

|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 1                                                                              |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

### 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)                | 2      | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 18.000 | Add Flow / Climate Change (%)         | 40    |
| Ratio R                              | 0.325  | Minimum Backdrop Height (m)           | 4.000 |
| Maximum Rainfall (mm/hr)             | 250    | Maximum Backdrop Height (m)           | 4.000 |
| 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)    | 0.76  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Time Area Diagram for Storm

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|
| 0-4            | 0.710        | 4-8            | 1.320        | 8-12           | 0.717        | 12-16          | 0.003        |

Total Area Contributing (ha) = 2.750

Total Pipe Volume (m³) = 20.620

#### 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) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| S1.000 | 33.240        | 0.202       | 164.8          | 0.000          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S2.000 | 38.235        | 0.224       | 170.6          | 0.000          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S2.001 | 7.049         | 0.040       | 174.8          | 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) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S1.000 | 53.85           | 5.71           | 28.834       | 0.000            | 0.0                  | 0.0           | 0.0               | 0.78         | 13.8         | 0.0           |
| S2.000 | 53.38           | 5.83           | 28.897       | 0.000            | 0.0                  | 0.0           | 0.0               | 0.77         | 13.5         | 0.0           |
| S2.001 | 52.79           | 5.99           | 28.673       | 0.000            | 0.0                  | 0.0           | 0.0               | 0.76         | 13.4         | 0.0           |

Barnsley Marshall

1 Birch Court  
Blackpole East  
Worcester, WR3 8SG

Date 12/03/2021 11:26  
File SW Drainage - 22.0 lps ...

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Network 2020.1

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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) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| S1.001 | 28.777        | 0.170       | 169.6          | 0.239          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S1.002 | 19.865        | 0.196       | 101.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S1.003 | 13.831        | 0.081       | 170.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S1.004 | 47.053        | 0.275       | 171.2          | 0.166          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S3.000 | 76.078        | 0.446       | 170.5          | 0.000          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S3.001 | 29.005        | 0.171       | 169.9          | 0.244          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S3.002 | 11.998        | 0.071       | 169.9          | 0.045          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S3.003 | 4.969         | 0.362       | 13.7           | 0.080          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S1.005 | 45.002        | 0.264       | 170.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S1.006 | 15.817        | 0.093       | 170.0          | 0.090          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S1.007 | 29.411        | 0.173       | 169.8          | 0.206          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| S4.000 | 56.129        | 0.329       | 170.6          | 0.000          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |   |
| S4.001 | 6.861         | 0.040       | 170.6          | 0.174          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S4.002 | 40.586        | 0.324       | 125.5          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S4.003 | 12.907        | 0.244       | 52.9           | 0.185          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S4.004 | 16.340        | 0.157       | 104.4          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S4.005 | 7.516         | 0.045       | 167.9          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S4.006 | 26.403        | 0.648       | 40.7           | 0.068          | 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) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S1.001 | 50.58           | 6.61           | 28.633       | 0.239            | 0.0                  | 0.0           | 13.1              | 0.77         | 13.6«        | 45.9          |
| S1.002 | 49.49           | 6.94           | 28.463       | 0.239            | 0.0                  | 0.0           | 13.1              | 1.00         | 17.6«        | 45.9          |
| S1.003 | 48.55           | 7.24           | 28.267       | 0.239            | 0.0                  | 0.0           | 13.1              | 0.77         | 13.5«        | 45.9          |
| S1.004 | 45.65           | 8.27           | 28.186       | 0.405            | 0.0                  | 0.0           | 20.0              | 0.77         | 13.5«        | 70.2          |
| S3.000 | 50.44           | 6.65           | 28.961       | 0.000            | 0.0                  | 0.0           | 0.0               | 0.77         | 13.5         | 0.0           |
| S3.001 | 48.43           | 7.28           | 28.515       | 0.244            | 0.0                  | 0.0           | 12.8              | 0.77         | 13.6«        | 44.8          |
| S3.002 | 47.66           | 7.54           | 28.344       | 0.290            | 0.0                  | 0.0           | 14.9              | 0.77         | 13.6«        | 52.3          |
| S3.003 | 47.57           | 7.57           | 28.273       | 0.369            | 0.0                  | 0.0           | 19.0              | 2.73         | 48.3«        | 66.6          |
| S1.005 | 43.25           | 9.25           | 27.911       | 0.775            | 0.0                  | 0.0           | 36.3              | 0.77         | 13.5«        | 127.0         |
| S1.006 | 42.47           | 9.59           | 27.648       | 0.865            | 0.0                  | 0.0           | 39.8              | 0.77         | 13.6«        | 139.3         |
| S1.007 | 41.12           | 10.23          | 27.554       | 1.071            | 0.0                  | 0.0           | 47.7              | 0.77         | 13.6«        | 166.9         |
| S4.000 | 51.94           | 6.22           | 29.167       | 0.000            | 0.0                  | 0.0           | 0.0               | 0.77         | 13.5         | 0.0           |
| S4.001 | 51.41           | 6.37           | 28.838       | 0.174            | 0.0                  | 0.0           | 9.7               | 0.77         | 13.5«        | 33.9          |
| S4.002 | 48.92           | 7.13           | 28.798       | 0.174            | 0.0                  | 0.0           | 9.7               | 0.90         | 15.8«        | 33.9          |
| S4.003 | 48.44           | 7.28           | 28.474       | 0.359            | 0.0                  | 0.0           | 18.8              | 1.39         | 24.5«        | 65.9          |
| S4.004 | 47.62           | 7.56           | 28.230       | 0.359            | 0.0                  | 0.0           | 18.8              | 0.98         | 17.4«        | 65.9          |
| S4.005 | 47.15           | 7.72           | 28.074       | 0.359            | 0.0                  | 0.0           | 18.8              | 0.77         | 13.7«        | 65.9          |
| S4.006 | 46.38           | 8.00           | 28.029       | 0.427            | 0.0                  | 0.0           | 21.5              | 1.58         | 27.9«        | 75.1          |

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| Barnsley Marshall                                        |                 |                |                |                  |                      |                                |                   |              |              |               | Page 3                                                                              |                                                                                       |
|----------------------------------------------------------|-----------------|----------------|----------------|------------------|----------------------|--------------------------------|-------------------|--------------|--------------|---------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                 |                |                |                  |                      |                                |                   |              |              |               |  |                                                                                       |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... |                 |                |                |                  |                      | Designed by Alex<br>Checked by |                   |              |              |               |                                                                                     |                                                                                       |
| Innovyze                                                 |                 |                |                |                  |                      | Network 2020.1                 |                   |              |              |               |                                                                                     |                                                                                       |
| 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)         | HYD<br>SECT  | DIA<br>(mm)  | Section       | Type                                                                                | Auto<br>Design                                                                        |
| S1.008                                                   | 17.251          | 0.101          | 171.2          | 0.000            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S1.009                                                   | 16.529          | 0.097          | 170.9          | 0.000            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S1.010                                                   | 10.398          | 0.061          | 169.7          | 0.000            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S5.000                                                   | 22.237          | 0.130          | 170.6          | 0.000            | 5.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S5.001                                                   | 7.273           | 0.575          | 12.6           | 0.100            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S1.011                                                   | 48.297          | 0.284          | 170.1          | 0.000            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S1.012                                                   | 45.920          | 0.395          | 116.3          | 0.238            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S6.000                                                   | 54.321          | 0.663          | 81.9           | 0.000            | 5.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S6.001                                                   | 7.499           | 0.059          | 127.8          | 0.088            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S6.002                                                   | 33.866          | 0.374          | 90.6           | 0.000            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |    |
| S6.003                                                   | 4.782           | 0.045          | 106.6          | 0.066            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |   |
| S6.004                                                   | 25.796          | 0.216          | 119.3          | 0.000            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |  |
| S7.000                                                   | 70.752          | 0.848          | 83.5           | 0.000            | 5.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |  |
| S7.001                                                   | 23.862          | 0.307          | 77.7           | 0.300            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |  |
| S6.005                                                   | 25.924          | 0.151          | 171.4          | 0.083            | 0.00                 | 0.0                            | 0.600             | o            | 150          | Pipe/Conduit  |                                                                                     |  |
| S1.013                                                   | 20.047          | 0.118          | 170.6          | 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) |                                                                                     |                                                                                       |
| S1.008                                                   | 40.37           | 10.60          | 27.381         | 1.498            |                      | 0.0                            | 0.0               | 65.5         | 0.77         | 13.5«         | 229.2                                                                               |                                                                                       |
| S1.009                                                   | 39.68           | 10.96          | 27.280         | 1.498            |                      | 0.0                            | 0.0               | 65.5         | 0.77         | 13.5«         | 229.2                                                                               |                                                                                       |
| S1.010                                                   | 39.26           | 11.19          | 27.184         | 1.498            |                      | 0.0                            | 0.0               | 65.5         | 0.77         | 13.6«         | 229.2                                                                               |                                                                                       |
| S5.000                                                   | 54.76           | 5.48           | 27.827         | 0.000            |                      | 0.0                            | 0.0               | 0.0          | 0.77         | 13.5          | 0.0                                                                                 |                                                                                       |
| S5.001                                                   | 54.58           | 5.53           | 27.697         | 0.100            |                      | 0.0                            | 0.0               | 5.9          | 2.85         | 50.3          | 20.6                                                                                |                                                                                       |
| S1.011                                                   | 37.46           | 12.24          | 27.122         | 1.597            |                      | 0.0                            | 0.0               | 65.5         | 0.77         | 13.6«         | 229.2                                                                               |                                                                                       |
| S1.012                                                   | 36.17           | 13.06          | 26.838         | 1.836            |                      | 0.0                            | 0.0               | 71.9         | 0.93         | 16.5«         | 251.8                                                                               |                                                                                       |
| S6.000                                                   | 53.45           | 5.81           | 27.952         | 0.000            |                      | 0.0                            | 0.0               | 0.0          | 1.11         | 19.6          | 0.0                                                                                 |                                                                                       |
| S6.001                                                   | 52.91           | 5.96           | 27.288         | 0.088            |                      | 0.0                            | 0.0               | 5.0          | 0.89         | 15.7«         | 17.6                                                                                |                                                                                       |
| S6.002                                                   | 50.99           | 6.49           | 27.230         | 0.088            |                      | 0.0                            | 0.0               | 5.0          | 1.06         | 18.7          | 17.6                                                                                |                                                                                       |
| S6.003                                                   | 50.71           | 6.57           | 26.856         | 0.154            |                      | 0.0                            | 0.0               | 8.5          | 0.97         | 17.2«         | 29.6                                                                                |                                                                                       |
| S6.004                                                   | 49.19           | 7.04           | 26.811         | 0.154            |                      | 0.0                            | 0.0               | 8.5          | 0.92         | 16.2«         | 29.6                                                                                |                                                                                       |
| S7.000                                                   | 52.48           | 6.07           | 27.750         | 0.000            |                      | 0.0                            | 0.0               | 0.0          | 1.10         | 19.5          | 0.0                                                                                 |                                                                                       |
| S7.001                                                   | 51.24           | 6.42           | 26.902         | 0.300            |                      | 0.0                            | 0.0               | 16.6         | 1.14         | 20.2«         | 58.2                                                                                |                                                                                       |
| S6.005                                                   | 47.48           | 7.60           | 26.595         | 0.536            |                      | 0.0                            | 0.0               | 27.6         | 0.76         | 13.5«         | 96.5                                                                                |                                                                                       |
| S1.013                                                   | 35.54           | 13.50          | 26.444         | 2.372            |                      | 0.0                            | 0.0               | 91.3         | 0.77         | 13.5«         | 319.6                                                                               |                                                                                       |
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|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 4                                                                              |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

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) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                      |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| S8.000 | 33.673        | 0.698       | 48.3           | 0.000          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S8.001 | 8.247         | 0.206       | 40.0           | 0.153          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S1.014 | 10.617        | 0.343       | 31.0           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S9.000 | 33.990        | 0.424       | 80.1           | 0.000          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S9.001 | 23.160        | 0.188       | 123.1          | 0.225          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S9.002 | 18.274        | 0.107       | 171.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S1.015 | 11.447        | 0.067       | 171.9          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| S1.016 | 11.389        | 0.067       | 170.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | 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) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S8.000 | 55.16           | 5.39           | 27.230       | 0.000            | 0.0                  | 0.0           | 0.0               | 1.45         | 25.7         | 0.0           |
| S8.001 | 54.80           | 5.47           | 26.532       | 0.153            | 0.0                  | 0.0           | 9.1               | 1.60         | 28.2«        | 31.8          |
| S1.014 | 35.41           | 13.59          | 26.326       | 2.525            | 0.0                  | 0.0           | 96.8              | 1.82         | 32.1«        | 339.0         |
| S9.000 | 54.67           | 5.50           | 26.702       | 0.000            | 0.0                  | 0.0           | 0.0               | 1.12         | 19.9         | 0.0           |
| S9.001 | 53.00           | 5.93           | 26.278       | 0.225            | 0.0                  | 0.0           | 12.9              | 0.90         | 16.0«        | 45.2          |
| S9.002 | 51.55           | 6.33           | 26.090       | 0.225            | 0.0                  | 0.0           | 12.9              | 0.76         | 13.5«        | 45.2          |
| S1.015 | 35.06           | 13.84          | 25.983       | 2.750            | 0.0                  | 0.0           | 104.5             | 0.76         | 13.5«        | 365.6         |
| S1.016 | 34.81           | 14.03          | 25.917       | 2.750            | 0.0                  | 0.0           | 104.5             | 1.00         | 39.8«        | 365.6         |

| Barnsley Marshall                                        |           |              |               |                                |        |                           |               | Page 5                                                                              |                           |               |               |
|----------------------------------------------------------|-----------|--------------|---------------|--------------------------------|--------|---------------------------|---------------|-------------------------------------------------------------------------------------|---------------------------|---------------|---------------|
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |           |              |               |                                |        |                           |               |  |                           |               |               |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... |           |              |               | Designed by Alex<br>Checked by |        |                           |               |                                                                                     |                           |               |               |
| Innovyze                                                 |           |              |               |                                |        |                           |               | Network 2020.1                                                                      |                           |               |               |
| <u>Manhole Schedules for Storm</u>                       |           |              |               |                                |        |                           |               |                                                                                     |                           |               |               |
| 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) |
| S1                                                       | 30.184    | 1.350        | Open Manhole  | 1200                           | S1.000 | 28.834                    | 150           |                                                                                     |                           |               |               |
| S2                                                       | 30.247    | 1.350        | Open Manhole  | 1200                           | S2.000 | 28.897                    | 150           |                                                                                     |                           |               |               |
| S3                                                       | 30.230    | 1.557        | Open Manhole  | 1200                           | S2.001 | 28.673                    | 150           | S2.000                                                                              | 28.673                    | 150           |               |
| S4                                                       | 30.182    | 1.550        | Open Manhole  | 1200                           | S1.001 | 28.633                    | 150           | S1.000                                                                              | 28.633                    | 150           |               |
|                                                          |           |              |               |                                |        |                           |               | S2.001                                                                              | 28.633                    | 150           |               |
| S5                                                       | 30.128    | 1.665        | Open Manhole  | 1200                           | S1.002 | 28.463                    | 150           | S1.001                                                                              | 28.463                    | 150           |               |
| S6                                                       | 29.627    | 1.360        | Open Manhole  | 1200                           | S1.003 | 28.267                    | 150           | S1.002                                                                              | 28.267                    | 150           |               |
| S7                                                       | 29.701    | 1.514        | Open Manhole  | 1200                           | S1.004 | 28.186                    | 150           | S1.003                                                                              | 28.186                    | 150           |               |
| S8                                                       | 30.311    | 1.350        | Open Manhole  | 1200                           | S3.000 | 28.961                    | 150           |                                                                                     |                           |               |               |
| S9                                                       | 30.660    | 2.146        | Open Manhole  | 1200                           | S3.001 | 28.515                    | 150           | S3.000                                                                              | 28.515                    | 150           |               |
| S10                                                      | 30.228    | 1.884        | Open Manhole  | 1200                           | S3.002 | 28.344                    | 150           | S3.001                                                                              | 28.344                    | 150           |               |
| S11                                                      | 30.099    | 1.826        | Open Manhole  | 1200                           | S3.003 | 28.273                    | 150           | S3.002                                                                              | 28.273                    | 150           |               |
| S12                                                      | 30.082    | 2.170        | Open Manhole  | 1200                           | S1.005 | 27.911                    | 150           | S1.004                                                                              | 27.911                    | 150           |               |
|                                                          |           |              |               |                                |        |                           |               | S3.003                                                                              | 27.911                    | 150           |               |
| S13                                                      | 29.673    | 2.025        | Open Manhole  | 1200                           | S1.006 | 27.648                    | 150           | S1.005                                                                              | 27.648                    | 150           |               |
| S14                                                      | 29.745    | 2.190        | Open Manhole  | 1200                           | S1.007 | 27.554                    | 150           | S1.006                                                                              | 27.554                    | 150           |               |
| S15                                                      | 30.517    | 1.350        | Open Manhole  | 1200                           | S4.000 | 29.167                    | 150           |                                                                                     |                           |               |               |
| S16                                                      | 30.371    | 1.533        | Open Manhole  | 1200                           | S4.001 | 28.838                    | 150           | S4.000                                                                              | 28.838                    | 150           |               |
| S17                                                      | 30.259    | 1.461        | Open Manhole  | 1200                           | S4.002 | 28.798                    | 150           | S4.001                                                                              | 28.798                    | 150           |               |
| S18                                                      | 29.824    | 1.350        | Open Manhole  | 1200                           | S4.003 | 28.474                    | 150           | S4.002                                                                              | 28.474                    | 150           |               |
| S19                                                      | 29.579    | 1.348        | Open Manhole  | 1200                           | S4.004 | 28.230                    | 150           | S4.003                                                                              | 28.230                    | 150           |               |
| S20                                                      | 29.423    | 1.349        | Open Manhole  | 1200                           | S4.005 | 28.074                    | 150           | S4.004                                                                              | 28.074                    | 150           |               |
| S21                                                      | 29.426    | 1.397        | Open Manhole  | 1200                           | S4.006 | 28.029                    | 150           | S4.005                                                                              | 28.029                    | 150           |               |
| S22                                                      | 29.371    | 1.990        | Open Manhole  | 1200                           | S1.008 | 27.381                    | 150           | S1.007                                                                              | 27.381                    | 150           |               |
|                                                          |           |              |               |                                |        |                           |               | S4.006                                                                              | 27.381                    | 150           |               |
| S23                                                      | 29.252    | 1.971        | Open Manhole  | 1200                           | S1.009 | 27.280                    | 150           | S1.008                                                                              | 27.280                    | 150           |               |
| S24                                                      | 29.224    | 2.041        | Open Manhole  | 1200                           | S1.010 | 27.184                    | 150           | S1.009                                                                              | 27.184                    | 150           |               |
| S25                                                      | 29.177    | 1.350        | Open Manhole  | 1200                           | S5.000 | 27.827                    | 150           |                                                                                     |                           |               |               |
| S25                                                      | 29.134    | 1.437        | Open Manhole  | 1200                           | S5.001 | 27.697                    | 150           | S5.000                                                                              | 27.697                    | 150           |               |
| S26                                                      | 29.140    | 2.018        | Open Manhole  | 1200                           | S1.011 | 27.122                    | 150           | S1.010                                                                              | 27.122                    | 150           |               |
|                                                          |           |              |               |                                |        |                           |               | S5.001                                                                              | 27.122                    | 150           |               |
| S27                                                      | 28.468    | 1.629        | Open Manhole  | 1200                           | S1.012 | 26.838                    | 150           | S1.011                                                                              | 26.838                    | 150           |               |
| S28                                                      | 29.302    | 1.350        | Open Manhole  | 1200                           | S6.000 | 27.952                    | 150           |                                                                                     |                           |               |               |
| S29                                                      | 28.638    | 1.350        | Open Manhole  | 1200                           | S6.001 | 27.288                    | 150           | S6.000                                                                              | 27.288                    | 150           |               |
| S30                                                      | 28.580    | 1.350        | Open Manhole  | 1200                           | S6.002 | 27.230                    | 150           | S6.001                                                                              | 27.230                    | 150           |               |
| S31                                                      | 28.206    | 1.350        | Open Manhole  | 1200                           | S6.003 | 26.856                    | 150           | S6.002                                                                              | 26.856                    | 150           |               |
| S32                                                      | 28.162    | 1.351        | Open Manhole  | 1200                           | S6.004 | 26.811                    | 150           | S6.003                                                                              | 26.811                    | 150           |               |
| S33                                                      | 29.101    | 1.351        | Open Manhole  | 1200                           | S7.000 | 27.750                    | 150           |                                                                                     |                           |               |               |
| ©1982-2020 Innovyze                                      |           |              |               |                                |        |                           |               |                                                                                     |                           |               |               |

|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 6                                                                              |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

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) | Back (mm) |
|------------|-----------|--------------|---------------|--------------------|--------|---------------------------|---------------|--------|---------------------------|---------------|-----------|
| S34        | 28.252    | 1.350        | Open Manhole  | 1200               | S7.001 | 26.902                    | 150           | S7.000 | 26.902                    | 150           |           |
| S35        | 27.944    | 1.349        | Open Manhole  | 1200               | S6.005 | 26.595                    | 150           | S6.004 | 26.595                    | 150           |           |
|            |           |              |               |                    |        |                           |               | S7.001 | 26.595                    | 150           |           |
| S36        | 27.823    | 1.380        | Open Manhole  | 1200               | S1.013 | 26.444                    | 150           | S1.012 | 26.444                    | 150           |           |
|            |           |              |               |                    |        |                           |               | S6.005 | 26.444                    | 150           |           |
| S37        | 28.580    | 1.350        | Open Manhole  | 1200               | S8.000 | 27.230                    | 150           |        |                           |               |           |
| S38        | 27.882    | 1.350        | Open Manhole  | 1200               | S8.001 | 26.532                    | 150           | S8.000 | 26.532                    | 150           |           |
| S39        | 27.838    | 1.512        | Open Manhole  | 1200               | S1.014 | 26.326                    | 150           | S1.013 | 26.326                    | 150           |           |
|            |           |              |               |                    |        |                           |               | S8.001 | 26.326                    | 150           |           |
| S40        | 28.053    | 1.350        | Open Manhole  | 1200               | S9.000 | 26.702                    | 150           |        |                           |               |           |
| S41        | 27.628    | 1.350        | Open Manhole  | 1200               | S9.001 | 26.278                    | 150           | S9.000 | 26.278                    | 150           |           |
| S42        | 27.444    | 1.354        | Open Manhole  | 1200               | S9.002 | 26.090                    | 150           | S9.001 | 26.090                    | 150           |           |
| S43        | 27.768    | 1.784        | Open Manhole  | 1200               | S1.015 | 25.983                    | 150           | S1.014 | 25.983                    | 150           |           |
|            |           |              |               |                    |        |                           |               | S9.002 | 25.983                    | 150           |           |
| S44        | 27.656    | 1.739        | Open Manhole  | 1200               | S1.016 | 25.917                    | 225           | S1.015 | 25.917                    | 150           |           |
| SHWtoDitch | 27.513    | 1.663        | Open Manhole  | 0                  |        | OUTFALL                   |               | S1.016 | 25.850                    | 225           |           |

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North)                                                                        |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|---------------------------------------------------------------------------------------|
| S1      | 337626.867          | 349357.492           | 337626.867               | 349357.492                | Required       |  |
| S2      | 337618.933          | 349355.603           | 337618.933               | 349355.603                | Required       |                                                                                       |
| S3      | 337647.832          | 349330.568           | 337647.832               | 349330.568                | Required       |                                                                                       |
| S4      | 337652.265          | 349336.049           | 337652.265               | 349336.049                | Required       |                                                                                       |
| S5      | 337673.330          | 349355.655           | 337673.330               | 349355.655                | Required       |                                                                                       |
| S6      | 337692.805          | 349351.737           | 337692.805               | 349351.737                | Required       |                                                                                       |
| S7      | 337703.371          | 349342.813           | 337703.371               | 349342.813                | Required       |                                                                                       |





|                                                          |                                |                                                                                     |
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| Barnsley Marshall                                        |                                | Page 9                                                                              |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

Manhole Schedules for Storm

| MH Name    | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North)                                                                        |
|------------|---------------------|----------------------|--------------------------|---------------------------|----------------|---------------------------------------------------------------------------------------|
| S37        | 337821.054          | 349461.796           | 337821.054               | 349461.796                | Required       |    |
| S38        | 337842.759          | 349487.539           | 337842.759               | 349487.539                | Required       |    |
| S39        | 337850.749          | 349489.583           | 337850.749               | 349489.583                | Required       |    |
| S40        | 337913.260          | 349475.113           | 337913.260               | 349475.113                | Required       |    |
| S41        | 337887.149          | 349496.873           | 337887.149               | 349496.873                | Required       |   |
| S42        | 337869.349          | 349511.690           | 337869.349               | 349511.690                | Required       |  |
| S43        | 337857.626          | 349497.672           | 337857.626               | 349497.672                | Required       |  |
| S44        | 337849.061          | 349505.266           | 337849.061               | 349505.266                | Required       |  |
| SHWtoDitch | 337840.474          | 349512.748           |                          |                           | No Entry       |  |

|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 10                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

PIPELINE SCHEDULES for Storm

Upstream Manhole

| 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        | 150       | S1      | 30.184      | 28.834      | 1.200       | Open Manhole  | 1200               |
| S2.000 | o        | 150       | S2      | 30.247      | 28.897      | 1.200       | Open Manhole  | 1200               |
| S2.001 | o        | 150       | S3      | 30.230      | 28.673      | 1.407       | Open Manhole  | 1200               |
| S1.001 | o        | 150       | S4      | 30.182      | 28.633      | 1.400       | Open Manhole  | 1200               |
| S1.002 | o        | 150       | S5      | 30.128      | 28.463      | 1.515       | Open Manhole  | 1200               |
| S1.003 | o        | 150       | S6      | 29.627      | 28.267      | 1.210       | Open Manhole  | 1200               |
| S1.004 | o        | 150       | S7      | 29.701      | 28.186      | 1.364       | Open Manhole  | 1200               |
| S3.000 | o        | 150       | S8      | 30.311      | 28.961      | 1.200       | Open Manhole  | 1200               |
| S3.001 | o        | 150       | S9      | 30.660      | 28.515      | 1.996       | Open Manhole  | 1200               |
| S3.002 | o        | 150       | S10     | 30.228      | 28.344      | 1.734       | Open Manhole  | 1200               |
| S3.003 | o        | 150       | S11     | 30.099      | 28.273      | 1.676       | Open Manhole  | 1200               |
| S1.005 | o        | 150       | S12     | 30.082      | 27.911      | 2.020       | Open Manhole  | 1200               |
| S1.006 | o        | 150       | S13     | 29.673      | 27.648      | 1.875       | Open Manhole  | 1200               |
| S1.007 | o        | 150       | S14     | 29.745      | 27.554      | 2.040       | Open Manhole  | 1200               |
| S4.000 | o        | 150       | S15     | 30.517      | 29.167      | 1.200       | Open Manhole  | 1200               |
| S4.001 | o        | 150       | S16     | 30.371      | 28.838      | 1.383       | Open Manhole  | 1200               |

Downstream Manhole

| 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 | 33.240     | 164.8       | S4      | 30.182      | 28.633      | 1.400       | Open Manhole  | 1200               |
| S2.000 | 38.235     | 170.6       | S3      | 30.230      | 28.673      | 1.407       | Open Manhole  | 1200               |
| S2.001 | 7.049      | 174.8       | S4      | 30.182      | 28.633      | 1.400       | Open Manhole  | 1200               |
| S1.001 | 28.777     | 169.6       | S5      | 30.128      | 28.463      | 1.515       | Open Manhole  | 1200               |
| S1.002 | 19.865     | 101.6       | S6      | 29.627      | 28.267      | 1.210       | Open Manhole  | 1200               |
| S1.003 | 13.831     | 170.6       | S7      | 29.701      | 28.186      | 1.364       | Open Manhole  | 1200               |
| S1.004 | 47.053     | 171.2       | S12     | 30.082      | 27.911      | 2.020       | Open Manhole  | 1200               |
| S3.000 | 76.078     | 170.5       | S9      | 30.660      | 28.515      | 1.996       | Open Manhole  | 1200               |
| S3.001 | 29.005     | 169.9       | S10     | 30.228      | 28.344      | 1.734       | Open Manhole  | 1200               |
| S3.002 | 11.998     | 169.9       | S11     | 30.099      | 28.273      | 1.676       | Open Manhole  | 1200               |
| S3.003 | 4.969      | 13.7        | S12     | 30.082      | 27.911      | 2.020       | Open Manhole  | 1200               |
| S1.005 | 45.002     | 170.6       | S13     | 29.673      | 27.648      | 1.875       | Open Manhole  | 1200               |
| S1.006 | 15.817     | 170.0       | S14     | 29.745      | 27.554      | 2.040       | Open Manhole  | 1200               |
| S1.007 | 29.411     | 169.8       | S22     | 29.371      | 27.381      | 1.840       | Open Manhole  | 1200               |
| S4.000 | 56.129     | 170.6       | S16     | 30.371      | 28.838      | 1.383       | Open Manhole  | 1200               |
| S4.001 | 6.861      | 170.6       | S17     | 30.259      | 28.798      | 1.311       | Open Manhole  | 1200               |

|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 11                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

PIPELINE SCHEDULES for Storm

Upstream Manhole

| PN     | Hyd Sect | Diam (mm) | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |
|--------|----------|-----------|---------|-------------|-------------|-------------|---------------|--------------------|
| S4.002 | o        | 150       | S17     | 30.259      | 28.798      | 1.311       | Open Manhole  | 1200               |
| S4.003 | o        | 150       | S18     | 29.824      | 28.474      | 1.200       | Open Manhole  | 1200               |
| S4.004 | o        | 150       | S19     | 29.579      | 28.230      | 1.198       | Open Manhole  | 1200               |
| S4.005 | o        | 150       | S20     | 29.423      | 28.074      | 1.199       | Open Manhole  | 1200               |
| S4.006 | o        | 150       | S21     | 29.426      | 28.029      | 1.247       | Open Manhole  | 1200               |
| S1.008 | o        | 150       | S22     | 29.371      | 27.381      | 1.840       | Open Manhole  | 1200               |
| S1.009 | o        | 150       | S23     | 29.252      | 27.280      | 1.821       | Open Manhole  | 1200               |
| S1.010 | o        | 150       | S24     | 29.224      | 27.184      | 1.891       | Open Manhole  | 1200               |
| S5.000 | o        | 150       | S25     | 29.177      | 27.827      | 1.200       | Open Manhole  | 1200               |
| S5.001 | o        | 150       | S25     | 29.134      | 27.697      | 1.287       | Open Manhole  | 1200               |
| S1.011 | o        | 150       | S26     | 29.140      | 27.122      | 1.867       | Open Manhole  | 1200               |
| S1.012 | o        | 150       | S27     | 28.468      | 26.838      | 1.479       | Open Manhole  | 1200               |
| S6.000 | o        | 150       | S28     | 29.302      | 27.952      | 1.200       | Open Manhole  | 1200               |
| S6.001 | o        | 150       | S29     | 28.638      | 27.288      | 1.200       | Open Manhole  | 1200               |
| S6.002 | o        | 150       | S30     | 28.580      | 27.230      | 1.200       | Open Manhole  | 1200               |
| S6.003 | o        | 150       | S31     | 28.206      | 26.856      | 1.200       | Open Manhole  | 1200               |
| S6.004 | o        | 150       | S32     | 28.162      | 26.811      | 1.201       | Open Manhole  | 1200               |

Downstream Manhole

| PN     | Length (m) | Slope (1:X) | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |
|--------|------------|-------------|---------|-------------|-------------|-------------|---------------|--------------------|
| S4.002 | 40.586     | 125.5       | S18     | 29.824      | 28.474      | 1.200       | Open Manhole  | 1200               |
| S4.003 | 12.907     | 52.9        | S19     | 29.579      | 28.230      | 1.198       | Open Manhole  | 1200               |
| S4.004 | 16.340     | 104.4       | S20     | 29.423      | 28.074      | 1.199       | Open Manhole  | 1200               |
| S4.005 | 7.516      | 167.9       | S21     | 29.426      | 28.029      | 1.247       | Open Manhole  | 1200               |
| S4.006 | 26.403     | 40.7        | S22     | 29.371      | 27.381      | 1.840       | Open Manhole  | 1200               |
| S1.008 | 17.251     | 171.2       | S23     | 29.252      | 27.280      | 1.821       | Open Manhole  | 1200               |
| S1.009 | 16.529     | 170.9       | S24     | 29.224      | 27.184      | 1.891       | Open Manhole  | 1200               |
| S1.010 | 10.398     | 169.7       | S26     | 29.140      | 27.122      | 1.867       | Open Manhole  | 1200               |
| S5.000 | 22.237     | 170.6       | S25     | 29.134      | 27.697      | 1.287       | Open Manhole  | 1200               |
| S5.001 | 7.273      | 12.6        | S26     | 29.140      | 27.122      | 1.868       | Open Manhole  | 1200               |
| S1.011 | 48.297     | 170.1       | S27     | 28.468      | 26.838      | 1.479       | Open Manhole  | 1200               |
| S1.012 | 45.920     | 116.3       | S36     | 27.823      | 26.444      | 1.230       | Open Manhole  | 1200               |
| S6.000 | 54.321     | 81.9        | S29     | 28.638      | 27.288      | 1.200       | Open Manhole  | 1200               |
| S6.001 | 7.499      | 127.8       | S30     | 28.580      | 27.230      | 1.200       | Open Manhole  | 1200               |
| S6.002 | 33.866     | 90.6        | S31     | 28.206      | 26.856      | 1.200       | Open Manhole  | 1200               |
| S6.003 | 4.782      | 106.6       | S32     | 28.162      | 26.811      | 1.201       | Open Manhole  | 1200               |
| S6.004 | 25.796     | 119.3       | S35     | 27.944      | 26.595      | 1.199       | Open Manhole  | 1200               |

|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 12                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

PIPELINE SCHEDULES for Storm

Upstream Manhole

| PN     | Hyd<br>Sect | Diam<br>(mm) | MH<br>Name | C.Level<br>(m) | I.Level<br>(m) | D.Depth<br>(m) | MH<br>Connection | MH DIAM., L*W<br>(mm) |
|--------|-------------|--------------|------------|----------------|----------------|----------------|------------------|-----------------------|
| S7.000 | o           | 150          | S33        | 29.101         | 27.750         | 1.201          | Open Manhole     | 1200                  |
| S7.001 | o           | 150          | S34        | 28.252         | 26.902         | 1.200          | Open Manhole     | 1200                  |
| S6.005 | o           | 150          | S35        | 27.944         | 26.595         | 1.199          | Open Manhole     | 1200                  |
| S1.013 | o           | 150          | S36        | 27.823         | 26.444         | 1.230          | Open Manhole     | 1200                  |
| S8.000 | o           | 150          | S37        | 28.580         | 27.230         | 1.200          | Open Manhole     | 1200                  |
| S8.001 | o           | 150          | S38        | 27.882         | 26.532         | 1.200          | Open Manhole     | 1200                  |
| S1.014 | o           | 150          | S39        | 27.838         | 26.326         | 1.362          | Open Manhole     | 1200                  |
| S9.000 | o           | 150          | S40        | 28.053         | 26.702         | 1.200          | Open Manhole     | 1200                  |
| S9.001 | o           | 150          | S41        | 27.628         | 26.278         | 1.200          | Open Manhole     | 1200                  |
| S9.002 | o           | 150          | S42        | 27.444         | 26.090         | 1.204          | Open Manhole     | 1200                  |
| S1.015 | o           | 150          | S43        | 27.768         | 25.983         | 1.634          | Open Manhole     | 1200                  |
| S1.016 | o           | 225          | S44        | 27.656         | 25.917         | 1.514          | Open Manhole     | 1200                  |

Downstream Manhole

| PN     | Length<br>(m) | Slope<br>(1:X) | MH<br>Name | C.Level<br>(m) | I.Level<br>(m) | D.Depth<br>(m) | MH<br>Connection | MH DIAM., L*W<br>(mm) |
|--------|---------------|----------------|------------|----------------|----------------|----------------|------------------|-----------------------|
| S7.000 | 70.752        | 83.5           | S34        | 28.252         | 26.902         | 1.200          | Open Manhole     | 1200                  |
| S7.001 | 23.862        | 77.7           | S35        | 27.944         | 26.595         | 1.199          | Open Manhole     | 1200                  |
| S6.005 | 25.924        | 171.4          | S36        | 27.823         | 26.444         | 1.230          | Open Manhole     | 1200                  |
| S1.013 | 20.047        | 170.6          | S39        | 27.838         | 26.326         | 1.362          | Open Manhole     | 1200                  |
| S8.000 | 33.673        | 48.3           | S38        | 27.882         | 26.532         | 1.200          | Open Manhole     | 1200                  |
| S8.001 | 8.247         | 40.0           | S39        | 27.838         | 26.326         | 1.362          | Open Manhole     | 1200                  |
| S1.014 | 10.617        | 31.0           | S43        | 27.768         | 25.983         | 1.634          | Open Manhole     | 1200                  |
| S9.000 | 33.990        | 80.1           | S41        | 27.628         | 26.278         | 1.200          | Open Manhole     | 1200                  |
| S9.001 | 23.160        | 123.1          | S42        | 27.444         | 26.090         | 1.204          | Open Manhole     | 1200                  |
| S9.002 | 18.274        | 171.6          | S43        | 27.768         | 25.983         | 1.634          | Open Manhole     | 1200                  |
| S1.015 | 11.447        | 171.9          | S44        | 27.656         | 25.917         | 1.589          | Open Manhole     | 1200                  |
| S1.016 | 11.389        | 170.0          | SHWtoDitch | 27.513         | 25.850         | 1.438          | Open Manhole     | 0                     |











|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 18                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

Online Controls for Storm

Orifice Manhole: S4, DS/PN: S1.001, Volume (m³): 2.4

Diameter (m) 0.056 Discharge Coefficient 0.600 Invert Level (m) 28.633

Orifice Manhole: S7, DS/PN: S1.004, Volume (m³): 1.9

Diameter (m) 0.061 Discharge Coefficient 0.600 Invert Level (m) 28.186

Orifice Manhole: S9, DS/PN: S3.001, Volume (m³): 3.7

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 28.515

Orifice Manhole: S10, DS/PN: S3.002, Volume (m³): 2.6

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.344

Orifice Manhole: S11, DS/PN: S3.003, Volume (m³): 2.3

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.273

Orifice Manhole: S13, DS/PN: S1.006, Volume (m³): 3.1

Diameter (m) 0.052 Discharge Coefficient 0.600 Invert Level (m) 27.648

Hydro-Brake® Optimum Manhole: S14, DS/PN: S1.007, Volume (m³): 2.7

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SCL-0145-1200-1200-1200 |
| Design Head (m)                   | 1.200                      |
| Design Flow (l/s)                 | 12.0                       |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Minimise blockage risk     |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 145                        |
| Invert Level (m)                  | 27.554                     |
| Minimum Outlet Pipe Diameter (mm) | 225                        |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 1.200    | 12.0       |
| Flush-Flo™                | 0.276    | 12.0       |
| Kick-Flo®                 | 0.694    | 9.3        |
| Mean Flow over Head Range | -        | 10.1       |

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

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|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 19                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze Network 2020.1                                  |                                |                                                                                     |

Hydro-Brake® Optimum Manhole: S14, DS/PN: S1.007, Volume (m³): 2.7

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 5.8        | 1.200     | 12.0       | 3.000     | 18.5       | 7.000     | 27.7       |
| 0.200     | 11.8       | 1.400     | 12.9       | 3.500     | 19.9       | 7.500     | 28.7       |
| 0.300     | 12.0       | 1.600     | 13.7       | 4.000     | 21.2       | 8.000     | 29.6       |
| 0.400     | 11.7       | 1.800     | 14.5       | 4.500     | 22.4       | 8.500     | 30.5       |
| 0.500     | 11.2       | 2.000     | 15.3       | 5.000     | 23.6       | 9.000     | 31.3       |
| 0.600     | 10.6       | 2.200     | 16.0       | 5.500     | 24.7       | 9.500     | 32.1       |
| 0.800     | 9.9        | 2.400     | 16.6       | 6.000     | 25.8       |           |            |
| 1.000     | 11.0       | 2.600     | 17.3       | 6.500     | 26.8       |           |            |

Orifice Manhole: S16, DS/PN: S4.001, Volume (m³): 2.7

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.838

Orifice Manhole: S18, DS/PN: S4.003, Volume (m³): 2.2

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.474

Orifice Manhole: S21, DS/PN: S4.006, Volume (m³): 1.7

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.029

Orifice Manhole: S25, DS/PN: S5.001, Volume (m³): 2.0

Diameter (m) 0.056 Discharge Coefficient 0.600 Invert Level (m) 27.697

Orifice Manhole: S27, DS/PN: S1.012, Volume (m³): 2.7

Diameter (m) 0.074 Discharge Coefficient 0.600 Invert Level (m) 26.838

Orifice Manhole: S29, DS/PN: S6.001, Volume (m³): 2.5

Diameter (m) 0.039 Discharge Coefficient 0.600 Invert Level (m) 27.288

Orifice Manhole: S31, DS/PN: S6.003, Volume (m³): 2.1

Diameter (m) 0.039 Discharge Coefficient 0.600 Invert Level (m) 26.856

Orifice Manhole: S34, DS/PN: S7.001, Volume (m³): 2.8

Diameter (m) 0.052 Discharge Coefficient 0.600 Invert Level (m) 26.902

Orifice Manhole: S35, DS/PN: S6.005, Volume (m³): 2.4

Diameter (m) 0.090 Discharge Coefficient 0.600 Invert Level (m) 26.595

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|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 20                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze Network 2020.1                                  |                                |                                                                                     |

Orifice Manhole: S38, DS/PN: S8.001, Volume (m³): 2.1

Diameter (m) 0.074 Discharge Coefficient 0.600 Invert Level (m) 26.532

Orifice Manhole: S41, DS/PN: S9.001, Volume (m³): 2.1

Diameter (m) 0.052 Discharge Coefficient 0.600 Invert Level (m) 26.278

Complex Manhole: S44, DS/PN: S1.016, Volume (m³): 2.1

Hydro-Brake® Optimum

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SHE-0176-1450-0700-1450 |
| Design Head (m)                   | 0.700                      |
| Design Flow (l/s)                 | 14.5                       |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Minimise upstream storage  |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 176                        |
| Invert Level (m)                  | 25.917                     |
| Minimum Outlet Pipe Diameter (mm) | 225                        |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 0.700    | 14.5       |
| Flush-Flo™                | 0.276    | 14.5       |
| Kick-Flo®                 | 0.531    | 12.7       |
| Mean Flow over Head Range | -        | 11.9       |

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     | 6.2        | 1.200     | 18.7       | 3.000     | 29.0       | 7.000     | 43.7       |
| 0.200     | 14.2       | 1.400     | 20.2       | 3.500     | 31.3       | 7.500     | 45.0       |
| 0.300     | 14.5       | 1.600     | 21.5       | 4.000     | 33.4       | 8.000     | 46.5       |
| 0.400     | 14.1       | 1.800     | 22.7       | 4.500     | 35.3       | 8.500     | 47.9       |
| 0.500     | 13.3       | 2.000     | 23.9       | 5.000     | 37.2       | 9.000     | 49.4       |
| 0.600     | 13.5       | 2.200     | 25.0       | 5.500     | 38.9       | 9.500     | 50.7       |
| 0.800     | 15.4       | 2.400     | 26.1       | 6.000     | 40.6       |           |            |
| 1.000     | 17.2       | 2.600     | 27.1       | 6.500     | 42.2       |           |            |

Hydro-Brake® Optimum

|                   |                            |
|-------------------|----------------------------|
| Unit Reference    | MD-SHE-0229-2600-0500-2600 |
| Design Head (m)   | 0.500                      |
| Design Flow (l/s) | 26.0                       |

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |                                                                                     |            |            |            |            |            |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|-----------|------------|-------|-----|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|-------|-------|------|-------|------|-------|------|-------|-------|-------|------|-------|------|-------|------|-------|-------|-------|------|-------|------|-------|------|--|--|-------|------|-------|------|-------|------|--|--|---------------------|--|--|
| Barnsley Marshall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                | Page 21                                                                             |            |            |            |            |            |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |  |            |            |            |            |            |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Designed by Alex<br>Checked by |                                                                                     |            |            |            |            |            |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| Innovyze<br>Network 2020.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |                                                                                     |            |            |            |            |            |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| <div>Hydro-Brake® Optimum</div> <div><div>Flush-Flo™</div><div>Objective</div><div>Application</div><div>Sump Available</div><div>Diameter (mm)</div><div>Invert Level (m)</div><div>Minimum Outlet Pipe Diameter (mm)</div><div>Suggested Manhole Diameter (mm)</div></div> <div><div>Calculated</div><div>Minimise upstream storage</div><div>Surface</div><div>Yes</div><div>229</div><div>26.617</div><div>300</div><div>1200</div></div> <div><div>Control Points</div><div>Design Point (Calculated)</div><div>Flush-Flo™</div><div>Kick-Flo®</div><div>Mean Flow over Head Range</div></div> <div><div>Head (m)</div><div>0.500</div><div>0.310</div><div>0.443</div><div>-</div></div> <div><div>Flow (l/s)</div><div>26.0</div><div>26.0</div><div>24.5</div><div>18.9</div></div> <div><p>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</p><table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>7.6</td><td>1.200</td><td>39.6</td><td>3.000</td><td>61.6</td><td>7.000</td><td>92.7</td></tr><tr><td>0.200</td><td>22.9</td><td>1.400</td><td>42.6</td><td>3.500</td><td>66.4</td><td>7.500</td><td>96.1</td></tr><tr><td>0.300</td><td>26.0</td><td>1.600</td><td>45.4</td><td>4.000</td><td>70.9</td><td>8.000</td><td>99.2</td></tr><tr><td>0.400</td><td>25.3</td><td>1.800</td><td>48.1</td><td>4.500</td><td>75.1</td><td>8.500</td><td>102.3</td></tr><tr><td>0.500</td><td>26.0</td><td>2.000</td><td>50.6</td><td>5.000</td><td>79.0</td><td>9.000</td><td>105.4</td></tr><tr><td>0.600</td><td>28.4</td><td>2.200</td><td>53.0</td><td>5.500</td><td>82.0</td><td>9.500</td><td>108.3</td></tr><tr><td>0.800</td><td>32.6</td><td>2.400</td><td>55.3</td><td>6.000</td><td>85.7</td><td></td><td></td></tr><tr><td>1.000</td><td>36.2</td><td>2.600</td><td>57.5</td><td>6.500</td><td>89.3</td><td></td><td></td></tr></table></div> <tr><td colspan="3">©1982-2020 Innovyze</td></tr> |                                |                                                                                     | Depth (m)  | Flow (l/s) | Depth (m)  | Flow (l/s) | Depth (m)  | Flow (l/s) | Depth (m) | Flow (l/s) | 0.100 | 7.6 | 1.200 | 39.6 | 3.000 | 61.6 | 7.000 | 92.7 | 0.200 | 22.9 | 1.400 | 42.6 | 3.500 | 66.4 | 7.500 | 96.1 | 0.300 | 26.0 | 1.600 | 45.4 | 4.000 | 70.9 | 8.000 | 99.2 | 0.400 | 25.3 | 1.800 | 48.1 | 4.500 | 75.1 | 8.500 | 102.3 | 0.500 | 26.0 | 2.000 | 50.6 | 5.000 | 79.0 | 9.000 | 105.4 | 0.600 | 28.4 | 2.200 | 53.0 | 5.500 | 82.0 | 9.500 | 108.3 | 0.800 | 32.6 | 2.400 | 55.3 | 6.000 | 85.7 |  |  | 1.000 | 36.2 | 2.600 | 57.5 | 6.500 | 89.3 |  |  | ©1982-2020 Innovyze |  |  |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Flow (l/s)                     | Depth (m)                                                                           | Flow (l/s) | Depth (m)  | Flow (l/s) | Depth (m)  | Flow (l/s) |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 7.6                            | 1.200                                                                               | 39.6       | 3.000      | 61.6       | 7.000      | 92.7       |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 22.9                           | 1.400                                                                               | 42.6       | 3.500      | 66.4       | 7.500      | 96.1       |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 26.0                           | 1.600                                                                               | 45.4       | 4.000      | 70.9       | 8.000      | 99.2       |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 25.3                           | 1.800                                                                               | 48.1       | 4.500      | 75.1       | 8.500      | 102.3      |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 26.0                           | 2.000                                                                               | 50.6       | 5.000      | 79.0       | 9.000      | 105.4      |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| 0.600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 28.4                           | 2.200                                                                               | 53.0       | 5.500      | 82.0       | 9.500      | 108.3      |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| 0.800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 32.6                           | 2.400                                                                               | 55.3       | 6.000      | 85.7       |            |            |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
| 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 36.2                           | 2.600                                                                               | 57.5       | 6.500      | 89.3       |            |            |            |           |            |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |       |       |       |      |       |      |       |      |  |  |       |      |       |      |       |      |  |  |                     |  |  |
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|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 22                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: S1.001

Invert Level (m) 28.633 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     | 350.0                  | 0.0                         | 0.401     | 0.0                    | 0.0                         |
| 0.400     | 350.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S7, DS/PN: S1.004

Invert Level (m) 28.186 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     | 120.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 120.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S9, DS/PN: S3.001

Invert Level (m) 28.515 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     | 345.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 345.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S10, DS/PN: S3.002

Invert Level (m) 28.344 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     | 18.4                   | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 18.4                   | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S11, DS/PN: S3.003

Invert Level (m) 28.273 Safety Factor 2.0  
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
Infiltration Coefficient Side (m/hr) 0.00000

|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 23                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze Network 2020.1                                  |                                |                                                                                     |

Cellular Storage Manhole: S11, DS/PN: S3.003

| 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     | 78.9                   | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 78.9                   | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S13, DS/PN: S1.006

Invert Level (m) 27.648 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     | 150.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 150.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S14, DS/PN: S1.007

Invert Level (m) 27.554 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     | 240.0                  | 0.0                         | 1.201     | 0.0                    | 0.0                         |
| 1.200     | 240.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S16, DS/PN: S4.001

Invert Level (m) 28.838 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     | 150.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 150.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S18, DS/PN: S4.003

Invert Level (m) 28.474 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     | 250.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 250.0                  | 0.0                         |           |                        |                             |

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|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 24                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze Network 2020.1                                  |                                |                                                                                     |

Cellular Storage Manhole: S21, DS/PN: S4.006

Invert Level (m) 28.029 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     | 80.0                   | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 80.0                   | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S25, DS/PN: S5.001

Invert Level (m) 27.697 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     | 90.0                   | 0.0                         | 0.401     | 0.0                    | 0.0                         |
| 0.400     | 90.0                   | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S27, DS/PN: S1.012

Invert Level (m) 26.838 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     | 150.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 150.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S29, DS/PN: S6.001

Invert Level (m) 27.288 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     | 100.0                  | 0.0                         | 0.401     | 0.0                    | 0.0                         |
| 0.400     | 100.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S31, DS/PN: S6.003

Invert Level (m) 26.856 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     | 150.0                  | 0.0                         | 0.400     | 150.0                  | 0.0                         |

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|                                                          |                                |                                                                                     |
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| Barnsley Marshall                                        |                                | Page 25                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze Network 2020.1                                  |                                |                                                                                     |

Cellular Storage Manhole: S31, DS/PN: S6.003

| 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> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.401     | 0.0                    | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S34, DS/PN: S7.001

Invert Level (m) 26.902 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     | 300.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 300.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S35, DS/PN: S6.005

Invert Level (m) 26.595 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     | 100.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 100.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S38, DS/PN: S8.001

Invert Level (m) 26.532 Safety Factor 2.0  
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
Infiltration Coefficient Side (m/hr) 0.00000

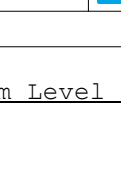
| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 72.3                   | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 72.3                   | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S41, DS/PN: S9.001

Invert Level (m) 26.278 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     | 164.5                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 164.5                  | 0.0                         |           |                        |                             |

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|                                                            |                                |                                                                                     |
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| Barnsley Marshall                                          |                                | Page 26                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG      |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ...   | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze <span style="float: right;">Network 2020.1</span> |                                |                                                                                     |

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

Simulation Criteria

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

|                               |                                 |
|-------------------------------|---------------------------------|
| Number of Input Hydrographs 0 | Number of Storage Structures 18 |
| Number of Online Controls 19  | Number of Time/Area Diagrams 0  |
| Number of Offline Controls 0  | Number of Real Time Controls 0  |

Synthetic Rainfall Details

|                                      |                    |               |
|--------------------------------------|--------------------|---------------|
| Rainfall Model                       | FSR                | Ratio R 0.323 |
| Region England and Wales Cv (Summer) | 0.750              |               |
| M5-60 (mm)                           | 18.000 Cv (Winter) | 0.840         |

|                                                   |       |
|---------------------------------------------------|-------|
| Margin for Flood Risk Warning (mm)                | 150.0 |
| Analysis Timestep 2.5 Second Increment (Extended) |       |
| DTS Status                                        | OFF   |
| DVD Status                                        | ON    |
| Inertia Status                                    | ON    |

|                          |                                                                                                     |
|--------------------------|-----------------------------------------------------------------------------------------------------|
| Profile(s)               | Summer and Winter                                                                                   |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080 |
| Return Period(s) (years) | 1, 30, 100                                                                                          |
| Climate Change (%)       | 40, 40, 40                                                                                          |

| PN     | US/MH Name | Storm       | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|--------|------------|-------------|---------------|----------------|-----------------|-----------------|--------------------|---------------|
| S1.000 | S1         | 15 Summer   | 1             | +40%           | 100/180 Winter  |                 |                    |               |
| S2.000 | S2         | 15 Summer   | 1             | +40%           | 100/360 Winter  |                 |                    |               |
| S2.001 | S3         | 480 Winter  | 1             | +40%           | 30/60 Summer    |                 |                    |               |
| S1.001 | S4         | 480 Winter  | 1             | +40%           | 30/30 Summer    |                 |                    |               |
| S1.002 | S5         | 480 Winter  | 1             | +40%           | 30/60 Winter    |                 |                    |               |
| S1.003 | S6         | 480 Winter  | 1             | +40%           | 1/480 Winter    |                 |                    |               |
| S1.004 | S7         | 480 Winter  | 1             | +40%           | 1/60 Winter     |                 |                    |               |
| S3.000 | S8         | 15 Summer   | 1             | +40%           | 100/600 Winter  |                 |                    |               |
| S3.001 | S9         | 2160 Winter | 1             | +40%           | 1/240 Winter    |                 |                    |               |
| S3.002 | S10        | 1440 Winter | 1             | +40%           | 1/15 Winter     |                 |                    |               |
| S3.003 | S11        | 1440 Winter | 1             | +40%           | 1/120 Summer    |                 |                    |               |
| S1.005 | S12        | 1440 Winter | 1             | +40%           | 1/600 Winter    |                 |                    |               |
| S1.006 | S13        | 1440 Winter | 1             | +40%           | 1/120 Summer    |                 |                    |               |
| S1.007 | S14        | 240 Winter  | 1             | +40%           | 30/30 Summer    |                 |                    |               |
| S4.000 | S15        | 15 Summer   | 1             | +40%           | 30/180 Winter   |                 |                    |               |
| S4.001 | S16        | 720 Winter  | 1             | +40%           | 1/120 Summer    |                 |                    |               |
| S4.002 | S17        | 720 Winter  | 1             | +40%           | 30/480 Winter   |                 |                    |               |

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|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 28                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

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

| PN     | US/MH Name | Storm       | Return Period | Climate Change | First (X)<br>Surcharge | First (Y)<br>Flood | First (Z)<br>Overflow | Overflow Act. |
|--------|------------|-------------|---------------|----------------|------------------------|--------------------|-----------------------|---------------|
| S4.003 | S18        | 2880 Winter | 1             | +40%           | 1/180 Winter           |                    |                       |               |
| S4.004 | S19        | 2880 Winter | 1             | +40%           | 30/120 Winter          |                    |                       |               |
| S4.005 | S20        | 2880 Winter | 1             | +40%           | 1/360 Winter           |                    |                       |               |
| S4.006 | S21        | 2880 Winter | 1             | +40%           | 1/180 Summer           |                    |                       |               |
| S1.008 | S22        | 720 Winter  | 1             | +40%           | 30/30 Summer           |                    |                       |               |
| S1.009 | S23        | 720 Winter  | 1             | +40%           | 1/360 Winter           |                    |                       |               |
| S1.010 | S24        | 720 Winter  | 1             | +40%           | 1/240 Winter           |                    |                       |               |
| S5.000 | S25        | 15 Summer   | 1             | +40%           | 30/60 Winter           |                    |                       |               |
| S5.001 | S25        | 180 Winter  | 1             | +40%           | 30/15 Summer           |                    |                       |               |
| S1.011 | S26        | 720 Winter  | 1             | +40%           | 1/180 Winter           |                    |                       |               |
| S1.012 | S27        | 960 Winter  | 1             | +40%           | 1/30 Summer            |                    |                       |               |
| S6.000 | S28        | 15 Summer   | 1             | +40%           |                        |                    |                       |               |
| S6.001 | S29        | 360 Winter  | 1             | +40%           | 30/15 Winter           |                    |                       |               |
| S6.002 | S30        | 360 Winter  | 1             | +40%           | 100/240 Winter         |                    |                       |               |
| S6.003 | S31        | 960 Winter  | 1             | +40%           | 30/60 Summer           |                    |                       |               |
| S6.004 | S32        | 960 Winter  | 1             | +40%           | 30/120 Summer          |                    |                       |               |
| S7.000 | S33        | 15 Summer   | 1             | +40%           |                        |                    |                       |               |
| S7.001 | S34        | 600 Winter  | 1             | +40%           | 1/120 Winter           |                    |                       |               |
| S6.005 | S35        | 480 Winter  | 1             | +40%           | 1/480 Winter           |                    |                       |               |
| S1.013 | S36        | 480 Winter  | 1             | +40%           | 1/120 Winter           |                    |                       |               |
| S8.000 | S37        | 15 Summer   | 1             | +40%           |                        |                    |                       |               |
| S8.001 | S38        | 120 Winter  | 1             | +40%           | 1/30 Winter            |                    |                       |               |
| S1.014 | S39        | 360 Winter  | 1             | +40%           | 1/120 Winter           |                    |                       |               |
| S9.000 | S40        | 15 Summer   | 1             | +40%           | 30/180 Winter          |                    |                       |               |
| S9.001 | S41        | 480 Winter  | 1             | +40%           | 1/60 Winter            | 100/480 Winter     |                       |               |
| S9.002 | S42        | 480 Winter  | 1             | +40%           | 1/60 Winter            |                    |                       |               |
| S1.015 | S43        | 480 Winter  | 1             | +40%           | 1/30 Winter            |                    |                       |               |
| S1.016 | S44        | 480 Winter  | 1             | +40%           | 1/60 Winter            |                    |                       |               |

| PN     | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status     |
|--------|------------|-----------------|----------------------|---------------------|-------------------|------------------------|-----------------|------------|
| S4.003 | S18        | 28.767          | 0.143                | 0.000               | 0.05              | 1222                   | 1.1             | SURCHARGED |
| S4.004 | S19        | 28.374          | -0.006               | 0.000               | 0.07              |                        | 1.1             | OK         |
| S4.005 | S20        | 28.369          | 0.145                | 0.000               | 0.10              |                        | 1.1             | SURCHARGED |
| S4.006 | S21        | 28.366          | 0.187                | 0.000               | 0.05              | 1429                   | 1.2             | SURCHARGED |
| S1.008 | S22        | 27.493          | -0.039               | 0.000               | 0.51              |                        | 6.4             | OK         |
| S1.009 | S23        | 27.466          | 0.036                | 0.000               | 0.51              |                        | 6.4             | SURCHARGED |
| S1.010 | S24        | 27.440          | 0.106                | 0.000               | 0.52              |                        | 6.3             | SURCHARGED |
| S5.000 | S25        | 27.827          | -0.150               | 0.000               | 0.00              |                        | 0.0             | OK         |
| S5.001 | S25        | 27.821          | -0.026               | 0.000               | 0.05              | 88                     | 2.0             | OK         |
| S1.011 | S26        | 27.419          | 0.147                | 0.000               | 0.59              |                        | 7.8             | SURCHARGED |
| S1.012 | S27        | 27.346          | 0.357                | 0.000               | 0.49              | 544                    | 7.8             | SURCHARGED |
| S6.000 | S28        | 27.952          | -0.150               | 0.000               | 0.00              |                        | 0.0             | OK         |
| S6.001 | S29        | 27.416          | -0.023               | 0.000               | 0.08              | 179                    | 1.0             | OK         |
| S6.002 | S30        | 27.253          | -0.127               | 0.000               | 0.06              |                        | 1.0             | OK         |

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|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 30                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

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

Simulation Criteria

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Areal Reduction Factor          | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Hot Start (mins)                | 0     | MADD Factor * 10m <sup>3</sup> /ha Storage | 0.000 |
| Hot Start Level (mm)            | 0     | Inlet Coefficient                          | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day)        | 0.000 |
| Foul Sewage per hectare (l/s)   | 0.000 |                                            |       |

|                             |    |                              |    |
|-----------------------------|----|------------------------------|----|
| Number of Input Hydrographs | 0  | Number of Storage Structures | 18 |
| Number of Online Controls   | 19 | Number of Time/Area Diagrams | 0  |
| Number of Offline Controls  | 0  | Number of Real Time Controls | 0  |

Synthetic Rainfall Details

|                          |             |             |       |
|--------------------------|-------------|-------------|-------|
| Rainfall Model           | FSR         | Ratio R     | 0.323 |
| Region England and Wales | Cv (Summer) |             | 0.750 |
| M5-60 (mm)               | 18.000      | Cv (Winter) | 0.840 |

|                                    |                                 |
|------------------------------------|---------------------------------|
| Margin for Flood Risk Warning (mm) | 150.0                           |
| Analysis Timestep                  | 2.5 Second Increment (Extended) |
| DTS Status                         | OFF                             |
| DVD Status                         | ON                              |
| Inertia Status                     | ON                              |

|                          |                                                                                                           |
|--------------------------|-----------------------------------------------------------------------------------------------------------|
| Profile(s)               | Summer and Winter                                                                                         |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600,<br>720, 960, 1440, 2160, 2880, 4320, 5760,<br>7200, 8640, 10080 |
| Return Period(s) (years) | 1, 30, 100                                                                                                |
| Climate Change (%)       | 40, 40, 40                                                                                                |

**WARNING: Half Drain Time has not been calculated as the structure is too full.**

| PN     | US/MH<br>Name | Storm       | Return<br>Period | Climate<br>Change | First (X)<br>Surcharge | First (Y)<br>Flood | First (Z)<br>Overflow | Overflow<br>Act. |
|--------|---------------|-------------|------------------|-------------------|------------------------|--------------------|-----------------------|------------------|
| S1.000 | S1            | 480 Winter  | 30               | +40%              | 100/180                | Winter             |                       |                  |
| S2.000 | S2            | 480 Winter  | 30               | +40%              | 100/360                | Winter             |                       |                  |
| S2.001 | S3            | 480 Winter  | 30               | +40%              | 30/60                  | Summer             |                       |                  |
| S1.001 | S4            | 480 Winter  | 30               | +40%              | 30/30                  | Summer             |                       |                  |
| S1.002 | S5            | 960 Winter  | 30               | +40%              | 30/60                  | Winter             |                       |                  |
| S1.003 | S6            | 960 Winter  | 30               | +40%              | 1/480                  | Winter             |                       |                  |
| S1.004 | S7            | 960 Winter  | 30               | +40%              | 1/60                   | Winter             |                       |                  |
| S3.000 | S8            | 2160 Winter | 30               | +40%              | 100/600                | Winter             |                       |                  |
| S3.001 | S9            | 2160 Winter | 30               | +40%              | 1/240                  | Winter             |                       |                  |
| S3.002 | S10           | 1440 Winter | 30               | +40%              | 1/15                   | Winter             |                       |                  |
| S3.003 | S11           | 1440 Winter | 30               | +40%              | 1/120                  | Summer             |                       |                  |
| S1.005 | S12           | 960 Winter  | 30               | +40%              | 1/600                  | Winter             |                       |                  |
| S1.006 | S13           | 960 Winter  | 30               | +40%              | 1/120                  | Summer             |                       |                  |
| S1.007 | S14           | 960 Winter  | 30               | +40%              | 30/30                  | Summer             |                       |                  |

|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 31                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

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

| PN     | US/MH<br>Name | Water  | Surcharged | Flooded | Flow /<br>Cap. | Overflow<br>(l/s) | Half Drain | Pipe  | Status     |
|--------|---------------|--------|------------|---------|----------------|-------------------|------------|-------|------------|
|        |               | Level  | Depth      | Volume  |                |                   | Time       | Flow  |            |
|        |               | (m)    | (m)        | (m³)    |                |                   | (mins)     | (l/s) |            |
| S1.000 | S1            | 28.924 | -0.060     | 0.000   | 0.00           |                   |            | 0.0   | OK         |
| S2.000 | S2            | 28.924 | -0.123     | 0.000   | 0.00           |                   |            | 0.0   | OK         |
| S2.001 | S3            | 28.924 | 0.101      | 0.000   | 0.00           |                   |            | 0.0   | SURCHARGED |
| S1.001 | S4            | 28.924 | 0.142      | 0.000   | 0.23           |                   | 405        | 3.0   | SURCHARGED |
| S1.002 | S5            | 28.790 | 0.177      | 0.000   | 0.18           |                   |            | 2.9   | SURCHARGED |
| S1.003 | S6            | 28.781 | 0.364      | 0.000   | 0.23           |                   |            | 2.9   | SURCHARGED |
| S1.004 | S7            | 28.773 | 0.437      | 0.000   | 0.36           |                   | 654        | 4.8   | SURCHARGED |
| S3.000 | S8            | 29.040 | -0.071     | 0.000   | 0.00           |                   |            | 0.0   | OK         |
| S3.001 | S9            | 29.040 | 0.375      | 0.000   | 0.07           |                   | 1728       | 0.9   | SURCHARGED |
| S3.002 | S10           | 28.981 | 0.487      | 0.000   | 0.08           |                   |            | 1.0   | SURCHARGED |
| S3.003 | S11           | 28.848 | 0.424      | 0.000   | 0.04           |                   | 1452       | 1.4   | SURCHARGED |
| S1.005 | S12           | 28.632 | 0.571      | 0.000   | 0.45           |                   |            | 6.0   | SURCHARGED |
| S1.006 | S13           | 28.601 | 0.804      | 0.000   | 0.35           |                   |            | 4.4   | SURCHARGED |
| S1.007 | S14           | 28.035 | 0.331      | 0.000   | 0.52           |                   | 589        | 6.8   | SURCHARGED |

| PN     | US/MH |  | Level<br>Exceeded |
|--------|-------|--|-------------------|
|        | Name  |  |                   |
| S1.000 | S1    |  |                   |
| S2.000 | S2    |  |                   |
| S2.001 | S3    |  |                   |
| S1.001 | S4    |  |                   |
| S1.002 | S5    |  |                   |
| S1.003 | S6    |  |                   |
| S1.004 | S7    |  |                   |
| S3.000 | S8    |  |                   |
| S3.001 | S9    |  |                   |
| S3.002 | S10   |  |                   |
| S3.003 | S11   |  |                   |
| S1.005 | S12   |  |                   |
| S1.006 | S13   |  |                   |
| S1.007 | S14   |  |                   |

|                                                          |                                |                                                                                     |
|----------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Barnsley Marshall                                        |                                | Page 32                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

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

| PN     | US/MH<br>Name | Storm       | Return<br>Period | Climate<br>Change | First (X)<br>Surcharge | First (Y)<br>Flood | First (Z)<br>Overflow | Overflow<br>Act. |
|--------|---------------|-------------|------------------|-------------------|------------------------|--------------------|-----------------------|------------------|
| S4.000 | S15           | 720 Winter  | 30               | +40%              | 30/180 Winter          |                    |                       |                  |
| S4.001 | S16           | 720 Winter  | 30               | +40%              | 1/120 Summer           |                    |                       |                  |
| S4.002 | S17           | 2160 Winter | 30               | +40%              | 30/480 Winter          |                    |                       |                  |
| S4.003 | S18           | 2160 Winter | 30               | +40%              | 1/180 Winter           |                    |                       |                  |
| S4.004 | S19           | 2880 Winter | 30               | +40%              | 30/120 Winter          |                    |                       |                  |
| S4.005 | S20           | 2880 Winter | 30               | +40%              | 1/360 Winter           |                    |                       |                  |
| S4.006 | S21           | 2880 Winter | 30               | +40%              | 1/180 Summer           |                    |                       |                  |
| S1.008 | S22           | 960 Winter  | 30               | +40%              | 30/30 Summer           |                    |                       |                  |
| S1.009 | S23           | 960 Winter  | 30               | +40%              | 1/360 Winter           |                    |                       |                  |
| S1.010 | S24           | 360 Winter  | 30               | +40%              | 1/240 Winter           |                    |                       |                  |
| S5.000 | S25           | 180 Winter  | 30               | +40%              | 30/60 Winter           |                    |                       |                  |
| S5.001 | S25           | 180 Winter  | 30               | +40%              | 30/15 Summer           |                    |                       |                  |
| S1.011 | S26           | 360 Winter  | 30               | +40%              | 1/180 Winter           |                    |                       |                  |
| S1.012 | S27           | 480 Winter  | 30               | +40%              | 1/30 Summer            |                    |                       |                  |
| S6.000 | S28           | 15 Summer   | 30               | +40%              |                        |                    |                       |                  |
| S6.001 | S29           | 240 Winter  | 30               | +40%              | 30/15 Winter           |                    |                       |                  |
| S6.002 | S30           | 720 Winter  | 30               | +40%              | 100/240 Winter         |                    |                       |                  |
| S6.003 | S31           | 720 Winter  | 30               | +40%              | 30/60 Summer           |                    |                       |                  |
| S6.004 | S32           | 720 Winter  | 30               | +40%              | 30/120 Summer          |                    |                       |                  |
| S7.000 | S33           | 15 Summer   | 30               | +40%              |                        |                    |                       |                  |
| S7.001 | S34           | 600 Winter  | 30               | +40%              | 1/120 Winter           |                    |                       |                  |
| S6.005 | S35           | 720 Winter  | 30               | +40%              | 1/480 Winter           |                    |                       |                  |
| S1.013 | S36           | 720 Winter  | 30               | +40%              | 1/120 Winter           |                    |                       |                  |
| S8.000 | S37           | 15 Summer   | 30               | +40%              |                        |                    |                       |                  |
| S8.001 | S38           | 120 Winter  | 30               | +40%              | 1/30 Winter            |                    |                       |                  |
| S1.014 | S39           | 600 Winter  | 30               | +40%              | 1/120 Winter           |                    |                       |                  |
| S9.000 | S40           | 720 Winter  | 30               | +40%              | 30/180 Winter          |                    |                       |                  |
| S9.001 | S41           | 720 Winter  | 30               | +40%              | 1/60 Winter            | 100/480 Winter     |                       |                  |
| S9.002 | S42           | 600 Winter  | 30               | +40%              | 1/60 Winter            |                    |                       |                  |
| S1.015 | S43           | 600 Winter  | 30               | +40%              | 1/30 Winter            |                    |                       |                  |
| S1.016 | S44           | 600 Winter  | 30               | +40%              | 1/60 Winter            |                    |                       |                  |

| PN     | US/MH<br>Name | Water        | Surcharged   | Flooded        | Flow /<br>Cap. | Overflow<br>(l/s) | Half Drain     | Pipe          | Status     |
|--------|---------------|--------------|--------------|----------------|----------------|-------------------|----------------|---------------|------------|
|        |               | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) |                |                   | Time<br>(mins) | Flow<br>(l/s) |            |
| S4.000 | S15           | 29.390       | 0.073        | 0.000          | 0.00           |                   |                | 0.0           | SURCHARGED |
| S4.001 | S16           | 29.390       | 0.402        | 0.000          | 0.12           |                   | 764            | 1.4           | SURCHARGED |
| S4.002 | S17           | 29.091       | 0.143        | 0.000          | 0.08           |                   |                | 1.2           | SURCHARGED |
| S4.003 | S18           | 29.084       | 0.460        | 0.000          | 0.06           |                   | 1714           | 1.4           | SURCHARGED |
| S4.004 | S19           | 28.648       | 0.267        | 0.000          | 0.09           |                   |                | 1.4           | SURCHARGED |
| S4.005 | S20           | 28.642       | 0.418        | 0.000          | 0.12           |                   |                | 1.4           | SURCHARGED |
| S4.006 | S21           | 28.638       | 0.459        | 0.000          | 0.06           |                   | 2680           | 1.6           | SURCHARGED |
| S1.008 | S22           | 27.926       | 0.395        | 0.000          | 0.60           |                   |                | 7.6           | SURCHARGED |
| S1.009 | S23           | 27.901       | 0.470        | 0.000          | 0.61           |                   |                | 7.6           | SURCHARGED |
| S1.010 | S24           | 27.888       | 0.555        | 0.000          | 0.64           |                   |                | 7.7           | SURCHARGED |
| S5.000 | S25           | 28.007       | 0.030        | 0.000          | 0.00           |                   |                | 0.0           | SURCHARGED |

Barnsley Marshall

1 Birch Court  
Blackpole East  
Worcester, WR3 8SG

Date 12/03/2021 11:26  
File SW Drainage - 22.0 lps ...

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

| PN     | US/MH<br>Name | Water Level<br>(m) | Surcharged Depth<br>(m) | Flooded Volume<br>(m³) | Flow /<br>Cap. | Overflow<br>(l/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|--------|---------------|--------------------|-------------------------|------------------------|----------------|-------------------|------------------------------|-----------------------|------------|
| S5.001 | S25           | 28.007             | 0.160                   | 0.000                  | 0.08           |                   | 112                          | 3.6                   | SURCHARGED |
| S1.011 | S26           | 27.887             | 0.615                   | 0.000                  | 0.75           |                   |                              | 9.9                   | SURCHARGED |
| S1.012 | S27           | 27.872             | 0.884                   | 0.000                  | 0.62           |                   |                              | 9.9                   | SURCHARGED |
| S6.000 | S28           | 27.952             | -0.150                  | 0.000                  | 0.00           |                   |                              | 0.0                   | OK         |
| S6.001 | S29           | 27.601             | 0.162                   | 0.000                  | 0.13           |                   | 216                          | 1.7                   | SURCHARGED |
| S6.002 | S30           | 27.318             | -0.062                  | 0.000                  | 0.09           |                   |                              | 1.6                   | OK         |
| S6.003 | S31           | 27.311             | 0.305                   | 0.000                  | 0.11           |                   | 619                          | 1.4                   | SURCHARGED |
| S6.004 | S32           | 27.125             | 0.164                   | 0.000                  | 0.09           |                   |                              | 1.4                   | SURCHARGED |
| S7.000 | S33           | 27.750             | -0.150                  | 0.000                  | 0.00           |                   |                              | 0.0                   | OK         |
| S7.001 | S34           | 27.352             | 0.300                   | 0.000                  | 0.16           |                   | 524                          | 3.1                   | SURCHARGED |
| S6.005 | S35           | 27.120             | 0.375                   | 0.000                  | 0.38           |                   | 773                          | 4.9                   | SURCHARGED |
| S1.013 | S36           | 27.031             | 0.438                   | 0.000                  | 1.06           |                   |                              | 13.5                  | SURCHARGED |
| S8.000 | S37           | 27.230             | -0.150                  | 0.000                  | 0.00           |                   |                              | 0.0                   | OK         |
| S8.001 | S38           | 27.065             | 0.383                   | 0.000                  | 0.26           |                   |                              | 6.3                   | SURCHARGED |
| S1.014 | S39           | 26.908             | 0.432                   | 0.000                  | 0.54           |                   |                              | 15.6                  | SURCHARGED |
| S9.000 | S40           | 26.945             | 0.093                   | 0.000                  | 0.00           |                   |                              | 0.0                   | SURCHARGED |
| S9.001 | S41           | 26.945             | 0.517                   | 0.000                  | 0.14           |                   |                              | 2.2                   | SURCHARGED |
| S9.002 | S42           | 26.816             | 0.577                   | 0.000                  | 0.16           |                   |                              | 2.0                   | SURCHARGED |
| S1.015 | S43           | 26.808             | 0.674                   | 0.000                  | 1.43           |                   |                              | 17.4                  | SURCHARGED |
| S1.016 | S44           | 26.671             | 0.529                   | 0.000                  | 0.52           |                   |                              | 17.4                  | SURCHARGED |

US/MH  
PN

Level  
Name

Exceeded

S4.000 S15

S4.001 S16

S4.002 S17

S4.003 S18

S4.004 S19

S4.005 S20

S4.006 S21

S1.008 S22

S1.009 S23

S1.010 S24

S5.000 S25

S5.001 S25

S1.011 S26

S1.012 S27

S6.000 S28

S6.001 S29

S6.002 S30

S6.003 S31

S6.004 S32

S7.000 S33

S7.001 S34

S6.005 S35

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|                                                                                                        |                                             |                                                                                     |
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| Barnsley Marshall                                                                                      |                                             | Page 34                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG                                                  |                                             |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ...                                               | Designed by Alex<br>Checked by              |                                                                                     |
| Innovyze                                                                                               | Network 2020.1                              |                                                                                     |
| <u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u><br><u>for Storm</u> |                                             |                                                                                     |
|                                                                                                        | <div><div>US/MH</div><div>Level</div></div> |                                                                                     |
| <div>PN</div>                                                                                          | <div>Name</div>                             | <div>Exceeded</div>                                                                 |
| S1.013                                                                                                 | S36                                         |                                                                                     |
| S8.000                                                                                                 | S37                                         |                                                                                     |
| S8.001                                                                                                 | S38                                         |                                                                                     |
| S1.014                                                                                                 | S39                                         |                                                                                     |
| S9.000                                                                                                 | S40                                         |                                                                                     |
| S9.001                                                                                                 | S41                                         | 3                                                                                   |
| S9.002                                                                                                 | S42                                         |                                                                                     |
| S1.015                                                                                                 | S43                                         |                                                                                     |
| S1.016                                                                                                 | S44                                         |                                                                                     |

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|                                                          |                                |                                                                                     |
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| Barnsley Marshall                                        |                                | Page 36                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

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<br>Flow<br>(l/s) | Status |
|--------|---------------|--------------|--------------|----------------|----------------|-------------------|----------------|------------|-----|-----------------------|--------|
|        |               | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) | Flow /<br>Cap. | Overflow<br>(l/s) | Time<br>(mins) |            |     |                       |        |
| S1.000 | S1            | 29.417       | 0.433        | 0.000          | 0.02           |                   |                |            | 0.3 | SURCHARGED            |        |
| S2.000 | S2            | 29.417       | 0.370        | 0.000          | 0.02           |                   |                |            | 0.3 | SURCHARGED            |        |
| S2.001 | S3            | 29.417       | 0.594        | 0.000          | 0.06           |                   |                |            | 0.7 | SURCHARGED            |        |
| S1.001 | S4            | 29.417       | 0.634        | 0.000          | 0.25           |                   | 627            |            | 3.2 | SURCHARGED            |        |
| S1.002 | S5            | 29.299       | 0.687        | 0.000          | 0.19           |                   |                |            | 3.2 | SURCHARGED            |        |
| S1.003 | S6            | 29.289       | 0.872        | 0.000          | 0.25           |                   |                |            | 3.2 | SURCHARGED            |        |
| S1.004 | S7            | 29.280       | 0.944        | 0.000          | 0.40           |                   |                |            | 5.3 | SURCHARGED            |        |
| S3.000 | S8            | 29.231       | 0.120        | 0.000          | 0.00           |                   |                |            | 0.0 | SURCHARGED            |        |
| S3.001 | S9            | 29.231       | 0.566        | 0.000          | 0.08           |                   | 2149           |            | 1.0 | SURCHARGED            |        |
| S3.002 | S10           | 29.187       | 0.693        | 0.000          | 0.08           |                   |                |            | 1.0 | SURCHARGED            |        |
| S3.003 | S11           | 29.179       | 0.755        | 0.000          | 0.04           |                   |                |            | 1.6 | SURCHARGED            |        |
| S1.005 | S12           | 29.063       | 1.002        | 0.000          | 0.49           |                   |                |            | 6.5 | SURCHARGED            |        |
| S1.006 | S13           | 29.030       | 1.232        | 0.000          | 0.38           |                   |                |            | 4.7 | SURCHARGED            |        |
| S1.007 | S14           | 28.323       | 0.619        | 0.000          | 0.53           |                   | 684            |            | 6.8 | SURCHARGED            |        |

| PN     | US/MH |  | Level<br>Exceeded |
|--------|-------|--|-------------------|
|        | Name  |  |                   |
| S1.000 | S1    |  |                   |
| S2.000 | S2    |  |                   |
| S2.001 | S3    |  |                   |
| S1.001 | S4    |  |                   |
| S1.002 | S5    |  |                   |
| S1.003 | S6    |  |                   |
| S1.004 | S7    |  |                   |
| S3.000 | S8    |  |                   |
| S3.001 | S9    |  |                   |
| S3.002 | S10   |  |                   |
| S3.003 | S11   |  |                   |
| S1.005 | S12   |  |                   |
| S1.006 | S13   |  |                   |
| S1.007 | S14   |  |                   |

|                                                          |                                |                                                                                     |
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| Barnsley Marshall                                        |                                | Page 37                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

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

| PN     | US/MH Name | Storm       | Return Period | Climate Change | First (X) SurchARGE | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|--------|------------|-------------|---------------|----------------|---------------------|-----------------|--------------------|---------------|
| S4.000 | S15        | 720 Winter  | 100           | +40%           | 30/180 Winter       |                 |                    |               |
| S4.001 | S16        | 720 Winter  | 100           | +40%           | 1/120 Summer        |                 |                    |               |
| S4.002 | S17        | 2160 Winter | 100           | +40%           | 30/480 Winter       |                 |                    |               |
| S4.003 | S18        | 2160 Winter | 100           | +40%           | 1/180 Winter        |                 |                    |               |
| S4.004 | S19        | 1440 Winter | 100           | +40%           | 30/120 Winter       |                 |                    |               |
| S4.005 | S20        | 1440 Winter | 100           | +40%           | 1/360 Winter        |                 |                    |               |
| S4.006 | S21        | 1440 Winter | 100           | +40%           | 1/180 Summer        |                 |                    |               |
| S1.008 | S22        | 720 Winter  | 100           | +40%           | 30/30 Summer        |                 |                    |               |
| S1.009 | S23        | 240 Winter  | 100           | +40%           | 1/360 Winter        |                 |                    |               |
| S1.010 | S24        | 240 Winter  | 100           | +40%           | 1/240 Winter        |                 |                    |               |
| S5.000 | S25        | 240 Winter  | 100           | +40%           | 30/60 Winter        |                 |                    |               |
| S5.001 | S25        | 240 Winter  | 100           | +40%           | 30/15 Summer        |                 |                    |               |
| S1.011 | S26        | 240 Winter  | 100           | +40%           | 1/180 Winter        |                 |                    |               |
| S1.012 | S27        | 180 Winter  | 100           | +40%           | 1/30 Summer         |                 |                    |               |
| S6.000 | S28        | 240 Winter  | 100           | +40%           |                     |                 |                    |               |
| S6.001 | S29        | 240 Winter  | 100           | +40%           | 30/15 Winter        |                 |                    |               |
| S6.002 | S30        | 600 Winter  | 100           | +40%           | 100/240 Winter      |                 |                    |               |
| S6.003 | S31        | 600 Winter  | 100           | +40%           | 30/60 Summer        |                 |                    |               |
| S6.004 | S32        | 720 Winter  | 100           | +40%           | 30/120 Summer       |                 |                    |               |
| S7.000 | S33        | 15 Summer   | 100           | +40%           |                     |                 |                    |               |
| S7.001 | S34        | 600 Winter  | 100           | +40%           | 1/120 Winter        |                 |                    |               |
| S6.005 | S35        | 720 Winter  | 100           | +40%           | 1/480 Winter        |                 |                    |               |
| S1.013 | S36        | 600 Winter  | 100           | +40%           | 1/120 Winter        |                 |                    |               |
| S8.000 | S37        | 180 Winter  | 100           | +40%           |                     |                 |                    |               |
| S8.001 | S38        | 180 Winter  | 100           | +40%           | 1/30 Winter         |                 |                    |               |
| S1.014 | S39        | 600 Winter  | 100           | +40%           | 1/120 Winter        |                 |                    |               |
| S9.000 | S40        | 600 Winter  | 100           | +40%           | 30/180 Winter       |                 |                    |               |
| S9.001 | S41        | 600 Winter  | 100           | +40%           | 1/60 Winter         | 100/480 Winter  |                    |               |
| S9.002 | S42        | 600 Winter  | 100           | +40%           | 1/60 Winter         |                 |                    |               |
| S1.015 | S43        | 600 Winter  | 100           | +40%           | 1/30 Winter         |                 |                    |               |
| S1.016 | S44        | 600 Winter  | 100           | +40%           | 1/60 Winter         |                 |                    |               |

|        |       | Water  | Surcharged | Flooded           |        |          |        | Half Drain | Pipe       |  |
|--------|-------|--------|------------|-------------------|--------|----------|--------|------------|------------|--|
|        | US/MH | Level  | Depth      | Volume            | Flow / | Overflow | Time   | Flow       |            |  |
| PN     | Name  | (m)    | (m)        | (m <sup>3</sup> ) | Cap.   | (l/s)    | (mins) | (l/s)      | Status     |  |
| S4.000 | S15   | 29.585 | 0.267      | 0.000             | 0.00   |          |        | 0.0        | SURCHARGED |  |
| S4.001 | S16   | 29.585 | 0.596      | 0.000             | 0.13   |          |        | 1.5        | SURCHARGED |  |
| S4.002 | S17   | 29.270 | 0.322      | 0.000             | 0.08   |          |        | 1.2        | SURCHARGED |  |
| S4.003 | S18   | 29.263 | 0.638      | 0.000             | 0.07   |          | 1985   | 1.5        | SURCHARGED |  |
| S4.004 | S19   | 28.788 | 0.407      | 0.000             | 0.09   |          |        | 1.5        | SURCHARGED |  |
| S4.005 | S20   | 28.782 | 0.558      | 0.000             | 0.13   |          |        | 1.5        | SURCHARGED |  |
| S4.006 | S21   | 28.777 | 0.598      | 0.000             | 0.07   |          |        | 1.8        | SURCHARGED |  |
| S1.008 | S22   | 28.201 | 0.669      | 0.000             | 0.66   |          |        | 8.3        | SURCHARGED |  |
| S1.009 | S23   | 28.253 | 0.823      | 0.000             | 0.67   |          |        | 8.4        | SURCHARGED |  |
| S1.010 | S24   | 28.322 | 0.989      | 0.000             | 0.65   |          |        | 7.9        | SURCHARGED |  |
| S5.000 | S25   | 29.003 | 1.026      | 0.000             | 0.05   |          |        | 0.6        | SURCHARGED |  |

|                                                          |                                |                                                                                     |
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| Barnsley Marshall                                        |                                | Page 38                                                                             |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG    |                                |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by |                                                                                     |
| Innovyze                                                 | Network 2020.1                 |                                                                                     |

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

| PN     | US/MH<br>Name | Water        | Surcharged   | Flooded        | Flow /<br>Cap. | Overflow<br>(l/s) | Half Drain     | Pipe          | Status     |
|--------|---------------|--------------|--------------|----------------|----------------|-------------------|----------------|---------------|------------|
|        |               | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) |                |                   | Time<br>(mins) | Flow<br>(l/s) |            |
| S5.001 | S25           | 29.003       | 1.156        | 0.000          | 0.12           |                   | 243            | 5.3           | FLOOD RISK |
| S1.011 | S26           | 28.380       | 1.108        | 0.000          | 0.76           |                   |                | 10.1          | SURCHARGED |
| S1.012 | S27           | 28.443       | 1.454        | 0.000          | 0.77           |                   |                | 12.3          | FLOOD RISK |
| S6.000 | S28           | 28.061       | -0.041       | 0.000          | 0.01           |                   |                | 0.2           | OK         |
| S6.001 | S29           | 28.061       | 0.623        | 0.000          | 0.20           |                   | 286            | 2.8           | SURCHARGED |
| S6.002 | S30           | 27.770       | 0.390        | 0.000          | 0.11           |                   |                | 1.9           | SURCHARGED |
| S6.003 | S31           | 27.762       | 0.756        | 0.000          | 0.16           |                   |                | 2.1           | SURCHARGED |
| S6.004 | S32           | 27.322       | 0.361        | 0.000          | 0.13           |                   |                | 2.0           | SURCHARGED |
| S7.000 | S33           | 27.750       | -0.150       | 0.000          | 0.00           |                   |                | 0.0           | OK         |
| S7.001 | S34           | 27.525       | 0.473        | 0.000          | 0.17           |                   | 561            | 3.2           | SURCHARGED |
| S6.005 | S35           | 27.311       | 0.566        | 0.000          | 0.43           |                   | 840            | 5.6           | SURCHARGED |
| S1.013 | S36           | 27.195       | 0.602        | 0.000          | 1.19           |                   |                | 15.2          | SURCHARGED |
| S8.000 | S37           | 27.275       | -0.105       | 0.000          | 0.00           |                   |                | 0.0           | OK         |
| S8.001 | S38           | 27.275       | 0.593        | 0.000          | 0.25           |                   | 181            | 6.3           | SURCHARGED |
| S1.014 | S39           | 27.052       | 0.576        | 0.000          | 0.62           |                   |                | 17.9          | SURCHARGED |
| S9.000 | S40           | 27.629       | 0.777        | 0.000          | 0.02           |                   |                | 0.3           | SURCHARGED |
| S9.001 | S41           | 27.629       | 1.201        | 0.603          | 0.31           |                   |                | 4.6           | FLOOD      |
| S9.002 | S42           | 26.948       | 0.708        | 0.000          | 0.37           |                   |                | 4.6           | SURCHARGED |
| S1.015 | S43           | 26.927       | 0.794        | 0.000          | 1.81           |                   |                | 22.0          | SURCHARGED |
| S1.016 | S44           | 26.710       | 0.568        | 0.000          | 0.65           |                   |                | 22.0          | SURCHARGED |

| PN     | US/MH<br>Name | Level<br>Exceeded |
|--------|---------------|-------------------|
| S4.000 | S15           |                   |
| S4.001 | S16           |                   |
| S4.002 | S17           |                   |
| S4.003 | S18           |                   |
| S4.004 | S19           |                   |
| S4.005 | S20           |                   |
| S4.006 | S21           |                   |
| S1.008 | S22           |                   |
| S1.009 | S23           |                   |
| S1.010 | S24           |                   |
| S5.000 | S25           |                   |
| S5.001 | S25           |                   |
| S1.011 | S26           |                   |
| S1.012 | S27           |                   |
| S6.000 | S28           |                   |
| S6.001 | S29           |                   |
| S6.002 | S30           |                   |
| S6.003 | S31           |                   |
| S6.004 | S32           |                   |
| S7.000 | S33           |                   |
| S7.001 | S34           |                   |
| S6.005 | S35           |                   |

|                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------|-------|--|----|------|----------|--|--------|-----|--|--|--------|-----|--|--|--------|-----|--|--|--------|-----|--|--|--------|-----|--|--|--------|-----|---|--|--------|-----|--|--|--------|-----|--|--|--------|-----|--|--|--|
| Barnsley Marshall                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Page 39                                                                             |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| Date 12/03/2021 11:26<br>File SW Drainage - 22.0 lps ...                                      | Designed by Alex<br>Checked by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| Innovyze                                                                                      | Network 2020.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| <u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
|                                                                                               | <table><tr><td></td><td>US/MH</td><td>Level</td><td></td></tr><tr><td>PN</td><td>Name</td><td>Exceeded</td><td></td></tr><tr><td>S1.013</td><td>S36</td><td></td><td></td></tr><tr><td>S8.000</td><td>S37</td><td></td><td></td></tr><tr><td>S8.001</td><td>S38</td><td></td><td></td></tr><tr><td>S1.014</td><td>S39</td><td></td><td></td></tr><tr><td>S9.000</td><td>S40</td><td></td><td></td></tr><tr><td>S9.001</td><td>S41</td><td>3</td><td></td></tr><tr><td>S9.002</td><td>S42</td><td></td><td></td></tr><tr><td>S1.015</td><td>S43</td><td></td><td></td></tr><tr><td>S1.016</td><td>S44</td><td></td><td></td></tr></table> |                                                                                     | US/MH | Level |  | PN | Name | Exceeded |  | S1.013 | S36 |  |  | S8.000 | S37 |  |  | S8.001 | S38 |  |  | S1.014 | S39 |  |  | S9.000 | S40 |  |  | S9.001 | S41 | 3 |  | S9.002 | S42 |  |  | S1.015 | S43 |  |  | S1.016 | S44 |  |  |  |
|                                                                                               | US/MH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level                                                                               |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| PN                                                                                            | Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Exceeded                                                                            |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| S1.013                                                                                        | S36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| S8.000                                                                                        | S37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| S8.001                                                                                        | S38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| S1.014                                                                                        | S39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| S9.000                                                                                        | S40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| S9.001                                                                                        | S41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3                                                                                   |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| S9.002                                                                                        | S42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| S1.015                                                                                        | S43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
| S1.016                                                                                        | S44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |       |       |  |    |      |          |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |  |  |        |     |   |  |        |     |  |  |        |     |  |  |        |     |  |  |  |
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