

|                                                               |                                           |                                                                                     |
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| 11 Tungsten Building<br>George Street<br>Fishersgate BN41 1RA | Manor Nursery<br>Angmering<br>West Sussex |  |
| Date 28/06/2019<br>File Planning Network File.MDX             | Designed by S Burgess<br>Checked by SRD   |                                                                                     |
| Innovyze                                                      | Network 2017.1.2                          |                                                                                     |

  

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for NETWORK 3.SWS

Pipe Sizes NETWORK 9 Manhole Sizes NETWORK 9

FSR Rainfall Model - England and Wales

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 2      | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 19.600 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.350  | Minimum Backdrop Height (m)           | 0.500 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.000 |
| 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)    | 0.75  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

  

Network Design Table for NETWORK 3.SWS

| 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                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| 1.000 | 4.084         | 0.040       | 102.9          | 0.015          | 5.00           | 0.0                | 0.600     | o           | 100         | Pipe/Conduit |  |
| 1.001 | 12.407        | 0.121       | 103.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 100         | Pipe/Conduit |  |
| 2.000 | 14.607        | 0.485       | 30.1           | 0.010          | 5.00           | 0.0                | 0.600     | o           | 100         | Pipe/Conduit |  |
| 2.001 | 1.217         | 0.356       | 3.4            | 0.000          | 0.00           | 0.0                | 0.600     | o           | 100         | Pipe/Conduit |  |
| 1.002 | 3.389         | 0.033       | 103.0          | 0.015          | 0.00           | 0.0                | 0.600     | o           | 100         | 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) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 50.00           | 5.09           | 14.566       | 0.015            | 0.0                  | 0.0           | 0.0               | 0.76         | 6.0          | 2.0           |
| 1.001 | 50.00           | 5.36           | 14.526       | 0.015            | 0.0                  | 0.0           | 0.0               | 0.76         | 5.9          | 2.0           |
| 2.000 | 50.00           | 5.17           | 15.247       | 0.010            | 0.0                  | 0.0           | 0.0               | 1.41         | 11.1         | 1.4           |
| 2.001 | 50.00           | 5.18           | 14.762       | 0.010            | 0.0                  | 0.0           | 0.0               | 4.21         | 33.1         | 1.4           |
| 1.002 | 50.00           | 5.44           | 14.406       | 0.040            | 0.0                  | 0.0           | 0.0               | 0.76         | 5.9          | 5.4           |

  

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PIPELINE SCHEDULES for NETWORK 3.SWS

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) |
|-------|-------------|--------------|------------|----------------|----------------|----------------|------------------|-----------------------|
| 1.000 | o           | 100          | 1          | 15.866         | 14.566         | 1.200          | Open Manhole     | 1200                  |
| 1.001 | o           | 100          | 2          | 15.961         | 14.526         | 1.335          | Open Manhole     | 1200                  |
| 2.000 | o           | 100          | 5          | 16.547         | 15.247         | 1.200          | Open Manhole     | 1200                  |
| 2.001 | o           | 100          | 6          | 16.264         | 14.762         | 1.402          | Open Manhole     | 1200                  |
| 1.002 | o           | 100          | 3          | 16.291         | 14.406         | 1.785          | 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) |
|-------|---------------|----------------|------------|----------------|----------------|----------------|------------------|-----------------------|
| 1.000 | 4.084         | 102.9          | 2          | 15.961         | 14.526         | 1.335          | Open Manhole     | 1200                  |
| 1.001 | 12.407        | 103.0          | 3          | 16.291         | 14.406         | 1.785          | Open Manhole     | 1200                  |
| 2.000 | 14.607        | 30.1           | 6          | 16.264         | 14.762         | 1.402          | Open Manhole     | 1200                  |
| 2.001 | 1.217         | 3.4            | 3          | 16.291         | 14.406         | 1.785          | Open Manhole     | 1200                  |
| 1.002 | 3.389         | 103.0          | 4          | 16.375         | 14.373         | 1.902          | Open Manhole     | 0                     |

|                                                               |                                           |                                                                                     |
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| Innovyze Network 2017.1.2                                     |                                           |                                                                                     |

  

Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 3.SWS

  

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
 Hot Start (mins) 0      MADD Factor \* 10m³/ha Storage 2.000  
 Hot Start Level (mm) 0      Inlet 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 0  
 Number of Online Controls 0      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 0.350  
 Region England and Wales Cv (Summer) 0.750  
 M5-60 (mm) 19.500 Cv (Winter) 0.840

  

Margin for Flood Risk Warning (mm) 300.0      DVD Status OFF  
 Analysis Timestep Fine Inertia Status OFF  
 DTS Status ON

  

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

  

| PN    | US/MH Name | Storm     | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|-------|------------|-----------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|
| 1.000 | 1          | 15 Winter | 100           | +40%           | 100/15 Summer   |                 |                    |               | 15.104          |
| 1.001 | 2          | 15 Winter | 100           | +40%           | 100/15 Summer   |                 |                    |               | 15.036          |
| 2.000 | 5          | 15 Winter | 100           | +40%           |                 |                 |                    |               | 15.300          |
| 2.001 | 6          | 15 Winter | 100           | +40%           | 100/15 Summer   |                 |                    |               | 14.922          |
| 1.002 | 3          | 15 Winter | 100           | +40%           | 100/15 Summer   |                 |                    |               | 14.893          |

  

| PN    | US/MH Name | Surcharged Flooded |             | Flow / Overflow |       | Pipe       | Status     | Level Exceeded |
|-------|------------|--------------------|-------------|-----------------|-------|------------|------------|----------------|
|       |            | Depth (m)          | Volume (m³) | Cap.            | (l/s) | Flow (l/s) |            |                |
| 1.000 | 1          | 0.438              | 0.000       | 1.29            |       | 6.5        | SURCHARGED |                |
| 1.001 | 2          | 0.410              | 0.000       | 1.25            |       | 7.0        | SURCHARGED |                |
| 2.000 | 5          | -0.047             | 0.000       | 0.55            |       | 5.7        | OK         |                |
| 2.001 | 6          | 0.060              | 0.000       | 0.31            |       | 5.2        | SURCHARGED |                |
| 1.002 | 3          | 0.387              | 0.000       | 3.55            |       | 17.5       | SURCHARGED |                |

  

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