole</td><td>225</td></tr><tr><td>S4.001</td><td>o</td><td>300</td><td>SWMH5</td><td>76.100</td><td>74.992</td><td>0.808</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S1.004</td><td>o</td><td>225</td><td>SWMH6</td><td>76.100</td><td>73.771</td><td>2.104</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.005</td><td>o</td><td>150</td><td>SWMH7</td><td>76.100</td><td>74.770</td><td>1.180</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S1.006</td><td>o</td><td>150</td><td>SWMH8</td><td>76.100</td><td>74.290</td><td>1.660</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S1.007</td><td>o</td><td>150</td><td>SCWMH1</td><td>75.500</td><td>73.300</td><td>2.050</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S1.008</td><td>o</td><td>150</td><td>SCWHM2</td><td>75.900</td><td>72.820</td><td>2.930</td><td>Open Manhole</td><td>1200</td></tr></table> <p style="text-align: center;"><u>Downstream Manhole</u></p> <table><tr><th>PN</th><th>Length (m)</th><th>Slope (1:X)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>S1.000</td><td>10.437</td><td>39.4</td><td>SWMH1</td><td>76.100</td><td>75.110</td><td>0.765</td><td>Open Manhole</td><td>600</td></tr><tr><td>S1.001</td><td>5.712</td><td>34.8</td><td>SWMH2</td><td>76.100</td><td>74.946</td><td>0.929</td><td>Open Manhole</td><td>600</td></tr><tr><td>S2.000</td><td>10.371</td><td>24.2</td><td>SWMH2</td><td>76.100</td><td>74.946</td><td>0.929</td><td>Open Manhole</td><td>600</td></tr><tr><td>S3.000</td><td>4.861</td><td>11.3</td><td>SWMH2</td><td>76.100</td><td>74.946</td><td>0.929</td><td>Open Manhole</td><td>600</td></tr><tr><td>S1.002</td><td>13.049</td><td>165.2</td><td>SWMH3</td><td>76.100</td><td>74.867</td><td>0.858</td><td>Open Manhole</td><td>600</td></tr><tr><td>S1.003</td><td>12.461</td><td>129.8</td><td>SWMH6</td><td>76.100</td><td>74.771</td><td>0.954</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S4.000</td><td>6.348</td><td>76.5</td><td>SWMH5</td><td>76.100</td><td>75.067</td><td>0.883</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S5.000</td><td>20.812</td><td>131.7</td><td>SWMH5</td><td>76.100</td><td>74.992</td><td>0.883</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S4.001</td><td>21.614</td><td>97.8</td><td>SWMH6</td><td>76.100</td><td>74.771</td><td>1.029</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.004</td><td>22.032</td><td>22032.0</td><td>SWMH7</td><td>76.100</td><td>73.770</td><td>2.105</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S1.005</td><td>28.172</td><td>58.7</td><td>SWMH8</td><td>76.100</td><td>74.290</td><td>1.660</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S1.006</td><td>4.937</td><td>14.6</td><td>SCWMH1</td><td>75.500</td><td>73.952</td><td>1.398</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S1.007</td><td>39.917</td><td>83.2</td><td>SCWHM2</td><td>75.900</td><td>72.820</td><td>2.930</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S1.008</td><td>40.467</td><td>115.6</td><td>S6500</td><td>75.210</td><td>72.470</td><td>2.590</td><td>Open Manhole</td><td>1200</td></tr></table> |            |                                                                                     |         |                                   |             | PN          | Hyd Sect      | Diam (mm)          | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) | S1.000 | o | 225 | SRE1 | 76.100 | 75.375 | 0.500 | Open Manhole | 225 | S1.001 | o | 225 | SWMH1 | 76.100 | 75.110 | 0.765 | Open Manhole | 600 | S2.000 | o | 225 | SRE2 | 76.100 | 75.375 | 0.500 | Open Manhole | 225 | S3.000 | o | 225 | SRE3 | 76.100 | 75.375 | 0.500 | Open Manhole | 225 | S1.002 | o | 375 | SWMH2 | 76.100 | 74.946 | 0.779 | Open Manhole | 600 | S1.003 | o | 375 | SWMH3 | 76.100 | 74.867 | 0.858 | Open Manhole | 600 | S4.000 | o | 150 | SWMH4 | 76.100 | 75.150 | 0.800 | Open Manhole | 600 | S5.000 | o | 225 | SRE4 | 76.100 | 75.150 | 0.725 | Open Manhole | 225 | S4.001 | o | 300 | SWMH5 | 76.100 | 74.992 | 0.808 | Open Manhole | 1200 | S1.004 | o | 225 | SWMH6 | 76.100 | 73.771 | 2.104 | Open Manhole | 1500 | S1.005 | o | 150 | SWMH7 | 76.100 | 74.770 | 1.180 | Open Manhole | 1200 | S1.006 | o | 150 | SWMH8 | 76.100 | 74.290 | 1.660 | Open Manhole | 1200 | S1.007 | o | 150 | SCWMH1 | 75.500 | 73.300 | 2.050 | Open Manhole | 1200 | S1.008 | o | 150 | SCWHM2 | 75.900 | 72.820 | 2.930 | Open Manhole | 1200 | PN | Length (m) | Slope (1:X) | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) | S1.000 | 10.437 | 39.4 | SWMH1 | 76.100 | 75.110 | 0.765 | Open Manhole | 600 | S1.001 | 5.712 | 34.8 | SWMH2 | 76.100 | 74.946 | 0.929 | Open Manhole | 600 | S2.000 | 10.371 | 24.2 | SWMH2 | 76.100 | 74.946 | 0.929 | Open Manhole | 600 | S3.000 | 4.861 | 11.3 | SWMH2 | 76.100 | 74.946 | 0.929 | Open Manhole | 600 | S1.002 | 13.049 | 165.2 | SWMH3 | 76.100 | 74.867 | 0.858 | Open Manhole | 600 | S1.003 | 12.461 | 129.8 | SWMH6 | 76.100 | 74.771 | 0.954 | Open Manhole | 1500 | S4.000 | 6.348 | 76.5 | SWMH5 | 76.100 | 75.067 | 0.883 | Open Manhole | 1200 | S5.000 | 20.812 | 131.7 | SWMH5 | 76.100 | 74.992 | 0.883 | Open Manhole | 1200 | S4.001 | 21.614 | 97.8 | SWMH6 | 76.100 | 74.771 | 1.029 | Open Manhole | 1500 | S1.004 | 22.032 | 22032.0 | SWMH7 | 76.100 | 73.770 | 2.105 | Open Manhole | 1200 | S1.005 | 28.172 | 58.7 | SWMH8 | 76.100 | 74.290 | 1.660 | Open Manhole | 1200 | S1.006 | 4.937 | 14.6 | SCWMH1 | 75.500 | 73.952 | 1.398 | Open Manhole | 1200 | S1.007 | 39.917 | 83.2 | SCWHM2 | 75.900 | 72.820 | 2.930 | Open Manhole | 1200 | S1.008 | 40.467 | 115.6 | S6500 | 75.210 | 72.470 | 2.590 | Open Manhole | 1200 |
| PN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Hyd Sect   | Diam (mm)                                                                           | MH Name | C.Level (m)                       | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | o          | 225                                                                                 | SRE1    | 76.100                            | 75.375      | 0.500       | Open Manhole  | 225                |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | o          | 225                                                                                 | SWMH1   | 76.100                            | 75.110      | 0.765       | Open Manhole  | 600                |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S2.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | o          | 225                                                                                 | SRE2    | 76.100                            | 75.375      | 0.500       | Open Manhole  | 225                |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S3.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | o          | 225                                                                                 | SRE3    | 76.100                            | 75.375      | 0.500       | Open Manhole  | 225                |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.002                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | o          | 375                                                                                 | SWMH2   | 76.100                            | 74.946      | 0.779       | Open Manhole  | 600                |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        |      |       |        |        |       |              |     |        |       |      |       |        |        |       |              |     |        |        |      |       |        |        |       |              |     |        |       |      |       |        |        |       |              |     |        |        |       |       |        |        |       |              |     |        |        |       |       |        |        |       |              |      |        |       |      |       |        |        |       |              |      |        |        |       |       |        |        |       |              |      |        |        |      |       |        |        |       |              |      |        |        |         |       |        |        |       |              |      |        |        |      |       |        |        |       |              |      |        |       |      |        |        |        |       |              |      |        |        |      |        |        |        |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.003                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S4.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S5.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S4.001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | o          | 300                                                                                 | SWMH5   | 76.100                            | 74.992      | 0.808       | Open Manhole  | 1200               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S1.004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S1.005                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S1.006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.007                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | o          | 150                                                                                 | SCWMH1  | 75.500                            | 73.300      | 2.050       | Open Manhole  | 1200               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S1.008                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        |      |       |        |        |       |              |     |        |       |      |       |        |        |       |              |     |        |        |      |       |        |        |       |              |     |        |       |      |       |        |        |       |              |     |        |        |       |       |        |        |       |              |     |        |        |       |       |        |        |       |              |      |        |       |      |       |        |        |       |              |      |        |        |       |       |        |        |       |              |      |        |        |      |       |        |        |       |              |      |        |        |         |       |        |        |       |              |      |        |        |      |       |        |        |       |              |      |        |       |      |        |        |        |       |              |      |        |        |      |        |        |     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| PN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Length (m) | Slope (1:X)                                                                         | MH Name | C.Level (m)                       | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        |      |       |        |        |       |              |     |        |       |      |       |        |        |       |              |     |        |        |      |       |        |        |       |              |     |        |       |      |       |        |        |       |              |     |        |        |       |       |        |        |       |              |     |        |        |       |       |        |        |       |              |      |        |       |      |       |        |        |       |              |      |        |        |       |       |        |        |       |              |      |        |        |      |       |        |        |       |              |      |        |        |         |       |        |        |       |              |      |        |        |      |       |        |        |       |              |      |        |       |      |        |        |        |       |              |      |        |        |      |        |        |        |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S1.001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S2.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S3.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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   |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S1.002                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 13.049     | 165.2                                                                               | SWMH3   | 76.100                            | 74.867      | 0.858       | Open Manhole  | 600                |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S1.003                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 12.461     | 129.8                                                                               | SWMH6   | 76.100                            | 74.771      | 0.954       | Open Manhole  | 1500               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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| S4.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.348      | 76.5                                                                                | SWMH5   | 76.100                            | 75.067      | 0.883       | Open Manhole  | 1200               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S5.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 20.812     | 131.7                                                                               | SWMH5   | 76.100                            | 74.992      | 0.883       | Open Manhole  | 1200               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S4.001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 21.614     | 97.8                                                                                | SWMH6   | 76.100                            | 74.771      | 1.029       | Open Manhole  | 1500               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        |      |       |        |        |       |              |     |        |       |      |       |        |        |       |              |     |        |        |      |       |        |        |       |              |     |        |       |      |       |        |        |       |              |     |        |        |       |       |        |        |       |              |     |        |        |       |       |        |        |       |              |      |        |       |      |       |        |        |       |              |      |        |        |       |       |        |        |       |              |      |        |        |      |       |        |        |       |              |      |        |        |         |       |        |        |       |              |      |        |        |      |       |        |        |       |              |      |        |       |      |        |        |        |       |              |      |        |        |      |        |        |        |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 22.032     | 22032.0                                                                             | SWMH7   | 76.100                            | 73.770      | 2.105       | Open Manhole  | 1200               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.005                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 28.172     | 58.7                                                                                | SWMH8   | 76.100                            | 74.290      | 1.660       | Open Manhole  | 1200               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4.937      | 14.6                                                                                | SCWMH1  | 75.500                            | 73.952      | 1.398       | Open Manhole  | 1200               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.007                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 39.917     | 83.2                                                                                | SCWHM2  | 75.900                            | 72.820      | 2.930       | Open Manhole  | 1200               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |
| S1.008                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 40.467     | 115.6                                                                               | S6500   | 75.210                            | 72.470      | 2.590       | Open Manhole  | 1200               |         |             |             |             |               |                    |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |       |        |        |       |              |     |        |   |     |      |        |        |       |              |     |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |       |        |        |       |              |      |        |   |     |        |        |        |       |              |      |        |   |     |        |        |        |       |              |      |    |            |             |         |             |             |             |               |                    |        |        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   |       |              |      |        |        |       |       |        |        |       |              |      |

|                                                          |                                   |                                                                                     |
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Free Flowing Outfall Details for Storm

| Outfall<br>Pipe Number | Outfall C. Level<br>Name (m) | I. Level<br>(m) | Min<br>I. Level<br>(m) | D,L<br>(mm) | W<br>(mm) |
|------------------------|------------------------------|-----------------|------------------------|-------------|-----------|
| S1.008                 | S6500                        | 75.210          | 72.470                 | 72.470 1200 | 0         |

  

Simulation Criteria for Storm

|                                 |       |                                     |               |
|---------------------------------|-------|-------------------------------------|---------------|
| Volumetric Runoff Coeff         | 0.750 | Additional Flow - % of Total Flow   | 0.000         |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /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 Storage Structures | 10 |
| Number of Online Controls   | 1 | Number of Time/Area Diagrams | 4  |
| Number of Offline Controls  | 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)            | 18.000            | Storm Duration (mins) | 30     |
| Ratio R               | 0.340             |                       |        |

  

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|                                                       |                     |                                                                                     |
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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SWMH7, DS/PN: S1.005, Volume (m³): 2.3

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SHE-0102-5000-1255-5000 |
| Design Head (m)                   | 1.255                      |
| Design Flow (l/s)                 | 5.0                        |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Minimise upstream storage  |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 102                        |
| Invert Level (m)                  | 74.770                     |
| Minimum Outlet Pipe Diameter (mm) | 150                        |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 1.255    | 5.0        |
| Flush-Flo™                | 0.370    | 5.0        |
| Kick-Flo®                 | 0.775    | 4.0        |
| Mean Flow over Head Range | -        | 4.4        |

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) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 3.4        | 1.200     | 4.9        | 3.000     | 7.5        | 7.000     | 11.2       |
| 0.200     | 4.7        | 1.400     | 5.3        | 3.500     | 8.1        | 7.500     | 11.6       |
| 0.300     | 5.0        | 1.600     | 5.6        | 4.000     | 8.6        | 8.000     | 12.0       |
| 0.400     | 5.0        | 1.800     | 5.9        | 4.500     | 9.1        | 8.500     | 12.3       |
| 0.500     | 4.9        | 2.000     | 6.2        | 5.000     | 9.6        | 9.000     | 12.7       |
| 0.600     | 4.8        | 2.200     | 6.5        | 5.500     | 10.0       | 9.500     | 13.0       |
| 0.800     | 4.1        | 2.400     | 6.8        | 6.000     | 10.4       |           |            |
| 1.000     | 4.5        | 2.600     | 7.0        | 6.500     | 10.8       |           |            |

|                                                          |                                   |                                                                                     |
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### Storage Structures for Storm

#### Filter Drain Manhole: SRE1, DS/PN: S1.000

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Pipe Diameter (m)           | 0.225 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | Pipe Depth above Invert (m) | 0.000 |
| Safety Factor                        | 2.0     | Number of Pipes             | 1     |
| Porosity                             | 0.30    | Slope (1:X)                 | 40.0  |
| Invert Level (m)                     | 75.375  | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.7     | Cap Infiltration Depth (m)  | 0.000 |
| Trench Length (m)                    | 10.4    |                             |       |

#### Filter Drain Manhole: SWMH1, DS/PN: S1.001

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Pipe Diameter (m)           | 0.225 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | Pipe Depth above Invert (m) | 0.000 |
| Safety Factor                        | 2.0     | Number of Pipes             | 1     |
| Porosity                             | 0.30    | Slope (1:X)                 | 35.0  |
| Invert Level (m)                     | 75.110  | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.7     | Cap Infiltration Depth (m)  | 0.000 |
| Trench Length (m)                    | 5.7     |                             |       |

#### Filter Drain Manhole: SRE2, DS/PN: S2.000

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Pipe Diameter (m)           | 0.225 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | Pipe Depth above Invert (m) | 0.000 |
| Safety Factor                        | 2.0     | Number of Pipes             | 1     |
| Porosity                             | 0.30    | Slope (1:X)                 | 24.0  |
| Invert Level (m)                     | 75.375  | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.7     | Cap Infiltration Depth (m)  | 0.000 |
| Trench Length (m)                    | 10.4    |                             |       |

#### Filter Drain Manhole: SRE3, DS/PN: S3.000

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Pipe Diameter (m)           | 0.225 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | Pipe Depth above Invert (m) | 0.000 |
| Safety Factor                        | 2.0     | Number of Pipes             | 1     |
| Porosity                             | 0.30    | Slope (1:X)                 | 11.0  |
| Invert Level (m)                     | 75.375  | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.7     | Cap Infiltration Depth (m)  | 0.000 |
| Trench Length (m)                    | 4.9     |                             |       |

#### Filter Drain Manhole: SWMH2, DS/PN: S1.002

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Pipe Diameter (m)           | 0.375 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | Pipe Depth above Invert (m) | 0.000 |
| Safety Factor                        | 2.0     | Number of Pipes             | 1     |
| Porosity                             | 0.30    | Slope (1:X)                 | 165.0 |
| Invert Level (m)                     | 74.946  | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.7     | Cap Infiltration Depth (m)  | 0.000 |
| Trench Length (m)                    | 13.0    |                             |       |

|                                                          |                                   |                                                                                     |
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Filter Drain Manhole: SWMH3, DS/PN: S1.003

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Pipe Diameter (m)           | 0.375 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | Pipe Depth above Invert (m) | 0.000 |
| Safety Factor                        | 2.0     | Number of Pipes             | 1     |
| Porosity                             | 0.30    | Slope (1:X)                 | 129.0 |
| Invert Level (m)                     | 74.867  | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.7     | Cap Infiltration Depth (m)  | 0.000 |
| Trench Length (m)                    | 12.5    |                             |       |

  

Filter Drain Manhole: SWMH4, DS/PN: S4.000

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Pipe Diameter (m)           | 0.150 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | Pipe Depth above Invert (m) | 0.000 |
| Safety Factor                        | 2.0     | Number of Pipes             | 1     |
| Porosity                             | 0.30    | Slope (1:X)                 | 76.0  |
| Invert Level (m)                     | 75.150  | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.7     | Cap Infiltration Depth (m)  | 0.000 |
| Trench Length (m)                    | 6.3     |                             |       |

  

Filter Drain Manhole: SRE4, DS/PN: S5.000

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Pipe Diameter (m)           | 0.225 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | Pipe Depth above Invert (m) | 0.000 |
| Safety Factor                        | 2.0     | Number of Pipes             | 1     |
| Porosity                             | 0.30    | Slope (1:X)                 | 131.0 |
| Invert Level (m)                     | 75.150  | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.7     | Cap Infiltration Depth (m)  | 0.000 |
| Trench Length (m)                    | 20.8    |                             |       |

  

Filter Drain Manhole: SWMH5, DS/PN: S4.001

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Pipe Diameter (m)           | 0.300 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | Pipe Depth above Invert (m) | 0.000 |
| Safety Factor                        | 2.0     | Number of Pipes             | 1     |
| Porosity                             | 0.30    | Slope (1:X)                 | 97.0  |
| Invert Level (m)                     | 74.992  | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.7     | Cap Infiltration Depth (m)  | 0.000 |
| Trench Length (m)                    | 21.6    |                             |       |

  

Cellular Storage Manhole: SWMH6, DS/PN: S1.004

|                                      |         |               |      |
|--------------------------------------|---------|---------------|------|
| Invert Level (m)                     | 73.796  | 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 <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 52.5                   | 0.0                         | 0.401     | 0.0                    | 0.0                         |
| 0.400     | 52.5                   | 0.0                         | 2.304     | 0.0                    | 0.0                         |

  

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|                                                          |                                   |                                                                                     |
|----------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|
| Nolan Associates Ltd                                     |                                   | Page 15                                                                             |
| 54 Hagley Road<br>Birmingham<br>West Midlands B16 8PE    |                                   |  |
| Date 23/04/2024 15:20<br>File SW CONSTRUCTION & ASBUI... | Designed by J.Dulku<br>Checked by |                                                                                     |
| XP Solutions                                             | Network 2020.1.3                  |                                                                                     |

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

| PN     | US/MH<br>Name | Water  | Surcharged | Flooded | Half Drain |          |        | Pipe  | Status     |
|--------|---------------|--------|------------|---------|------------|----------|--------|-------|------------|
|        |               | Level  | Depth      | Volume  | Flow /     | Overflow | Time   | Flow  |            |
|        |               | (m)    | (m)        | (m³)    | Cap.       | (l/s)    | (mins) | (l/s) |            |
| S1.000 | SRE1          | 76.067 | 0.467      | 0.000   | 0.07       |          | 63     | 0.8   | FLOOD RISK |
| S1.001 | SWMH1         | 76.063 | 0.728      | 0.000   | 0.05       |          | 93     | 0.7   | FLOOD RISK |
| S2.000 | SRE2          | 76.070 | 0.470      | 0.000   | 0.13       |          | 51     | 2.1   | FLOOD RISK |
| S3.000 | SRE3          | 76.061 | 0.461      | 0.000   | 0.06       |          | 51     | 1.3   | FLOOD RISK |
| S1.002 | SWMH2         | 76.061 | 0.740      | 0.000   | 0.15       |          | 111    | 3.5   | FLOOD RISK |
| S1.003 | SWMH3         | 76.055 | 0.813      | 0.000   | 0.26       |          | 129    | 6.8   | FLOOD RISK |
| S4.000 | SWMH4         | 76.055 | 0.755      | 0.000   | 0.43       |          | 81     | 1.3   | FLOOD RISK |
| S5.000 | SRE4          | 76.063 | 0.688      | 0.000   | 0.82       |          | 84     | 5.5   | FLOOD RISK |
| S4.001 | SWMH5         | 76.053 | 0.761      | 0.000   | 0.37       |          | 102    | 6.3   | FLOOD RISK |
| S1.004 | SWMH6         | 76.047 | 2.051      | 0.000   | 3.07       |          |        | 5.1   | FLOOD RISK |
| S1.005 | SWMH7         | 75.960 | 1.040      | 0.000   | 1.42       |          |        | 4.9   | FLOOD RISK |
| S1.006 | SWMH8         | 74.384 | -0.056     | 0.000   | 0.71       |          |        | 4.9   | OK         |
| S1.007 | SCWMH1        | 73.352 | -0.098     | 0.000   | 0.26       |          |        | 4.9   | OK         |
| S1.008 | SCWHM2        | 72.876 | -0.094     | 0.000   | 0.30       |          |        | 4.9   | OK         |

| PN     | US/MH  |  | Level<br>Exceeded |
|--------|--------|--|-------------------|
|        | Name   |  |                   |
| S1.000 | SRE1   |  |                   |
| S1.001 | SWMH1  |  |                   |
| S2.000 | SRE2   |  |                   |
| S3.000 | SRE3   |  |                   |
| S1.002 | SWMH2  |  |                   |
| S1.003 | SWMH3  |  |                   |
| S4.000 | SWMH4  |  |                   |
| S5.000 | SRE4   |  |                   |
| S4.001 | SWMH5  |  |                   |
| S1.004 | SWMH6  |  |                   |
| S1.005 | SWMH7  |  |                   |
| S1.006 | SWMH8  |  |                   |
| S1.007 | SCWMH1 |  |                   |
| S1.008 | SCWHM2 |  |                   |