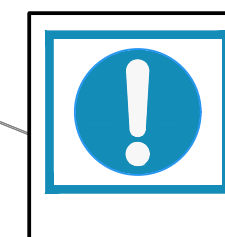


## **Appendix G – Drainage Strategy**



CLASH DETECTION BETWEEN THE PROPOSED DRAINAGE NETWORK AND THE SERVICES TO BE COMPLETED UPON RECEIPT OF THE SERVICES LAYOUT THE M&E CONSULTANTS.

1. DO NOT SCALE THIS DRAWING. WORK ONLY TO FIGURED DIMENSIONS.
2. FOR ALL RELEVANT NOTES, REFER TO STRUCTURAL AND CIVIL ENGINEERING PERFORMANCE SPECIFICATION.
3. ANY DISCREPANCIES ARE TO BE REPORTED TO PINNACLE CONSULTING ENGINEERS IMMEDIATELY.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SUB-CONTRACTORS DRAWINGS AND DETAILS.

|                                                                                     |                                            |
|-------------------------------------------------------------------------------------|--------------------------------------------|
|  | SITE BOUNDARY                              |
|  | PROPOSED PRIVATE SURFACE WATER SEWER       |
|  | PROPOSED PRIVATE FOUL SEWER                |
|  | EXISTING PUBLIC SURFACE SEWER              |
|  | EXISTING PUBLIC FOUL SEWER                 |
|  | PERFORATED PIPE                            |
|  | PROPOSED PRIVATE SURFACE WATER RISING MAIN |
|  | PROPOSED SURFACE WATER DRAINAGE CHANNEL    |
|  | PROPOSED ATTENUATION TANK                  |
|  | EXISTING ATTENUATION TANK                  |
|  | PROPOSED QUADRECEPTOR                      |
|  | PROPOSED PRETREAT INTERCEPTOR              |
|  | PROPOSED GULLY                             |
|  | PROPOSED OUT BOX/ SUMP UNIT                |
|  | PROPOSED ACCESS BOX                        |
|  | PROPOSED RAINWATER PIPE                    |
|  | PROPOSED POLYPROPYLENE INSPECTION CHAMBER  |
|  | PROPOSED POROUS PAVING                     |
|  | TREE PRESERVATION ORDERS (TPO) AREA        |
|  | NO DIG CONSTRUCTION AREA                   |

|     |                                                |    |     |          |
|-----|------------------------------------------------|----|-----|----------|
| P07 | REVISED PROPOSED OUTFALL MANHOLE INVERT LEVELS | SC | E0  | 07/05/21 |
| P06 | REVISED DRAINAGE LAYOUT                        | SC | E0  | 01/04/21 |
| P06 | REVISED DRAINAGE LAYOUT                        | SC | E0  | 01/04/21 |
| P05 | UPDATED SITE LAYOUT                            | SC | SG  | 09/02/21 |
| P04 | UPDATED SITE LAYOUT                            | SC | SG  | 05/02/21 |
| P03 | REVISED DRAINAGE LAYOUT                        | SC | SG  | 29/01/21 |
| P02 | UPDATED CLIENT NAME                            | IL | SG  | 22/01/21 |
| P01 | FIRST ISSUE                                    | BY | SG  | 21/01/21 |
| REV | DESCRIPTION                                    | IL | CHK | DATE     |

DRAWING TITLE  
DRAINAGE STRATEGY

ALCHEMY,  
BESSEMER ROAD,  
WELWYN GARDEN CITY,  
HERTS.  
AL7 1HE. TELEPHONE: 01707 527 630

NORWICH | LONDON | DUBLIN | THE HAGUE

|                                                                                                         |                 |                |                 |
|---------------------------------------------------------------------------------------------------------|-----------------|----------------|-----------------|
| DRAWING STATUS                                                                                          |                 |                |                 |
| INFORMATION                                                                                             |                 |                |                 |
| SCALE  A0<br>1:500 | DATE<br>JAN '21 | DRAWN BY<br>IL | CHECKED<br>SG   |
| DRG NO.<br>C200810-PIN-XX-XX-DR-C-00205                                                                 |                 |                | REVISION<br>P07 |

## **Appendix H – MicroDrainage Calculations**

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 1                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

#### Existing Network Details 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 |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|
| 1.000 | 90.000        | 0.900       | 100.0          | 0.110          | 4.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 1.001 | 31.605        | 0.300       | 105.4          | 0.119          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 2.000 | 80.692        | 0.710       | 113.7          | 0.318          | 4.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |
| 3.000 | 35.633        | 0.119       | 300.0          | 0.164          | 4.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |
| 3.001 | 34.527        | 0.106       | 325.0          | 0.191          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |
| 1.002 | 4.734         | 0.014       | 350.0          | 0.524          | 0.00           | 0.0                | 0.600     | o           | 525         | Pipe/Conduit |
| 1.003 | 50.167        | 0.125       | 400.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 525         | Pipe/Conduit |
| 1.004 | 90.021        | 0.225       | 400.0          | 0.016          | 0.00           | 0.0                | 0.600     | o           | 525         | Pipe/Conduit |
| 1.005 | 54.259        | 0.136       | 400.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 525         | Pipe/Conduit |
| 1.006 | 49.241        | -0.945      | -52.1          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 4.000 | 73.558        | 0.300       | 245.2          | 0.035          | 4.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 5.000 | 25.774        | 0.110       | 234.3          | 0.035          | 4.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 4.001 | 2.277         | 0.010       | 227.7          | 0.158          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 4.002 | 2.337         | 0.010       | 233.7          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 1.007 | 10.415        | 0.049       | 212.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 6.000 | 70.448        | 0.684       | 103.0          | 0.029          | 4.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 6.001 | 11.102        | 0.037       | 300.1          | 0.073          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |
| 6.002 | 97.993        | 0.292       | 335.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |

#### Network Results Table

| PN    | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Vel<br>(m/s) | Cap<br>(l/s) |
|-------|--------------|------------------|----------------------|--------------|--------------|
| 1.000 | 13.550       | 0.110            | 0.0                  | 1.57         | 111.1        |
| 1.001 | 12.650       | 0.229            | 0.0                  | 1.53         | 108.3        |
| 2.000 | 12.985       | 0.318            | 0.0                  | 1.70         | 187.6        |
| 3.000 | 12.500       | 0.164            | 0.0                  | 1.04         | 115.0        |
| 3.001 | 12.381       | 0.355            | 0.0                  | 1.00         | 110.4        |
| 1.002 | 12.125       | 1.426            | 0.0                  | 1.19         | 257.9        |
| 1.003 | 12.061       | 1.426            | 0.0                  | 1.11         | 241.1        |
| 1.004 | 11.936       | 1.442            | 0.0                  | 1.11         | 241.1        |
| 1.005 | 11.711       | 1.442            | 0.0                  | 1.11         | 241.1        |
| 1.006 | 11.575       | 1.442            | 0.0                  | 0.00         | 0.0          |
| 4.000 | 12.890       | 0.035            | 0.0                  | 1.00         | 70.7         |
| 5.000 | 12.700       | 0.035            | 0.0                  | 1.02         | 72.3         |
| 4.001 | 12.590       | 0.228            | 0.0                  | 1.04         | 73.4         |
| 4.002 | 12.530       | 0.228            | 0.0                  | 1.02         | 72.4         |
| 1.007 | 12.520       | 1.669            | 0.0                  | 1.07         | 76.0         |
| 6.000 | 13.484       | 0.029            | 0.0                  | 1.55         | 109.5        |
| 6.001 | 12.800       | 0.102            | 0.0                  | 1.04         | 114.9        |
| 6.002 | 12.763       | 0.102            | 0.0                  | 0.98         | 108.6        |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 2                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

Existing Network Details 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 |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|
| 7.000 | 55.968        | 0.224       | 250.0          | 0.167          | 4.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |
| 7.001 | 92.225        | 0.369       | 250.0          | 0.281          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |
| 7.002 | 8.072         | 0.040       | 201.8          | 0.486          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |
| 7.003 | 4.760         | 0.024       | 202.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |
| 7.004 | 9.043         | 0.108       | 83.7           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |
| 1.008 | 16.619        | 0.068       | 245.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 1.009 | 24.045        | 0.098       | 245.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |
| 1.010 | 15.897        | 0.065       | 244.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |

Network Results Table

| PN    | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Vel<br>(m/s) | Cap<br>(l/s) |
|-------|--------------|------------------|----------------------|--------------|--------------|
| 7.000 | 13.286       | 0.167            | 0.0                  | 1.28         | 203.8        |
| 7.001 | 13.062       | 0.449            | 0.0                  | 1.28         | 203.8        |
| 7.002 | 12.693       | 0.934            | 0.0                  | 1.43         | 227.0        |
| 7.003 | 12.603       | 0.934            | 0.0                  | 1.43         | 226.9        |
| 7.004 | 12.579       | 0.934            | 0.0                  | 2.22         | 353.6        |
| 1.008 | 12.471       | 2.706            | 0.0                  | 1.00         | 70.7         |
| 1.009 | 12.403       | 2.706            | 0.0                  | 1.00         | 70.7         |
| 1.010 | 12.305       | 2.706            | 0.0                  | 1.00         | 70.7         |

|                                                              |                                |                                                                                     |
|--------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                | Page 3                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F |  |
| Date 04/05/2021                                              | Designed by Sudeep Chongbang   |                                                                                     |
| File SW NETWORK 1.MDX                                        | Checked by Elizabeth Orchard   |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2               |                                                                                     |

### Manhole Schedules for Storm

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | Pipe Out PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipes In PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|-------------|---------------------------|------------------------|-------------|---------------------------|------------------------|---------------|
| S1      | 15.095    | 1.545        | Open Manhole  | 1200               | 1.000       | 13.550                    | 300                    |             |                           |                        |               |
| S2      | 14.970    | 2.320        | Open Manhole  | 1200               | 1.001       | 12.650                    | 300                    | 1.000       | 12.650                    | 300                    |               |
| S11     | 14.635    | 1.650        | Open Manhole  | 1350               | 2.000       | 12.985                    | 375                    |             |                           |                        |               |
| S12     | 14.151    | 1.651        | Open Manhole  | 1350               | 3.000       | 12.500                    | 375                    |             |                           |                        |               |
| S13     | 14.149    | 1.768        | Open Manhole  | 1350               | 3.001       | 12.381                    | 375                    | 3.000       | 12.381                    | 375                    |               |
| S3      | 14.444    | 2.319        | Open Manhole  | 1500               | 1.002       | 12.125                    | 525                    | 1.001       | 12.350                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 2.000       | 12.275                    | 375                    |               |
|         |           |              |               |                    |             |                           |                        | 3.001       | 12.275                    | 375                    |               |
| P1      | 14.462    | 2.401        | Open Manhole  | 1500               | 1.003       | 12.061                    | 525                    | 1.002       | 12.111                    | 525                    | 50            |
| S4      | 15.187    | 3.251        | Open Manhole  | 1500               | 1.004       | 11.936                    | 525                    | 1.003       | 11.936                    | 525                    |               |
| S5      | 14.655    | 2.944        | Open Manhole  | 1500               | 1.005       | 11.711                    | 525                    | 1.004       | 11.711                    | 525                    |               |
| S6      | 14.265    | 2.690        | Open Manhole  | 1500               | 1.006       | 11.575                    | 300                    | 1.005       | 11.575                    | 525                    |               |
| S21     | 14.465    | 1.575        | Open Manhole  | 1200               | 4.000       | 12.890                    | 300                    |             |                           |                        |               |
| S23     | 13.680    | 0.980        | Open Manhole  | 1200               | 5.000       | 12.700                    | 300                    |             |                           |                        |               |
| S22     | 13.993    | 1.403        | Open Manhole  | 1200               | 4.001       | 12.590                    | 300                    | 4.000       | 12.590                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 5.000       | 12.590                    | 300                    |               |
| S13     | 14.069    | 1.539        | Open Manhole  | 1200               | 4.002       | 12.530                    | 300                    | 4.001       | 12.580                    | 300                    | 50            |
| S7      | 14.156    | 1.636        | Open Manhole  | 1200               | 1.007       | 12.520                    | 300                    | 1.006       | 12.520                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 4.002       | 12.520                    | 300                    |               |
| S14     | 14.984    | 1.500        | Open Manhole  | 1200               | 6.000       | 13.484                    | 300                    |             |                           |                        |               |
| S15     | 14.746    | 1.946        | Open Manhole  | 1200               | 6.001       | 12.800                    | 375                    | 6.000       | 12.800                    | 300                    |               |
| S16     | 14.716    | 1.953        | Open Manhole  | 1200               | 6.002       | 12.763                    | 375                    | 6.001       | 12.763                    | 375                    |               |
| S17     | 14.936    | 1.650        | Open Manhole  | 1350               | 7.000       | 13.286                    | 450                    |             |                           |                        |               |
| S18     | 14.936    | 1.874        | Open Manhole  | 1350               | 7.001       | 13.062                    | 450                    | 7.000       | 13.062                    | 450                    |               |
| S19     | 14.936    | 2.243        | Open Manhole  | 1350               | 7.002       | 12.693                    | 450                    | 7.001       | 12.693                    | 450                    |               |
| P2      | 14.859    | 2.256        | Open Manhole  | 1350               | 7.003       | 12.603                    | 450                    | 7.002       | 12.653                    | 450                    | 50            |
| S20     | 14.762    | 2.183        | Open Manhole  | 1350               | 7.004       | 12.579                    | 450                    | 7.003       | 12.579                    | 450                    |               |
| S8      | 14.200    | 1.729        | Open Manhole  | 1350               | 1.008       | 12.471                    | 300                    | 1.007       | 12.471                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 6.002       | 12.471                    | 375                    |               |
|         |           |              |               |                    |             |                           |                        | 7.004       | 12.471                    | 450                    |               |
| S9      | 13.870    | 1.467        | Open Manhole  | 1200               | 1.009       | 12.403                    | 300                    | 1.008       | 12.403                    | 300                    |               |
| S10     | 13.350    | 1.045        | Open Manhole  | 1200               | 1.010       | 12.305                    | 300                    | 1.009       | 12.305                    | 300                    |               |
|         | 12.890    | 0.650        | Open Manhole  | 1200               |             | OUTFALL                   |                        | 1.010       | 12.240                    | 300                    |               |

|                                                              |                                |                                                                                     |
|--------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                | Page 4                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F |  |
| Date 04/05/2021                                              | Designed by Sudeep Chongbang   |                                                                                     |
| File SW NETWORK 1.MDX                                        | Checked by Elizabeth Orchard   |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2               |                                                                                     |

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) |
|-------|----------|-----------|---------|-------------|-------------|-------------|---------------|--------------------|
| 1.000 | o        | 300       | S1      | 15.095      | 13.550      | 1.245       | Open Manhole  | 1200               |
| 1.001 | o        | 300       | S2      | 14.970      | 12.650      | 2.020       | Open Manhole  | 1200               |
| 2.000 | o        | 375       | S11     | 14.635      | 12.985      | 1.275       | Open Manhole  | 1350               |
| 3.000 | o        | 375       | S12     | 14.151      | 12.500      | 1.276       | Open Manhole  | 1350               |
| 3.001 | o        | 375       | S13     | 14.149      | 12.381      | 1.393       | Open Manhole  | 1350               |
| 1.002 | o        | 525       | S3      | 14.444      | 12.125      | 1.794       | Open Manhole  | 1500               |
| 1.003 | o        | 525       | P1      | 14.462      | 12.061      | 1.876       | Open Manhole  | 1500               |
| 1.004 | o        | 525       | S4      | 15.187      | 11.936      | 2.726       | Open Manhole  | 1500               |
| 1.005 | o        | 525       | S5      | 14.655      | 11.711      | 2.419       | Open Manhole  | 1500               |
| 1.006 | o        | 300       | S6      | 14.265      | 11.575      | 2.390       | Open Manhole  | 1500               |
| 4.000 | o        | 300       | S21     | 14.465      | 12.890      | 1.275       | Open Manhole  | 1200               |
| 5.000 | o        | 300       | S23     | 13.680      | 12.700      | 0.680       | Open Manhole  | 1200               |
| 4.001 | o        | 300       | S22     | 13.993      | 12.590      | 1.103       | Open Manhole  | 1200               |
| 4.002 | o        | 300       | S13     | 14.069      | 12.530      | 1.239       | Open Manhole  | 1200               |
| 1.007 | o        | 300       | S7      | 14.156      | 12.520      | 1.336       | Open Manhole  | 1200               |
| 6.000 | o        | 300       | S14     | 14.984      | 13.484      | 1.200       | Open Manhole  | 1200               |
| 6.001 | o        | 375       | S15     | 14.746      | 12.800      | 1.571       | 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) |
|-------|------------|-------------|---------|-------------|-------------|-------------|---------------|--------------------|
| 1.000 | 90.000     | 100.0       | S2      | 14.970      | 12.650      | 2.020       | Open Manhole  | 1200               |
| 1.001 | 31.605     | 105.4       | S3      | 14.444      | 12.350      | 1.794       | Open Manhole  | 1500               |
| 2.000 | 80.692     | 113.7       | S3      | 14.444      | 12.275      | 1.794       | Open Manhole  | 1500               |
| 3.000 | 35.633     | 300.0       | S13     | 14.149      | 12.381      | 1.393       | Open Manhole  | 1350               |
| 3.001 | 34.527     | 325.0       | S3      | 14.444      | 12.275      | 1.794       | Open Manhole  | 1500               |
| 1.002 | 4.734      | 350.0       | P1      | 14.462      | 12.111      | 1.826       | Open Manhole  | 1500               |
| 1.003 | 50.167     | 400.0       | S4      | 15.187      | 11.936      | 2.726       | Open Manhole  | 1500               |
| 1.004 | 90.021     | 400.0       | S5      | 14.655      | 11.711      | 2.419       | Open Manhole  | 1500               |
| 1.005 | 54.259     | 400.0       | S6      | 14.265      | 11.575      | 2.165       | Open Manhole  | 1500               |
| 1.006 | 49.241     | -52.1       | S7      | 14.156      | 12.520      | 1.336       | Open Manhole  | 1200               |
| 4.000 | 73.558     | 245.2       | S22     | 13.993      | 12.590      | 1.103       | Open Manhole  | 1200               |
| 5.000 | 25.774     | 234.3       | S22     | 13.993      | 12.590      | 1.103       | Open Manhole  | 1200               |
| 4.001 | 2.277      | 227.7       | S13     | 14.069      | 12.580      | 1.189       | Open Manhole  | 1200               |
| 4.002 | 2.337      | 233.7       | S7      | 14.156      | 12.520      | 1.336       | Open Manhole  | 1200               |
| 1.007 | 10.415     | 212.6       | S8      | 14.200      | 12.471      | 1.429       | Open Manhole  | 1350               |
| 6.000 | 70.448     | 103.0       | S15     | 14.746      | 12.800      | 1.646       | Open Manhole  | 1200               |
| 6.001 | 11.102     | 300.1       | S16     | 14.716      | 12.763      | 1.578       | Open Manhole  | 1200               |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 5                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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) |
|-------|----------|-----------|---------|-------------|-------------|-------------|---------------|--------------------|
| 6.002 | o        | 375       | S16     | 14.716      | 12.763      | 1.578       | Open Manhole  | 1200               |
| 7.000 | o        | 450       | S17     | 14.936      | 13.286      | 1.200       | Open Manhole  | 1350               |
| 7.001 | o        | 450       | S18     | 14.936      | 13.062      | 1.424       | Open Manhole  | 1350               |
| 7.002 | o        | 450       | S19     | 14.936      | 12.693      | 1.793       | Open Manhole  | 1350               |
| 7.003 | o        | 450       | P2      | 14.859      | 12.603      | 1.806       | Open Manhole  | 1350               |
| 7.004 | o        | 450       | S20     | 14.762      | 12.579      | 1.733       | Open Manhole  | 1350               |
| 1.008 | o        | 300       | S8      | 14.200      | 12.471      | 1.429       | Open Manhole  | 1350               |
| 1.009 | o        | 300       | S9      | 13.870      | 12.403      | 1.167       | Open Manhole  | 1200               |
| 1.010 | o        | 300       | S10     | 13.350      | 12.305      | 0.745       | 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) |
|-------|------------|-------------|---------|-------------|-------------|-------------|---------------|--------------------|
| 6.002 | 97.993     | 335.6       | S8      | 14.200      | 12.471      | 1.354       | Open Manhole  | 1350               |
| 7.000 | 55.968     | 250.0       | S18     | 14.936      | 13.062      | 1.424       | Open Manhole  | 1350               |
| 7.001 | 92.225     | 250.0       | S19     | 14.936      | 12.693      | 1.793       | Open Manhole  | 1350               |
| 7.002 | 8.072      | 201.8       | P2      | 14.859      | 12.653      | 1.756       | Open Manhole  | 1350               |
| 7.003 | 4.760      | 202.0       | S20     | 14.762      | 12.579      | 1.733       | Open Manhole  | 1350               |
| 7.004 | 9.043      | 83.7        | S8      | 14.200      | 12.471      | 1.279       | Open Manhole  | 1350               |
| 1.008 | 16.619     | 245.0       | S9      | 13.870      | 12.403      | 1.167       | Open Manhole  | 1200               |
| 1.009 | 24.045     | 245.0       | S10     | 13.350      | 12.305      | 0.745       | Open Manhole  | 1200               |
| 1.010 | 15.897     | 244.6       |         | 12.890      | 12.240      | 0.350       | Open Manhole  | 1200               |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 6                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.000       | User      | -         | 100      | 0.059           | 0.059          | 0.059           |
|             | User      | -         | 100      | 0.051           | 0.051          | 0.110           |
| 1.001       | User      | -         | 100      | 0.056           | 0.056          | 0.056           |
|             | User      | -         | 100      | 0.053           | 0.053          | 0.108           |
|             | User      | -         | 100      | 0.011           | 0.011          | 0.119           |
| 2.000       | User      | -         | 100      | 0.096           | 0.096          | 0.096           |
|             | User      | -         | 100      | 0.107           | 0.107          | 0.203           |
|             | User      | -         | 100      | 0.115           | 0.115          | 0.318           |
| 3.000       | User      | -         | 100      | 0.164           | 0.164          | 0.164           |
| 3.001       | User      | -         | 100      | 0.171           | 0.171          | 0.171           |
|             | User      | -         | 100      | 0.020           | 0.020          | 0.191           |
| 1.002       | User      | -         | 100      | 0.171           | 0.171          | 0.171           |
|             | User      | -         | 100      | 0.095           | 0.095          | 0.267           |
|             | User      | -         | 100      | 0.174           | 0.174          | 0.441           |
|             | User      | -         | 100      | 0.013           | 0.013          | 0.454           |
|             | User      | -         | 100      | 0.071           | 0.071          | 0.524           |
| 1.003       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.004       | User      | -         | 100      | 0.016           | 0.016          | 0.016           |
| 1.005       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.006       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 4.000       | User      | -         | 100      | 0.035           | 0.035          | 0.035           |
| 5.000       | User      | -         | 100      | 0.035           | 0.035          | 0.035           |
| 4.001       | User      | -         | 100      | 0.158           | 0.158          | 0.158           |
| 4.002       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.007       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 6.000       | User      | -         | 100      | 0.029           | 0.029          | 0.029           |
| 6.001       | User      | -         | 100      | 0.073           | 0.073          | 0.073           |
| 6.002       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 7.000       | User      | -         | 100      | 0.159           | 0.159          | 0.159           |
|             | User      | -         | 100      | 0.004           | 0.004          | 0.163           |
|             | User      | -         | 100      | 0.004           | 0.004          | 0.167           |
| 7.001       | User      | -         | 100      | 0.277           | 0.277          | 0.277           |
|             | User      | -         | 100      | 0.004           | 0.004          | 0.281           |
| 7.002       | User      | -         | 100      | 0.480           | 0.480          | 0.480           |
|             | User      | -         | 100      | 0.004           | 0.004          | 0.484           |
|             | User      | -         | 100      | 0.001           | 0.001          | 0.486           |
| 7.003       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 7.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.008       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.009       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.010       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 2.706           | 2.706          | 2.706           |

Free Flowing Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
| 1.010               |              | 12.890       | 12.240       | 12.240           | 1200     | 0      |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 7                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

#### Simulation Criteria for Storm

|                                 |       |                                     |       |
|---------------------------------|-------|-------------------------------------|-------|
| Volumetric Runoff Coeff         | 0.750 | Additional Flow - % of Total Flow   | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m³/ha Storage       | 2.000 |
| Hot Start (mins)                | 0     | Inlet Coefficient                   | 0.800 |
| Hot Start Level (mm)            | 0     | Flow per Person per Day (l/per/day) | 0.000 |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins)                     | 2880  |
| Foul Sewage per hectare (l/s)   | 0.000 | Output Interval (mins)              | 24    |
| Number of Input Hydrographs     | 0     | Number of Offline Controls          | 0     |
| Number of Online Controls       | 1     | Number of Storage Structures        | 3     |
|                                 |       | Number of Time/Area Diagrams        | 0     |
|                                 |       | Number of Real Time Controls        | 0     |

#### Synthetic Rainfall Details

|                                               |        |                       |       |
|-----------------------------------------------|--------|-----------------------|-------|
| Rainfall Model                                | FEH    | E (1km)               | 0.310 |
| Return Period (years)                         | 100    | F (1km)               | 2.252 |
| FEH Rainfall Version                          | 1999   | Summer Storms         | Yes   |
| Site Location GB 472400 107400 SU 72400 07400 |        | Winter Storms         | No    |
| C (1km)                                       | -0.029 | Cv (Summer)           | 0.750 |
| D1 (1km)                                      | 0.457  | Cv (Winter)           | 0.840 |
| D2 (1km)                                      | 0.295  | Storm Duration (mins) | 1440  |
| D3 (1km)                                      | 0.387  |                       |       |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 8                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

Online Controls for Storm

Pump Manhole: S6, DS/PN: 1.006, Volume (m³): 16.2

Invert Level (m) 11.575

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 26.0000    | 0.700     | 26.0000    | 1.300     | 26.0000    | 1.900     | 26.0000    | 2.500     | 26.0000    |
| 0.200     | 26.0000    | 0.800     | 26.0000    | 1.400     | 26.0000    | 2.000     | 26.0000    | 2.600     | 26.0000    |
| 0.300     | 26.0000    | 0.900     | 26.0000    | 1.500     | 26.0000    | 2.100     | 26.0000    | 2.700     | 26.0000    |
| 0.400     | 26.0000    | 1.000     | 26.0000    | 1.600     | 26.0000    | 2.200     | 26.0000    | 2.800     | 26.0000    |
| 0.500     | 26.0000    | 1.100     | 26.0000    | 1.700     | 26.0000    | 2.300     | 26.0000    | 2.900     | 26.0000    |
| 0.600     | 26.0000    | 1.200     | 26.0000    | 1.800     | 26.0000    | 2.400     | 26.0000    | 3.000     | 26.0000    |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 9                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

### Storage Structures for Storm

#### Cellular Storage Manhole: P1, DS/PN: 1.003

Invert Level (m) 12.061 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> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 600.0                  | 600.0                       | 1.000     | 600.0                  | 710.0                       | 1.001     | 0.0                    | 710.0                       |

#### Cellular Storage Manhole: S15, DS/PN: 6.001

Invert Level (m) 12.883 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> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 80.0                   | 80.0                        | 0.500     | 80.0                   | 101.0                       | 0.501     | 0.0                    | 101.0                       |

#### Cellular Storage Manhole: S8, DS/PN: 1.008

Invert Level (m) 12.471 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> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 1023.6                 | 1023.6                      | 0.500     | 1023.6                 | 1120.9                      | 0.501     | 0.0                    | 1120.9                      |

|                                                              |                                |                                                                                     |
|--------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                | Page 10                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F |  |
| Date 04/05/2021                                              | Designed by Sudeep Chongbang   |                                                                                     |
| File SW NETWORK 1.MDX                                        | Checked by Elizabeth Orchard   |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2               |                                                                                     |

# 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 \* 10m<sup>3</sup>/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 Offline Controls 0    Number of Time/Area Diagrams 0  
 Number of Online Controls 1    Number of Storage Structures 3    Number of Real Time Controls 0

## Synthetic Rainfall Details

Rainfall Model FEH    D3 (1km) 0.387  
 FEH Rainfall Version 1999    E (1km) 0.310  
 Site Location GB 472400 107400 SU 72400 07400    F (1km) 2.252  
 C (1km) -0.029 Cv (Summer) 0.750  
 D1 (1km) 0.457 Cv (Winter) 0.840  
 D2 (1km) 0.295  
  
 Margin for Flood Risk Warning (mm) 300.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status ON  
 Inertia Status OFF  
  
 Profile(s) Summer and Winter  
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440  
 Return Period(s) (years) 1, 30, 100  
 Climate Change (%) 0, 0, 20

| US/MH |      | Return Climate |        | First (X) |               | First (Y)     |          | First (Z) |      | Water Surcharged |           |
|-------|------|----------------|--------|-----------|---------------|---------------|----------|-----------|------|------------------|-----------|
| PN    | Name | Storm          | Period | Change    | Surcharge     | Flood         | Overflow | Overflow  | Act. | Level (m)        | Depth (m) |
| 1.000 | S1   | 15 Winter      | 1      | +0%       | 100/15 Summer |               |          |           |      | 13.613           | -0.237    |
| 1.001 | S2   | 15 Winter      | 1      | +0%       | 30/15 Summer  |               |          |           |      | 12.740           | -0.210    |
| 2.000 | S11  | 15 Winter      | 1      | +0%       | 100/15 Summer |               |          |           |      | 13.089           | -0.271    |
| 3.000 | S12  | 15 Winter      | 1      | +0%       | 30/15 Summer  |               |          |           |      | 12.599           | -0.276    |
| 3.001 | S13  | 15 Winter      | 1      | +0%       | 30/15 Summer  |               |          |           |      | 12.521           | -0.235    |
| 1.002 | S3   | 15 Winter      | 1      | +0%       | 30/15 Summer  |               |          |           |      | 12.447           | -0.203    |
| 1.003 | P1   | 120 Winter     | 1      | +0%       | 100/15 Winter |               |          |           |      | 12.197           | -0.389    |
| 1.004 | S4   | 120 Winter     | 1      | +0%       | 30/30 Winter  |               |          |           |      | 12.069           | -0.392    |
| 1.005 | S5   | 180 Winter     | 1      | +0%       | 30/15 Summer  |               |          |           |      | 11.930           | -0.306    |
| 1.006 | S6   | 180 Winter     | 1      | +0%       | 1/120 Winter  | 100/15 Winter |          |           |      | 11.898           | 0.023     |
| 4.000 | S21  | 15 Winter      | 1      | +0%       | 100/15 Summer |               |          |           |      | 12.933           | -0.257    |
| 5.000 | S23  | 15 Winter      | 1      | +0%       | 100/15 Summer |               |          |           |      | 12.749           | -0.251    |
| 4.001 | S22  | 15 Winter      | 1      | +0%       | 30/15 Summer  |               |          |           |      | 12.710           | -0.180    |
| 4.002 | S13  | 120 Winter     | 1      | +0%       | 30/30 Summer  |               |          |           |      | 12.678           | -0.152    |
| 1.007 | S7   | 120 Winter     | 1      | +0%       | 30/120 Winter |               |          |           |      | 12.677           | -0.143    |
| 6.000 | S14  | 15 Winter      | 1      | +0%       |               |               |          |           |      | 13.516           | -0.268    |
| 6.001 | S15  | 15 Winter      | 1      | +0%       |               |               |          |           |      | 12.878           | -0.297    |
| 6.002 | S16  | 15 Winter      | 1      | +0%       |               |               |          |           |      | 12.833           | -0.305    |
| 7.000 | S17  | 15 Winter      | 1      | +0%       | 100/15 Summer | 100/15 Winter |          |           |      | 13.375           | -0.361    |
| 7.001 | S18  | 15 Winter      | 1      | +0%       | 100/15 Summer |               |          |           |      | 13.194           | -0.318    |
| 7.002 | S19  | 15 Winter      | 1      | +0%       | 30/15 Summer  |               |          |           |      | 12.907           | -0.236    |
| 7.003 | P2   | 15 Winter      | 1      | +0%       | 30/15 Summer  |               |          |           |      | 12.839           | -0.214    |
| 7.004 | S20  | 15 Winter      | 1      | +0%       | 30/15 Summer  |               |          |           |      | 12.768           | -0.261    |
| 1.008 | S8   | 360 Winter     | 1      | +0%       | 100/30 Summer |               |          |           |      | 12.644           | -0.127    |
| 1.009 | S9   | 360 Winter     | 1      | +0%       | 100/30 Summer |               |          |           |      | 12.571           | -0.132    |
| 1.010 | S10  | 360 Winter     | 1      | +0%       | 100/30 Winter |               |          |           |      | 12.479           | -0.126    |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 11                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

| PN    | US/MH<br>Name | Flooded        |                | Pipe              | Status | Level<br>Exceeded |               |
|-------|---------------|----------------|----------------|-------------------|--------|-------------------|---------------|
|       |               | Volume<br>(m³) | Flow /<br>Cap. | Overflow<br>(l/s) |        |                   | Flow<br>(l/s) |
| 1.000 | S1            | 0.000          | 0.09           |                   | 10.0   | OK                |               |
| 1.001 | S2            | 0.000          | 0.19           |                   | 19.2   | OK                |               |
| 2.000 | S11           | 0.000          | 0.16           |                   | 29.4   | OK                |               |
| 3.000 | S12           | 0.000          | 0.15           |                   | 15.5   | OK                |               |
| 3.001 | S13           | 0.000          | 0.29           |                   | 28.6   | OK                |               |
| 1.002 | S3            | 0.000          | 0.69           |                   | 112.0  | OK                |               |
| 1.003 | P1            | 0.000          | 0.15           |                   | 32.8   | OK                |               |
| 1.004 | S4            | 0.000          | 0.15           |                   | 33.0   | OK                |               |
| 1.005 | S5            | 0.000          | 0.14           |                   | 30.7   | OK                |               |
| 1.006 | S6            | 0.000          | 0.80           |                   | 26.0   | SURCHARGED        | 10            |
| 4.000 | S21           | 0.000          | 0.05           |                   | 3.1    | OK                |               |
| 5.000 | S23           | 0.000          | 0.05           |                   | 3.3    | OK                |               |
| 4.001 | S22           | 0.000          | 0.33           |                   | 17.7   | OK                |               |
| 4.002 | S13           | 0.000          | 0.16           |                   | 8.5    | OK                |               |
| 1.007 | S7            | 0.000          | 0.54           |                   | 32.2   | OK                |               |
| 6.000 | S14           | 0.000          | 0.03           |                   | 2.7    | OK                |               |
| 6.001 | S15           | 0.000          | 0.10           |                   | 8.3    | OK                |               |
| 6.002 | S16           | 0.000          | 0.08           |                   | 8.3    | OK                |               |
| 7.000 | S17           | 0.000          | 0.08           |                   | 15.5   | OK                | 1             |
| 7.001 | S18           | 0.000          | 0.18           |                   | 34.7   | OK                |               |
| 7.002 | S19           | 0.000          | 0.46           |                   | 68.5   | OK                |               |
| 7.003 | P2            | 0.000          | 0.54           |                   | 68.2   | OK                |               |
| 7.004 | S20           | 0.000          | 0.37           |                   | 68.1   | OK                |               |
| 1.008 | S8            | 0.000          | 0.63           |                   | 37.9   | OK                |               |
| 1.009 | S9            | 0.000          | 0.60           |                   | 37.9   | OK                |               |
| 1.010 | S10           | 0.000          | 0.63           |                   | 37.9   | OK                |               |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 12                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

#### Synthetic Rainfall Details

Rainfall Model FEH    D3 (1km) 0.387  
 FEH Rainfall Version 1999    E (1km) 0.310  
 Site Location GB 472400 107400 SU 72400 07400    F (1km) 2.252  
 C (1km) -0.029 Cv (Summer) 0.750  
 D1 (1km) 0.457 Cv (Winter) 0.840  
 D2 (1km) 0.295

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

Profile(s) Summer and Winter  
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440  
 Return Period(s) (years) 1, 30, 100  
 Climate Change (%) 0, 0, 20

| US/MH |      | Return Climate |        | First (X) |               | First (Y)     |          | First (Z) |      | Water     | Surcharged |
|-------|------|----------------|--------|-----------|---------------|---------------|----------|-----------|------|-----------|------------|
| PN    | Name | Storm          | Period | Change    | Surcharge     | Flood         | Overflow | Overflow  | Act. | Level (m) | Depth (m)  |
| 1.000 | S1   | 15 Winter      | 30     | +0%       | 100/15 Summer |               |          |           |      | 13.667    | -0.183     |
| 1.001 | S2   | 15 Winter      | 30     | +0%       | 30/15 Summer  |               |          |           |      | 12.990    | 0.040      |
| 2.000 | S11  | 15 Winter      | 30     | +0%       | 100/15 Summer |               |          |           |      | 13.187    | -0.173     |
| 3.000 | S12  | 15 Winter      | 30     | +0%       | 30/15 Summer  |               |          |           |      | 13.048    | 0.173      |
| 3.001 | S13  | 15 Winter      | 30     | +0%       | 30/15 Summer  |               |          |           |      | 12.965    | 0.209      |
| 1.002 | S3   | 15 Winter      | 30     | +0%       | 30/15 Summer  |               |          |           |      | 12.856    | 0.206      |
| 1.003 | P1   | 180 Winter     | 30     | +0%       | 100/15 Winter |               |          |           |      | 12.500    | -0.086     |
| 1.004 | S4   | 30 Winter      | 30     | +0%       | 30/30 Winter  |               |          |           |      | 12.520    | 0.059      |
| 1.005 | S5   | 30 Winter      | 30     | +0%       | 30/15 Summer  |               |          |           |      | 12.569    | 0.333      |
| 1.006 | S6   | 30 Winter      | 30     | +0%       | 1/120 Winter  | 100/15 Winter |          |           |      | 12.566    | 0.691      |
| 4.000 | S21  | 15 Winter      | 30     | +0%       | 100/15 Summer |               |          |           |      | 12.971    | -0.219     |
| 5.000 | S23  | 15 Winter      | 30     | +0%       | 100/15 Summer |               |          |           |      | 12.929    | -0.071     |
| 4.001 | S22  | 15 Winter      | 30     | +0%       | 30/15 Summer  |               |          |           |      | 12.924    | 0.034      |
| 4.002 | S13  | 30 Summer      | 30     | +0%       | 30/30 Summer  |               |          |           |      | 12.886    | 0.056      |
| 1.007 | S7   | 240 Winter     | 30     | +0%       | 30/120 Winter |               |          |           |      | 12.857    | 0.037      |
| 6.000 | S14  | 15 Winter      | 30     | +0%       |               |               |          |           |      | 13.543    | -0.241     |
| 6.001 | S15  | 15 Winter      | 30     | +0%       |               |               |          |           |      | 12.928    | -0.247     |
| 6.002 | S16  | 15 Winter      | 30     | +0%       |               |               |          |           |      | 12.880    | -0.258     |
| 7.000 | S17  | 15 Winter      | 30     | +0%       | 100/15 Summer | 100/15 Winter |          |           |      | 13.520    | -0.216     |
| 7.001 | S18  | 15 Winter      | 30     | +0%       | 100/15 Summer |               |          |           |      | 13.478    | -0.034     |
| 7.002 | S19  | 15 Winter      | 30     | +0%       | 30/15 Summer  |               |          |           |      | 13.370    | 0.227      |
| 7.003 | P2   | 15 Winter      | 30     | +0%       | 30/15 Summer  |               |          |           |      | 13.211    | 0.158      |
| 7.004 | S20  | 15 Winter      | 30     | +0%       | 30/15 Summer  |               |          |           |      | 13.054    | 0.025      |
| 1.008 | S8   | 240 Winter     | 30     | +0%       | 100/30 Summer |               |          |           |      | 12.767    | -0.004     |
| 1.009 | S9   | 360 Winter     | 30     | +0%       | 100/30 Summer |               |          |           |      | 12.694    | -0.009     |
| 1.010 | S10  | 360 Winter     | 30     | +0%       | 100/30 Winter |               |          |           |      | 12.605    | 0.000      |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 13                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

| PN    | US/MH<br>Name | Flooded        |                | Pipe              |               | Status     | Level<br>Exceeded |
|-------|---------------|----------------|----------------|-------------------|---------------|------------|-------------------|
|       |               | Volume<br>(m³) | Flow /<br>Cap. | Overflow<br>(l/s) | Flow<br>(l/s) |            |                   |
| 1.000 | S1            | 0.000          | 0.30           |                   | 32.7          | OK         |                   |
| 1.001 | S2            | 0.000          | 0.62           |                   | 61.4          | SURCHARGED |                   |
| 2.000 | S11           | 0.000          | 0.54           |                   | 96.5          | OK         |                   |
| 3.000 | S12           | 0.000          | 0.43           |                   | 44.2          | SURCHARGED |                   |
| 3.001 | S13           | 0.000          | 0.97           |                   | 96.0          | SURCHARGED |                   |
| 1.002 | S3            | 0.000          | 2.33           |                   | 378.6         | SURCHARGED |                   |
| 1.003 | P1            | 0.000          | 0.31           |                   | 67.4          | OK         |                   |
| 1.004 | S4            | 0.000          | 0.49           |                   | 110.4         | SURCHARGED |                   |
| 1.005 | S5            | 0.000          | 0.31           |                   | 66.7          | SURCHARGED |                   |
| 1.006 | S6            | 0.000          | 0.80           |                   | 26.0          | SURCHARGED | 10                |
| 4.000 | S21           | 0.000          | 0.15           |                   | 10.0          | OK         |                   |
| 5.000 | S23           | 0.000          | 0.15           |                   | 9.8           | OK         |                   |
| 4.001 | S22           | 0.000          | 1.01           |                   | 53.9          | SURCHARGED |                   |
| 4.002 | S13           | 0.000          | 0.97           |                   | 51.7          | SURCHARGED |                   |
| 1.007 | S7            | 0.000          | 0.74           |                   | 44.6          | SURCHARGED |                   |
| 6.000 | S14           | 0.000          | 0.08           |                   | 8.8           | OK         |                   |
| 6.001 | S15           | 0.000          | 0.25           |                   | 22.1          | OK         |                   |
| 6.002 | S16           | 0.000          | 0.20           |                   | 20.6          | OK         |                   |
| 7.000 | S17           | 0.000          | 0.27           |                   | 50.4          | OK         | 1                 |
| 7.001 | S18           | 0.000          | 0.54           |                   | 104.6         | OK         |                   |
| 7.002 | S19           | 0.000          | 1.47           |                   | 219.7         | SURCHARGED |                   |
| 7.003 | P2            | 0.000          | 1.74           |                   | 219.1         | SURCHARGED |                   |
| 7.004 | S20           | 0.000          | 1.19           |                   | 220.3         | SURCHARGED |                   |
| 1.008 | S8            | 0.000          | 1.00           |                   | 60.1          | OK         |                   |
| 1.009 | S9            | 0.000          | 0.95           |                   | 60.0          | OK         |                   |
| 1.010 | S10           | 0.000          | 1.00           |                   | 59.8          | OK         |                   |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 14                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

# 100 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 | 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 Offline Controls                 | 0     |
| Number of Online Controls       | 1     | Number of Storage Structures               | 3     |
|                                 |       | Number of Time/Area Diagrams               | 0     |
|                                 |       | Number of Real Time Controls               | 0     |

## Synthetic Rainfall Details

|                                    |                                                          |                             |       |
|------------------------------------|----------------------------------------------------------|-----------------------------|-------|
| Rainfall Model                     | FEH                                                      | D3 (1km)                    | 0.387 |
| FEH Rainfall Version               | 1999                                                     | E (1km)                     | 0.310 |
| Site Location                      | GB 472400 107400 SU 72400 07400                          | F (1km)                     | 2.252 |
| C (1km)                            | -0.029                                                   | Cv (Summer)                 | 0.750 |
| D1 (1km)                           | 0.457                                                    | Cv (Winter)                 | 0.840 |
| D2 (1km)                           | 0.295                                                    |                             |       |
| Margin for Flood Risk Warning (mm) |                                                          |                             | 300.0 |
| Analysis Timestep                  | 2.5                                                      | Second Increment (Extended) |       |
| DTS Status                         |                                                          |                             | ON    |
| DVD Status                         |                                                          |                             | ON    |
| Inertia Status                     |                                                          |                             | OFF   |
| Profile(s)                         |                                                          | Summer and Winter           |       |
| Duration(s) (mins)                 | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |                             |       |
| Return Period(s) (years)           |                                                          | 1, 30, 100                  |       |
| Climate Change (%)                 |                                                          | 0, 0, 20                    |       |

|       |       |       |        |        |         |           |           |           | Water    | Surcharged |        |
|-------|-------|-------|--------|--------|---------|-----------|-----------|-----------|----------|------------|--------|
|       | US/MH |       |        | Return | Climate | First (X) | First (Y) | First (Z) | Overflow | Level      | Depth  |
| PN    | Name  | Storm |        | Period | Change  | Surcharge | Flood     | Overflow  | Act.     | (m)        | (m)    |
| 1.000 | S1    | 15    | Winter | 100    | +20%    | 100/15    | Summer    |           |          | 13.964     | 0.114  |
| 1.001 | S2    | 15    | Winter | 100    | +20%    | 30/15     | Summer    |           |          | 13.757     | 0.807  |
| 2.000 | S11   | 15    | Winter | 100    | +20%    | 100/15    | Summer    |           |          | 13.969     | 0.609  |
| 3.000 | S12   | 15    | Winter | 100    | +20%    | 30/15     | Summer    |           |          | 13.805     | 0.930  |
| 3.001 | S13   | 15    | Winter | 100    | +20%    | 30/15     | Summer    |           |          | 13.717     | 0.961  |
| 1.002 | S3    | 15    | Winter | 100    | +20%    | 30/15     | Summer    |           |          | 13.390     | 0.740  |
| 1.003 | P1    | 360   | Winter | 100    | +20%    | 100/15    | Winter    |           |          | 13.005     | 0.419  |
| 1.004 | S4    | 120   | Winter | 100    | +20%    | 30/30     | Winter    |           |          | 14.013     | 1.553  |
| 1.005 | S5    | 120   | Winter | 100    | +20%    | 30/15     | Summer    |           |          | 14.315     | 2.079  |
| 1.006 | S6    | 120   | Winter | 100    | +20%    | 1/120     | Winter    | 100/15    | Winter   | 14.268     | 2.393  |
| 4.000 | S21   | 15    | Winter | 100    | +20%    | 100/15    | Summer    |           |          | 13.401     | 0.211  |
| 5.000 | S23   | 15    | Winter | 100    | +20%    | 100/15    | Summer    |           |          | 13.390     | 0.390  |
| 4.001 | S22   | 15    | Winter | 100    | +20%    | 30/15     | Summer    |           |          | 13.371     | 0.481  |
| 4.002 | S13   | 15    | Winter | 100    | +20%    | 30/30     | Summer    |           |          | 13.180     | 0.350  |
| 1.007 | S7    | 240   | Winter | 100    | +20%    | 30/120    | Winter    |           |          | 13.010     | 0.190  |
| 6.000 | S14   | 15    | Winter | 100    | +20%    |           |           |           |          | 13.564     | -0.220 |
| 6.001 | S15   | 15    | Winter | 100    | +20%    |           |           |           |          | 12.983     | -0.192 |
| 6.002 | S16   | 240   | Winter | 100    | +20%    |           |           |           |          | 12.933     | -0.205 |
| 7.000 | S17   | 15    | Winter | 100    | +20%    | 100/15    | Summer    | 100/15    | Winter   | 14.937     | 1.201  |
| 7.001 | S18   | 15    | Winter | 100    | +20%    | 100/15    | Summer    |           |          | 14.908     | 1.396  |
| 7.002 | S19   | 15    | Winter | 100    | +20%    | 30/15     | Summer    |           |          | 14.505     | 1.362  |
| 7.003 | P2    | 15    | Winter | 100    | +20%    | 30/15     | Summer    |           |          | 13.961     | 0.908  |
| 7.004 | S20   | 15    | Winter | 100    | +20%    | 30/15     | Summer    |           |          | 13.426     | 0.397  |
| 1.008 | S8    | 240   | Winter | 100    | +20%    | 100/30    | Summer    |           |          | 12.928     | 0.157  |
| 1.009 | S9    | 240   | Winter | 100    | +20%    | 100/30    | Summer    |           |          | 12.806     | 0.103  |
| 1.010 | S10   | 240   | Winter | 100    | +20%    | 100/30    | Winter    |           |          | 12.644     | 0.039  |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 15                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment A, B and F                               |  |
| Date 04/05/2021<br>File SW NETWORK 1.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

| PN    | US/MH<br>Name | Flooded        |                | Pipe              |               | Status     | Level<br>Exceeded |
|-------|---------------|----------------|----------------|-------------------|---------------|------------|-------------------|
|       |               | Volume<br>(m³) | Flow /<br>Cap. | Overflow<br>(l/s) | Flow<br>(l/s) |            |                   |
| 1.000 | S1            | 0.000          | 0.54           |                   | 57.7          | SURCHARGED |                   |
| 1.001 | S2            | 0.000          | 1.08           |                   | 106.9         | SURCHARGED |                   |
| 2.000 | S11           | 0.000          | 0.90           |                   | 160.3         | SURCHARGED |                   |
| 3.000 | S12           | 0.000          | 0.78           |                   | 80.9          | SURCHARGED |                   |
| 3.001 | S13           | 0.000          | 1.75           |                   | 173.7         | SURCHARGED |                   |
| 1.002 | S3            | 0.000          | 4.08           |                   | 663.1         | SURCHARGED |                   |
| 1.003 | P1            | 0.000          | 0.88           |                   | 189.8         | SURCHARGED |                   |
| 1.004 | S4            | 0.000          | 0.92           |                   | 208.0         | SURCHARGED |                   |
| 1.005 | S5            | 0.000          | 0.47           |                   | 102.0         | SURCHARGED |                   |
| 1.006 | S6            | 3.109          | 0.80           |                   | 26.0          | FLOOD      | 10                |
| 4.000 | S21           | 0.000          | 0.24           |                   | 16.1          | SURCHARGED |                   |
| 5.000 | S23           | 0.000          | 0.27           |                   | 17.2          | FLOOD RISK |                   |
| 4.001 | S22           | 0.000          | 2.06           |                   | 109.8         | SURCHARGED |                   |
| 4.002 | S13           | 0.000          | 2.06           |                   | 109.1         | SURCHARGED |                   |
| 1.007 | S7            | 0.000          | 0.83           |                   | 49.5          | SURCHARGED |                   |
| 6.000 | S14           | 0.000          | 0.15           |                   | 16.2          | OK         |                   |
| 6.001 | S15           | 0.000          | 0.48           |                   | 41.3          | OK         |                   |
| 6.002 | S16           | 0.000          | 0.10           |                   | 10.3          | OK         |                   |
| 7.000 | S17           | 0.618          | 0.38           |                   | 71.9          | FLOOD      | 1                 |
| 7.001 | S18           | 0.000          | 0.98           |                   | 188.4         | FLOOD RISK |                   |
| 7.002 | S19           | 0.000          | 2.73           |                   | 407.2         | SURCHARGED |                   |
| 7.003 | P2            | 0.000          | 3.20           |                   | 403.4         | SURCHARGED |                   |
| 7.004 | S20           | 0.000          | 2.19           |                   | 405.1         | SURCHARGED |                   |
| 1.008 | S8            | 0.000          | 1.34           |                   | 80.8          | SURCHARGED |                   |
| 1.009 | S9            | 0.000          | 1.28           |                   | 80.8          | SURCHARGED |                   |
| 1.010 | S10           | 0.000          | 1.35           |                   | 80.8          | SURCHARGED |                   |

|                                                              |                              |                                                                                     |
|--------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                              | Page 1                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D  |  |
| Date 05/05/2021                                              | Designed by Sudeep Chongbang |                                                                                     |
| File SW NETWORK 2.MDX                                        | Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2             |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

|                                               |        |
|-----------------------------------------------|--------|
| FEH Rainfall Model                            |        |
| Return Period (years)                         | 2      |
| FEH Rainfall Version                          | 1999   |
| Site Location GB 472400 107400 SU 72400 07400 |        |
| C (1km)                                       | -0.029 |
| D1 (1km)                                      | 0.457  |
| D2 (1km)                                      | 0.295  |
| D3 (1km)                                      | 0.387  |
| E (1km)                                       | 0.310  |
| F (1km)                                       | 2.252  |
| Maximum Rainfall (mm/hr)                      | 50     |
| Maximum Time of Concentration (mins)          | 30     |
| Foul Sewage (l/s/ha)                          | 0.000  |
| Volumetric Runoff Coeff.                      | 0.750  |
| PIMP (%)                                      | 100    |
| Add Flow / Climate Change (%)                 | 0      |
| Minimum Backdrop Height (m)                   | 0.200  |
| Maximum Backdrop Height (m)                   | 1.500  |
| Min Design Depth for Optimisation (m)         | 1.200  |
| Min Vel for Auto Design only (m/s)            | 1.00   |
| Min Slope for Optimisation (1:X)              | 500    |

Designed with Level Soffits

#### Network Design Table for Storm

« - Indicates pipe capacity < flow

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| 1.000 | 44.103        | 0.294       | 150.0          | 0.075          | 4.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |
| 1.001 | 45.915        | 0.306       | 150.0          | 0.159          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |
| 1.002 | 41.677        | 0.246       | 169.4          | 0.189          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |
| 1.003 | 48.155        | 0.321       | 150.0          | 0.158          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |
| 2.000 | 61.502        | 0.439       | 140.0          | 0.076          | 4.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |
| 2.001 | 43.052        | 0.308       | 140.0          | 0.160          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |
| 2.002 | 29.320        | 0.262       | 111.9          | 0.187          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |
| 2.003 | 43.356        | 0.173       | 250.6          | 0.190          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |

#### Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | E I.Area<br>(ha) | E 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           | 4.50           | 13.800       | 0.075            | 0.0                  | 0.0           | 0.0               | 1.48         | 163.1        | 10.2          |
| 1.001 | 47.67           | 5.02           | 13.506       | 0.235            | 0.0                  | 0.0           | 0.0               | 1.48         | 163.1        | 30.3          |
| 1.002 | 45.19           | 5.52           | 13.200       | 0.423            | 0.0                  | 0.0           | 0.0               | 1.39         | 153.4        | 51.8          |
| 1.003 | 42.86           | 6.06           | 12.954       | 0.581            | 0.0                  | 0.0           | 0.0               | 1.48         | 163.1        | 67.5          |
| 2.000 | 49.63           | 4.67           | 13.815       | 0.076            | 0.0                  | 0.0           | 0.0               | 1.53         | 168.9        | 10.3          |
| 2.001 | 47.02           | 5.14           | 13.376       | 0.236            | 0.0                  | 0.0           | 0.0               | 1.53         | 168.9        | 30.1          |
| 2.002 | 45.61           | 5.42           | 13.068       | 0.424            | 0.0                  | 0.0           | 0.0               | 1.71         | 189.1        | 52.3          |
| 2.003 | 42.86           | 6.06           | 12.806       | 0.613            | 0.0                  | 0.0           | 0.0               | 1.14         | 125.9        | 71.2          |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 2                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

### 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                                                                        |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| 1.004  | 17.311        | 0.042       | 412.2          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |    |
| 3.000  | 24.873        | 0.102       | 243.9          | 0.026          | 4.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |    |
| 4.000  | 20.015        | 0.200       | 100.1          | 0.049          | 4.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| 5.000  | 10.114        | 0.506       | 20.0           | 0.028          | 4.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| 3.001  | 26.365        | 0.108       | 244.1          | 0.044          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |    |
| 6.000  | 5.013         | 0.033       | 151.9          | 0.058          | 4.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |    |
| 6.001  | 20.238        | 0.215       | 94.1           | 0.017          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |    |
| 7.000  | 9.765         | 0.651       | 15.0           | 0.018          | 4.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| 3.002  | 28.553        | 0.117       | 244.0          | 0.024          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |    |
| 8.000  | 19.387        | 0.396       | 49.0           | 0.032          | 4.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |   |
| 9.000  | 9.830         | 0.914       | 10.8           | 0.034          | 4.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| 3.003  | 4.900         | 0.020       | 245.0          | 0.046          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 10.000 | 11.528        | 0.047       | 245.3          | 0.033          | 4.00           | 0.0                | 0.600     | o           | 300         | 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) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.004  | 41.75           | 6.35           | 12.558       | 1.195            | 0.0                  | 0.0           | 0.0               | 1.00         | 158.3        | 135.1         |
| 3.000  | 50.00           | 4.41           | 13.013       | 0.026            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.9         | 3.6           |
| 4.000  | 50.00           | 4.33           | 13.261       | 0.049            | 0.0                  | 0.0           | 0.0               | 1.00         | 17.7         | 6.6           |
| 5.000  | 50.00           | 4.07           | 13.567       | 0.028            | 0.0                  | 0.0           | 0.0               | 2.26         | 40.0         | 3.7           |
| 3.001  | 48.57           | 4.85           | 12.911       | 0.147            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.8         | 19.3          |
| 6.000  | 50.00           | 4.07           | 13.051       | 0.058            | 0.0                  | 0.0           | 0.0               | 1.27         | 90.0         | 7.8           |
| 6.001  | 50.00           | 4.27           | 13.018       | 0.075            | 0.0                  | 0.0           | 0.0               | 1.62         | 114.6        | 10.1          |
| 7.000  | 50.00           | 4.06           | 13.604       | 0.018            | 0.0                  | 0.0           | 0.0               | 2.61         | 46.2         | 2.4           |
| 3.002  | 46.08           | 5.33           | 12.803       | 0.263            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.8         | 32.9          |
| 8.000  | 50.00           | 4.22           | 13.232       | 0.032            | 0.0                  | 0.0           | 0.0               | 1.44         | 25.5         | 4.3           |
| 9.000  | 50.00           | 4.05           | 13.750       | 0.034            | 0.0                  | 0.0           | 0.0               | 3.09         | 54.6         | 4.6           |
| 3.003  | 45.69           | 5.41           | 12.686       | 0.375            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.7         | 46.4          |
| 10.000 | 50.00           | 4.19           | 12.969       | 0.033            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.6         | 4.4           |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 3                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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                                                                      |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| 11.000 | 20.000        | 0.200       | 100.0          | 0.043          | 4.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| 12.000 | 10.101        | 0.101       | 100.0          | 0.030          | 4.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| 10.001 | 36.944        | 0.151       | 244.7          | 0.028          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 13.000 | 10.006        | 0.100       | 100.1          | 0.040          | 4.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| 14.000 | 18.199        | 0.182       | 100.0          | 0.041          | 4.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| 10.002 | 25.657        | 0.105       | 244.4          | 0.034          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 1.005  | 6.215         | 0.016       | 388.4          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 1.006  | 33.952        | 0.270       | 125.7          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | 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) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 11.000 | 50.00           | 4.33           | 13.272       | 0.043            | 0.0                  | 0.0           | 0.0               | 1.00         | 17.8         | 5.9           |
| 12.000 | 50.00           | 4.17           | 13.173       | 0.030            | 0.0                  | 0.0           | 0.0               | 1.00         | 17.8         | 4.1           |
| 10.001 | 48.04           | 4.95           | 12.922       | 0.134            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.7         | 17.5          |
| 13.000 | 50.00           | 4.17           | 13.021       | 0.040            | 0.0                  | 0.0           | 0.0               | 1.00         | 17.8         | 5.4           |
| 14.000 | 50.00           | 4.30           | 13.103       | 0.041            | 0.0                  | 0.0           | 0.0               | 1.00         | 17.8         | 5.5           |
| 10.002 | 45.86           | 5.37           | 12.771       | 0.248            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.8         | 30.8          |
| 1.005  | 41.38           | 6.45           | 12.516       | 1.818            | 0.0                  | 0.0           | 0.0               | 1.03         | 163.1        | 203.7         |
| 1.006  | 40.29           | 6.76           | 12.500       | 1.818            | 0.0                  | 0.0           | 0.0               | 1.81         | 288.1        | 203.7         |

|                                                              |                              |                                                                                     |
|--------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                              | Page 4                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D  |  |
| Date 05/05/2021                                              | Designed by Sudeep Chongbang |                                                                                     |
| File SW NETWORK 2.MDX                                        | Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2             |                                                                                     |

### Manhole Schedules for Storm

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | Pipe Out PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipes In PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|-------------|---------------------------|------------------------|-------------|---------------------------|------------------------|---------------|
| S24     | 15.439    | 1.639        | Open Manhole  | 1350               | 1.000       | 13.800                    | 375                    |             |                           |                        |               |
| S25     | 15.439    | 1.933        | Open Manhole  | 1350               | 1.001       | 13.506                    | 375                    | 1.000       | 13.506                    | 375                    |               |
| S26     | 15.439    | 2.239        | Open Manhole  | 1350               | 1.002       | 13.200                    | 375                    | 1.001       | 13.200                    | 375                    |               |
| S27     | 15.428    | 2.474        | Open Manhole  | 1350               | 1.003       | 12.954                    | 375                    | 1.002       | 12.954                    | 375                    |               |
| S30     | 15.390    | 1.575        | Open Manhole  | 1350               | 2.000       | 13.815                    | 375                    |             |                           |                        |               |
| S31     | 15.390    | 2.014        | Open Manhole  | 1350               | 2.001       | 13.376                    | 375                    | 2.000       | 13.376                    | 375                    |               |
| S32     | 15.382    | 2.314        | Open Manhole  | 1350               | 2.002       | 13.068                    | 375                    | 2.001       | 13.068                    | 375                    |               |
| S33     | 15.349    | 2.543        | Open Manhole  | 1350               | 2.003       | 12.806                    | 375                    | 2.002       | 12.806                    | 375                    |               |
| S28     | 15.265    | 2.707        | Open Manhole  | 1350               | 1.004       | 12.558                    | 450                    | 1.003       | 12.633                    | 375                    |               |
|         |           |              |               |                    |             |                           |                        | 2.003       | 12.633                    | 375                    |               |
| PPIC1   | 14.917    | 1.904        | Open Manhole  | 1200               | 3.000       | 13.013                    | 300                    |             |                           |                        |               |
| PPIC8   | 14.467    | 1.206        | Open Manhole  | 1200               | 4.000       | 13.261                    | 150                    |             |                           |                        |               |
| PPIC9   | 15.424    | 1.857        | Open Manhole  | 1200               | 5.000       | 13.567                    | 150                    |             |                           |                        |               |
| PPIC2   | 14.961    | 2.050        | Open Manhole  | 1200               | 3.001       | 12.911                    | 300                    | 3.000       | 12.911                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 4.000       | 13.061                    | 150                    |               |
|         |           |              |               |                    |             |                           |                        | 5.000       | 13.061                    | 150                    |               |
| S34     | 14.551    | 1.500        | Open Manhole  | 1200               | 6.000       | 13.051                    | 300                    |             |                           |                        |               |
| PPIC4   | 14.496    | 1.478        | Open Manhole  | 1200               | 6.001       | 13.018                    | 300                    | 6.000       | 13.018                    | 300                    |               |
| PPIC14  | 15.233    | 1.629        | Open Manhole  | 1200               | 7.000       | 13.604                    | 150                    |             |                           |                        |               |
| PPIC3   | 14.989    | 2.186        | Open Manhole  | 1200               | 3.002       | 12.803                    | 300                    | 3.001       | 12.803                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 6.001       | 12.803                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 7.000       | 12.953                    | 150                    |               |
| PPIC15  | 14.582    | 1.350        | Open Manhole  | 1200               | 8.000       | 13.232                    | 150                    |             |                           |                        |               |
| PPIC16  | 15.300    | 1.550        | Open Manhole  | 1200               | 9.000       | 13.750                    | 150                    |             |                           |                        |               |
| PPIC17  | 15.018    | 2.332        | Open Manhole  | 1200               | 3.003       | 12.686                    | 300                    | 3.002       | 12.686                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 8.000       | 12.836                    | 150                    |               |
|         |           |              |               |                    |             |                           |                        | 9.000       | 12.836                    | 150                    |               |
| PPIC5   | 14.500    | 1.531        | Open Manhole  | 1200               | 10.000      | 12.969                    | 300                    |             |                           |                        |               |
| PPIC10  | 14.161    | 0.889        | Open Manhole  | 1200               | 11.000      | 13.272                    | 150                    |             |                           |                        |               |
| PPIC11  | 14.721    | 1.548        | Open Manhole  | 1200               | 12.000      | 13.173                    | 150                    |             |                           |                        |               |
| PPIC6   | 14.516    | 1.594        | Open Manhole  | 1200               | 10.001      | 12.922                    | 300                    | 10.000      | 12.922                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 11.000      | 13.072                    | 150                    |               |
|         |           |              |               |                    |             |                           |                        | 12.000      | 13.072                    | 150                    |               |
| PPIC13  | 15.190    | 2.169        | Open Manhole  | 1200               | 13.000      | 13.021                    | 150                    |             |                           |                        |               |
| PPIC12  | 14.622    | 1.519        | Open Manhole  | 1200               | 14.000      | 13.103                    | 150                    |             |                           |                        |               |
| PPIC7   | 14.993    | 2.222        | Open Manhole  | 1200               | 10.002      | 12.771                    | 300                    | 10.001      | 12.771                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 13.000      | 12.921                    | 150                    |               |
|         |           |              |               |                    |             |                           |                        | 14.000      | 12.921                    | 150                    |               |
| TANK    | 15.036    | 2.520        | Open Manhole  | 1350               | 1.005       | 12.516                    | 450                    | 1.004       | 12.516                    | 450                    |               |
|         |           |              |               |                    |             |                           |                        | 3.003       | 12.666                    | 300                    |               |
|         |           |              |               |                    |             |                           |                        | 10.002      | 12.666                    | 300                    |               |
| S29     | 14.900    | 2.400        | Open Manhole  | 1350               | 1.006       | 12.500                    | 450                    | 1.005       | 12.500                    | 450                    |               |
|         | 13.730    | 1.500        | Open Manhole  | 1500               |             | OUTFALL                   |                        | 1.006       | 12.230                    | 450                    |               |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 5                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

### 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) |
|-------|-------------|--------------|------------|----------------|----------------|----------------|------------------|-----------------------|
| 1.000 | o           | 375          | S24        | 15.439         | 13.800         | 1.264          | Open Manhole     | 1350                  |
| 1.001 | o           | 375          | S25        | 15.439         | 13.506         | 1.558          | Open Manhole     | 1350                  |
| 1.002 | o           | 375          | S26        | 15.439         | 13.200         | 1.864          | Open Manhole     | 1350                  |
| 1.003 | o           | 375          | S27        | 15.428         | 12.954         | 2.099          | Open Manhole     | 1350                  |
| 2.000 | o           | 375          | S30        | 15.390         | 13.815         | 1.200          | Open Manhole     | 1350                  |
| 2.001 | o           | 375          | S31        | 15.390         | 13.376         | 1.639          | Open Manhole     | 1350                  |
| 2.002 | o           | 375          | S32        | 15.382         | 13.068         | 1.939          | Open Manhole     | 1350                  |
| 2.003 | o           | 375          | S33        | 15.349         | 12.806         | 2.168          | Open Manhole     | 1350                  |
| 1.004 | o           | 450          | S28        | 15.265         | 12.558         | 2.257          | Open Manhole     | 1350                  |
| 3.000 | o           | 300          | PPIC1      | 14.917         | 13.013         | 1.604          | Open Manhole     | 1200                  |
| 4.000 | o           | 150          | PPIC8      | 14.467         | 13.261         | 1.056          | Open Manhole     | 1200                  |
| 5.000 | o           | 150          | PPIC9      | 15.424         | 13.567         | 1.707          | Open Manhole     | 1200                  |
| 3.001 | o           | 300          | PPIC2      | 14.961         | 12.911         | 1.750          | Open Manhole     | 1200                  |
| 6.000 | o           | 300          | S34        | 14.551         | 13.051         | 1.200          | Open Manhole     | 1200                  |
| 6.001 | o           | 300          | PPIC4      | 14.496         | 13.018         | 1.178          | Open Manhole     | 1200                  |
| 7.000 | o           | 150          | PPIC14     | 15.233         | 13.604         | 1.479          | 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 | 44.103        | 150.0          | S25        | 15.439         | 13.506         | 1.558          | Open Manhole     | 1350                  |
| 1.001 | 45.915        | 150.0          | S26        | 15.439         | 13.200         | 1.864          | Open Manhole     | 1350                  |
| 1.002 | 41.677        | 169.4          | S27        | 15.428         | 12.954         | 2.099          | Open Manhole     | 1350                  |
| 1.003 | 48.155        | 150.0          | S28        | 15.265         | 12.633         | 2.257          | Open Manhole     | 1350                  |
| 2.000 | 61.502        | 140.0          | S31        | 15.390         | 13.376         | 1.639          | Open Manhole     | 1350                  |
| 2.001 | 43.052        | 140.0          | S32        | 15.382         | 13.068         | 1.939          | Open Manhole     | 1350                  |
| 2.002 | 29.320        | 111.9          | S33        | 15.349         | 12.806         | 2.168          | Open Manhole     | 1350                  |
| 2.003 | 43.356        | 250.6          | S28        | 15.265         | 12.633         | 2.257          | Open Manhole     | 1350                  |
| 1.004 | 17.311        | 412.2          | TANK       | 15.036         | 12.516         | 2.070          | Open Manhole     | 1350                  |
| 3.000 | 24.873        | 243.9          | PPIC2      | 14.961         | 12.911         | 1.750          | Open Manhole     | 1200                  |
| 4.000 | 20.015        | 100.1          | PPIC2      | 14.961         | 13.061         | 1.750          | Open Manhole     | 1200                  |
| 5.000 | 10.114        | 20.0           | PPIC2      | 14.961         | 13.061         | 1.750          | Open Manhole     | 1200                  |
| 3.001 | 26.365        | 244.1          | PPIC3      | 14.989         | 12.803         | 1.886          | Open Manhole     | 1200                  |
| 6.000 | 5.013         | 151.9          | PPIC4      | 14.496         | 13.018         | 1.178          | Open Manhole     | 1200                  |
| 6.001 | 20.238        | 94.1           | PPIC3      | 14.989         | 12.803         | 1.886          | Open Manhole     | 1200                  |
| 7.000 | 9.765         | 15.0           | PPIC3      | 14.989         | 12.953         | 1.886          | Open Manhole     | 1200                  |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 6                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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) |
|--------|----------|-----------|---------|-------------|-------------|-------------|---------------|--------------------|
| 3.002  | o        | 300       | PPIC3   | 14.989      | 12.803      | 1.886       | Open Manhole  | 1200               |
| 8.000  | o        | 150       | PPIC15  | 14.582      | 13.232      | 1.200       | Open Manhole  | 1200               |
| 9.000  | o        | 150       | PPIC16  | 15.300      | 13.750      | 1.400       | Open Manhole  | 1200               |
| 3.003  | o        | 300       | PPIC17  | 15.018      | 12.686      | 2.032       | Open Manhole  | 1200               |
| 10.000 | o        | 300       | PPIC5   | 14.500      | 12.969      | 1.231       | Open Manhole  | 1200               |
| 11.000 | o        | 150       | PPIC10  | 14.161      | 13.272      | 0.739       | Open Manhole  | 1200               |
| 12.000 | o        | 150       | PPIC11  | 14.721      | 13.173      | 1.398       | Open Manhole  | 1200               |
| 10.001 | o        | 300       | PPIC6   | 14.516      | 12.922      | 1.294       | Open Manhole  | 1200               |
| 13.000 | o        | 150       | PPIC13  | 15.190      | 13.021      | 2.019       | Open Manhole  | 1200               |
| 14.000 | o        | 150       | PPIC12  | 14.622      | 13.103      | 1.369       | Open Manhole  | 1200               |
| 10.002 | o        | 300       | PPIC7   | 14.993      | 12.771      | 1.922       | Open Manhole  | 1200               |
| 1.005  | o        | 450       | TANK    | 15.036      | 12.516      | 2.070       | Open Manhole  | 1350               |
| 1.006  | o        | 450       | S29     | 14.900      | 12.500      | 1.950       | Open Manhole  | 1350               |

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) |
|--------|------------|-------------|---------|-------------|-------------|-------------|---------------|--------------------|
| 3.002  | 28.553     | 244.0       | PPIC17  | 15.018      | 12.686      | 2.032       | Open Manhole  | 1200               |
| 8.000  | 19.387     | 49.0        | PPIC17  | 15.018      | 12.836      | 2.032       | Open Manhole  | 1200               |
| 9.000  | 9.830      | 10.8        | PPIC17  | 15.018      | 12.836      | 2.032       | Open Manhole  | 1200               |
| 3.003  | 4.900      | 245.0       | TANK    | 15.036      | 12.666      | 2.070       | Open Manhole  | 1350               |
| 10.000 | 11.528     | 245.3       | PPIC6   | 14.516      | 12.922      | 1.294       | Open Manhole  | 1200               |
| 11.000 | 20.000     | 100.0       | PPIC6   | 14.516      | 13.072      | 1.294       | Open Manhole  | 1200               |
| 12.000 | 10.101     | 100.0       | PPIC6   | 14.516      | 13.072      | 1.294       | Open Manhole  | 1200               |
| 10.001 | 36.944     | 244.7       | PPIC7   | 14.993      | 12.771      | 1.922       | Open Manhole  | 1200               |
| 13.000 | 10.006     | 100.1       | PPIC7   | 14.993      | 12.921      | 1.922       | Open Manhole  | 1200               |
| 14.000 | 18.199     | 100.0       | PPIC7   | 14.993      | 12.921      | 1.922       | Open Manhole  | 1200               |
| 10.002 | 25.657     | 244.4       | TANK    | 15.036      | 12.666      | 2.070       | Open Manhole  | 1350               |
| 1.005  | 6.215      | 388.4       | S29     | 14.900      | 12.500      | 1.950       | Open Manhole  | 1350               |
| 1.006  | 33.952     | 125.7       |         | 13.730      | 12.230      | 1.050       | Open Manhole  | 1500               |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 7                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

#### Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.000       | User      | -         | 100      | 0.075           | 0.075          | 0.075           |
| 1.001       | User      | -         | 100      | 0.159           | 0.159          | 0.159           |
| 1.002       | User      | -         | 100      | 0.189           | 0.189          | 0.189           |
| 1.003       | User      | -         | 100      | 0.158           | 0.158          | 0.158           |
| 2.000       | User      | -         | 100      | 0.076           | 0.076          | 0.076           |
| 2.001       | User      | -         | 100      | 0.160           | 0.160          | 0.160           |
| 2.002       | User      | -         | 100      | 0.187           | 0.187          | 0.187           |
| 2.003       | User      | -         | 100      | 0.158           | 0.158          | 0.158           |
|             | User      | -         | 100      | 0.032           | 0.032          | 0.190           |
| 1.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 3.000       | User      | -         | 100      | 0.026           | 0.026          | 0.026           |
| 4.000       | User      | -         | 100      | 0.049           | 0.049          | 0.049           |
| 5.000       | User      | -         | 100      | 0.028           | 0.028          | 0.028           |
| 3.001       | User      | -         | 100      | 0.044           | 0.044          | 0.044           |
| 6.000       | User      | -         | 100      | 0.052           | 0.052          | 0.052           |
|             | User      | -         | 100      | 0.006           | 0.006          | 0.058           |
| 6.001       | User      | -         | 100      | 0.017           | 0.017          | 0.017           |
| 7.000       | User      | -         | 100      | 0.018           | 0.018          | 0.018           |
| 3.002       | User      | -         | 100      | 0.024           | 0.024          | 0.024           |
| 8.000       | User      | -         | 100      | 0.032           | 0.032          | 0.032           |
| 9.000       | User      | -         | 100      | 0.034           | 0.034          | 0.034           |
| 3.003       | User      | -         | 100      | 0.046           | 0.046          | 0.046           |
| 10.000      | User      | -         | 100      | 0.033           | 0.033          | 0.033           |
| 11.000      | User      | -         | 100      | 0.043           | 0.043          | 0.043           |
| 12.000      | User      | -         | 100      | 0.030           | 0.030          | 0.030           |
| 10.001      | User      | -         | 100      | 0.028           | 0.028          | 0.028           |
| 13.000      | User      | -         | 100      | 0.040           | 0.040          | 0.040           |
| 14.000      | User      | -         | 100      | 0.041           | 0.041          | 0.041           |
| 10.002      | User      | -         | 100      | 0.034           | 0.034          | 0.034           |
| 1.005       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.006       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 1.818           | 1.818          | 1.818           |

#### Free Flowing Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
|---------------------|--------------|--------------|--------------|------------------|----------|--------|

|       |  |        |        |        |      |   |
|-------|--|--------|--------|--------|------|---|
| 1.006 |  | 13.730 | 12.230 | 12.230 | 1500 | 0 |
|-------|--|--------|--------|--------|------|---|

#### Simulation Criteria for Storm

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

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 1    Number of Storage Structures 4    Number of Real Time Controls 0

#### Synthetic Rainfall Details

Rainfall Model FEH Return Period (years) 2

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 8                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

### Synthetic Rainfall Details

|                                               |        |                       |       |
|-----------------------------------------------|--------|-----------------------|-------|
| FEH Rainfall Version                          | 1999   | F (1km)               | 2.252 |
| Site Location GB 472400 107400 SU 72400 07400 |        | Summer Storms         | Yes   |
| C (1km)                                       | -0.029 | Winter Storms         | Yes   |
| D1 (1km)                                      | 0.457  | Cv (Summer)           | 0.750 |
| D2 (1km)                                      | 0.295  | Cv (Winter)           | 0.840 |
| D3 (1km)                                      | 0.387  | Storm Duration (mins) | 30    |
| E (1km)                                       | 0.310  |                       |       |

|                                                              |                              |                                                                                     |
|--------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                              | Page 9                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D  |  |
| Date 05/05/2021                                              | Designed by Sudeep Chongbang |                                                                                     |
| File SW NETWORK 2.MDX                                        | Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2             |                                                                                     |

### Online Controls for Storm

Hydro-Brake® Optimum Manhole: S29, DS/PN: 1.006, Volume (m³): 4.2

|                                   |                                                    |
|-----------------------------------|----------------------------------------------------|
| Unit Reference                    | MD-SHE-0437-1400-2400-1400                         |
| Design Head (m)                   | 2.400                                              |
| Design Flow (l/s)                 | 140.0                                              |
| Flush-Flo™                        | Calculated                                         |
| Objective                         | Minimise upstream storage                          |
| Application                       | Surface                                            |
| Sump Available                    | Yes                                                |
| Diameter (mm)                     | 437                                                |
| Invert Level (m)                  | 12.500                                             |
| Minimum Outlet Pipe Diameter (mm) | 450                                                |
| Suggested Manhole Diameter (mm)   | Site Specific Design (Contact Hydro International) |

| Control Points            | Head (m) | Flow (l/s) | Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|---------------------------|----------|------------|
| Design Point (Calculated) | 2.400    | 139.9      | Kick-Flo®                 | 1.680    | 117.6      |
| Flush-Flo™                | 0.793    | 139.5      | Mean Flow over Head Range | -        | 118.6      |

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

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 11.6       | 0.800     | 139.5      | 2.000     | 128.0      | 4.000     | 179.5      | 7.000     | 236.0      |
| 0.200     | 42.1       | 1.000     | 138.3      | 2.200     | 134.1      | 4.500     | 190.1      | 7.500     | 244.1      |
| 0.300     | 83.1       | 1.200     | 135.7      | 2.400     | 139.9      | 5.000     | 200.1      | 8.000     | 252.0      |
| 0.400     | 122.5      | 1.400     | 131.6      | 2.600     | 145.4      | 5.500     | 209.7      | 8.500     | 259.6      |
| 0.500     | 134.6      | 1.600     | 123.3      | 3.000     | 155.9      | 6.000     | 218.8      | 9.000     | 267.0      |
| 0.600     | 137.6      | 1.800     | 121.6      | 3.500     | 168.1      | 6.500     | 227.6      | 9.500     | 274.2      |

|                                                              |                              |                                                                                     |
|--------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                              | Page 10                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D  |  |
| Date 05/05/2021                                              | Designed by Sudeep Chongbang |                                                                                     |
| File SW NETWORK 2.MDX                                        | Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2             |                                                                                     |

### Storage Structures for Storm

#### Porous Car Park Manhole: PPIC2, DS/PN: 3.001

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 22.0  |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 50.0  |
| Max Percolation (l/s)                | 305.6   | Slope (1:X)             | 300.0 |
| Safety Factor                        | 2.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 14.461  | Membrane Depth (mm)     | 0     |

#### Porous Car Park Manhole: PPIC17, DS/PN: 3.003

|                                      |         |                         |      |
|--------------------------------------|---------|-------------------------|------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 34.0 |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 50.0 |
| Max Percolation (l/s)                | 472.2   | Slope (1:X)             | 0.0  |
| Safety Factor                        | 2.0     | Depression Storage (mm) | 5    |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3    |
| Invert Level (m)                     | 14.518  | Membrane Depth (mm)     | 0    |

#### Porous Car Park Manhole: PPIC7, DS/PN: 10.002

|                                      |         |                         |      |
|--------------------------------------|---------|-------------------------|------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 34.0 |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 50.0 |
| Max Percolation (l/s)                | 472.2   | Slope (1:X)             | 0.0  |
| Safety Factor                        | 2.0     | Depression Storage (mm) | 5    |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3    |
| Invert Level (m)                     | 14.493  | Membrane Depth (mm)     | 0    |

#### Cellular Storage Manhole: TANK, DS/PN: 1.005

|                                      |         |               |      |
|--------------------------------------|---------|---------------|------|
| Invert Level (m)                     | 12.516  | 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> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 754.0                  | 754.0                       | 0.500     | 754.0                  | 825.0                       | 0.501     | 0.0                    | 825.0                       |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 11                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

# 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 * 10m <sup>3</sup> /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 Offline Controls                 | 0     |
| Number of Online Controls       | 1     | Number of Storage Structures               | 4     |
|                                 |       | Number of Time/Area Diagrams               | 0     |
|                                 |       | Number of Real Time Controls               | 0     |

## Synthetic Rainfall Details

|                                    |                                                          |                             |       |
|------------------------------------|----------------------------------------------------------|-----------------------------|-------|
| Rainfall Model                     | FEH                                                      | D3 (1km)                    | 0.387 |
| FEH Rainfall Version               | 1999                                                     | E (1km)                     | 0.310 |
| Site Location                      | GB 472400 107400 SU 72400 07400                          | F (1km)                     | 2.252 |
| C (1km)                            | -0.029                                                   | Cv (Summer)                 | 0.750 |
| D1 (1km)                           | 0.457                                                    | Cv (Winter)                 | 0.840 |
| D2 (1km)                           | 0.295                                                    |                             |       |
| Margin for Flood Risk Warning (mm) |                                                          |                             | 300.0 |
| Analysis Timestep                  | 2.5                                                      | Second Increment (Extended) |       |
| DTS Status                         |                                                          |                             | OFF   |
| DVD Status                         |                                                          |                             | OFF   |
| Inertia Status                     |                                                          |                             | OFF   |
| Profile(s)                         |                                                          | Summer and Winter           |       |
| Duration(s) (mins)                 | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |                             |       |
| Return Period(s) (years)           |                                                          | 1, 30, 100                  |       |
| Climate Change (%)                 |                                                          | 0, 0, 20                    |       |

|        |            |        |               |                |                             |                 |                    |               |           | Water Surcharged |
|--------|------------|--------|---------------|----------------|-----------------------------|-----------------|--------------------|---------------|-----------|------------------|
| PN     | US/MH Name | Storm  | Return Period | Climate Change | First (X) Surge             | First (Y) Flood | First (Z) Overflow | Overflow Act. | Level (m) | Depth (m)        |
| 1.000  | S24 15     | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.853    | -0.322           |
| 1.001  | S25 15     | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.596    | -0.285           |
| 1.002  | S26 15     | Winter | 1             | +0%            | 30/15 Summer                |                 |                    |               | 13.324    | -0.251           |
| 1.003  | S27 15     | Winter | 1             | +0%            | 30/15 Summer                |                 |                    |               | 13.094    | -0.235           |
| 2.000  | S30 15     | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.867    | -0.323           |
| 2.001  | S31 15     | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.464    | -0.286           |
| 2.002  | S32 15     | Winter | 1             | +0%            | 30/15 Summer                |                 |                    |               | 13.182    | -0.261           |
| 2.003  | S33 15     | Winter | 1             | +0%            | 30/15 Summer                |                 |                    |               | 12.974    | -0.207           |
| 1.004  | S28 15     | Winter | 1             | +0%            | 30/15 Summer                |                 |                    |               | 12.856    | -0.152           |
| 3.000  | PPIC1 15   | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.052    | -0.261           |
| 4.000  | PPIC8 15   | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.315    | -0.096           |
| 5.000  | PPIC9 15   | Summer | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.594    | -0.123           |
| 3.001  | PPIC2 15   | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 12.990    | -0.221           |
| 6.000  | S34 15     | Summer | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.113    | -0.238           |
| 6.001  | PPIC4 15   | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.070    | -0.248           |
| 7.000  | PPIC14 15  | Winter | 1             | +0%            | 100/60 Winter               |                 |                    |               | 13.624    | -0.130           |
| 3.002  | PPIC3 15   | Winter | 1             | +0%            | 30/15 Summer                |                 |                    |               | 12.917    | -0.186           |
| 8.000  | PPIC15 15  | Summer | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.268    | -0.114           |
| 9.000  | PPIC16 15  | Winter | 1             | +0%            | 100/60 Winter               |                 |                    |               | 13.775    | -0.125           |
| 3.003  | PPIC17 15  | Winter | 1             | +0%            | 30/15 Summer                |                 |                    |               | 12.843    | -0.143           |
| 10.000 | PPIC5 15   | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.027    | -0.242           |
| 11.000 | PPIC10 15  | Winter | 1             | +0%            | 100/15 Summer 100/60 Winter |                 |                    |               | 13.323    | -0.099           |
| 12.000 | PPIC11 15  | Summer | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.217    | -0.106           |
| 10.001 | PPIC6 15   | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.010    | -0.212           |
| 13.000 | PPIC13 15  | Summer | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.071    | -0.100           |
| 14.000 | PPIC12 15  | Winter | 1             | +0%            | 100/15 Summer               |                 |                    |               | 13.152    | -0.101           |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 12                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

| PN     | US/MH<br>Name | Flooded                     |                | Pipe              |               | Status | Level<br>Exceeded |
|--------|---------------|-----------------------------|----------------|-------------------|---------------|--------|-------------------|
|        |               | Volume<br>(m <sup>3</sup> ) | Flow /<br>Cap. | Overflow<br>(l/s) | Flow<br>(l/s) |        |                   |
| 1.000  | S24           | 0.000                       | 0.05           |                   | 7.2           | OK     |                   |
| 1.001  | S25           | 0.000                       | 0.13           |                   | 19.2          | OK     |                   |
| 1.002  | S26           | 0.000                       | 0.23           |                   | 32.8          | OK     |                   |
| 1.003  | S27           | 0.000                       | 0.29           |                   | 44.0          | OK     |                   |
| 2.000  | S30           | 0.000                       | 0.05           |                   | 7.2           | OK     |                   |
| 2.001  | S31           | 0.000                       | 0.13           |                   | 19.3          | OK     |                   |
| 2.002  | S32           | 0.000                       | 0.20           |                   | 33.4          | OK     |                   |
| 2.003  | S33           | 0.000                       | 0.40           |                   | 46.6          | OK     |                   |
| 1.004  | S28           | 0.000                       | 0.77           |                   | 88.3          | OK     |                   |
| 3.000  | PPIC1         | 0.000                       | 0.04           |                   | 2.5           | OK     |                   |
| 4.000  | PPIC8         | 0.000                       | 0.29           |                   | 4.8           | OK     |                   |
| 5.000  | PPIC9         | 0.000                       | 0.08           |                   | 2.7           | OK     |                   |
| 3.001  | PPIC2         | 0.000                       | 0.15           |                   | 9.8           | OK     |                   |
| 6.000  | S34           | 0.000                       | 0.09           |                   | 5.6           | OK     |                   |
| 6.001  | PPIC4         | 0.000                       | 0.07           |                   | 6.9           | OK     |                   |
| 7.000  | PPIC14        | 0.000                       | 0.04           |                   | 1.7           | OK     |                   |
| 3.002  | PPIC3         | 0.000                       | 0.31           |                   | 19.5          | OK     |                   |
| 8.000  | PPIC15        | 0.000                       | 0.13           |                   | 3.1           | OK     |                   |
| 9.000  | PPIC16        | 0.000                       | 0.07           |                   | 3.3           | OK     |                   |
| 3.003  | PPIC17        | 0.000                       | 0.53           |                   | 24.8          | OK     |                   |
| 10.000 | PPIC5         | 0.000                       | 0.06           |                   | 3.1           | OK     |                   |
| 11.000 | PPIC10        | 0.000                       | 0.25           |                   | 4.2           | OK     | 1                 |
| 12.000 | PPIC11        | 0.000                       | 0.19           |                   | 3.0           | OK     |                   |
| 10.001 | PPIC6         | 0.000                       | 0.19           |                   | 12.1          | OK     |                   |
| 13.000 | PPIC13        | 0.000                       | 0.24           |                   | 3.8           | OK     |                   |
| 14.000 | PPIC12        | 0.000                       | 0.24           |                   | 4.0           | OK     |                   |

|                                                              |                              |                                                                                     |
|--------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                              | Page 13                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D  |  |
| Date 05/05/2021                                              | Designed by Sudeep Chongbang |                                                                                     |
| File SW NETWORK 2.MDX                                        | Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2             |                                                                                     |

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

|        |       |            |        |         |               |           |           |          | Water  | Surcharged |
|--------|-------|------------|--------|---------|---------------|-----------|-----------|----------|--------|------------|
|        | US/MH |            | Return | Climate | First (X)     | First (Y) | First (Z) | Overflow | Level  | Depth      |
| PN     | Name  | Storm      | Period | Change  | Surcharge     | Flood     | Overflow  | Act.     | (m)    | (m)        |
| 10.002 | PPIC7 | 15 Winter  | 1      | +0%     | 100/15 Summer |           |           |          | 12.884 | -0.187     |
| 1.005  | TANK  | 180 Winter | 1      | +0%     | 100/15 Winter |           |           |          | 12.680 | -0.286     |
| 1.006  | S29   | 180 Winter | 1      | +0%     | 100/15 Winter |           |           |          | 12.662 | -0.288     |

| Flooded |        |                 | Pipe |       |       | Level  |          |
|---------|--------|-----------------|------|-------|-------|--------|----------|
| US/MH   | Volume | Flow / Overflow | Pipe | Flow  |       |        |          |
| PN      | Name   | (m³)            | Cap. | (l/s) | (l/s) | Status | Exceeded |
| 10.002  | PPIC7  | 0.000           | 0.30 |       | 19.2  | OK     |          |
| 1.005   | TANK   | 0.000           | 0.27 |       | 28.9  | OK     |          |
| 1.006   | S29    | 0.000           | 0.11 |       | 28.9  | OK     |          |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 14                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

### 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 \* 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 Offline Controls 0    Number of Time/Area Diagrams 0  
 Number of Online Controls 1    Number of Storage Structures 4    Number of Real Time Controls 0

#### Synthetic Rainfall Details

Rainfall Model FEH    D3 (1km) 0.387  
 FEH Rainfall Version 1999    E (1km) 0.310  
 Site Location GB 472400 107400 SU 72400 07400    F (1km) 2.252  
 C (1km) -0.029 Cv (Summer) 0.750  
 D1 (1km) 0.457 Cv (Winter) 0.840  
 D2 (1km) 0.295  
  
 Margin for Flood Risk Warning (mm) 300.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status OFF  
 DVD Status OFF  
 Inertia Status OFF  
  
 Profile(s) Summer and Winter  
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440  
 Return Period(s) (years) 1, 30, 100  
 Climate Change (%) 0, 0, 20

|        |        |           |        |         |               |               |           |          | Water  | Surcharged |
|--------|--------|-----------|--------|---------|---------------|---------------|-----------|----------|--------|------------|
| US/MH  |        |           | Return | Climate | First (X)     | First (Y)     | First (Z) | Overflow | Level  |            |
| PN     | Name   | Storm     | Period | Change  | Surcharge     | Flood         | Overflow  | Act.     | (m)    | Depth (m)  |
| 1.000  | S24    | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.900 | -0.275     |
| 1.001  | S25    | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.693 | -0.188     |
| 1.002  | S26    | 15 Winter | 30     | +0%     | 30/15 Summer  |               |           |          | 13.637 | 0.062      |
| 1.003  | S27    | 15 Winter | 30     | +0%     | 30/15 Summer  |               |           |          | 13.498 | 0.169      |
| 2.000  | S30    | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.912 | -0.278     |
| 2.001  | S31    | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.648 | -0.102     |
| 2.002  | S32    | 15 Winter | 30     | +0%     | 30/15 Summer  |               |           |          | 13.603 | 0.160      |
| 2.003  | S33    | 15 Winter | 30     | +0%     | 30/15 Summer  |               |           |          | 13.503 | 0.322      |
| 1.004  | S28    | 15 Winter | 30     | +0%     | 30/15 Summer  |               |           |          | 13.203 | 0.195      |
| 3.000  | PPIC1  | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.168 | -0.145     |
| 4.000  | PPIC8  | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.375 | -0.036     |
| 5.000  | PPIC9  | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.617 | -0.100     |
| 3.001  | PPIC2  | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.161 | -0.050     |
| 6.000  | S34    | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.165 | -0.186     |
| 6.001  | PPIC4  | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.150 | -0.168     |
| 7.000  | PPIC14 | 15 Winter | 30     | +0%     | 100/60 Winter |               |           |          | 13.641 | -0.113     |
| 3.002  | PPIC3  | 15 Winter | 30     | +0%     | 30/15 Summer  |               |           |          | 13.129 | 0.026      |
| 8.000  | PPIC15 | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.300 | -0.082     |
| 9.000  | PPIC16 | 15 Winter | 30     | +0%     | 100/60 Winter |               |           |          | 13.798 | -0.102     |
| 3.003  | PPIC17 | 15 Winter | 30     | +0%     | 30/15 Summer  |               |           |          | 13.037 | 0.051      |
| 10.000 | PPIC5  | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.107 | -0.162     |
| 11.000 | PPIC10 | 15 Winter | 30     | +0%     | 100/15 Summer | 100/60 Winter |           |          | 13.376 | -0.046     |
| 12.000 | PPIC11 | 15 Summer | 30     | +0%     | 100/15 Summer |               |           |          | 13.258 | -0.065     |
| 10.001 | PPIC6  | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.099 | -0.123     |
| 13.000 | PPIC13 | 15 Summer | 30     | +0%     | 100/15 Summer |               |           |          | 13.123 | -0.048     |
| 14.000 | PPIC12 | 15 Winter | 30     | +0%     | 100/15 Summer |               |           |          | 13.203 | -0.050     |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 15                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

|        |        | Flooded |                 | Pipe  |       |            |          |
|--------|--------|---------|-----------------|-------|-------|------------|----------|
|        | US/MH  | Volume  | Flow / Overflow | Flow  |       | Level      |          |
| PN     | Name   | (m³)    | Cap.            | (l/s) | (l/s) | Status     | Exceeded |
| 1.000  | S24    | 0.000   | 0.16            |       | 23.6  | OK         |          |
| 1.001  | S25    | 0.000   | 0.48            |       | 71.3  | OK         |          |
| 1.002  | S26    | 0.000   | 0.76            |       | 106.7 | SURCHARGED |          |
| 1.003  | S27    | 0.000   | 0.93            |       | 140.4 | SURCHARGED |          |
| 2.000  | S30    | 0.000   | 0.15            |       | 23.6  | OK         |          |
| 2.001  | S31    | 0.000   | 0.45            |       | 69.2  | OK         |          |
| 2.002  | S32    | 0.000   | 0.62            |       | 103.8 | SURCHARGED |          |
| 2.003  | S33    | 0.000   | 1.28            |       | 147.1 | SURCHARGED |          |
| 1.004  | S28    | 0.000   | 2.50            |       | 286.1 | SURCHARGED |          |
| 3.000  | PPIC1  | 0.000   | 0.12            |       | 7.4   | OK         |          |
| 4.000  | PPIC8  | 0.000   | 0.93            |       | 15.6  | OK         |          |
| 5.000  | PPIC9  | 0.000   | 0.25            |       | 8.7   | OK         |          |
| 3.001  | PPIC2  | 0.000   | 0.43            |       | 27.2  | OK         |          |
| 6.000  | S34    | 0.000   | 0.31            |       | 18.4  | OK         |          |
| 6.001  | PPIC4  | 0.000   | 0.23            |       | 23.0  | OK         |          |
| 7.000  | PPIC14 | 0.000   | 0.14            |       | 5.7   | OK         |          |
| 3.002  | PPIC3  | 0.000   | 0.88            |       | 56.3  | SURCHARGED |          |
| 8.000  | PPIC15 | 0.000   | 0.42            |       | 10.1  | OK         |          |
| 9.000  | PPIC16 | 0.000   | 0.22            |       | 10.7  | OK         |          |
| 3.003  | PPIC17 | 0.000   | 1.55            |       | 72.0  | SURCHARGED |          |
| 10.000 | PPIC5  | 0.000   | 0.18            |       | 10.3  | OK         |          |
| 11.000 | PPIC10 | 0.000   | 0.82            |       | 13.7  | OK         | 1        |
| 12.000 | PPIC11 | 0.000   | 0.61            |       | 9.7   | OK         |          |
| 10.001 | PPIC6  | 0.000   | 0.63            |       | 41.1  | OK         |          |
| 13.000 | PPIC13 | 0.000   | 0.80            |       | 12.6  | OK         |          |
| 14.000 | PPIC12 | 0.000   | 0.78            |       | 12.9  | OK         |          |

|                                                              |                              |                                                                                     |
|--------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                              | Page 16                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D  |  |
| Date 05/05/2021                                              | Designed by Sudeep Chongbang |                                                                                     |
| File SW NETWORK 2.MDX                                        | Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2             |                                                                                     |

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

| US/MH  |       | Return Climate |        | First (X) | First (Y)     | First (Z) | Overflow      | Water Level | Surcharged Depth |
|--------|-------|----------------|--------|-----------|---------------|-----------|---------------|-------------|------------------|
| PN     | Name  | Storm          | Period | Change    | Surcharge     | Flood     | Overflow Act. | (m)         | (m)              |
| 10.002 | PPIC7 | 15 Winter      | 30     | +0%       | 100/15 Summer |           |               | 13.018      | -0.053           |
| 1.005  | TANK  | 120 Winter     | 30     | +0%       | 100/15 Winter |           |               | 12.863      | -0.103           |
| 1.006  | S29   | 120 Winter     | 30     | +0%       | 100/15 Winter |           |               | 12.843      | -0.107           |

| Flooded |        |                 | Pipe |       |        | Level    |  |
|---------|--------|-----------------|------|-------|--------|----------|--|
| US/MH   | Volume | Flow / Overflow | Pipe | Flow  | Status | Exceeded |  |
| PN      | Name   | (m³)            | Cap. | (l/s) | (l/s)  |          |  |
| 10.002  | PPIC7  | 0.000           | 1.00 |       | 63.2   | OK       |  |
| 1.005   | TANK   | 0.000           | 0.93 |       | 101.2  | OK       |  |
| 1.006   | S29    | 0.000           | 0.40 |       | 101.2  | OK       |  |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 17                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

# 100 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 | 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 Offline Controls                 | 0     |
| Number of Online Controls       | 1     | Number of Storage Structures               | 4     |
|                                 |       | Number of Time/Area Diagrams               | 0     |
|                                 |       | Number of Real Time Controls               | 0     |

## Synthetic Rainfall Details

|                                    |                                                          |                             |       |
|------------------------------------|----------------------------------------------------------|-----------------------------|-------|
| Rainfall Model                     | FEH                                                      | D3 (1km)                    | 0.387 |
| FEH Rainfall Version               | 1999                                                     | E (1km)                     | 0.310 |
| Site Location                      | GB 472400 107400 SU 72400 07400                          | F (1km)                     | 2.252 |
| C (1km)                            | -0.029                                                   | Cv (Summer)                 | 0.750 |
| D1 (1km)                           | 0.457                                                    | Cv (Winter)                 | 0.840 |
| D2 (1km)                           | 0.295                                                    |                             |       |
| Margin for Flood Risk Warning (mm) |                                                          |                             | 300.0 |
| Analysis Timestep                  | 2.5                                                      | Second Increment (Extended) |       |
| DTS Status                         |                                                          |                             | OFF   |
| DVD Status                         |                                                          |                             | OFF   |
| Inertia Status                     |                                                          |                             | OFF   |
| Profile(s)                         |                                                          | Summer and Winter           |       |
| Duration(s) (mins)                 | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |                             |       |
| Return Period(s) (years)           |                                                          | 1, 30, 100                  |       |
| Climate Change (%)                 |                                                          | 0, 0, 20                    |       |

|        |            |        |               |                |                             |                 |                    |               | Water Surcharged |
|--------|------------|--------|---------------|----------------|-----------------------------|-----------------|--------------------|---------------|------------------|
| PN     | US/MH Name | Storm  | Return Period | Climate Change | First (X) Surge             | First (Y) Flood | First (Z) Overflow | Overflow Act. | Level (m)        |
|        |            |        |               |                |                             |                 |                    |               | Depth (m)        |
| 1.000  | S24 15     | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 15.051           |
| 1.001  | S25 15     | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 15.028           |
| 1.002  | S26 15     | Winter | 100           | +20%           | 30/15 Summer                |                 |                    |               | 14.904           |
| 1.003  | S27 15     | Winter | 100           | +20%           | 30/15 Summer                |                 |                    |               | 14.516           |
| 2.000  | S30 15     | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 15.021           |
| 2.001  | S31 15     | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.993           |
| 2.002  | S32 15     | Winter | 100           | +20%           | 30/15 Summer                |                 |                    |               | 14.872           |
| 2.003  | S33 15     | Winter | 100           | +20%           | 30/15 Summer                |                 |                    |               | 14.574           |
| 1.004  | S28 60     | Winter | 100           | +20%           | 30/15 Summer                |                 |                    |               | 14.198           |
| 3.000  | PPIC1 60   | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.196           |
| 4.000  | PPIC8 60   | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.210           |
| 5.000  | PPIC9 60   | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.198           |
| 3.001  | PPIC2 60   | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.197           |
| 6.000  | S34 60     | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.187           |
| 6.001  | PPIC4 60   | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.187           |
| 7.000  | PPIC14 60  | Winter | 100           | +20%           | 100/60 Winter               |                 |                    |               | 14.180           |
| 3.002  | PPIC3 60   | Winter | 100           | +20%           | 30/15 Summer                |                 |                    |               | 14.188           |
| 8.000  | PPIC15 60  | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.163           |
| 9.000  | PPIC16 60  | Winter | 100           | +20%           | 100/60 Winter               |                 |                    |               | 14.159           |
| 3.003  | PPIC17 60  | Winter | 100           | +20%           | 30/15 Summer                |                 |                    |               | 14.174           |
| 10.000 | PPIC5 60   | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.175           |
| 11.000 | PPIC10 60  | Winter | 100           | +20%           | 100/15 Summer 100/60 Winter |                 |                    |               | 14.162           |
| 12.000 | PPIC11 60  | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.174           |
| 10.001 | PPIC6 60   | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.178           |
| 13.000 | PPIC13 60  | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.169           |
| 14.000 | PPIC12 60  | Winter | 100           | +20%           | 100/15 Summer               |                 |                    |               | 14.175           |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 18                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

| PN     | US/MH<br>Name | Flooded        |                               | Pipe          | Status     | Level<br>Exceeded |
|--------|---------------|----------------|-------------------------------|---------------|------------|-------------------|
|        |               | Volume<br>(m³) | Flow / Overflow<br>Cap. (l/s) | Flow<br>(l/s) |            |                   |
| 1.000  | S24           | 0.000          | 0.22                          | 32.7          | SURCHARGED |                   |
| 1.001  | S25           | 0.000          | 0.63                          | 95.1          | SURCHARGED |                   |
| 1.002  | S26           | 0.000          | 1.23                          | 172.0         | SURCHARGED |                   |
| 1.003  | S27           | 0.000          | 1.56                          | 235.2         | SURCHARGED |                   |
| 2.000  | S30           | 0.000          | 0.21                          | 33.8          | SURCHARGED |                   |
| 2.001  | S31           | 0.000          | 0.63                          | 96.7          | SURCHARGED |                   |
| 2.002  | S32           | 0.000          | 1.05                          | 174.5         | SURCHARGED |                   |
| 2.003  | S33           | 0.000          | 2.19                          | 252.3         | SURCHARGED |                   |
| 1.004  | S28           | 0.000          | 2.60                          | 297.2         | SURCHARGED |                   |
| 3.000  | PPIC1         | 0.000          | 0.11                          | 6.7           | SURCHARGED |                   |
| 4.000  | PPIC8         | 0.000          | 0.80                          | 13.4          | FLOOD RISK |                   |
| 5.000  | PPIC9         | 0.000          | 0.21                          | 7.5           | SURCHARGED |                   |
| 3.001  | PPIC2         | 0.000          | 0.59                          | 37.4          | SURCHARGED |                   |
| 6.000  | S34           | 0.000          | 0.25                          | 15.0          | SURCHARGED |                   |
| 6.001  | PPIC4         | 0.000          | 0.19                          | 19.1          | SURCHARGED |                   |
| 7.000  | PPIC14        | 0.000          | 0.12                          | 4.9           | SURCHARGED |                   |
| 3.002  | PPIC3         | 0.000          | 1.04                          | 66.8          | SURCHARGED |                   |
| 8.000  | PPIC15        | 0.000          | 0.37                          | 8.7           | SURCHARGED |                   |
| 9.000  | PPIC16        | 0.000          | 0.19                          | 9.2           | SURCHARGED |                   |
| 3.003  | PPIC17        | 0.000          | 2.04                          | 95.1          | SURCHARGED |                   |
| 10.000 | PPIC5         | 0.000          | 0.16                          | 8.9           | SURCHARGED |                   |
| 11.000 | PPIC10        | 1.179          | 0.71                          | 11.9          | FLOOD      | 1                 |
| 12.000 | PPIC11        | 0.000          | 0.53                          | 8.3           | SURCHARGED |                   |
| 10.001 | PPIC6         | 0.000          | 0.56                          | 36.6          | SURCHARGED |                   |
| 13.000 | PPIC13        | 0.000          | 0.69                          | 10.8          | SURCHARGED |                   |
| 14.000 | PPIC12        | 0.000          | 0.67                          | 11.1          | SURCHARGED |                   |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 19                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment C and D                                  |  |
| Date 05/05/2021<br>File SW NETWORK 2.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

|        |            |           |               |                |                    |                 |                    |               |           | Water     | Surcharged  | Flooded |
|--------|------------|-----------|---------------|----------------|--------------------|-----------------|--------------------|---------------|-----------|-----------|-------------|---------|
| PN     | US/MH Name | Storm     | Return Period | Climate Change | First (X) Surchage | First (Y) Flood | First (Z) Overflow | Overflow Act. | Level (m) | Depth (m) | Volume (m³) |         |
| 10.002 | PPIC7      | 60 Winter | 100           | +20%           | 100/15 Summer      |                 |                    |               | 14.178    | 1.107     | 0.000       |         |
| 1.005  | TANK       | 60 Winter | 100           | +20%           | 100/15 Winter      |                 |                    |               | 14.168    | 1.202     | 0.000       |         |
| 1.006  | S29        | 60 Winter | 100           | +20%           | 100/15 Winter      |                 |                    |               | 14.144    | 1.194     | 0.000       |         |

|        |            |             |                | Pipe       |            |                |
|--------|------------|-------------|----------------|------------|------------|----------------|
| PN     | US/MH Name | Flow / Cap. | Overflow (l/s) | Flow (l/s) | Status     | Level Exceeded |
| 10.002 | PPIC7      | 0.92        |                | 58.3       | SURCHARGED |                |
| 1.005  | TANK       | 1.48        |                | 161.6      | SURCHARGED |                |
| 1.006  | S29        | 0.55        |                | 139.3      | SURCHARGED |                |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 1                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

|                                               |        |
|-----------------------------------------------|--------|
| FEH Rainfall Model                            |        |
| Return Period (years)                         | 2      |
| FEH Rainfall Version                          | 1999   |
| Site Location GB 472400 107400 SU 72400 07400 |        |
| C (1km)                                       | -0.029 |
| D1 (1km)                                      | 0.457  |
| D2 (1km)                                      | 0.295  |
| D3 (1km)                                      | 0.387  |
| E (1km)                                       | 0.310  |
| F (1km)                                       | 2.252  |
| Maximum Rainfall (mm/hr)                      | 50     |
| Maximum Time of Concentration (mins)          | 30     |
| Foul Sewage (l/s/ha)                          | 0.000  |
| Volumetric Runoff Coeff.                      | 0.750  |
| PIMP (%)                                      | 100    |
| Add Flow / Climate Change (%)                 | 0      |
| Minimum Backdrop Height (m)                   | 0.200  |
| Maximum Backdrop Height (m)                   | 1.500  |
| Min Design Depth for Optimisation (m)         | 1.200  |
| Min Vel for Auto Design only (m/s)            | 1.00   |
| Min Slope for Optimisation (1:X)              | 500    |

Designed with Level Soffits

#### 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                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| 1.000 | 17.754        | 0.072       | 246.6          | 0.088          | 4.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 1.001 | 64.925        | 0.203       | 320.0          | 0.124          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 1.002 | 60.329        | 0.183       | 329.7          | 0.407          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 2.000 | 22.729        | 0.093       | 244.4          | 0.053          | 4.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 2.001 | 13.707        | 0.056       | 244.8          | 0.015          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 1.003 | 3.495         | 0.011       | 317.7          | 0.187          | 0.00           | 0.0                | 0.600     | o           | 450         | 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           | 4.30           | 13.643       | 0.088            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.5         | 11.9          |
| 1.001 | 46.45           | 5.25           | 13.421       | 0.211            | 0.0                  | 0.0           | 0.0               | 1.13         | 179.9        | 26.6          |
| 1.002 | 42.48           | 6.16           | 13.218       | 0.619            | 0.0                  | 0.0           | 0.0               | 1.11         | 177.2        | 71.2          |
| 2.000 | 50.00           | 4.38           | 13.334       | 0.053            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.8         | 7.2           |
| 2.001 | 50.00           | 4.61           | 13.241       | 0.068            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.7         | 9.2           |
| 1.003 | 42.28           | 6.21           | 13.035       | 0.874            | 0.0                  | 0.0           | 0.0               | 1.14         | 180.5        | 100.0         |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 2                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| 1.004 | 22.121        | 0.068       | 325.3          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 3.000 | 60.480        | 0.247       | 244.9          | 0.063          | 4.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 3.001 | 49.329        | 0.201       | 245.4          | 0.088          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 3.002 | 18.265        | 0.172       | 106.2          | 0.146          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 3.003 | 24.238        | 0.075       | 323.2          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |
| 1.005 | 4.024         | 0.010       | 402.4          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 1.006 | 17.579        | 0.043       | 408.8          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 1.007 | 16.262        | 0.053       | 306.8          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | 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) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.004 | 41.07           | 6.54           | 12.974       | 0.874            | 0.0                  | 0.0           | 0.0               | 1.12         | 178.4        | 100.0         |
| 3.000 | 47.72           | 5.01           | 13.775       | 0.063            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.7         | 8.1           |
| 3.001 | 43.80           | 5.83           | 13.528       | 0.151            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.6         | 17.9          |
| 3.002 | 42.98           | 6.03           | 13.327       | 0.297            | 0.0                  | 0.0           | 0.0               | 1.53         | 107.8        | 34.6          |
| 3.003 | 41.44           | 6.43           | 13.080       | 0.297            | 0.0                  | 0.0           | 0.0               | 1.00         | 110.7        | 34.6          |
| 1.005 | 40.84           | 6.60           | 12.906       | 1.171            | 0.0                  | 0.0           | 0.0               | 1.01         | 160.2        | 129.5         |
| 1.006 | 39.85           | 6.90           | 12.896       | 1.171            | 0.0                  | 0.0           | 0.0               | 1.00         | 158.9        | 129.5         |
| 1.007 | 39.11           | 7.13           | 12.853       | 1.171            | 0.0                  | 0.0           | 0.0               | 1.16         | 183.7        | 129.5         |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 3                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 |                                                              | Network 2017.1.2                                                                    |

Manhole Schedules for Storm

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | Pipe Out PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipes In PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|-------------|---------------------------|------------------------|-------------|---------------------------|------------------------|---------------|
| S35     | 15.200    | 1.557        | Open Manhole  | 1200               | 1.000       | 13.643                    | 300                    |             |                           |                        |               |
| S36     | 15.125    | 1.704        | Open Manhole  | 1350               | 1.001       | 13.421                    | 450                    | 1.000       | 13.571                    | 300                    |               |
| S37     | 14.971    | 1.753        | Open Manhole  | 1350               | 1.002       | 13.218                    | 450                    | 1.001       | 13.218                    | 450                    |               |
| S46     | 14.729    | 1.395        | Open Manhole  | 1200               | 2.000       | 13.334                    | 300                    |             |                           |                        |               |
| S47     | 15.080    | 1.839        | Open Manhole  | 1200               | 2.001       | 13.241                    | 300                    | 2.000       | 13.241                    | 300                    |               |
| S38     | 15.304    | 2.269        | Open Manhole  | 1350               | 1.003       | 13.035                    | 450                    | 1.002       | 13.035                    | 450                    |               |
|         |           |              |               |                    |             |                           |                        | 2.001       | 13.185                    | 300                    |               |
| PI      | 15.266    | 2.292        | Open Manhole  | 1350               | 1.004       | 12.974                    | 450                    | 1.003       | 13.024                    | 450                    | 50            |
| S42     | 15.131    | 1.356        | Open Manhole  | 1200               | 3.000       | 13.775                    | 300                    |             |                           |                        |               |
| S43     | 15.131    | 1.603        | Open Manhole  | 1200               | 3.001       | 13.528                    | 300                    | 3.000       | 13.528                    | 300                    |               |
| S44     | 15.298    | 1.971        | Open Manhole  | 1200               | 3.002       | 13.327                    | 300                    | 3.001       | 13.327                    | 300                    |               |
| S45     | 15.264    | 2.184        | Open Manhole  | 1350               | 3.003       | 13.080                    | 375                    | 3.002       | 13.155                    | 300                    |               |
| S39     | 14.867    | 1.961        | Open Manhole  | 1350               | 1.005       | 12.906                    | 450                    | 1.004       | 12.906                    | 450                    |               |
|         |           |              |               |                    |             |                           |                        | 3.003       | 13.005                    | 375                    | 24            |
| S40     | 14.784    | 1.888        | Open Manhole  | 1350               | 1.006       | 12.896                    | 450                    | 1.005       | 12.896                    | 450                    |               |
| S41     | 14.377    | 1.524        | Open Manhole  | 1350               | 1.007       | 12.853                    | 450                    | 1.006       | 12.853                    | 450                    |               |
|         | 14.860    | 2.060        | Open Manhole  | 1350               |             | OUTFALL                   |                        | 1.007       | 12.800                    | 450                    |               |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 4                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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) |
|-------|-------------|--------------|------------|----------------|----------------|----------------|------------------|-----------------------|
| 1.000 | o           | 300          | S35        | 15.200         | 13.643         | 1.257          | Open Manhole     | 1200                  |
| 1.001 | o           | 450          | S36        | 15.125         | 13.421         | 1.254          | Open Manhole     | 1350                  |
| 1.002 | o           | 450          | S37        | 14.971         | 13.218         | 1.303          | Open Manhole     | 1350                  |
| 2.000 | o           | 300          | S46        | 14.729         | 13.334         | 1.095          | Open Manhole     | 1200                  |
| 2.001 | o           | 300          | S47        | 15.080         | 13.241         | 1.539          | Open Manhole     | 1200                  |
| 1.003 | o           | 450          | S38        | 15.304         | 13.035         | 1.819          | Open Manhole     | 1350                  |
| 1.004 | o           | 450          | PI         | 15.266         | 12.974         | 1.842          | Open Manhole     | 1350                  |
| 3.000 | o           | 300          | S42        | 15.131         | 13.775         | 1.056          | Open Manhole     | 1200                  |
| 3.001 | o           | 300          | S43        | 15.131         | 13.528         | 1.303          | Open Manhole     | 1200                  |
| 3.002 | o           | 300          | S44        | 15.298         | 13.327         | 1.671          | Open Manhole     | 1200                  |
| 3.003 | o           | 375          | S45        | 15.264         | 13.080         | 1.809          | Open Manhole     | 1350                  |
| 1.005 | o           | 450          | S39        | 14.867         | 12.906         | 1.511          | Open Manhole     | 1350                  |
| 1.006 | o           | 450          | S40        | 14.784         | 12.896         | 1.438          | Open Manhole     | 1350                  |
| 1.007 | o           | 450          | S41        | 14.377         | 12.853         | 1.074          | Open Manhole     | 1350                  |

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 | 17.754        | 246.6          | S36        | 15.125         | 13.571         | 1.254          | Open Manhole     | 1350                  |
| 1.001 | 64.925        | 320.0          | S37        | 14.971         | 13.218         | 1.303          | Open Manhole     | 1350                  |
| 1.002 | 60.329        | 329.7          | S38        | 15.304         | 13.035         | 1.819          | Open Manhole     | 1350                  |
| 2.000 | 22.729        | 244.4          | S47        | 15.080         | 13.241         | 1.539          | Open Manhole     | 1200                  |
| 2.001 | 13.707        | 244.8          | S38        | 15.304         | 13.185         | 1.819          | Open Manhole     | 1350                  |
| 1.003 | 3.495         | 317.7          | PI         | 15.266         | 13.024         | 1.792          | Open Manhole     | 1350                  |
| 1.004 | 22.121        | 325.3          | S39        | 14.867         | 12.906         | 1.511          | Open Manhole     | 1350                  |
| 3.000 | 60.480        | 244.9          | S43        | 15.131         | 13.528         | 1.303          | Open Manhole     | 1200                  |
| 3.001 | 49.329        | 245.4          | S44        | 15.298         | 13.327         | 1.671          | Open Manhole     | 1200                  |
| 3.002 | 18.265        | 106.2          | S45        | 15.264         | 13.155         | 1.809          | Open Manhole     | 1350                  |
| 3.003 | 24.238        | 323.2          | S39        | 14.867         | 13.005         | 1.487          | Open Manhole     | 1350                  |
| 1.005 | 4.024         | 402.4          | S40        | 14.784         | 12.896         | 1.438          | Open Manhole     | 1350                  |
| 1.006 | 17.579        | 408.8          | S41        | 14.377         | 12.853         | 1.074          | Open Manhole     | 1350                  |
| 1.007 | 16.262        | 306.8          |            | 14.860         | 12.800         | 1.610          | Open Manhole     | 1350                  |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 5                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

#### Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.000       | User      | -         | 100      | 0.088           | 0.088          | 0.088           |
| 1.001       | User      | -         | 100      | 0.124           | 0.124          | 0.124           |
| 1.002       | User      | -         | 100      | 0.222           | 0.222          | 0.222           |
|             | User      | -         | 100      | 0.185           | 0.185          | 0.407           |
| 2.000       | User      | -         | 100      | 0.053           | 0.053          | 0.053           |
| 2.001       | User      | -         | 100      | 0.015           | 0.015          | 0.015           |
| 1.003       | User      | -         | 100      | 0.038           | 0.038          | 0.038           |
|             | User      | -         | 100      | 0.149           | 0.149          | 0.187           |
| 1.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 3.000       | User      | -         | 100      | 0.063           | 0.063          | 0.063           |
| 3.001       | User      | -         | 100      | 0.088           | 0.088          | 0.088           |
| 3.002       | User      | -         | 100      | 0.146           | 0.146          | 0.146           |
| 3.003       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.005       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.006       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.007       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 1.171           | 1.171          | 1.171           |

#### Free Flowing Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
| 1.007               |              | 14.860       | 12.800       | 12.860           | 1350     | 0      |

#### Simulation Criteria for Storm

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

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

#### Synthetic Rainfall Details

|                       |                                 |                       |       |
|-----------------------|---------------------------------|-----------------------|-------|
| Rainfall Model        | FEH                             | E (1km)               | 0.310 |
| Return Period (years) | 2                               | F (1km)               | 2.252 |
| FEH Rainfall Version  | 1999                            | Summer Storms         | Yes   |
| Site Location         | GB 472400 107400 SU 72400 07400 | Winter Storms         | Yes   |
| C (1km)               | -0.029                          | Cv (Summer)           | 0.750 |
| D1 (1km)              | 0.457                           | Cv (Winter)           | 0.840 |
| D2 (1km)              | 0.295                           | Storm Duration (mins) | 30    |
| D3 (1km)              | 0.387                           |                       |       |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 6                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S39, DS/PN: 1.005, Volume (m³): 8.6

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SCU-0304-1200-1800-1200 |
| Design Head (m)                   | 1.800                      |
| Design Flow (l/s)                 | 120.0                      |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Linear discharge profile   |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 304                        |
| Invert Level (m)                  | 12.906                     |
| Minimum Outlet Pipe Diameter (mm) | 375                        |
| Suggested Manhole Diameter (mm)   | 1500                       |

| Control Points            | Head (m) | Flow (l/s) | Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|---------------------------|----------|------------|
| Design Point (Calculated) | 1.800    | 120.0      | Kick-Flo®                 | 0.455    | 61.7       |
| Flush-Flo™                | 0.343    | 64.0       | Mean Flow over Head Range | -        | 79.9       |

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) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 10.2       | 0.800     | 81.0       | 2.000     | 126.3      | 4.000     | 177.2      | 7.000     | 233.1      |
| 0.200     | 34.5       | 1.000     | 90.2       | 2.200     | 132.3      | 4.500     | 187.7      | 7.500     | 241.2      |
| 0.300     | 58.9       | 1.200     | 98.5       | 2.400     | 138.1      | 5.000     | 197.7      | 8.000     | 248.9      |
| 0.400     | 63.4       | 1.400     | 106.2      | 2.600     | 143.6      | 5.500     | 207.1      | 8.500     | 256.4      |
| 0.500     | 64.5       | 1.600     | 113.3      | 3.000     | 153.9      | 6.000     | 216.1      | 9.000     | 263.8      |
| 0.600     | 70.5       | 1.800     | 120.0      | 3.500     | 166.0      | 6.500     | 224.8      | 9.500     | 270.9      |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 7                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

Storage Structures for Storm

Cellular Storage Manhole: S39, DS/PN: 1.005

Invert Level (m) 12.906 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> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 252.0                  | 252.0                       | 1.000     | 252.0                  | 316.0                       | 1.001     | 0.0                    | 316.0                       |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 8                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

## Synthetic Rainfall Details

Rainfall Model FEH    D3 (1km) 0.387  
 FEH Rainfall Version 1999    E (1km) 0.310  
 Site Location GB 472400 107400 SU 72400 07400    F (1km) 2.252  
 C (1km) -0.029 Cv (Summer) 0.750  
 D1 (1km) 0.457 Cv (Winter) 0.840  
 D2 (1km) 0.295

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

Profile(s) Summer and Winter  
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440  
 Return Period(s) (years) 1, 30, 100  
 Climate Change (%) 0, 0, 20

| PN    | US/MH Name | Storm      | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level | Surcharged Depth | Flooded Volume |
|-------|------------|------------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-------------|------------------|----------------|
|       |            |            |               |                |                 |                 |                    |               | (m)         | (m)              | (m³)           |
| 1.000 | S35        | 15 Winter  | 1             | +0%            | 100/15 Summer   |                 |                    |               | 13.717      | -0.226           | 0.000          |
| 1.001 | S36        | 15 Winter  | 1             | +0%            | 100/15 Summer   |                 |                    |               | 13.519      | -0.352           | 0.000          |
| 1.002 | S37        | 15 Winter  | 1             | +0%            | 30/15 Summer    |                 |                    |               | 13.383      | -0.285           | 0.000          |
| 2.000 | S46        | 15 Winter  | 1             | +0%            | 100/15 Summer   |                 |                    |               | 13.391      | -0.243           | 0.000          |
| 2.001 | S47        | 15 Winter  | 1             | +0%            | 30/15 Summer    |                 |                    |               | 13.306      | -0.235           | 0.000          |
| 1.003 | S38        | 15 Winter  | 1             | +0%            | 30/15 Summer    |                 |                    |               | 13.263      | -0.222           | 0.000          |
| 1.004 | PI         | 180 Winter | 1             | +0%            | 30/15 Summer    |                 |                    |               | 13.188      | -0.236           | 0.000          |
| 3.000 | S42        | 15 Winter  | 1             | +0%            | 100/15 Summer   |                 |                    |               | 13.836      | -0.239           | 0.000          |
| 3.001 | S43        | 15 Winter  | 1             | +0%            | 100/15 Summer   |                 |                    |               | 13.616      | -0.212           | 0.000          |
| 3.002 | S44        | 15 Winter  | 1             | +0%            | 100/15 Summer   |                 |                    |               | 13.428      | -0.199           | 0.000          |
| 3.003 | S45        | 15 Winter  | 1             | +0%            | 30/30 Winter    |                 |                    |               | 13.204      | -0.251           | 0.000          |
| 1.005 | S39        | 180 Winter | 1             | +0%            | 30/15 Winter    |                 |                    |               | 13.181      | -0.175           | 0.000          |
| 1.006 | S40        | 180 Winter | 1             | +0%            |                 |                 |                    |               | 13.029      | -0.317           | 0.000          |
| 1.007 | S41        | 180 Winter | 1             | +0%            |                 |                 |                    |               | 12.971      | -0.332           | 0.000          |

| Pipe                  |      |            |            |        |          |
|-----------------------|------|------------|------------|--------|----------|
| US/MH Flow / Overflow |      |            | Level      |        |          |
| PN                    | Name | Cap. (l/s) | Flow (l/s) | Status | Exceeded |
| 1.000                 | S35  | 0.14       | 8.5        | OK     |          |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 9                                                                              |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

| PN    | US/MH Name | Flow / Overflow |       | Pipe Flow | Status | Level Exceeded |
|-------|------------|-----------------|-------|-----------|--------|----------------|
|       |            | Cap.            | (l/s) | (l/s)     |        |                |
| 1.001 | S36        | 0.10            |       | 17.2      | OK     |                |
| 1.002 | S37        | 0.28            |       | 45.2      | OK     |                |
| 2.000 | S46        | 0.08            |       | 5.1       | OK     |                |
| 2.001 | S47        | 0.11            |       | 6.2       | OK     |                |
| 1.003 | S38        | 0.51            |       | 61.6      | OK     |                |
| 1.004 | PI         | 0.18            |       | 26.6      | OK     |                |
| 3.000 | S42        | 0.09            |       | 5.7       | OK     |                |
| 3.001 | S43        | 0.18            |       | 12.0      | OK     |                |
| 3.002 | S44        | 0.24            |       | 22.6      | OK     |                |
| 3.003 | S45        | 0.24            |       | 22.8      | OK     |                |
| 1.005 | S39        | 0.19            |       | 22.4      | OK     |                |
| 1.006 | S40        | 0.19            |       | 22.4      | OK     |                |
| 1.007 | S41        | 0.16            |       | 22.4      | OK     |                |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 10                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

### 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 \* 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 Offline Controls 0      Number of Time/Area Diagrams 0  
 Number of Online Controls 1      Number of Storage Structures 1      Number of Real Time Controls 0

#### Synthetic Rainfall Details

Rainfall Model FEH      D3 (1km) 0.387  
 FEH Rainfall Version 1999      E (1km) 0.310  
 Site Location GB 472400 107400 SU 72400 07400      F (1km) 2.252  
 C (1km) -0.029 Cv (Summer) 0.750  
 D1 (1km) 0.457 Cv (Winter) 0.840  
 D2 (1km) 0.295

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

Profile(s) Summer and Winter  
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440  
 Return Period(s) (years) 1, 30, 100  
 Climate Change (%) 0, 0, 20

| PN    | US/MH Name | Storm     | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|-------|------------|-----------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|----------------------|---------------------|
| 1.000 | S35        | 15 Winter | 30            | +0%            | 100/15 Summer   |                 |                    |               | 13.822          | -0.121               | 0.000               |
| 1.001 | S36        | 15 Winter | 30            | +0%            | 100/15 Summer   |                 |                    |               | 13.799          | -0.072               | 0.000               |
| 1.002 | S37        | 15 Winter | 30            | +0%            | 30/15 Summer    |                 |                    |               | 13.768          | 0.100                | 0.000               |
| 2.000 | S46        | 15 Winter | 30            | +0%            | 100/15 Summer   |                 |                    |               | 13.634          | 0.000                | 0.000               |
| 2.001 | S47        | 15 Winter | 30            | +0%            | 30/15 Summer    |                 |                    |               | 13.619          | 0.078                | 0.000               |
| 1.003 | S38        | 15 Winter | 30            | +0%            | 30/15 Summer    |                 |                    |               | 13.605          | 0.120                | 0.000               |
| 1.004 | PI         | 60 Winter | 30            | +0%            | 30/15 Summer    |                 |                    |               | 13.513          | 0.089                | 0.000               |
| 3.000 | S42        | 15 Winter | 30            | +0%            | 100/15 Summer   |                 |                    |               | 13.886          | -0.189               | 0.000               |
| 3.001 | S43        | 15 Winter | 30            | +0%            | 100/15 Summer   |                 |                    |               | 13.713          | -0.115               | 0.000               |
| 3.002 | S44        | 15 Winter | 30            | +0%            | 100/15 Summer   |                 |                    |               | 13.556          | -0.071               | 0.000               |
| 3.003 | S45        | 60 Winter | 30            | +0%            | 30/30 Winter    |                 |                    |               | 13.503          | 0.048                | 0.000               |
| 1.005 | S39        | 60 Winter | 30            | +0%            | 30/15 Winter    |                 |                    |               | 13.493          | 0.137                | 0.000               |
| 1.006 | S40        | 60 Winter | 30            | +0%            |                 |                 |                    |               | 13.129          | -0.217               | 0.000               |
| 1.007 | S41        | 60 Winter | 30            | +0%            |                 |                 |                    |               | 13.059          | -0.244               | 0.000               |

|       |            | Pipe      |            |                |        | Level    |  |
|-------|------------|-----------|------------|----------------|--------|----------|--|
| PN    | US/MH Name | Flow Cap. | Flow (l/s) | Overflow (l/s) | Status | Exceeded |  |
| 1.000 | S35        | 0.46      |            | 27.7           | OK     |          |  |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 11                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

| PN    | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe       | Status     | Level    |
|-------|------------|-------------|----------------|------------|------------|----------|
|       |            |             |                | Flow (l/s) |            | Exceeded |
| 1.001 | S36        | 0.33        |                | 55.8       |            | OK       |
| 1.002 | S37        | 0.89        |                | 145.7      | SURCHARGED |          |
| 2.000 | S46        | 0.22        |                | 14.0       |            | OK       |
| 2.001 | S47        | 0.28        |                | 16.2       | SURCHARGED |          |
| 1.003 | S38        | 1.67        |                | 202.4      | SURCHARGED |          |
| 1.004 | PI         | 0.82        |                | 120.0      | SURCHARGED |          |
| 3.000 | S42        | 0.28        |                | 18.6       |            | OK       |
| 3.001 | S43        | 0.66        |                | 43.7       |            | OK       |
| 3.002 | S44        | 0.92        |                | 85.3       |            | OK       |
| 3.003 | S45        | 0.46        |                | 43.5       | SURCHARGED |          |
| 1.005 | S39        | 0.52        |                | 61.7       | SURCHARGED |          |
| 1.006 | S40        | 0.53        |                | 61.7       |            | OK       |
| 1.007 | S41        | 0.43        |                | 61.7       |            | OK       |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 12                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

### 100 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 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 Offline Controls 0      Number of Time/Area Diagrams 0  
 Number of Online Controls 1      Number of Storage Structures 1      Number of Real Time Controls 0

#### Synthetic Rainfall Details

Rainfall Model FEH      D3 (1km) 0.387  
 FEH Rainfall Version 1999      E (1km) 0.310  
 Site Location GB 472400 107400 SU 72400 07400      F (1km) 2.252  
 C (1km) -0.029 Cv (Summer) 0.750  
 D1 (1km) 0.457 Cv (Winter) 0.840  
 D2 (1km) 0.295

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

Profile(s) Summer and Winter  
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440  
 Return Period(s) (years) 1, 30, 100  
 Climate Change (%) 0, 0, 20

| PN    | US/MH Name | Storm     | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|-------|------------|-----------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|----------------------|---------------------|
| 1.000 | S35        | 15 Winter | 100           | +20%           | 100/15 Summer   |                 |                    |               | 14.955          | 1.012                | 0.000               |
| 1.001 | S36        | 15 Winter | 100           | +20%           | 100/15 Summer   |                 |                    |               | 14.916          | 1.045                | 0.000               |
| 1.002 | S37        | 15 Winter | 100           | +20%           | 30/15 Summer    |                 |                    |               | 14.848          | 1.180                | 0.000               |
| 2.000 | S46        | 60 Winter | 100           | +20%           | 100/15 Summer   |                 |                    |               | 14.418          | 0.784                | 0.000               |
| 2.001 | S47        | 60 Winter | 100           | +20%           | 30/15 Summer    |                 |                    |               | 14.414          | 0.873                | 0.000               |
| 1.003 | S38        | 60 Winter | 100           | +20%           | 30/15 Summer    |                 |                    |               | 14.409          | 0.924                | 0.000               |
| 1.004 | PI         | 60 Winter | 100           | +20%           | 30/15 Summer    |                 |                    |               | 14.400          | 0.976                | 0.000               |
| 3.000 | S42        | 60 Winter | 100           | +20%           | 100/15 Summer   |                 |                    |               | 14.434          | 0.359                | 0.000               |
| 3.001 | S43        | 60 Winter | 100           | +20%           | 100/15 Summer   |                 |                    |               | 14.426          | 0.598                | 0.000               |
| 3.002 | S44        | 60 Winter | 100           | +20%           | 100/15 Summer   |                 |                    |               | 14.408          | 0.781                | 0.000               |
| 3.003 | S45        | 60 Winter | 100           | +20%           | 30/30 Winter    |                 |                    |               | 14.385          | 0.930                | 0.000               |
| 1.005 | S39        | 60 Winter | 100           | +20%           | 30/15 Winter    |                 |                    |               | 14.370          | 1.014                | 0.000               |
| 1.006 | S40        | 60 Winter | 100           | +20%           |                 |                 |                    |               | 13.210          | -0.136               | 0.000               |
| 1.007 | S41        | 60 Winter | 100           | +20%           |                 |                 |                    |               | 13.125          | -0.178               | 0.000               |

|       |            | Pipe      |            |                |            | Level    |  |
|-------|------------|-----------|------------|----------------|------------|----------|--|
| PN    | US/MH Name | Flow Cap. | Flow (l/s) | Overflow (l/s) | Status     | Exceeded |  |
| 1.000 | S35        | 0.67      |            | 40.8           | FLOOD RISK |          |  |

|                                                              |                                                              |                                                                                     |
|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Alchemy                                                      |                                                              | Page 13                                                                             |
| Bessemer Road<br>Welwyn Garden City<br>Hertfordshire AL7 1HE | Havant<br>Catchment E                                        |  |
| Date 07/05/2021<br>File SW NETWORK 3.MDX                     | Designed by Sudeep Chongbang<br>Checked by Elizabeth Orchard |                                                                                     |
| XP Solutions                                                 | Network 2017.1.2                                             |                                                                                     |

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

| PN    | US/MH<br>Name | Flow /<br>Cap. | Overflow<br>(l/s) | Pipe<br>Flow<br>(l/s) | Status     | Level    |
|-------|---------------|----------------|-------------------|-----------------------|------------|----------|
|       |               |                |                   |                       |            | Exceeded |
| 1.001 | S36           | 0.57           |                   | 94.7                  | FLOOD RISK |          |
| 1.002 | S37           | 1.66           |                   | 272.0                 | FLOOD RISK |          |
| 2.000 | S46           | 0.20           |                   | 12.3                  | SURCHARGED |          |
| 2.001 | S47           | 0.25           |                   | 14.6                  | SURCHARGED |          |
| 1.003 | S38           | 1.70           |                   | 206.3                 | SURCHARGED |          |
| 1.004 | PI            | 1.40           |                   | 205.1                 | SURCHARGED |          |
| 3.000 | S42           | 0.25           |                   | 17.1                  | SURCHARGED |          |
| 3.001 | S43           | 0.60           |                   | 39.6                  | SURCHARGED |          |
| 3.002 | S44           | 0.76           |                   | 70.3                  | SURCHARGED |          |
| 3.003 | S45           | 0.69           |                   | 65.5                  | SURCHARGED |          |
| 1.005 | S39           | 0.81           |                   | 96.8                  | SURCHARGED |          |
| 1.006 | S40           | 0.83           |                   | 96.7                  | OK         |          |
| 1.007 | S41           | 0.68           |                   | 96.7                  | OK         |          |

## **Appendix I – Responses from the Pre-application Submission**

**Registered Office:**  
Portsmouth Water Ltd  
PO Box 8  
Havant  
Hampshire PO9 1LG

Tel: 023 9249 9888  
Fax: 023 9245 3632  
Web: [www.portsmouthwater.co.uk](http://www.portsmouthwater.co.uk)

**CONSULTATION UNDER THE TOWN AND COUNTRY PLANNING  
(DEVELOPMENT MANAGEMENT PROCEDURE ENGLAND) ORDER 2015**

|                                        |                                                                                                                                                                                                                  |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>                      | <b>Kingsbridge Estates Ltd</b>                                                                                                                                                                                   |
| <b>Planning Application Reference:</b> | <b>GEN/20/00451</b>                                                                                                                                                                                              |
| <b>Proposal:</b>                       | <b>Redevelopment of industrial land for the erection of a distribution warehouse building and a vehicle storage deck (Use Class B8), construction of an additional access, car parking and associated works.</b> |
| <b>Location:</b>                       | <b>32 New Lane, Havant, PO9 2NG</b>                                                                                                                                                                              |
| <b>Date:</b>                           | <b>20 July 2020</b>                                                                                                                                                                                              |

Portsmouth Water have reviewed the pre-application (GEN/20/00451) and have the following comments.

### **Portsmouth Water's Position**

Portsmouth Water do not object to the proposed development in principle, however recommend the following conditions on full planning permission in order to reduce the potential risks posed to groundwater and our resource as a result of the proposed development. Without these conditions we would object to the development due to the risk to groundwater quality and the local public water supply.

The site is located within the Source Protection Zone 1c (SPZ1c) for an essential Public Water Supply Source. The SPZ1c relates to subsurface activity only, where the Chalk aquifer is confined and may be impacted by deep drilling activities. Subterranean activities such as deep drainage solutions and/or piling may pose a risk to groundwater quality at the local public water supply source. The groundwater area is of high sensitivity and consequently all measures to prevent pollution during and post construction are required in order to safeguard the local public water supply.

## Recommended Planning Conditions

- 1. No development shall take place until a surface water drainage scheme based on sustainable drainage principles and a comprehensive assessment of the hydrological and hydrogeological context of the development, has been submitted to and approved in writing by the local planning authority in consultation with Portsmouth Water. The scheme shall subsequently be implemented in accordance with the approved details before any building within that phase is occupied.***

***Details of how the scheme shall be maintained and managed after completion shall also be included.***

***Reason - To ensure that any proposed surface water drainage scheme does not harm groundwater resources in line with paragraph 170 of the NPPF and to reduce the risk of groundwater pollution.***

- 2. No development shall commence until such time as a scheme to dispose of foul water has been submitted to, and approved in writing by, the local planning authority in consultation with Portsmouth Water. The scheme shall be implemented in accordance with the timetable agreed as part of the approved scheme.***

***The scheme shall also include:***

- details of how the scheme shall be maintained and managed after completion.***
- details of the sewage pipe work layout and specifications.***

***Reason- This is in order to manage the quantity of foul sewage in order to minimise the risk to controlled waters and the public drinking water supply.***

- 3. No piling or any other foundation construction using penetrative methods shall be carried out other than with the express written consent of the local planning authority in consultation with Portsmouth Water. The development shall be carried out in accordance with the approved details.***

***Thus it should be demonstrated that any proposed piling;***

- a. Will not result in contamination of groundwater. This is in accordance with National Planning Policy Framework paragraph 109.***
- b. Nor any increased risk to drinking water supplies (including turbidity).***
- c. Nor deterioration in the transmissivity of the aquifer.***

***Reason- Piling or any other foundation designs using penetrative methods can pose a risk to potable supplies from, for example, turbidity, mobilisation of historical contaminants, drilling through different aquifers and creation of preferential pathways.***

- 4. If, during development, contamination not previously identified is found to be present at the site then the local planning authority must be notified immediately. No further development (unless otherwise agreed in writing with the local planning authority in consultation with the Environment Agency and Portsmouth Water)***

*shall be undertaken in that phase until the developer has submitted and had approved a site investigation, risk assessment and remediation strategy report, detailing how to mitigate the contamination identified.*

*The remediation strategy approved by the local planning authority shall be implemented in full before development in that phase recommences.*

*Reason - To ensure that risks from land contamination to drinking water supplies is controlled and mitigated.*

5. *No development shall start on site until a construction environmental management plan (CEMP) has been submitted to and approved in writing by the Planning Authority in consultation with Portsmouth Water detailing all pollution mitigation measures to be adopted during the construction phase. This should include management of overland runoff, storage of hazardous materials, chemical and hydrocarbons on site and temporary drainage infrastructure to ensure that water resources are not put at risk from leaks or spillages.*

*Reason- Fugitive emissions from the site during construction could pose a significant threat to groundwater and therefore the local water supply source.*

## Informatives

### Drainage

The Flood Risk Assessment and Drainage Strategy should clearly identify the means of foul and surface water drainage for the site.

Portsmouth Water would have a presumption against the use of deep bore soakaways at this site and the discharge of foul and surface water into ground where adequate pollution prevention measures are not in place. If deep bore soakaways are proposed the application must be accompanied by detailed plans and a hydrogeological risk assessment stating how risk to groundwater have been assessed and mitigated through design.

Portsmouth Water will only agree to the use of deep pit based systems (including boreholes or other structures that bypass the soil layers) for surface water disposal if the developer can show that all of the following apply:

- there are no other feasible disposal options such as shallow infiltration systems (for surface water) that can be operated in accordance with current British Standards;
- the system is no deeper than is required to obtain sufficient soakage;
- pollution control measures are in place;
- risk assessment demonstrates that no unacceptable discharge to groundwater will take place, in particular that inputs of hazardous substances to groundwater will be prevented; and
- there are sufficient mitigating factors or measures to compensate for the increased risk arising from the use of deep structures.

Portsmouth Water request that no development shall commence until a scheme for surface and foul water drainage has been submitted to and approved in writing by the Local Planning Authority in consultation with Portsmouth Water, in line with recommended Conditions 1 and 2.

### Piling & Foundations

Portsmouth Water would have no objection to piling at this location if the piles terminate within the Clay cover. If the piles penetrate the full depth of the Clay cover we would expect a piling risk assessment and method statement, this should detail the depth and type of piling to be undertaken and the methodology by which such piling will be carried out, including pollution prevention measures. Portsmouth Water should be consulted on the piling design and risk assessment in line with recommended Condition 3.

## Pollution Prevention & CEMP

Portsmouth Water wish to be consulted on the Construction Environmental Management Plan (CEMP) for comment in line with recommended Condition 5. The CEMP should specifically outline the proposed means of surface water management during development.

Portsmouth Water requests that storage for fuels, oils or other chemicals be contained within a bund capable of holding 110% of the total capacity. The hook up/discharge points should be within the bunded area.

Portsmouth Water would require further information on the fire prevention plan for the site in regards the potential drainage of fire water and associated substances. This detail can be provided at full planning/ detailed stage of the development.

Catchment Management Team  
*Portsmouth Water*

[catchment.management@portsmouthwater.co.uk](mailto:catchment.management@portsmouthwater.co.uk)

# Solent & South Downs Area

## Pre-application Advice Note

September 2019

This document sets out the environmental issues we will consider when providing our planning application consultation advice to Local Councils. It can be used by applicants, developers and consultants at the pre-planning stage.

## Fluvial Flood Risk

**Development must be safe and should not increase the risk of flooding.**

You can view a site's flood zone on the Flood Map for Planning on our website: <https://flood-map-for-planning.service.gov.uk>

If your proposed development is located within flood zone 2 or 3 you should consult the Flood Risk and Coastal Change pages of the National Planning Policy Guidance (NPPG)

<http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

Here you can determine whether the flood risk vulnerability of your proposed development and the flood zone are compatible. You can also establish if there are flood risk sequential test and exception test requirements for your proposed development. In the first instance we recommend the developer/applicant liaises with the Local Planning Authority (LPA) to undertake the Sequential Test in accordance with the National Planning Policy Framework (NPPF).

If your proposed development is located within flood zone 2 or 3 and its vulnerability and flood zone are considered acceptable under the NPPG then a site specific Flood Risk Assessment (FRA) is required to support any subsequent planning application. This is required by paragraph 163 of the NPPF: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf)

Guidance on the content of a site specific FRA can be found in the NPPG and online: <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>

More detailed flood risk modelling data is available to help you produce a FRA please contact our Customers and Engagement team at [SSDenquiries@environment-agency.gov.uk](mailto:SSDenquiries@environment-agency.gov.uk).

## Climate Change Allowances

On 19 February 2016, we published new guidance for planners and developers on how to use climate change allowances in a site-specific FRA: <https://www.gov.uk/guidance/flood-risk-assessments-climatechange-allowances>

## Groundwater Quality

**Development must not cause pollution to the water environment.**

### Source Protection Zones

We have defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used across the country for public drinking water supply. These zones are more sensitive to contamination from activities that might cause pollution in the area. The closer the activity, the greater the risk.



SPZ1s are the areas designated as most at risk from contamination and development activities and in these areas we may consider it inappropriate for development to discharge foul or surface water into the ground.

To see if your proposed development is located within a Source Protection Zone, please use our online map: <https://magic.defra.gov.uk/>

## Contaminated Land

The NPPF takes a precautionary approach to land contamination. Before the principle of development can be determined, land contamination should be investigated to see whether it could preclude certain development due to environmental risk or cost of remediation. Where contamination is known or suspected, a desk study, site investigation, remediation and other works may be required to enable safe development.

## Pollution

If the proposed development use has the potential to pollute ground or surface water receptors then an assessment to establish whether the risk of pollution is acceptable or can be mitigated will be required within any planning application.

## Foul Drainage

When drawing up wastewater treatment proposals for any development, the first presumption is to provide a system of foul drainage discharging into a public sewer to be treated at a public sewage treatment works (those provided and operated by the water and sewerage companies). This should be done in consultation with the sewerage company of the area prior to the submission of a formal planning application.

If connection to a public sewage treatment plant is not feasible, a package sewage treatment plant may be considered. If you would like further advice please call 03708 506 506.

## Cemeteries

The development of new cemeteries in areas where groundwater vulnerability is high should be avoided, except where the thickness and nature of the unsaturated zone, or the impermeable formations beneath the site, protect groundwater; or where the long-term risk is mitigated by appropriate engineering methods.

## Main Rivers

### Ecology

In accordance with the National Planning Policy Framework (NPPF), any development proposal should avoid significant harm to biodiversity and seek to protect and enhance it. Opportunities to incorporate biodiversity in and around the development will be encouraged.

Your scheme should be designed with a naturalised buffer zone of at least 8 metres from the main river to protect and enhance the conservation value of the watercourse and ensure access for flood defence maintenance.

This buffer zone should be managed for the benefit of biodiversity for example by the planting of locally appropriate, UK native species. The buffer zone should be undisturbed by development with no fencing, footpaths or other structures. This buffer zone will help provide more space for flood waters, provide improved habitat for local biodiversity and allows access for any maintenance requirements.

To identify any Main Rivers in proximity to your proposed development please see our Main Rivers Consultation Map: <http://apps.environment-agency.gov.uk/wiyby/151293.aspx>

customer service line  
03708 506 506

[www.gov.uk/environment-agency](http://www.gov.uk/environment-agency)

incident hotline  
0800 80 70 60

floodline  
0345 988 1188

## Culverting

The Environment Agency is likely to oppose culverting as it is damaging to the ecological integrity of the river channel and its corridor and acts as a barrier to the movement of wildlife, including fish and may also increase flood risk. If the proposal will impact an existing culvert the Environment Agency may oppose planning consent for development either over, or within 8 metres of an existing culvert. Wherever possible, existing culverts should be removed and the river channel and bankside habitat reinstated to restore the ecological continuity of the river channel and its corridor.

## Water Framework Directive (WFD)

Any marine works below MHWS require an assessment of possible impacts on Water Framework Directive (WFD). The assessment should include all elements of the works that fall within, or have the potential to affect, a WFD water body and any of the protected areas therein (including Bathing Waters and Shellfish Waters).

The WFD assessment should follow the 'Clearing the Waters for All' guidance available at <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

Where appropriate, a WFD Assessment should assess any potential impacts and demonstrate that the required enhancements will be delivered. In some cases the requirements of a WFD assessment can be incorporated into an Environmental Impact Assessment (EIA). Any development that has the potential to cause deterioration in classification under WFD or that precludes the recommended actions from being delivered in the future is likely to be considered unacceptable to us.

## Permits & Consents

### Environmental Permitting Regulations

To see if your proposed development requires an Environmental Permit under the Environmental Permitting Regulations please refer to our website: <https://www.gov.uk/guidance/check-if-you-need-an-environmental-permit>

From 6 April 2016 an Environmental Permit is required for any proposed works or structures, in, under, over or within 8 metres of the top of the bank of designated Main River, and within 16 metres of a tidal defence.

### Ordinary Watercourse Consent

The prior written consent of the relevant Lead Local Flood Authority is required for the erection of any flow control structures, culverting or diversion of ordinary watercourses, including streams, land drains and ditches.

### Marine Licence

A marine licence may be required for any activities at the mean high water spring tide up to the territorial limit. This also includes the waters of every estuary, river or channel where the tide flows at mean high water spring tide.

Any development must demonstrate how adverse impacts on migratory fish, bathing waters, shellfish waters, designated sites, protected and priority species and habitats will be avoided, minimised, mitigated and if necessary compensated for. Works within or affecting a Water Framework Directive (WFD) waterbody will need to demonstrate that compliance with WFD objectives will be achieved. 'Clearing the Waters for All' provides guidance on how the impacts on WFD should be addressed, and should be used when preparing an assessment, including the screening and scoping of activities. <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

## Further pre-application options

The information provided above details generic information which may or may not be applicable to your development. We are able to provide more detailed and bespoke advice and answer technical questions for a charged fee of £100 per person per hour +VAT.

If you are interested in finding out more about this service, please email:

[planningssd@environment-agency.gov.uk](mailto:planningssd@environment-agency.gov.uk)

We can explain this service and provide you with a bespoke quote for further pre-application advice that you may require please see .gov - <https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

## Please note

*Please note that the view expressed in this letter by the Environment Agency is in response to the enquiry only and does not represent our final view in relation to any future planning application made in relation to this site.*

*We reserve the right to change our position in relation to any such application.*

*As part of this preliminary response we have not technically reviewed any documents. This opinion is based on the information submitted and current planning policy and guidance.*

If you have any questions please contact the Solent & South Downs Sustainable Places team:

[planningssd@environment-agency.gov.uk](mailto:planningssd@environment-agency.gov.uk)

## To make a request for data

Please submit your request for data to [ssdenquiries@environment-agency.gov.uk](mailto:ssdenquiries@environment-agency.gov.uk). You should get the information within 20 working days. We will tell you when to expect the information if we need more time.

There are many datasets available online at [www.data.gov.uk](http://www.data.gov.uk) including flood maps, historic landfill, waste exemptions, consented discharges to controlled waters, and much more.

customer service line  
03708 506 506

[www.gov.uk/environment-agency](http://www.gov.uk/environment-agency)

incident hotline  
0800 80 70 60

floodline  
0345 988 1188



Department of Planning and Development  
Havant Borough Council  
Public Service Plaza  
Civic Centre Road  
Havant  
Hampshire  
PO9 2AX

Your ref  
GEN/20/00451

Our ref  
PLAN-034255

Date  
29/07/2020

Contact  
Tel 0330 303 0119

Dear Sir/Madam,

**Proposal:** Redevelopment of industrial land for the erection of a distribution warehouse building and a vehicle storage deck (Use Class B8), construction of an additional access, car parking and associated works.

**Site:** GEN/20/00451: - 32 New Lane, Havant, PO9 2NG.

Thank you for your letter dated 09/07/2020.

Further to your scoping document for the above site Southern Water have the following observations to make with respect to the proposed development:

- Due to the size of the development and to protect the premises from the impact of sewage flooding, an assessment is required to ascertain an appropriate point of connection to the foul and surface water sewerage network.
- Southern Water requires a formal application for a connection to the public foul and surface water sewer to be made by the applicant or developer.

The disposal of surface water from this development shall follow the hierarchy within Part H3 of Building Regulations:

- a) An adequate soakaway or some other adequate infiltration system.
- b) A water course.
- c) Where neither of the above is practicable: a sewer.

- It is possible that a sewer now deemed to be public could be crossing the development site. Therefore, should any sewer be found during construction works, an investigation of the sewer will be required to ascertain its ownership before any further works commence on site.



In case you require any further information, please do not hesitate to contact us via the address shown in the footer of this document.

Yours faithfully,



Joff Edevane  
Growth Planning Lead  
**Business Channels**

## **Appendix J – Post-application Responses**

**Registered Office:**  
Portsmouth Water Ltd  
PO Box 8  
Havant  
Hampshire PO9 1LG

Tel: 023 9249 9888  
Fax: 023 9245 3632  
Web: [www.portsmouthwater.co.uk](http://www.portsmouthwater.co.uk)

**CONSULTATION UNDER THE TOWN AND COUNTRY PLANNING  
(DEVELOPMENT MANAGEMENT PROCEDURE ENGLAND) ORDER 2015**

|                                        |                                                                                                                                                                                                                                                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>                      | <b>Havant Property Investment LLP</b>                                                                                                                                                                                                                 |
| <b>Planning Application Reference:</b> | <b>APP/21/00200</b>                                                                                                                                                                                                                                   |
| <b>Proposal:</b>                       | <b>Demolition of existing buildings and redevelopment of site comprising erection of distribution warehouse (class B8) with ancillary offices and related facilities, vehicle storage deck, new access, landscaping and associated infrastructure</b> |
| <b>Location:</b>                       | <b>32 New Lane, Havant, PO9 2NG</b>                                                                                                                                                                                                                   |
| <b>Date:</b>                           | <b>23 March 2021</b>                                                                                                                                                                                                                                  |

## Portsmouth Water's Position

Portsmouth Water have reviewed the full application APP/21/00200 for the site. Our response is based on the review of the following documentation:

- Drainage Strategy Report by Pinnacle Consulting Engineers, February 2021
- Phase I Environment Assessment, January 2021
- Construction Management Plan, January 2021

The site is a brownfield site and ground contamination is suspected from the previous land uses. The site is located within the Source Protection Zone 1c (SPZ1c) for an essential Public Water Supply Source. The SPZ1c relates to subsurface activity only, where the Chalk aquifer is confined and may be impacted by deep drilling activities. Subterranean activities such as deep drainage solutions and/or piling may pose a risk to groundwater quality at the local public water supply source. The confined aquifer is of high sensitivity and consequently all measures to prevent pollution during and post construction are required in order to safeguard the local public water supply.

## Drainage

The proposed surface water drainage strategy for the site is utilising the existing surface water sewer network for final discharge. Car parking bays will be permeable paved to treat car park drainage. Run-off from the impermeable areas will be directed through drainage channel with a petrol interceptor prior to entering the attenuation tanks with final discharge to existing surface water sewer. Due to the sensitivity of the groundwater environment, infiltration is not proposed to be suitable solution for the site. Portsmouth Water agree with this assessment and would have a presumption against deep infiltration drainage due to the previous use on the site and the sensitivity of the underlying principal aquifer. The proposed foul water drainage strategy for the site is the connection to the existing public foul water sewer following confirmation from Southern Water.

Both drainage proposals are acceptable to Portsmouth Water in relation to groundwater protection. If there is any deviation from these proposals Portsmouth Water would wish to be further consulted.

## Piling & Foundations

Portsmouth Water would have no objection to piling at this location if the piles terminate within the Clay cover. If the piles penetrate the full depth of the Clay cover we would expect a piling risk assessment and method statement, this should detail the depth and type of piling to be undertaken and the methodology by which such piling will be carried out, including pollution prevention measures. Piling or any other foundation designs using penetrative methods can pose a risk to potable supplies from, for example, turbidity, mobilisation of historical contaminants, drilling through different aquifers and creation of preferential pathways for contaminants.

## Pollution Prevention & CEMP

The Construction Management Plan submitted as part of the application does not cover all the environmental pollution risks of construction. There is no detail on the management of overland runoff (including the drainage proposal for the wheel washing facilities), storage of hazardous materials, chemical and hydrocarbons on site and temporary drainage infrastructure to ensure that water resources are not put at risk from leaks or spillages. The current plan could be updated with this information or alternatively a separate plan could be prepared.

Reason- Fugitive emissions from the site during construction could pose a significant threat to groundwater and therefore the local water supply source if not appropriately managed.

Catchment Management Team  
*Portsmouth Water*

[catchment.management@portsmouthwater.co.uk](mailto:catchment.management@portsmouthwater.co.uk)

Havant Borough Council  
Development Control  
Civic Offices Civic Centre Road  
Havant  
Hampshire  
PO9 2AX

**Our ref:** HA/2021/123043/01-L01  
**Your ref:** APP/21/00200  
**Date:** 01 April 2021

Dear Sir/Madam

**DEMOLITION OF EXISTING BUILDINGS AND REDEVELOPMENT OF SITE  
COMPRISING ERECTION OF DISTRIBUTION WAREHOUSE (CLASS B8) WITH  
ANCILLARY OFFICES AND RELATED FACILITIES, VEHICLE STORAGE DECK, NEW  
ACCESS, LANDSCAPING AND ASSOCIATED INFRASTRUCTURE**

**32 NEW LANE, HAVANT, PO9 2NG**

Thank you for consulting the Environment Agency on the above application.

**Environment Agency Position**

We have **no objection** to the proposed development as submitted, **subject to the inclusion of the following 4 conditions**, in any permission granted.

We consider that planning permission could be granted to the proposed development, as submitted, if the following planning conditions are included as set out below. Without these conditions, the proposed development on this site poses an unacceptable risk to the environment and we would object to the application.

**Condition 1**

No development approved by this planning permission shall commence until a remediation strategy to deal with the risks associated with contamination of the site in respect of the development hereby permitted, has been submitted to, and approved in writing by, the local planning authority. This strategy will include the following components:

1. A preliminary risk assessment which has identified:
  - all previous uses
  - potential contaminants associated with those uses
  - a conceptual model of the site indicating sources, pathways and receptors
  - potentially unacceptable risks arising from contamination at the site
2. A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off-site.
3. The results of the site investigation and the detailed risk assessment referred to in (2) and, based on these, an options appraisal and remediation strategy giving full

Environment Agency  
Guildbourne House Chatsworth Road, Worthing, West Sussex, BN11 1LD.  
Customer services line: 03708 506 506

[www.gov.uk/environment-agency](http://www.gov.uk/environment-agency)

Cont/d..

details of the remediation measures required and how they are to be undertaken.

4. A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in the remediation strategy in (3) are complete and identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action.

Any changes to these components require the written consent of the local planning authority. The scheme shall be implemented as approved.

**Reason(s)**

*Potentially contaminating activities have been identified on this site. In particular various pharmaceutical and other industrial activities have been highlighted. The site is above the secondary superficial aquifer which would be considered a moderately sensitive controlled water receptor. The chalk principal aquifer and associated SPZ1c occurs at depth beneath the site under a layer of London clay. The chalk would be considered a highly sensitive controlled water receptor. These receptor could potentially be impacted by contamination present on this site.*

To ensure that the development does not contribute to, and is not put at unacceptable risk from or adversely affected by, unacceptable levels of water pollution in line with paragraph 170 of the National Planning Policy Framework.

**Condition 2**

If, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the local planning authority) shall be carried out until a remediation strategy detailing how this contamination will be dealt with has been submitted to, and approved in writing by, the local planning authority. The remediation strategy shall be implemented as approved.

**Reason(s)**

To ensure that the development does not contribute to, and is not put at unacceptable risk from or adversely affected by, unacceptable levels of water pollution from previously unidentified contamination sources at the development site. This is in line with paragraph 170 of the National Planning Policy Framework.

**Condition 3**

Prior to occupation of any part of the site, a verification report demonstrating the completion of works set out in the approved remediation strategy and the effectiveness of the remediation shall be submitted to, and confirmed in writing, by the local planning authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met.

**Reason(s)**

To ensure that the site does not pose any further risk to human health or the water environment by demonstrating that the requirements of the approved verification plan have been met and that remediation of the site is complete. This is in line with paragraph 170 of the National Planning Policy Framework.

**Condition 4**

Piling or other deep foundation using penetrative methods shall not be carried out other than with the written consent of the local planning authority. The development shall be carried out in accordance with the approved details.

**Reason(s)**

To ensure that the proposed Piling or other deep foundation does not harm groundwater resources in line with paragraph 170 of the National Planning Policy Framework.

Should you have any further queries please do not hesitate to contact me.

Yours faithfully

**Mrs Sophie Brown**  
**Sustainable Places Planning Advisor**

Direct dial 02030 257250

Direct e-mail [planningSSD@environment-agency.gov.uk](mailto:planningSSD@environment-agency.gov.uk)

cc Luken Beck MDP Ltd



Department of Planning and Development  
Havant Borough Council  
Public Service Plaza  
Civic Centre Road  
Havant  
Hampshire  
PO9 2AX

Your ref  
APP/21/00200

Our ref  
PLAN-037907

Date  
24/03/2021

Contact  
Tel 0330 303 0119

Dear Sir/Madam,

**Proposal:** Demolition of existing buildings and redevelopment of site comprising erection of distribution warehouse (class B8) with ancillary offices and related facilities, vehicle storage deck, new access, landscaping and associated infrastructure.

**Site:** APP/21/00200: - 32 New Lane, Havant, PO9 2NG.

Thank you for your letter dated 05/03/2021.

Please see the attached extract from Southern Water records showing the approximate position of our existing public foul and surface sewer within the development site. The exact position of the public assets must be determined on site by the applicant in consultation with Southern Water.

Please note:

- The 225 mm public foul sewer requires a clearance of 3 metres on either side of the gravity sewers to protect it from construction works and to allow for future access for maintenance.

The 600 mm public surface water sewer requires a clearance of 3.5 metres on either side of the public sewer to protect it from construction works and to allow for future access for maintenance.

- No development or tree planting should be carried out within 3 and 3.5 metres of the external edge of the public sewers without consent from Southern Water.

- No soakaway, swales, ponds, watercourses or any other surface water retaining or conveying features should be located within 5 metres of public sewers.

- All existing infrastructure should be protected during the course of construction works.

Please refer to: [southernwater.co.uk/media/3011/stand-off-distances.pdf](https://southernwater.co.uk/media/3011/stand-off-distances.pdf).



The impact of any works within the highway/access road on public apparatus shall be assessed and approved, in consultation with Southern Water, under a NRSWA enquiry in order to protect public apparatus. Please send these enquiries to: [Developer.Services@southernwater.co.uk](mailto:Developer.Services@southernwater.co.uk)

Furthermore, it is possible that a sewer now deemed to be public could be crossing the development site. Therefore, should any sewer be found during construction works, an investigation of the sewer will be required to ascertain its ownership before any further works commence on site.

Southern Water requires a formal application for any new connection to the public foul and surface water sewer to be made by the applicant or developer.

To make an application visit: [southernwater.co.uk/developing](https://southernwater.co.uk/developing) and please read our New Connections Services Charging Arrangements documents which are available on our website via the following link: [southernwater.co.uk/connection-charging-arrangements](https://southernwater.co.uk/connection-charging-arrangements)

Submitted FRA indicates that surface water from the site will be discharged to a public surface water sewer with a 50% betterment compared to the existing brownfield rates which is satisfactory to Southern Water. Surface water may be discharged to the existing sewer, provided the rate of discharge to sewer is no greater than existing contributing flows. You will be required to provide a topographical site survey and/or a CCTV survey showing the existing connection points, pipe sizes, gradients and calculations confirming the proposed surface water flow will be no greater than the existing contributing flows.

The Council's Building Control officers or technical staff should be asked to comment on the adequacy of soakaways to dispose of surface water from the proposed development.

The drainage design should ensure that no groundwater and/or land drainage will enter the public sewerage network.

Land uses such as general hardstanding that may be subject to oil/petrol spillages should be drained by means of oil trap gullies or petrol/oil interceptors.

We request that should this application receive planning approval, the following condition is attached to the consent: "Construction of the development shall not commence until details of the proposed means of foul and surface water sewerage disposal have been submitted to, and approved in writing by, the Local Planning Authority in consultation with Southern Water.

For Southern Water Planning Webpage please click the below link:

[southernwater.co.uk/regulations-services/planning-your-development](https://southernwater.co.uk/regulations-services/planning-your-development)



For further advice, please contact Southern Water, Southern House, Yeoman Road, Worthing, West Sussex, BN13 3NX (Tel: 0330 303 0119).

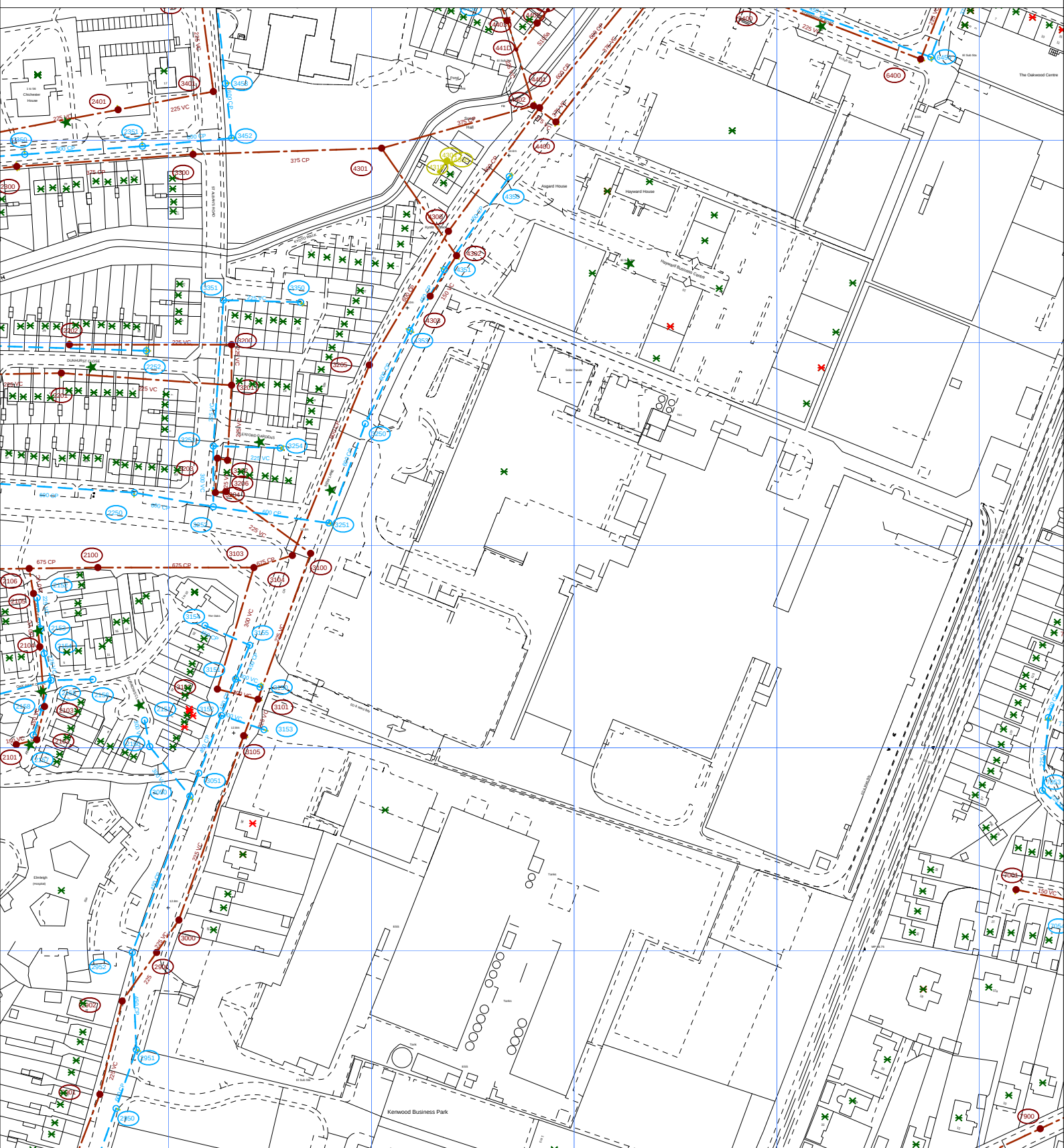
Website: [southernwater.co.uk](https://southernwater.co.uk) or by email at: [SouthernWaterPlanning@southernwater.co.uk](mailto:SouthernWaterPlanning@southernwater.co.uk)

Yours faithfully,



Joff Edevane  
Growth Planning Lead  
**Business Channels**

# SOUTHERN WATER



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site.

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530

O.S. REF: SU7207SW

Scale: 1:2500

Screen Print

**WARNING: BAC pipes are constructed of Bonded Asbestos Cement**

**WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement**



Printed By: kishoku

Date: 23-3-2021

Southern Water MapGuide Browser

Requested By:





# Hampshire County Council

Economy, Transport and Environment Department  
Elizabeth II Court West, The Castle  
Winchester, Hampshire SO23 8UD

Tel: 0300 555 1375 (General Enquiries)  
0300 555 1388 (Roads and Transport)  
0300 555 1389 (Recycling Waste & Planning)  
Textphone 0300 555 1390  
Fax 01962 847055  
[www.hants.gov.uk](http://www.hants.gov.uk)

|              |                    |                |                            |
|--------------|--------------------|----------------|----------------------------|
| Enquiries to | Santiago Manzanero | My reference   | SWM/2021/0165              |
| Direct Line  | 0370 779 8301      | Your reference | APP/21/00200               |
| Date         | 16 March 2021      | Email          | SWM.consultee@hants.gov.uk |

Dear Sir/Madam,

**Demolition of existing buildings and redevelopment of site comprising erection of distribution warehouse (class B8) with ancillary offices and related facilities, vehicle storage deck, new access, landscaping and associated infrastructure at 32 New Lane, Havant, PO9 2NG.**

Hampshire County Council as Lead Local Flood Authority has provided comments in relation to the above application in our role as statutory consultee on surface water drainage for major developments.

In order to assist applicants in providing the correct information to their Local Planning Authority for planning permission, Hampshire County Council has set out the information it requires to provide a substantive response at <https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/planning>

The County Council has reviewed the following documents relating to the above application:

- Drainage Strategy Report; ref: C200810-PIN-XX-XX-RP-C-02; dated: 9 February 2021.
- Flood Risk Assessment; ref: C200810-PIN-XX-XX-RP-C-01; dated: 9 February 2021.

The information submitted by the applicant in support of this planning application indicates that surface water runoff from the application site will be managed through permeable paving and attenuations tanks. Additionally, surface water runoff will be discharged into the surface water public network at a discharge rate of 395l/s (50% betterment), via existing connections (4 catchments). This is acceptable in principle bearing in mind that the underlying

Director of Economy, Transport and Environment  
**Stuart Jarvis BSc DipTP FCIHT MRTPI**

geology (London Clay Formation) and the potential contamination will make infiltration infeasible at the site, in the absence of any nearby watercourse, and considering that the existing site is discharging surface water into the surface water public sewer network.

The applicant is proposing to discharge surface water runoff at 395 l/s considering a 50% betterment of the existing discharge rate 790 l/s, which is acceptable. However, there is no information on the existing/proposed discharge rates for all rainfall events and it is unclear whether the discharge rates would be increased for some rainfall events. Therefore, we **request** a table with the existing and proposed discharge rates, including all the proposed catchments, for all rainfall events including those with a 1 in 1year, 1 in 30year & 1 in 100year annual probability of occurrence. We further request the calculations and values used for that discharge rates.

The drainage layout and source control calculations submitted are very high level at this stage considering that this is an application for full planning permission. Therefore, we **request**:

- Detailed drainage layout drawings at an identified scale indicating catchment areas, referenced drainage features, manhole cover and invert levels and pipe diameters, lengths and gradients.
- Detailed network hydraulic calculations for all rainfall events, including the listed below. The hydraulic calculations should take into account the connectivity of the entire drainage features including the discharge locations. The results should include design and simulation criteria, network design and result tables, manholes schedule tables and summary of critical result by maximum level during the 1 in 1, 1 in 30 and 1 in 100 (plus an allowance for climate change) rainfall events. The drainage features should have the same reference that the submitted drainage layout.
- Exceedance plans demonstrating the flow paths and areas of ponding in the event of blockages or storms exceeding design criteria.

The applicant is proposing to manage surface water through the existing drainage system, however, there is not information within the planning website which demonstrate that the asset owner has agreed to the proposals including the principle of re-using existing connections. Failure to secure this agreement is likely to necessitate in the need to review the drainage proposals for the application, which may have implications for the proposed quantum and layout of the proposed development.

Bearing in mind that this is an application for full planning permission and the layout will be fixed, we **request** that the above issues are addressed at this stage and not through planning conditions, to demonstrate that the development site has a secure outfall to dispose surface water, and to demonstrate that the quantum of development is achievable, whilst ensuring that flood risk will not be increased on or off site.

We would also recommend that the applicant is directed to our website <http://www3.hants.gov.uk/flooding/hampshireflooding/drainagesystems.htm> for further information on recommended surface water drainage techniques.

Please note that Hampshire County Council as Lead Local Flood Authority will not comment on the fluvial systems as these are outside our remit.

As a statutory consultee, the County Council has a duty to respond to consultations within **21 days**. The 21-day period will not begin until we have received sufficient information to enable us to provide a meaningful response. Please ensure all data is sent to us via the relevant Local Planning Authority.

For guidance on providing the correct information, please review the checklist and associated guidance document available on our [website](#).

This response has been provided using the best knowledge and information submitted as part of the planning application at the time of responding and is reliant on the accuracy of that information.

Yours faithfully,

A handwritten signature in black ink, appearing to be 'PP' followed by a stylized name.

Flood and Water Management Team  
Economy, Transport & Environment Department,  
Hampshire County Council, 1st Floor, Ell Court West,  
The Castle, Winchester, Hampshire SO23 8UD  
Web: <http://www3.hants.gov.uk/flooding/watercourses.htm>

## General guidance for the application

*It is important to ensure that the long-term maintenance and responsibility for Sustainable Drainage Systems is agreed between the Local Planning Authority and the applicant before planning permission is granted. This should involve discussions with those adopting and/or maintaining the proposed systems, which could include the Highway Authority, Planning Authority, Parish Councils, Water Companies and private management companies.*

*For SuDS systems to be adopted by Hampshire Highways it is recommended that you visit the website at:*

*<https://www.hants.gov.uk/transport/developers/constructionstandards> for guidance on which drainage features would be suitable for adoption.*

*Where the proposals are connecting to an existing drainage system it is likely that the authorities responsible for maintaining those systems will have their own design requirements. These requirements will need to be reviewed and agreed as part of any surface water drainage scheme.*

## Works in relation to ordinary watercourses

*PLEASE NOTE: If the proposals include works to an ordinary watercourse, under the Land Drainage Act 1991, as amended by the Flood and Water Management Act 2010, prior consent from the Lead Local Flood Authority is required. **This consent is required as a separate permission to planning.***

*Information on ordinary watercourse consenting can be found at the following link <http://www3.hants.gov.uk/flooding/hampshireflooding/watercourses.htm>*

*It is strongly recommended that this information is reviewed before Land Drainage consent application is made.*

*For guidance on providing the correct information, we recommend you use our **Ordinary Watercourse Consents Pre-application service** and help avoid delays occurring at the formal application stage. A Pre-application service for Ordinary Watercourse Consents is available, allowing consents to go through in a smoother, often more timely manner. For full information please visit:*

*<https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/WatercoursePreApplication>*

## **Appendix K – Southern Water Confirmation Letter**



Sudeep Chongbang  
Pinnacle Consulting Engineers  
Alchemy  
Bessemer Road  
Welwyn Garden City  
Hertfordshire  
AL7 1HE

Your ref  
-----

Our ref  
DS\_CC\_PPE-121779

Date  
23 April 2021

Contact  
Tel 0330 303 0119

Dear Mr Chongbang,

**Level 1 Capacity Check Enquiry: Pfizer, 32 New Lane, Havant, Hampshire, PO9 2NG.**

We have completed the capacity check for the above development site and the results are as follows:

### **Foul Water**

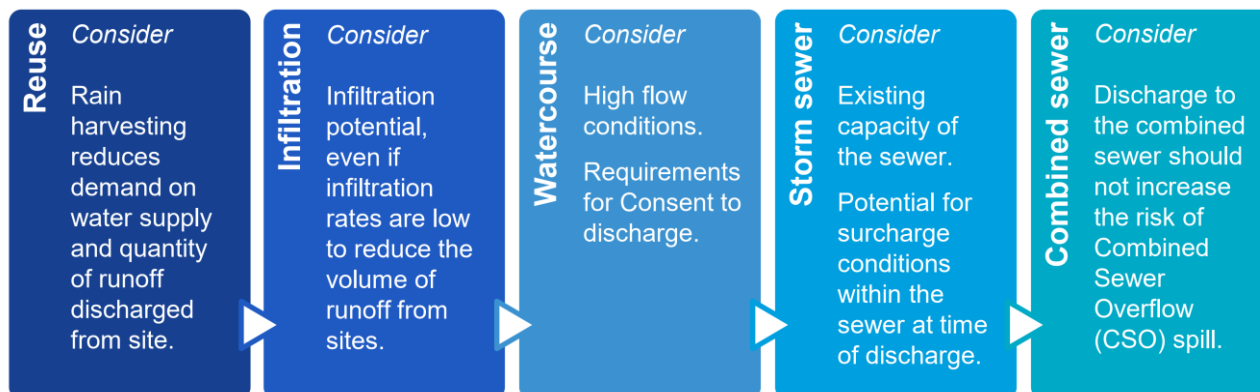
The enquiry has been reassessed to determine the capacity available for 0.41 l/s at manhole reference SU72073101.

There is currently adequate capacity in the local sewerage network to accommodate a foul flow of **0.41 l/s** for the above development at manhole reference SU72073101. Please note that no surface water flows (existing or proposed) can be accommodated within the existing foul sewerage system unless agreed by the Lead Local Flood Authority in consultation with Southern Water, after the hierarchy Part H3 of Building Regulations has been complied with.

### **Surface Water**

The revised documents submitted indicate that the proposed surface water flows are now restricted and hence will support the system to be more efficient. Therefore, surface water may be discharged to the existing sewer, provided the rate of discharge to the sewer is no greater than existing contributing flows.

Although capacity in the surface water network has been identified, in all situations where surface water is being considered for discharge to our network, we require the below hierarchy for surface water to be followed which is reflected in part H3 of the Building Regulations. Whilst reuse does not strictly form part of this hierarchy, Southern Water would encourage the consideration of reuse for new developments.



Guidance on Building Regulations is here: [gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h](https://gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h)

We would welcome the opportunity to engage with you on the design for disposal of surface water, with a particular focus on the potential for incorporating Sustainable Drainage Systems (SuDS), for this development at the earliest opportunity and we recommend that civil engineers and landscape architects work together and with Southern Water.

Where a surface water connection to the foul or combined sewer is being considered, this should be agreed by the Lead Local Flood Authority, in consultation with Southern Water.

It should be noted that although the above assessment indicates that there is capacity available for your proposed surface water flows the LLFA (Local Lead Flood Authority) may impose/request that a lower flow is discharged to the public surface water sewer.

If the excess surface water flows are to be attenuated on site, it could have a significant effect on any proposed Sewer Adoption (S104) Agreements. Any attenuation proposals should be agreed before any works are implemented on site. Where capacity is limited/restricted, agreement should be sought if you are to include any highway drainage within your proposals as Southern Water is not obligated to accept highway flows.

### Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: [Developer Services Portal \(southernwater.co.uk\)](https://southernwater.co.uk/Developer-Services-Portal)



Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Should it be necessary to contact us please quote our above reference number relating to this application by email at [southernwaterplanning@southernwater.co.uk](mailto:southernwaterplanning@southernwater.co.uk)

Yours sincerely,

Growth Planning Team  
**Business Channels**

[southernwater.co.uk/developing-building/planning-your-development](https://southernwater.co.uk/developing-building/planning-your-development)



Sudeep Chongbang  
Pinnacle Consulting Engineers  
Alchemy  
Bessemer Road  
Welwyn Garden City  
Hertfordshire  
AL7 1HE

Your ref  
-----

Our ref  
DS\_CC\_PPE-121779

Date  
26 May 2021

Contact  
Tel 0330 303 0119

Dear Mr Chongbang,

**Level 1 Capacity Check Enquiry: Pfizer, 32 New Lane, Havant, Hampshire, PO9 2NG.**

We have completed the capacity check for the above development site and the results are as follows:

### **Foul Water**

The enquiry has been reassessed to determine the capacity available for 1.18 l/s at manhole reference SU72073101.

There is currently adequate capacity in the local sewerage network to accommodate a foul flow of **1.18 l/s** for the above development at manhole reference SU72073101. Please note that no surface water flows (existing or proposed) can be accommodated within the existing foul sewerage system unless agreed by the Lead Local Flood Authority in consultation with Southern Water, after the hierarchy Part H3 of Building Regulations has been complied with.

### **Connecting to our network**

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: [Developer Services Portal \(southernwater.co.uk\)](https://southernwater.co.uk/developer-services-portal)

Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.



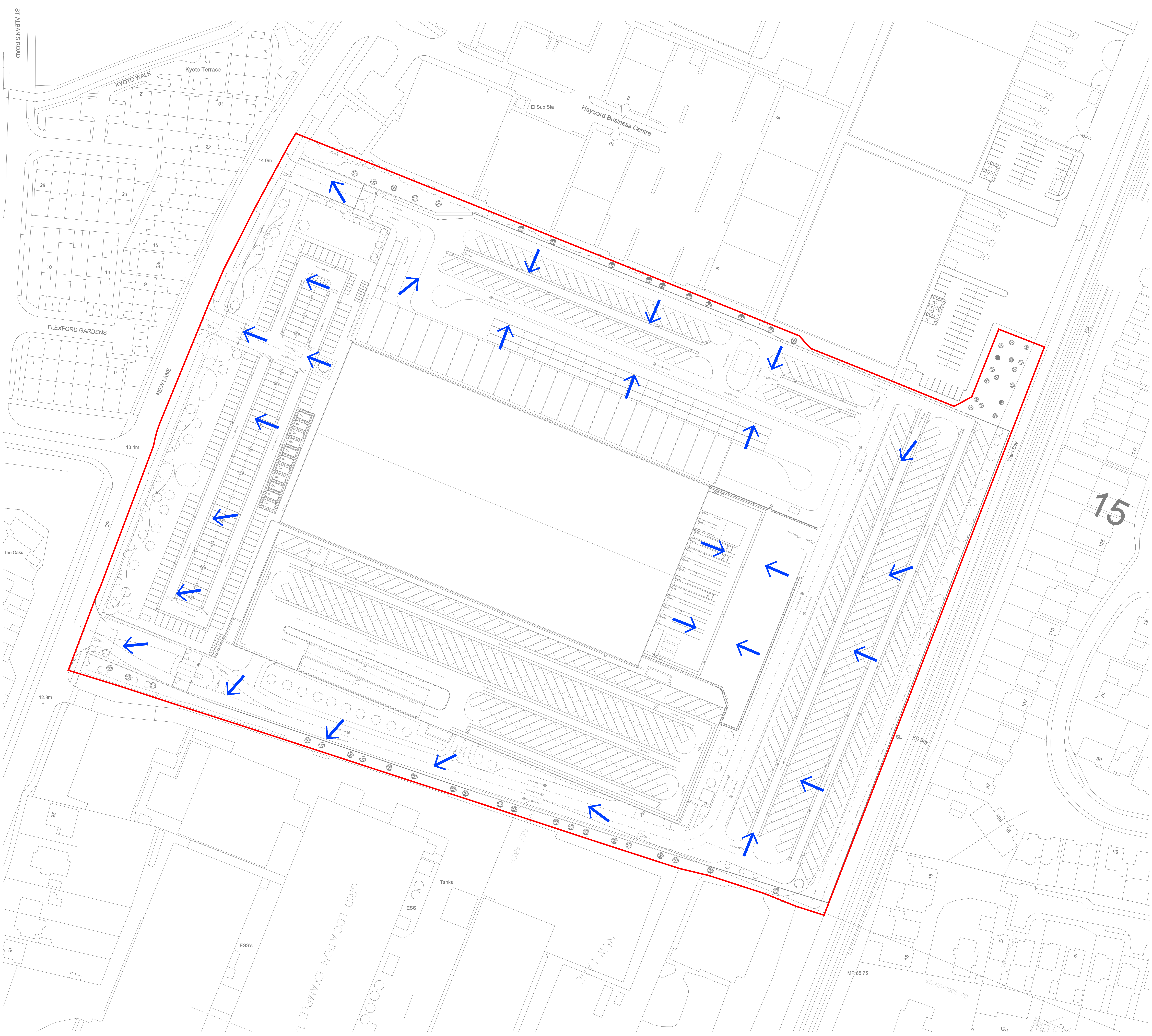
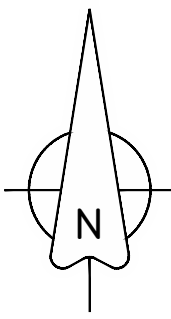
Should it be necessary to contact us please quote our above reference number relating to this application by email at [southernwaterplanning@southernwater.co.uk](mailto:southernwaterplanning@southernwater.co.uk)

Yours sincerely,

Growth Planning Team  
**Business Channels**

[southernwater.co.uk/developing-building/planning-your-development](https://southernwater.co.uk/developing-building/planning-your-development)

## **Appendix L – Exceedance Flow Path**



GENERAL NOTES

- DO NOT SCALE THIS DRAWING. WORK ONLY TO FIGURED DIMENSIONS.
- FOR ALL RELEVANT NOTES, REFER TO STRUCTURAL AND CIVIL ENGINEERING PERFORMANCE SPECIFICATION.
- ANY DISCREPANCIES ARE TO BE REPORTED TO PINNACLE CONSULTING ENGINEERS IMMEDIATELY.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SUB-CONTRACTORS DRAWINGS AND DETAILS.

LEGEND

- AREA TO BE DEVELOPED
- EXCEEDANCE FLOW PATH

|                 |    |     |          |
|-----------------|----|-----|----------|
| FOR INFORMATION | SC | EO  | 01/04/21 |
| REV DESCRIPTION | BY | CHK | DATE     |

CLIENT  
HAVANT PROPERTY  
INVESTMENT LLP

PROJECT  
HAVANT  
32 NEW LANE

DRAWING TITLE  
EXCEEDANCE FLOW PATH

**PINNACLE**  
CONSULTING ENGINEERS

ALCHEMY,  
BESSEMER ROAD,  
WELWYN GARDEN CITY,  
HERTS.  
ALT 110. TELEPHONE: 01707 527 630  
NORWICH LONDON DUBLIN THE HAGUE

| DRAWING STATUS             |          |          |         |
|----------------------------|----------|----------|---------|
| INFORMATION                |          |          |         |
| SCALE: A0                  | DATE     | DRAWN BY | CHECKED |
| 1:500                      | APR '21  | SC       | EO      |
| DRG NO                     | REVISION |          |         |
| C200810-PIN-XX-XX-DR-C-208 | P01      |          |         |

COPYRIGHT PINNACLE

**NORWICH**  
Pinnacle House  
3 Meridian Way  
Norwich  
NR7 0TA

01603 327 170

[norwich@ukpinnacle.com](mailto:norwich@ukpinnacle.com)

**WELWYN GARDEN CITY**  
Alchemy  
Bessemer Road  
Welwyn Garden City  
AL7 1HE

01707 527 630

[welwyn@ukpinnacle.com](mailto:welwyn@ukpinnacle.com)

**LONDON**  
Woolverstone House  
61 Berners Street  
London  
W1T 3NJ

0207 043 3410

[london@ukpinnacle.com](mailto:london@ukpinnacle.com)

**DUBLIN**  
Grosvenor Court  
67 Patrick Street  
Dun Laoghaire  
County Dublin

+353 1231 1041

[dublin@iepinncle.com](mailto:dublin@iepinncle.com)

**THE HAGUE**  
Business Suite 5.01 D-1  
Business Center, WTC  
Prinses Margrietplantsoen 33  
2595 AM, The Hague  
Netherlands

+31 70 240 0412

[netherlands@nlpinncle.com](mailto:netherlands@nlpinncle.com)