

Appendix E - Thames Water

Asset Location Search

Thames Water Formal Response

Asset location search



Property Searches

MLM Consulting Engineers Limited
Felaw Maltings,46

IPSWICH
IP2 8PN

Search address supplied Richmond-Upon-Thames College
Egerton Road
Twickenham
TW2 7SJ

Your reference 619579

Our reference ALS/ALS Standard/2018_3848777

Search date 3 August 2018

Keeping you up-to-date

Knowledge of features below the surface is essential in every development. The benefits of this not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility for any commercial or residential project.

An asset location search provides information on the location of known Thames Water clean and/or wastewater assets, including details of pipe sizes, direction of flow and depth. Please note that information on cover and invert levels will only be provided where the data is available.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0845 070 9148



Search address supplied: Richmond-Upon-Thames College, Egerton Road, Twickenham, TW2 7SJ

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

The following quartiles have been printed as they fall within Thames' sewerage area:

TQ1573NW
TQ1573NE

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

The following quartiles have been printed as they fall within Thames' water area:

TQ1573NW
TQ1573NE



Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

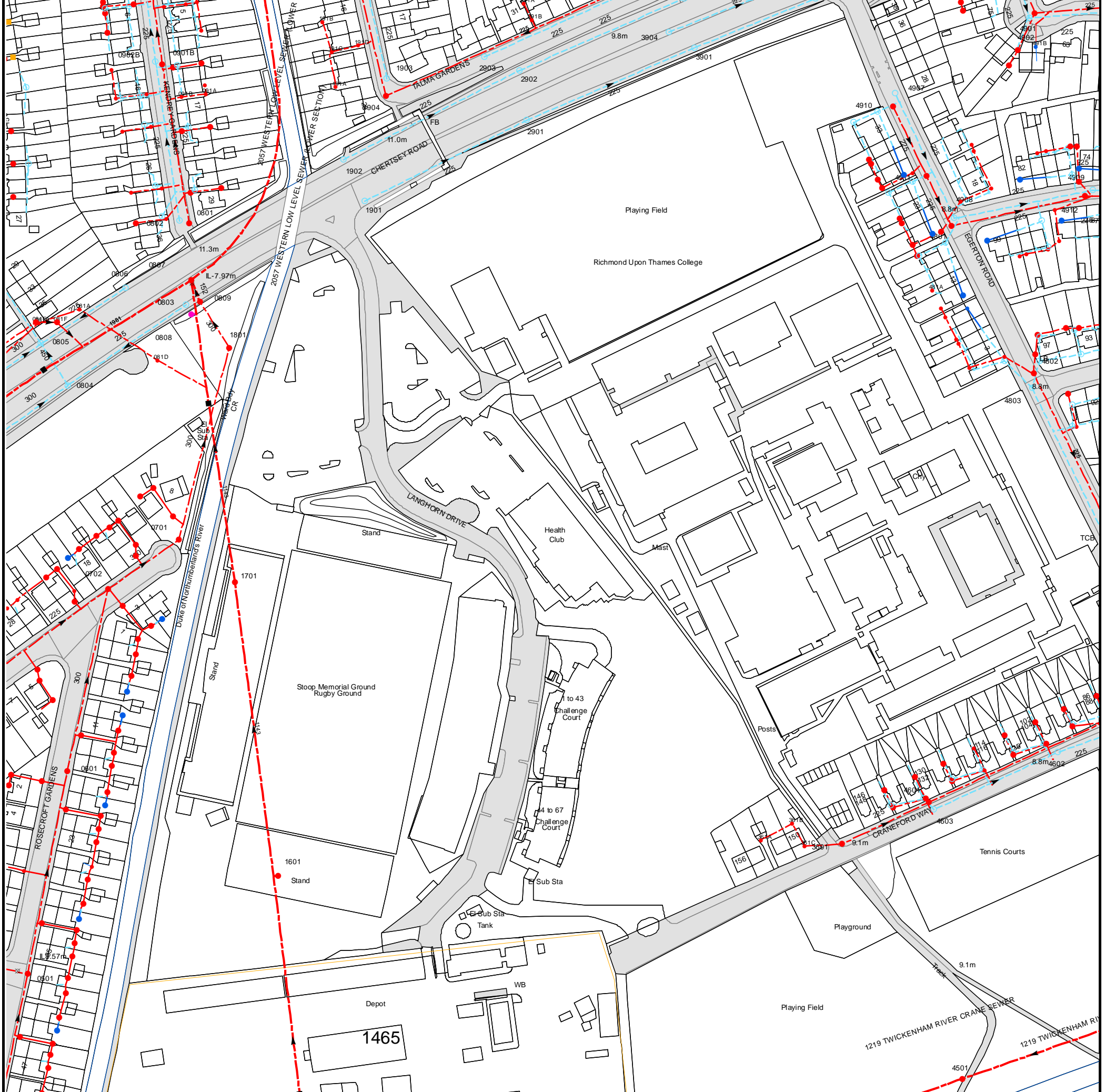
Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 515250,173750
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

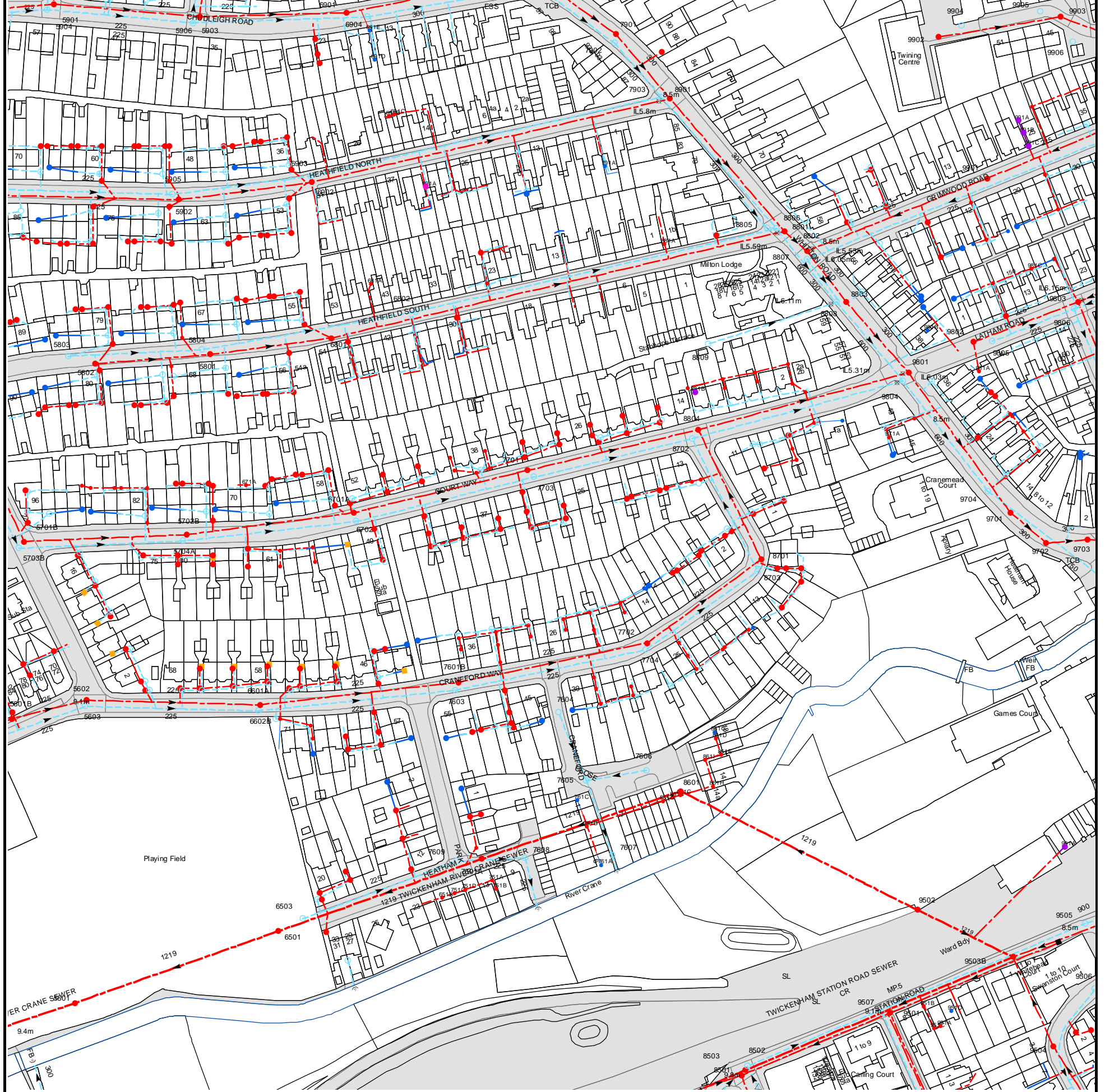
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
09PR	n/a	n/a
09PS	n/a	n/a
09QR	n/a	n/a
09PT	n/a	n/a
09QQ	n/a	n/a
09PQ	n/a	n/a
0902B	n/a	n/a
0901B	n/a	n/a
09QX	n/a	n/a
09RX	n/a	n/a
09VS	n/a	n/a
09TZ	n/a	n/a
09QY	n/a	n/a
09XX	n/a	n/a
09QZ	n/a	n/a
09RP	n/a	n/a
09VT	n/a	n/a
09PP	n/a	n/a
49VP	n/a	n/a
49TZ	n/a	n/a
49YW	n/a	n/a
49VX	n/a	n/a
49TX	n/a	n/a
49TY	n/a	n/a
49YX	n/a	n/a
4910	n/a	n/a
4907	n/a	n/a
49SS	n/a	n/a
49SY	n/a	n/a
491B	n/a	n/a
4902	n/a	n/a
4901	n/a	n/a
49TR	n/a	n/a
49TQ	n/a	n/a
49YQ	n/a	n/a
49WY	n/a	n/a
48WY	n/a	n/a
49XT	n/a	n/a
48WX	n/a	n/a
49YP	n/a	n/a
49XP	n/a	n/a
48WT	n/a	n/a
48XY	n/a	n/a
4911	n/a	n/a
481A	n/a	n/a
48WZ	n/a	n/a
48WW	n/a	n/a
48ZQ	n/a	n/a
48XX	n/a	n/a
48ZP	n/a	n/a
4801	n/a	n/a
4908	n/a	n/a
48YZ	n/a	n/a
49YT	n/a	n/a
48XV	n/a	n/a
48YT	n/a	n/a
49ZT	n/a	n/a
48VY	n/a	n/a
49ZV	n/a	n/a
49YV	n/a	n/a
48VP	n/a	n/a
49VT	n/a	n/a
48TZ	n/a	n/a
48SV	n/a	n/a
48SZ	n/a	n/a
48VZ	n/a	n/a
48TY	n/a	n/a
48WP	n/a	n/a
49WV	n/a	n/a
48TX	n/a	n/a
48VR	n/a	n/a
48SW	n/a	n/a
49VW	n/a	n/a
48TV	n/a	n/a
49TW	n/a	n/a
48SX	n/a	n/a
49WQ	n/a	n/a
4912	n/a	n/a
4909	n/a	n/a
1701	10.42	-7.66
191B	n/a	n/a
191C	n/a	n/a
191A	n/a	n/a
1902	11.38	8.53
191D	n/a	n/a
1901	10.99	9.35
1904	n/a	n/a
1903	n/a	n/a
2903	n/a	n/a
2902	n/a	n/a
291A	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
2901	n/a	n/a
291B	n/a	n/a
3904	n/a	n/a
3901	n/a	n/a
39ZV	n/a	n/a
39ZR	n/a	n/a
39ZQ	n/a	n/a
39ZT	n/a	n/a
39ZP	n/a	n/a
49XQ	n/a	n/a
48RT	n/a	n/a
48RY	n/a	n/a
48RZ	n/a	n/a
48RS	n/a	n/a
4803	n/a	n/a
4802	n/a	n/a
48ZV	n/a	n/a
48YX	n/a	n/a
48TR	n/a	n/a
48ZT	n/a	n/a
48YW	n/a	n/a
48SQ	n/a	n/a
48TT	n/a	n/a
48YY	n/a	n/a
46XR	n/a	n/a
46WX	n/a	n/a
4601	9.19	7.58
4603	8.95	8.14
46XY	n/a	n/a
46XX	n/a	n/a
46YR	n/a	n/a
4501	8.59	.14
46XT	n/a	n/a
46YQ	n/a	n/a
46XW	n/a	n/a
46YX	n/a	n/a
46ZQ	n/a	n/a
46YW	n/a	n/a
46WT	n/a	n/a
46ZP	n/a	n/a
46YV	n/a	n/a
4602	8.9	7.94
46ZV	n/a	n/a
46ZX	n/a	n/a
46ZT	n/a	n/a
46ZS	n/a	n/a
1601	11.24	-7.24
361C	n/a	n/a
3601	9.43	8.24
361A	n/a	n/a
361B	n/a	n/a
46WY	n/a	n/a
46XS	n/a	n/a
46WZ	n/a	n/a
46WV	n/a	n/a
09ZS	n/a	n/a
09XQ	n/a	n/a
09YZ	n/a	n/a
09SS	n/a	n/a
09SY	n/a	n/a
09SX	n/a	n/a
09WS	n/a	n/a
09YV	n/a	n/a
09YT	n/a	n/a
09WT	n/a	n/a
09VZ	n/a	n/a
09YP	n/a	n/a
09FX	n/a	n/a
09XY	n/a	n/a
091B	n/a	n/a
09GS	n/a	n/a
09XS	n/a	n/a
09XN	n/a	n/a
091A	n/a	n/a
09TS	n/a	n/a
09VV	n/a	n/a
09IR	n/a	n/a
0804	9.33	8.08
081D	n/a	n/a
1801	n/a	n/a
0805	9.75	8.07
081B	n/a	n/a
081F	n/a	n/a
081E	n/a	n/a
0808	10.2	-8
081A	n/a	n/a
0803	10.5	8.52
0809	11.06	5.7
0806	10.08	8.18
0807	10.6	-8.12
08ZY	n/a	n/a
0801	10.25	8.98
0802	10.21	8.63

Manhole Reference	Manhole Cover Level	Manhole Invert Level
09ZY	n/a	n/a
09ZW	n/a	n/a
09SR	n/a	n/a
09XP	n/a	n/a
09ZT	n/a	n/a
09WW	n/a	n/a
07ZY	n/a	n/a
07ZW	n/a	n/a
07ZT	n/a	n/a
07ZS	n/a	n/a
07YW	n/a	n/a
07ZQ	n/a	n/a
07ZR	n/a	n/a
07YT	n/a	n/a
07YS	n/a	n/a
0702	9.6	7.39
07YQ	n/a	n/a
07YP	n/a	n/a
07WZ	n/a	n/a
07XZ	n/a	n/a
07WX	n/a	n/a
07XY	n/a	n/a
07WV	n/a	n/a
07YZ	n/a	n/a
07XQ	n/a	n/a
07YY	n/a	n/a
07XS	n/a	n/a
07ZV	n/a	n/a
0701	9.65	7.03
06YQ	n/a	n/a
06WR	n/a	n/a
06WP	n/a	n/a
06WQ	n/a	n/a
0601	9.85	8.02
06YP	n/a	n/a
06XY	n/a	n/a
06YV	n/a	n/a
06YX	n/a	n/a
06YZ	n/a	n/a
06ZX	n/a	n/a
06ZS	n/a	n/a
06ZW	n/a	n/a
06ZQ	n/a	n/a
06ZV	n/a	n/a
05YW	n/a	n/a
0501	10.3	8.42
05YV	n/a	n/a
05YS	n/a	n/a
05YR	n/a	n/a
05YQ	n/a	n/a
05XW	n/a	n/a
05XT	n/a	n/a
05XS	n/a	n/a
06WT	n/a	n/a
06XS	n/a	n/a
06XR	n/a	n/a
06XP	n/a	n/a
06WZ	n/a	n/a
06WY	n/a	n/a
06YS	n/a	n/a
05ZR	n/a	n/a
05ZY	n/a	n/a
05ZW	n/a	n/a
05ZV	n/a	n/a
05ZT	n/a	n/a
05ZQ	n/a	n/a
05YZ	n/a	n/a
05YY	n/a	n/a

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The width of the displayed area is 500m and the centre of the map is located at OS coordinates 515750,173750
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NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
59YS	n/a	n/a
59WT	n/a	n/a
69VX	n/a	n/a
59WS	n/a	n/a
59TW	n/a	n/a
59TX	n/a	n/a
69VV	n/a	n/a
69VW	n/a	n/a
69WT	n/a	n/a
69VT	n/a	n/a
5906	n/a	n/a
5903	n/a	n/a
5901	n/a	n/a
59RZ	n/a	n/a
59TP	n/a	n/a
59TY	n/a	n/a
5904	n/a	n/a
59VQ	n/a	n/a
58XP	n/a	n/a
58WZ	n/a	n/a
59TV	n/a	n/a
58ZR	n/a	n/a
59ZW	n/a	n/a
58WY	n/a	n/a
59YV	n/a	n/a
59VT	n/a	n/a
59VV	n/a	n/a
59TS	n/a	n/a
59TT	n/a	n/a
59ZQ	n/a	n/a
59WX	n/a	n/a
58XW	n/a	n/a
58XV	n/a	n/a
58YV	n/a	n/a
59ZS	n/a	n/a
58XT	n/a	n/a
59XQ	n/a	n/a
59XP	n/a	n/a
59WR	n/a	n/a
59YX	n/a	n/a
59WQ	n/a	n/a
59WP	n/a	n/a
58XS	n/a	n/a
59XX	n/a	n/a
78VT	n/a	n/a
681A	n/a	n/a
78WR	n/a	n/a
78WS	n/a	n/a
79ZY	n/a	n/a
691A	n/a	n/a
6902	n/a	n/a
6903	n/a	n/a
691B	n/a	n/a
691C	n/a	n/a
69TZ	n/a	n/a
691D	n/a	n/a
69TY	n/a	n/a
69TX	n/a	n/a
691E	n/a	n/a
6904	n/a	n/a
6901	n/a	n/a
5905	n/a	n/a
58XY	n/a	n/a
5902	n/a	n/a
58RX	n/a	n/a
59XZ	n/a	n/a
69VQ	n/a	n/a
69XV	n/a	n/a
68WP	n/a	n/a
68VT	n/a	n/a
68TZ	n/a	n/a
69WP	n/a	n/a
69XR	n/a	n/a
68SW	n/a	n/a
68VS	n/a	n/a
68RZ	n/a	n/a
68VR	n/a	n/a
68VQ	n/a	n/a
68ST	n/a	n/a
68SS	n/a	n/a
69XT	n/a	n/a
68VW	n/a	n/a
69WZ	n/a	n/a
69WS	n/a	n/a
68VP	n/a	n/a
69VS	n/a	n/a
68TS	n/a	n/a
68SR	n/a	n/a
58WQ	n/a	n/a
58WR	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
59ZY	n/a	n/a
58XR	n/a	n/a
58ZX	n/a	n/a
58XQ	n/a	n/a
58ZQ	n/a	n/a
59SZ	n/a	n/a
58WV	n/a	n/a
68SV	n/a	n/a
58AS	n/a	n/a
58QS	n/a	n/a
58AF	n/a	n/a
58UW	n/a	n/a
58PR	n/a	n/a
68RY	n/a	n/a
58AD	n/a	n/a
5802	n/a	n/a
5803	n/a	n/a
5801	n/a	n/a
5804	n/a	n/a
58TS	n/a	n/a
58RW	n/a	n/a
58VR	n/a	n/a
58VP	n/a	n/a
58ST	n/a	n/a
58SW	n/a	n/a
58RQ	n/a	n/a
58TW	n/a	n/a
58VS	n/a	n/a
58TV	n/a	n/a
58TT	n/a	n/a
58SP	n/a	n/a
58RZ	n/a	n/a
58SX	n/a	n/a
58RY	n/a	n/a
67VW	n/a	n/a
67YW	n/a	n/a
67ZV	n/a	n/a
77YR	n/a	n/a
67YT	n/a	n/a
77ZW	n/a	n/a
77YS	n/a	n/a
77XY	n/a	n/a
67WQ	n/a	n/a
77YT	n/a	n/a
77XX	n/a	n/a
68QW	n/a	n/a
68QT	n/a	n/a
68QV	n/a	n/a
68QS	n/a	n/a
68RT	n/a	n/a
68RP	n/a	n/a
68RS	n/a	n/a
68QR	n/a	n/a
68WS	n/a	n/a
6801	n/a	n/a
68SQ	n/a	n/a
68TY	n/a	n/a
68SZ	n/a	n/a
68TR	n/a	n/a
78XQ	n/a	n/a
6802	n/a	n/a
57VZ	n/a	n/a
57YX	n/a	n/a
57XT	n/a	n/a
57ZY	n/a	n/a
57VX	n/a	n/a
57YV	n/a	n/a
57XY	n/a	n/a
57XP	n/a	n/a
57WX	n/a	n/a
57WY	n/a	n/a
57WZ	n/a	n/a
57ZW	n/a	n/a
57YY	n/a	n/a
57XQ	n/a	n/a
57ZX	n/a	n/a
57ZR	n/a	n/a
57ZS	n/a	n/a
58PT	n/a	n/a
58BP	n/a	n/a
58AA	n/a	n/a
58PV	n/a	n/a
58AB	n/a	n/a
58PS	n/a	n/a
58QT	n/a	n/a
58OX	n/a	n/a
58AC	n/a	n/a
68QX	n/a	n/a
77VR	n/a	n/a
77XW	n/a	n/a
77WP	n/a	n/a
77XZ	n/a	n/a
77WQ	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
7701	n/a	n/a
77WR	n/a	n/a
7703	n/a	n/a
77ZS	n/a	n/a
78TX	n/a	n/a
77YP	n/a	n/a
77WT	n/a	n/a
77VX	n/a	n/a
77WS	n/a	n/a
78ST	n/a	n/a
78SS	n/a	n/a
77PZ	n/a	n/a
77XV	n/a	n/a
78SV	n/a	n/a
77XS	n/a	n/a
78SW	n/a	n/a
77XR	n/a	n/a
78SY	n/a	n/a
78SX	n/a	n/a
77XQ	n/a	n/a
88TQ	n/a	n/a
87ZQ	n/a	n/a
881B	n/a	n/a
56YQ	n/a	n/a
56YR	n/a	n/a
56YP	n/a	n/a
5703B	n/a	n/a
5701B	n/a	n/a
57VS	n/a	n/a
57WP	n/a	n/a
57WQ	n/a	n/a
57VT	n/a	n/a
58PX	n/a	n/a
58PW	n/a	n/a
58WP	n/a	n/a
58QQ	n/a	n/a
67VY	n/a	n/a
67WW	n/a	n/a
6701A	n/a	n/a
6702	n/a	n/a
67SV	n/a	n/a
67ST	n/a	n/a
67SY	n/a	n/a
66WW	n/a	n/a
66WT	n/a	n/a
67TP	n/a	n/a
67SZ	n/a	n/a
67RZ	n/a	n/a
67VZ	n/a	n/a
67SX	n/a	n/a
67QZ	n/a	n/a
67XP	n/a	n/a
67WP	n/a	n/a
67RT	n/a	n/a
67RV	n/a	n/a
67RW	n/a	n/a
67RR	n/a	n/a
7601B	n/a	n/a
77SX	n/a	n/a
77SY	n/a	n/a
77SZ	n/a	n/a
77VP	n/a	n/a
77TV	n/a	n/a
86ZR	n/a	n/a
76ZS	n/a	n/a
76YZ	n/a	n/a
76VX	n/a	n/a
7704	n/a	n/a
77SV	n/a	n/a
77QZ	n/a	n/a
7702	n/a	n/a
77ST	n/a	n/a
77SW	n/a	n/a
77SP	n/a	n/a
77RS	n/a	n/a
77RP	n/a	n/a
77SS	n/a	n/a
77RY	n/a	n/a
77RR	n/a	n/a
77RQ	n/a	n/a
77QY	n/a	n/a
77QS	n/a	n/a
77QX	n/a	n/a
771A	n/a	n/a
77QR	n/a	n/a
77YN	n/a	n/a
87YT	n/a	n/a
77TQ	n/a	n/a
77VW	n/a	n/a
77VQ	n/a	n/a
56ZR	n/a	n/a
66ZW	n/a	n/a
56ZV	n/a	n/a



















Manhole Reference	Manhole Cover Level	Manhole Invert Level
56ZY	n/a	n/a
56YZ	n/a	n/a
66ZV	n/a	n/a
57RW	n/a	n/a
57RT	n/a	n/a
57SZ	n/a	n/a
57TQ	n/a	n/a
57VQ	n/a	n/a
57TW	n/a	n/a
57VP	n/a	n/a
57TV	n/a	n/a
57SS	n/a	n/a
57RX	n/a	n/a
57SW	n/a	n/a
57SR	n/a	n/a
57TZ	n/a	n/a
57SQ	n/a	n/a
57SP	n/a	n/a
57TT	n/a	n/a
5704A	n/a	n/a
5702B	n/a	n/a
57WW	n/a	n/a
57ZV	n/a	n/a
57XX	n/a	n/a
66ZQ	n/a	n/a
67VR	n/a	n/a
671A	n/a	n/a
67TR	n/a	n/a
67TT	n/a	n/a
67YY	n/a	n/a
66ZX	n/a	n/a
66ZY	n/a	n/a
67XY	n/a	n/a
67XX	n/a	n/a
66ZS	n/a	n/a
67YX	n/a	n/a
67ZQ	n/a	n/a
67TQ	n/a	n/a
67TV	n/a	n/a
66YX	n/a	n/a
66YY	n/a	n/a
66YT	n/a	n/a
67YV	n/a	n/a
66YQ	n/a	n/a
67TW	n/a	n/a
67TX	n/a	n/a
67ZT	n/a	n/a
66ZP	n/a	n/a
67YS	n/a	n/a
66YZ	n/a	n/a
66YR	n/a	n/a
651A	n/a	n/a
751C	n/a	n/a
751D	n/a	n/a
751B	n/a	n/a
751A	n/a	n/a
66XR	n/a	n/a
7609	n/a	n/a
7601A	8.47	.31
76ZW	n/a	n/a
66XS	n/a	n/a
76ZX	n/a	n/a
76ZY	n/a	n/a
66XT	n/a	n/a
76ZT	n/a	n/a
66WY	n/a	n/a
66VQ	n/a	n/a
66VX	n/a	n/a
76WP	n/a	n/a
66TZ	n/a	n/a
66VW	n/a	n/a
76XY	n/a	n/a
76XX	n/a	n/a
76WZ	n/a	n/a
76XS	n/a	n/a
76WY	n/a	n/a
76XW	n/a	n/a
66VV	n/a	n/a
76XV	n/a	n/a
76XT	n/a	n/a
7603	n/a	n/a
56XZ	n/a	n/a
5601B	n/a	n/a
56XX	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.








ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

-  **Foul:** A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
-  **Surface Water:** A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
-  **Combined:** A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
-  Trunk Surface Water
-  Trunk Foul
-  Storm Relief
-  Trunk Combined
-  Vent Pipe
-  Bio-solids (Sludge)
-  Proposed Thames Surface Water Sewer
-  Proposed Thames Water Foul Sewer
-  Gallery
-  Foul Rising Main
-  Surface Water Rising Main
-  Combined Rising Main
-  Sludge Rising Main
-  Proposed Thames Water Rising Main
-  Vacuum





Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

-  Air Valve
-  Dam Chase
-  Fitting
-  Meter
-  Vent Column




Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

-  Control Valve
-  Drop Pipe
-  Ancillary
-  Weir






End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

-  Outfall
-  Undefined End
-  Inlet






Other Symbols

Symbols used on maps which do not fall under other general categories








-  /  Public/Private Pumping Station
-  Change of characteristic indicator (C.O.C.I.)
-  Invert Level
-  Summit

Areas

Lines denoting areas of underground surveys, etc.

-  Agreement
-  Operational Site
-  Chamber
-  Tunnel
-  Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

-  Foul Sewer
-  Surface Water Sewer
-  Combined Sewer
-  Gully
-  Culverted Watercourse
-  Proposed
-  Abandoned Sewer

Notes:

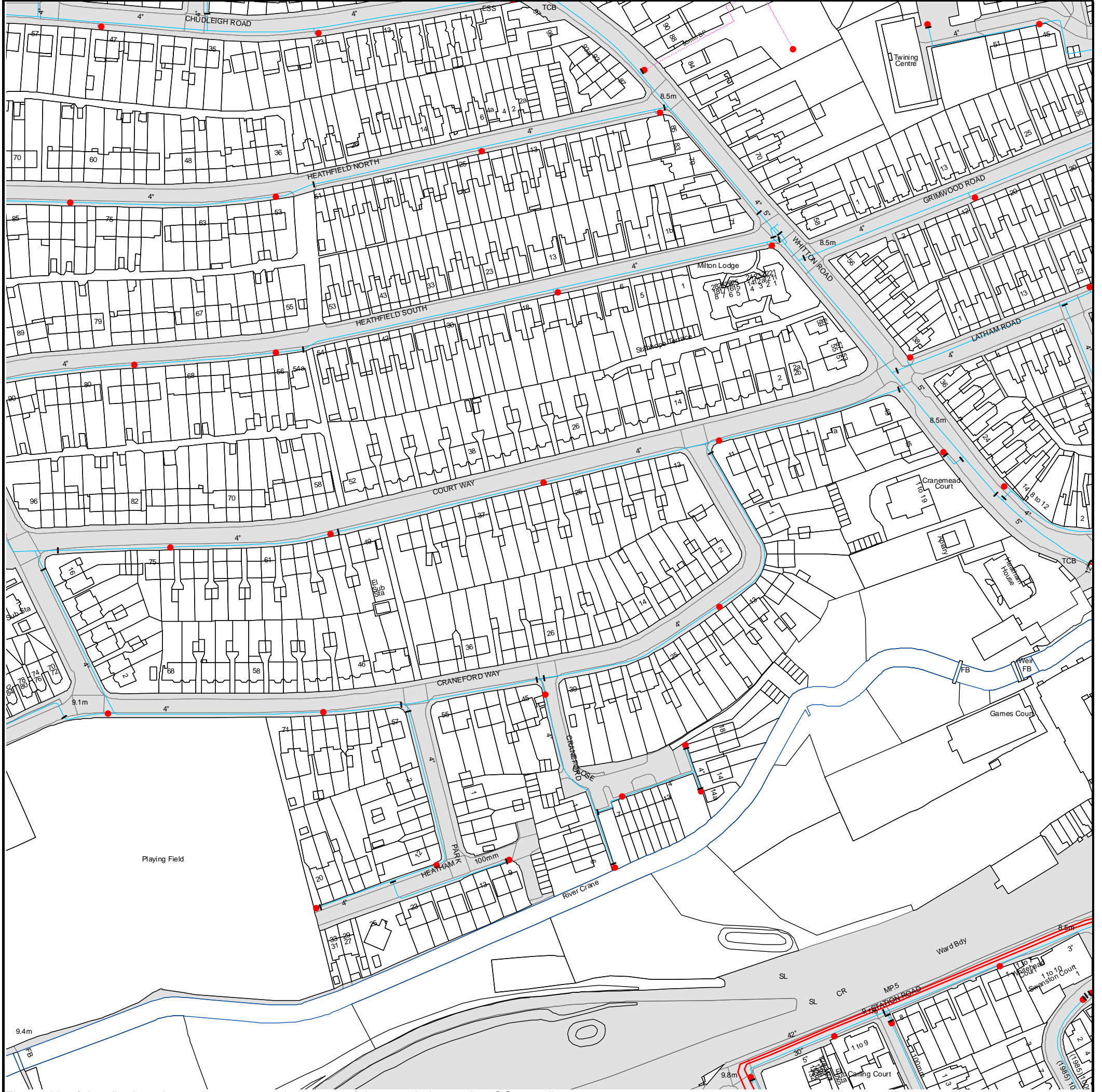
- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.
- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 515250,173750

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 515750,173750








The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.







ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)


- 
Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
- 
Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
- 
Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.
- 
Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
- 
Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
- 
Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
- 
Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

-  General Purpose Valve
-  Air Valve
-  Pressure Control Valve
-  Customer Valve

Hydrants








-  Single Hydrant

Meters










-  Meter

End Items

Symbol indicating what happens at the end of a water main.

-  Blank Flange
-  Capped End
-  Emptying Pit
-  Undefined End
-  Manifold
-  Customer Supply
-  Fire Supply



Operational Sites

-  Booster Station
-  Other
-  Other (Proposed)
-  Pumping Station
-  Service Reservoir
-  Shaft Inspection
-  Treatment Works
-  Unknown
-  Water Tower

Other Symbols

-  Data Logger

Other Water Pipes (Not Operated or Maintained by Thames Water)

-  **Other Water Company Main:** Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.
-  **Private Main:** Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL's terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking	Cheque
<p>Call 0845 070 9148 quoting your invoice number starting CBA or ADS / OSS</p>	<p>Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater.co.uk</p>	<p>By calling your bank and quoting: Account number 90478703 Sort code 60-00-01 and your invoice number</p>	<p>Made payable to 'Thames Water Utilities Ltd' Write your Thames Water account number on the back. Send to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13</p>

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.



Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

This search has been produced by Thames Water Property Searches, Clearwater Court, Vastern Road, Reading RG1 8DB, which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs Contact Details

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE



Jessica Taylor
Atkins
Euston Tower
286 Euston Road
London
NW1 3AT



Your account number
DS4007616



thameswater.co.uk



0800 009 3921
Mon – Fri 9am-5pm,
01/11/2017

Pre Development Enquiry

Site Address: Richmond College, Twickenham, Middlesex, TW2 7SQ

Development Details: Demolition of existing college buildings, site clearance and groundworks together with the redevelopment of the site to provide:

Phase 1 – RuT College – Main Building

Phase 2 – RuT College – STEM and Sports buildings

Phase 3 – Haymarket Building

Phase 3 (1) – Residential (approximately 90 units)

Phase 3 (2) – Residential (approximately 89 units)

Proposed SW 10l/s into SW sewer in Chertsey Rd, proposed total FW 29.81l/s in Egerton Rd and Craneford Way.

Dear Miss Taylor

I write in relation to the above site regarding the proposed development here.

Please note: your initial fee of £398+ VAT covers the expense of our asset planners reviewing your proposed discharges in relation to the capacity in our existing network. They also carry out flood risk assessments. At this stage if your proposal is accepted, we issue an approval letter for you to progress with your development.

Foul Water

Details approved in principle.

In this instance we have notified our Catchment Planners for the area and they have made comment regarding the capacity of the public sewers. From the information you have provided, I can confirm that the existing foul sewer network does have sufficient capacity to accommodate the proposed foul water discharge from the proposed development.

Surface Water

Please note that discharging surface water to the public sewer network should only be considered after all other methods of disposal have been investigated and proven to be not viable. In accordance with the Building Act 2000 Clause H3.3, positive connection to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable.

The disposal hierarchy being: 1st Store rain water for Later Use; 2nd Use infiltration techniques, such as porous surfaces in non-clay area; 3rd Attenuate rainwater in ponds or open water features for gradual release to a watercourse; 4th Attenuate rainwater by storing in tanks or sealed water features for gradual release to a watercourse; 5th Discharge rainwater direct to a watercourse; 6th Discharge rainwater to a surface water drain; 7th Discharge rainwater to the combined sewer.

Only when it can be proven that soakage into the ground or a connection into the adjacent watercourse is not possible would we consider a restricted discharge into the public surface water sewer network. A reduction of at least 50% on existing flows from the same site area would be sought for a range of storm conditions.

Any approvals are subject to conditions that may be imposed through the planning process.

There is no right of discharge of highway drainage into the public sewerage system. An agreement to allow a discharge may be granted under section 115 (WIA 1991) by negotiation between the Highway Authority and Thames Water.

Details approved in principle.

Please Note

Public sewers are liable to surcharge to ground level. Any property that has a floor level lower than an adjacent manhole may be subject to flooding. Adequate provision shall be made by the developer to guard against this eventuality.

All connection requests are subject to a full Section 106 (Water Industry Act 1991) application before the Company can confirm approval to the connection itself. Please also note that capacity in the public sewerage system cannot be reserved.

The views expressed by Thames Water in this letter are in response to this pre development enquiry at this time and do not represent our final views on any future planning applications made in relation to this site.

Yours sincerely



Natalya Collins
Development Engineer

Appendix F - Foul and Surface Water Drainage Strategy

Greenfield Calculations

Surface Water Drainage Strategy and Foul Drawing


MicroDrainage Calculations

Atkins - Connection Point Levels

Atkins - Thames Water Formal Response

Atkins Drawing - 5137894-ATK-00-XX-SK-C-0012-A1 LV

Atkins Drawing - 5137894-ATK-00-XX-SK-C-0014

MLM		Page 1
North Kiln Felaw Maltings 46 Felaw Street Ipswich IP2 8PN	619579 Richmond Upon Thames College	
Date 15/08/18 File	Designed by AW Checked by	
XP Solutions	Source Control 2017.1.2	

ICP SUDS Mean Annual Flood

Input

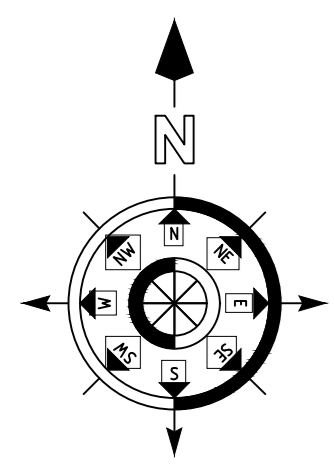
Return Period (years)	100	Soil	0.300
Area (ha)	1.970	Urban	0.000
SAAR (mm)	638	Region Number	Region 6

Results l/s

QBAR Rural 3.2
QBAR Urban 3.2

Q100 years 10.3

Q1 year 2.7
Q30 years 7.3
Q100 years 10.3



KEY

- PRIVATE SURFACE WATER DRAIN SLOTTED PIPES
- FOUL
- PRIVATE SURFACE WATER MANHOLE
- CELLULAR ATTENUATION CRATES (95% VOIDS)
- PERMEABLE PAVING
- APPROX. SITE/PHASE BOUNDARY
- 70-80% GREEN ROOFS PROPOSED ON DEVELOPMENT EXACT PERCENTAGE TO BE CONFIRMED

- NOTES**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
 - DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.
 - THIS DRAINAGE STRATEGY SHOWS HOW SURFACE WATER RUN-OFF COULD BE MANAGED ON SITE WITH A RESTRICTED OFF-SITE DISCHARGE. FOR ALL RAINFALL EVENTS UP TO AND INCLUDING THE 100 YEAR RETURN PERIOD EVENT PLUS 40% CLIMATE CHANGE TO ENSURE NO INCREASED FLOOD RISK TO OTHERS AS A RESULT OF THE PROPOSED DEVELOPMENT. THIS IS NOT INTENDED TO BE A DETAILED DESIGN AT THIS STAGE. PLEASE NOTE THAT THE FINAL LAYOUT MAY BE SUBJECT TO REFINEMENT TO MEET CERTAIN TECHNICAL CRITERIA.
 - ALL GROUND LEVELS HAVE BEEN TAKEN AS 9.05m AOD. CONFIRMATION OF DRAINAGE DESIGNER WILL BE SUBJECT TO CONFIRMATION OF DETAILED LEVELS DESIGN.
 - LOCATION AND INVERT LEVELS OF OUTFALLS FROM PHASE 2 TO THE WEST ARE APPROXIMATE AND SUBJECT TO CONFIRMATION AT DETAILED DESIGN STAGE.



CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015

DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION

- IF YOU DO NOT FULLY UNDERSTAND THE RISKS INVOLVED DURING THE CONSTRUCTION OF THE ITEMS INDICATED ON THIS DRAWING ASK YOUR MANAGER, HEALTH & SAFETY ADVISOR OR A MEMBER OF THE DESIGN TEAM BEFORE PROCEEDING.
- TO BE COMPLETED AT DETAILED DESIGN STAGE.

THE ABOVE NOTES REFER SPECIFICALLY TO THE INFORMATION SHOWN ON THIS DRAWING. REFER TO THE HEALTH AND SAFETY PLAN FOR FURTHER INFORMATION.

REV	DATE	REVISION	HAZID	CHK	APP
P03	04.12.18	SECOND REVISION		AW	JRC
P02	22.11.18	FIRST REVISION		AW	JRC
P01	04.10.18	PRELIMINARY ISSUE		CBV	JRC

PRELIMINARY

MLM Group

North Kiln, Felaw Maltings,
46 Felaw Street, Ipswich,
Suffolk IP2 8PN
Tel: 01473 231100
Website: www.mlmgroup.com

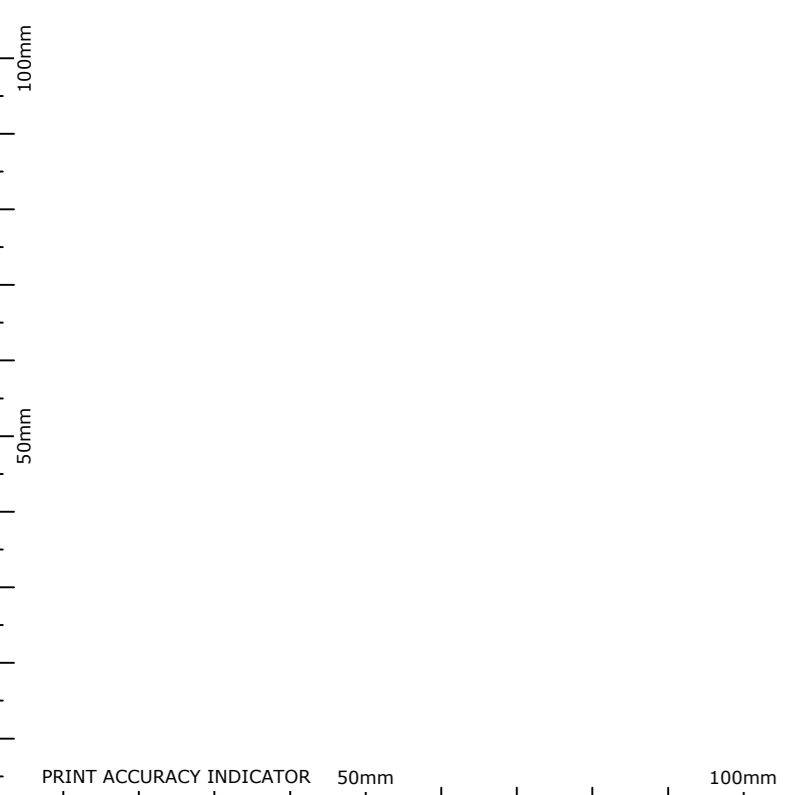
BARTON WILLMORE


RICHMOND UPON THAMES COLLEGE

SURFACE WATER DRAINAGE STRATEGY AND FOUL

SCALE	ORIGINATOR	VOLUME/LEVELS	STATUS	REVISION
1:250 @A0	619579	-	P03	

619579-MLM-ZZ-XX-DR-C-0110



MLM		Page 1
North Kiln Felaw Maltings 46 Felaw Street Ipswich IP2 8PN	619679 Richmond Upon Thames College SW Network - Phase 1 + 2	
Date 22/11/18 File 619579-MLM-ZZ-XX-CA-C-S...	Designed by AW Checked by JRC	
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)	100
FEH Rainfall Version	1999
Site Location GB 516200 173750 TQ 16200 73750	
C (1km)	-0.025
D1 (1km)	0.297
D2 (1km)	0.319
D3 (1km)	0.231
E (1km)	0.307
F (1km)	2.536
Maximum Rainfall (mm/hr)	0
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)	0.000
Maximum Backdrop Height (m)	0.000
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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.333	4-8	0.862	8-12	0.017

Total Area Contributing (ha) = 1.212


Total Pipe Volume (m³) = 130.432

Network Design Table for Storm














PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
----	------------	----------	-------------	-------------	-------------	-----------------	--------	----------	----------	--------------	-------------

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
----	--------------	-------------	-----------	---------------	-------------------	------------	----------------	-----------	-----------	------------


MLM		Page 2
North Kiln Felaw Maltings 46 Felaw Street Ipswich IP2 8PN	619679 Richmond Upon Thames College SW Network - Phase 1 + 2	
Date 22/11/18 File 619579-MLM-ZZ-XX-CA-C-S...	Designed by AW Checked by JRC	
XP Solutions		Network 2017.1.2

Network Design Table for Storm












PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	41.690	0.139	300.0	0.045	3.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	41.690	0.139	300.0	0.078	3.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	7.720	0.026	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	21.621	0.043	500.0	0.099	3.00	0.0	0.600	o	525	Pipe/Conduit	
S1.002	41.794	0.084	500.0	0.144	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.003	33.635	0.206	163.3	0.026	0.00	0.0	0.600	o	525	Pipe/Conduit	
S4.000	18.001	0.060	300.0	0.026	3.00	0.0	0.600	o	300	Pipe/Conduit	
S5.000	23.999	0.080	300.0	0.026	3.00	0.0	0.600	o	300	Pipe/Conduit	
S4.001	3.472	0.012	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	38.510	0.236	163.2	0.026	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.005	61.501	0.123	500.0	0.124	0.00	0.0	0.600	o	525	Pipe/Conduit	
S6.000	14.227	0.028	500.0	0.010	3.00	0.0	0.600	o	525	Pipe/Conduit	
S6.001	13.882	0.028	500.0	0.029	0.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	0.00	3.77	8.173	0.045	0.0	0.0	0.0	0.90	63.8	0.0
S2.000	0.00	3.77	8.173	0.078	0.0	0.0	0.0	0.90	63.8	0.0
S1.001	0.00	3.91	8.034	0.123	0.0	0.0	0.0	0.90	63.8	0.0
S3.000	0.00	3.36	7.826	0.099	0.0	0.0	0.0	0.99	215.4	0.0
S1.002	0.00	4.61	7.783	0.366	0.0	0.0	0.0	0.99	215.4	0.0
S1.003	0.00	4.93	7.699	0.392	0.0	0.0	0.0	1.75	378.9	0.0
S4.000	0.00	3.33	7.789	0.026	0.0	0.0	0.0	0.90	63.8	0.0
S5.000	0.00	3.44	7.809	0.026	0.0	0.0	0.0	0.90	63.8	0.0
S4.001	0.00	3.51	7.729	0.052	0.0	0.0	0.0	0.90	63.8	0.0
S1.004	0.00	5.30	7.492	0.470	0.0	0.0	0.0	1.75	379.0	0.0
S1.005	0.00	6.33	7.256	0.594	0.0	0.0	0.0	0.99	215.4	0.0
S6.000	0.00	3.24	7.249	0.010	0.0	0.0	0.0	0.99	215.4	0.0
S6.001	0.00	3.47	7.221	0.039	0.0	0.0	0.0	0.99	215.4	0.0


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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.002	29.664	0.059	500.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.006	39.593	0.079	500.0	0.092	0.00	0.0	0.600	o	525	Pipe/Conduit	
S7.000	37.184	0.124	300.0	0.045	3.00	0.0	0.600	o	300	Pipe/Conduit	
S8.000	17.919	0.060	300.0	0.023	3.00	0.0	0.600	o	300	Pipe/Conduit	
S7.001	7.920	0.026	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S9.000	35.359	0.071	500.0	0.154	3.00	0.0	0.600	o	525	Pipe/Conduit	
S7.002	15.633	0.031	500.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S7.003	71.837	0.144	500.0	0.086	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.007	56.202	0.112	500.0	0.134	0.00	0.0	0.600	o	525	Pipe/Conduit	
S10.000	62.894	0.126	500.0	0.045	3.00	0.0	0.600	o	525	Pipe/Conduit	
S1.008	12.263	0.082	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.002	0.00	3.97	7.193	0.039	0.0	0.0	0.0	0.99	215.4	0.0
S1.006	0.00	6.99	7.133	0.725	0.0	0.0	0.0	0.99	215.4	0.0
S7.000	0.00	3.69	7.604	0.045	0.0	0.0	0.0	0.90	63.8	0.0
S8.000	0.00	3.33	7.540	0.023	0.0	0.0	0.0	0.90	63.8	0.0
S7.001	0.00	3.83	7.480	0.068	0.0	0.0	0.0	0.90	63.8	0.0
S9.000	0.00	3.59	7.300	0.154	0.0	0.0	0.0	0.99	215.4	0.0
S7.002	0.00	4.09	7.229	0.222	0.0	0.0	0.0	0.99	215.4	0.0
S7.003	0.00	5.30	7.198	0.308	0.0	0.0	0.0	0.99	215.4	0.0
S1.007	0.00	7.93	7.054	1.167	0.0	0.0	0.0	0.99	215.4	0.0
S10.000	0.00	4.05	7.068	0.045	0.0	0.0	0.0	0.99	215.4	0.0
S1.008	0.00	8.18	6.942	1.212	0.0	0.0	0.0	0.82	14.5	0.0

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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)
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S1.008	S	9.050	6.860	0.000	0	0
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Simulation Criteria for Storm

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 516200 173750 TQ 16200 73750
C (1km)	-0.025
D1 (1km)	0.297
D2 (1km)	0.319
D3 (1km)	0.231
E (1km)	0.307
F (1km)	2.536
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S9, DS/PN: S1.008, Volume (m³): 28.9

Unit Reference	MD-SHE-0100-5000-1400-5000
Design Head (m)	1.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	6.942
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.0
Flush-Flo™	0.416	5.0
Kick-Flo®	0.855	4.0
Mean Flow over Head Range	-	4.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	1.200	4.7	3.000	7.1	7.000	10.7
0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.0
0.300	4.9	1.600	5.3	4.000	8.2	8.000	11.4
0.400	5.0	1.800	5.6	4.500	8.6	8.500	11.7
0.500	5.0	2.000	5.9	5.000	9.1	9.000	12.0
0.600	4.9	2.200	6.2	5.500	9.5	9.500	12.3
0.800	4.3	2.400	6.4	6.000	9.9		
1.000	4.3	2.600	6.7	6.500	10.3		

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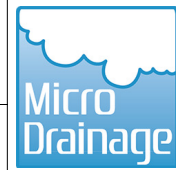
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Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: S3.000

Invert Level (m) 7.826 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	99.0	0.0	0.401	0.0	0.0
0.400	99.0	0.0			

Cellular Storage Manhole: S3, DS/PN: S1.002

Invert Level (m) 7.783 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	103.5	0.0	0.401	0.0	0.0
0.400	103.5	0.0			

Cellular Storage Manhole: S4, DS/PN: S1.003

Invert Level (m) 7.699 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	157.5	0.0	0.401	0.0	0.0
0.400	157.5	0.0			

Cellular Storage Manhole: S6, DS/PN: S1.005

Invert Level (m) 7.256 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	126.0	0.0	0.801	0.0	0.0
0.800	126.0	0.0			

Cellular Storage Manhole: S13, DS/PN: S6.001

Invert Level (m) 7.221 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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Cellular Storage Manhole: S13, DS/PN: S6.001

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	128.0	0.0	0.801	0.0	0.0
0.800	128.0	0.0			

Cellular Storage Manhole: S7, DS/PN: S1.006

Invert Level (m) 7.133 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	162.0	0.0	0.801	0.0	0.0
0.800	162.0	0.0			

Cellular Storage Manhole: S19, DS/PN: S9.000

Invert Level (m) 7.300 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	108.0	0.0	0.801	0.0	0.0
0.800	108.0	0.0			

Cellular Storage Manhole: S18, DS/PN: S7.002


Invert Level (m) 7.229 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	90.0	0.0	0.801	0.0	0.0
0.800	90.0	0.0			

Cellular Storage Manhole: S19, DS/PN: S7.003

Invert Level (m) 7.198 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000


Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	139.5	0.0	0.801	0.0	0.0
0.800	139.5	0.0			

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Cellular Storage Manhole: S8, DS/PN: S1.007

Invert Level (m) 7.054 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	144.0	0.0	0.801	0.0	0.0
0.800	144.0	0.0			

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 516200 173750 TQ 16200 73750
C (1km) -0.025
D1 (1km) 0.297
D2 (1km) 0.319
D3 (1km) 0.231
E (1km) 0.307
F (1km) 2.536
Cv (Summer) 0.750
Cv (Winter) 0.840

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


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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	60 Summer	1	+0%					8.226
S2.000	S2	60 Summer	1	+0%					8.243
S1.001	S2	60 Summer	1	+0%	100/60 Summer				8.133
S3.000	S4	60 Winter	1	+0%	100/960 Winter				7.896
S1.002	S3	60 Winter	1	+0%	100/960 Winter				7.885
S1.003	S4	60 Winter	1	+0%	100/960 Winter				7.768
S4.000	S7	60 Summer	1	+0%	100/360 Winter				7.834
S5.000	S8	60 Summer	1	+0%	100/360 Winter				7.850
S4.001	S8	60 Summer	1	+0%	100/240 Winter				7.792
S1.004	S5	60 Winter	1	+0%	100/240 Winter				7.565
S1.005	S6	120 Winter	1	+0%	100/60 Summer				7.360

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
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PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S1.000	S1	-0.247	0.000	0.07		4.2	OK	
S2.000	S2	-0.230	0.000	0.12		7.2	OK	
S1.001	S2	-0.201	0.000	0.24		11.4	OK	
S3.000	S4	-0.455	0.000	0.02		3.3	OK	
S1.002	S3	-0.423	0.000	0.09		16.0	OK	
S1.003	S4	-0.456	0.000	0.04		13.5	OK	
S4.000	S7	-0.255	0.000	0.04		2.4	OK	
S5.000	S8	-0.259	0.000	0.04		2.4	OK	
S4.001	S8	-0.237	0.000	0.10		4.9	OK	
S1.004	S5	-0.453	0.000	0.05		15.2	OK	
S1.005	S6	-0.422	0.000	0.08		16.0	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S6.000	S12	360 Winter	1	+0%	100/60 Summer			
S6.001	S13	360 Winter	1	+0%	100/60 Summer			
S6.002	S14	360 Winter	1	+0%	100/60 Summer			
S1.006	S7	360 Winter	1	+0%	100/60 Summer			
S7.000	S16	60 Summer	1	+0%	100/120 Winter			
S8.000	S17	60 Summer	1	+0%	100/60 Winter			
S7.001	S17	60 Summer	1	+0%	100/60 Winter			
S9.000	S19	60 Winter	1	+0%	100/60 Winter			
S7.002	S18	360 Winter	1	+0%	100/60 Summer			
S7.003	S19	360 Winter	1	+0%	100/60 Summer			
S1.007	S8	360 Winter	1	+0%	30/360 Winter			
S10.000	S23	360 Winter	1	+0%	30/360 Winter			
S1.008	S9	360 Winter	1	+0%	1/60 Summer			

PN	US/MH Name	Water Surcharged Flooded			Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)		
S6.000	S12	7.315	-0.459	0.000	0.00	0.2	OK	
S6.001	S13	7.315	-0.431	0.000	0.01	0.6	OK	
S6.002	S14	7.315	-0.403	0.000	0.00	0.6	OK	
S1.006	S7	7.315	-0.343	0.000	0.04	8.1	OK	
S7.000	S16	7.657	-0.247	0.000	0.07	4.2	OK	
S8.000	S17	7.585	-0.255	0.000	0.04	2.2	OK	
S7.001	S17	7.552	-0.228	0.000	0.13	6.3	OK	
S9.000	S19	7.372	-0.453	0.000	0.04	6.7	OK	
S7.002	S18	7.315	-0.439	0.000	0.03	3.7	OK	
S7.003	S19	7.314	-0.409	0.000	0.02	3.9	OK	
S1.007	S8	7.314	-0.265	0.000	0.03	6.8	OK	
S10.000	S23	7.312	-0.281	0.000	0.00	0.8	OK	
S1.008	S9	7.312	0.220	0.000	0.38	5.0	SURCHARGED	

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


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 516200 173750 TQ 16200 73750
C (1km) -0.025
D1 (1km) 0.297
D2 (1km) 0.319
D3 (1km) 0.231
E (1km) 0.307
F (1km) 2.536
Cv (Summer) 0.750
Cv (Winter) 0.840

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


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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	60 Summer	30	+0%					8.267
S2.000	S2	60 Summer	30	+0%					8.296
S1.001	S2	60 Summer	30	+0%	100/60 Summer				8.212
S3.000	S4	60 Summer	30	+0%	100/960 Winter				7.992
S1.002	S3	60 Summer	30	+0%	100/960 Winter				7.984
S1.003	S4	60 Winter	30	+0%	100/960 Winter				7.844
S4.000	S7	60 Summer	30	+0%	100/360 Winter				7.871
S5.000	S8	60 Summer	30	+0%	100/360 Winter				7.884
S4.001	S8	60 Summer	30	+0%	100/240 Winter				7.836
S1.004	S5	60 Winter	30	+0%	100/240 Winter				7.649
S1.005	S6	480 Winter	30	+0%	100/60 Summer				7.606

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


PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S1.000	S1	-0.206	0.000	0.20		11.7	OK	
S2.000	S2	-0.177	0.000	0.34		20.4	OK	
S1.001	S2	-0.122	0.000	0.65		30.9	OK	
S3.000	S4	-0.359	0.000	0.09		14.4	OK	
S1.002	S3	-0.324	0.000	0.31		58.6	OK	
S1.003	S4	-0.380	0.000	0.17		55.2	OK	
S4.000	S7	-0.218	0.000	0.13		6.9	OK	
S5.000	S8	-0.225	0.000	0.12		6.9	OK	
S4.001	S8	-0.193	0.000	0.28		13.7	OK	
S1.004	S5	-0.369	0.000	0.19		63.6	OK	
S1.005	S6	-0.175	0.000	0.10		19.8	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S6.000	S12	480 Winter	30	+0%	100/60 Summer			
S6.001	S13	480 Winter	30	+0%	100/60 Summer			
S6.002	S14	480 Winter	30	+0%	100/60 Summer			
S1.006	S7	480 Winter	30	+0%	100/60 Summer			
S7.000	S16	60 Summer	30	+0%	100/120 Winter			
S8.000	S17	60 Summer	30	+0%	100/60 Winter			
S7.001	S17	60 Summer	30	+0%	100/60 Winter			
S9.000	S19	480 Winter	30	+0%	100/60 Winter			
S7.002	S18	480 Winter	30	+0%	100/60 Summer			
S7.003	S19	480 Winter	30	+0%	100/60 Summer			
S1.007	S8	480 Winter	30	+0%	30/360 Winter			
S10.000	S23	480 Winter	30	+0%	30/360 Winter			
S1.008	S9	480 Winter	30	+0%	1/60 Summer			

PN	US/MH Name	Water Surcharged		Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Flow (l/s)		
S6.000	S12	7.605	-0.169	0.000	0.00	0.3	OK	
S6.001	S13	7.605	-0.141	0.000	0.01	0.7	OK	
S6.002	S14	7.605	-0.113	0.000	0.00	0.8	OK	
S1.006	S7	7.605	-0.053	0.000	0.05	8.6	OK	
S7.000	S16	7.696	-0.208	0.000	0.20	11.9	OK	
S8.000	S17	7.627	-0.213	0.000	0.11	6.1	OK	
S7.001	S17	7.605	-0.175	0.000	0.37	17.5	OK	
S9.000	S19	7.601	-0.224	0.000	0.03	4.8	OK	
S7.002	S18	7.601	-0.153	0.000	0.04	5.1	OK	
S7.003	S19	7.601	-0.122	0.000	0.02	4.0	OK	
S1.007	S8	7.603	0.023	0.000	0.04	6.9	SURCHARGED	
S10.000	S23	7.621	0.028	0.000	0.01	1.7	SURCHARGED	
S1.008	S9	7.621	0.530	0.000	0.38	5.0	SURCHARGED	

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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 ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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


Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 516200 173750 TQ 16200 73750
C (1km)	-0.025
D1 (1km)	0.297
D2 (1km)	0.319
D3 (1km)	0.231
E (1km)	0.307
F (1km)	2.536
Cv (Summer)	0.750
Cv (Winter)	0.840

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


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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	60 Summer	100	+40%					8.394
S2.000	S2	60 Summer	100	+40%					8.416
S1.001	S2	960 Winter	100	+40%	100/60 Summer				8.358
S3.000	S4	960 Winter	100	+40%	100/960 Winter				8.358
S1.002	S3	960 Winter	100	+40%	100/960 Winter				8.358
S1.003	S4	960 Winter	100	+40%	100/960 Winter				8.358
S4.000	S7	960 Winter	100	+40%	100/360 Winter				8.358
S5.000	S8	960 Winter	100	+40%	100/360 Winter				8.358
S4.001	S8	960 Winter	100	+40%	100/240 Winter				8.358
S1.004	S5	960 Winter	100	+40%	100/240 Winter				8.358
S1.005	S6	960 Winter	100	+40%	100/60 Summer				8.358

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


PN	US/MH Name	Surcharged Flooded			Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)			
S1.000	S1	-0.079	0.000	0.39	22.9	OK	
S2.000	S2	-0.057	0.000	0.68	40.2	OK	
S1.001	S2	0.024	0.000	0.12	5.5	SURCHARGED	
S3.000	S4	0.007	0.000	0.03	4.5	SURCHARGED	
S1.002	S3	0.050	0.000	0.09	16.0	SURCHARGED	
S1.003	S4	0.134	0.000	0.07	21.1	SURCHARGED	
S4.000	S7	0.269	0.000	0.04	2.3	SURCHARGED	
S5.000	S8	0.249	0.000	0.04	2.1	SURCHARGED	
S4.001	S8	0.329	0.000	0.16	7.8	SURCHARGED	
S1.004	S5	0.341	0.000	0.07	21.9	SURCHARGED	
S1.005	S6	0.577	0.000	0.12	23.2	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S6.000	S12	960 Winter	100	+40%	100/60 Summer			
S6.001	S13	960 Winter	100	+40%	100/60 Summer			
S6.002	S14	960 Winter	100	+40%	100/60 Summer			
S1.006	S7	960 Winter	100	+40%	100/60 Summer			
S7.000	S16	960 Winter	100	+40%	100/120 Winter			
S8.000	S17	960 Winter	100	+40%	100/60 Winter			
S7.001	S17	960 Winter	100	+40%	100/60 Winter			
S9.000	S19	960 Winter	100	+40%	100/60 Winter			
S7.002	S18	960 Winter	100	+40%	100/60 Summer			
S7.003	S19	960 Winter	100	+40%	100/60 Summer			
S1.007	S8	960 Winter	100	+40%	30/360 Winter			
S10.000	S23	960 Winter	100	+40%	30/360 Winter			
S1.008	S9	960 Winter	100	+40%	1/60 Summer			

PN	US/MH Name	Water Surcharged		Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Flow (l/s)		
S6.000	S12	8.358	0.584	0.000	0.04	4.4	SURCHARGED	
S6.001	S13	8.358	0.612	0.000	0.27	32.0	SURCHARGED	
S6.002	S14	8.358	0.640	0.000	0.15	27.5	SURCHARGED	
S1.006	S7	8.358	0.700	0.000	0.14	26.9	SURCHARGED	
S7.000	S16	8.357	0.453	0.000	0.05	2.9	SURCHARGED	
S8.000	S17	8.357	0.517	0.000	0.06	3.0	SURCHARGED	
S7.001	S17	8.357	0.577	0.000	0.16	7.6	SURCHARGED	
S9.000	S19	8.357	0.532	0.000	0.13	23.8	SURCHARGED	
S7.002	S18	8.357	0.603	0.000	0.26	32.9	SURCHARGED	
S7.003	S19	8.357	0.634	0.000	0.10	19.1	SURCHARGED	
S1.007	S8	8.357	0.778	0.000	0.09	16.7	SURCHARGED	
S10.000	S23	8.355	0.762	0.000	0.03	5.9	SURCHARGED	
S1.008	S9	8.355	1.264	0.000	0.38	5.0	SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	1999
Site Location GB 516200 173750 TQ 16200 73750	
C (1km)	-0.025
D1 (1km)	0.297
D2 (1km)	0.319
D3 (1km)	0.231
E (1km)	0.307
F (1km)	2.536
Maximum Rainfall (mm/hr)	0
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)	0.000
Maximum Backdrop Height (m)	0.000
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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.205	4-8	0.637	8-12	0.017

Total Area Contributing (ha) = 0.859


Total Pipe Volume (m³) = 85.773

Network Design Table for Storm














PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
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Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
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Network Design Table for Storm





PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	41.690	0.139	300.0	0.045	3.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	41.690	0.139	300.0	0.078	3.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	7.720	0.026	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	21.621	0.043	500.0	0.099	3.00	0.0	0.600	o	525	Pipe/Conduit	
S1.002	41.794	0.084	500.0	0.144	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.003	33.635	0.206	163.3	0.026	0.00	0.0	0.600	o	525	Pipe/Conduit	
S4.000	18.001	0.060	300.0	0.026	3.00	0.0	0.600	o	300	Pipe/Conduit	
S5.000	23.999	0.080	300.0	0.026	3.00	0.0	0.600	o	300	Pipe/Conduit	
S4.001	3.472	0.012	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	38.510	0.236	163.2	0.026	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.005	61.501	0.123	500.0	0.124	0.00	0.0	0.600	o	525	Pipe/Conduit	
S6.000	14.227	0.028	500.0	0.010	3.00	0.0	0.600	o	525	Pipe/Conduit	
S6.001	13.882	0.028	500.0	0.029	0.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	0.00	3.77	8.173	0.045	0.0	0.0	0.0	0.90	63.8	0.0
S2.000	0.00	3.77	8.173	0.078	0.0	0.0	0.0	0.90	63.8	0.0
S1.001	0.00	3.91	8.034	0.123	0.0	0.0	0.0	0.90	63.8	0.0
S3.000	0.00	3.36	7.826	0.099	0.0	0.0	0.0	0.99	215.4	0.0
S1.002	0.00	4.61	7.783	0.366	0.0	0.0	0.0	0.99	215.4	0.0
S1.003	0.00	4.93	7.699	0.392	0.0	0.0	0.0	1.75	378.9	0.0
S4.000	0.00	3.33	7.789	0.026	0.0	0.0	0.0	0.90	63.8	0.0
S5.000	0.00	3.44	7.809	0.026	0.0	0.0	0.0	0.90	63.8	0.0
S4.001	0.00	3.51	7.729	0.052	0.0	0.0	0.0	0.90	63.8	0.0
S1.004	0.00	5.30	7.492	0.470	0.0	0.0	0.0	1.75	379.0	0.0
S1.005	0.00	6.33	7.256	0.594	0.0	0.0	0.0	0.99	215.4	0.0
S6.000	0.00	3.24	7.249	0.010	0.0	0.0	0.0	0.99	215.4	0.0
S6.001	0.00	3.47	7.221	0.039	0.0	0.0	0.0	0.99	215.4	0.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.002	29.664	0.059	500.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.006	39.593	0.079	500.0	0.092	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.007	56.202	0.112	500.0	0.134	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.008	12.263	0.082	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.002	0.00	3.97	7.193	0.039	0.0	0.0	0.0	0.99	215.4	0.0
S1.006	0.00	6.99	7.133	0.725	0.0	0.0	0.0	0.99	215.4	0.0
S1.007	0.00	7.93	7.054	0.859	0.0	0.0	0.0	0.99	215.4	0.0
S1.008	0.00	8.18	6.942	0.859	0.0	0.0	0.0	0.82	14.5	0.0

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)
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S1.008 S 9.050 6.860 0.000 0 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 ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Storage Structures 7
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 516200 173750 TQ 16200 73750
C (1km)	-0.025
D1 (1km)	0.297
D2 (1km)	0.319
D3 (1km)	0.231

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Synthetic Rainfall Details

E (1km) 0.307
 F (1km) 2.536
 Summer Storms Yes
 Winter Storms Yes
 Cv (Summer) 0.750
 Cv (Winter) 0.840
 Storm Duration (mins) 30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S9, DS/PN: S1.008, Volume (m³): 15.6

Unit Reference	MD-SHE-0100-5000-1400-5000
Design Head (m)	1.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	6.942
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.0
Flush-Flo™	0.416	5.0
Kick-Flo®	0.855	4.0
Mean Flow over Head Range	-	4.4

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

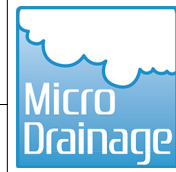
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	1.200	4.7	3.000	7.1	7.000	10.7
0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.0
0.300	4.9	1.600	5.3	4.000	8.2	8.000	11.4
0.400	5.0	1.800	5.6	4.500	8.6	8.500	11.7
0.500	5.0	2.000	5.9	5.000	9.1	9.000	12.0
0.600	4.9	2.200	6.2	5.500	9.5	9.500	12.3
0.800	4.3	2.400	6.4	6.000	9.9		
1.000	4.3	2.600	6.7	6.500	10.3		

North Kiln Felaw Maltings
46 Felaw Street
Ipswich IP2 8PN

619679
Richmond Upon Thames College
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Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: S3.000

Invert Level (m) 7.826 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	99.0	0.0	0.401	0.0	0.0
0.400	99.0	0.0			

Cellular Storage Manhole: S3, DS/PN: S1.002

Invert Level (m) 7.783 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	103.5	0.0	0.401	0.0	0.0
0.400	103.5	0.0			

Cellular Storage Manhole: S4, DS/PN: S1.003

Invert Level (m) 7.699 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	157.5	0.0	0.401	0.0	0.0
0.400	157.5	0.0			


Cellular Storage Manhole: S6, DS/PN: S1.005

Invert Level (m) 7.256 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	126.0	0.0	0.801	0.0	0.0
0.800	126.0	0.0			

Cellular Storage Manhole: S13, DS/PN: S6.001

Invert Level (m) 7.221 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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Cellular Storage Manhole: S13, DS/PN: S6.001

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	128.0	0.0	0.801	0.0	0.0
0.800	128.0	0.0			

Cellular Storage Manhole: S7, DS/PN: S1.006


Invert Level (m) 7.133 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	162.0	0.0	0.801	0.0	0.0
0.800	162.0	0.0			

Cellular Storage Manhole: S8, DS/PN: S1.007

Invert Level (m) 7.054 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	144.0	0.0	0.801	0.0	0.0
0.800	144.0	0.0			

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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 Storage Structures 7
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 516200 173750 TQ 16200 73750
C (1km) -0.025
D1 (1km) 0.297
D2 (1km) 0.319
D3 (1km) 0.231
E (1km) 0.307
F (1km) 2.536
Cv (Summer) 0.750
Cv (Winter) 0.840

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


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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	60 Summer	1	+0%					8.226
S2.000	S2	60 Summer	1	+0%					8.243
S1.001	S2	60 Summer	1	+0%	100/60 Summer				8.133
S3.000	S4	60 Winter	1	+0%					7.896
S1.002	S3	60 Winter	1	+0%					7.885
S1.003	S4	60 Winter	1	+0%					7.768
S4.000	S7	60 Summer	1	+0%	100/240 Winter				7.834
S5.000	S8	60 Summer	1	+0%	100/240 Winter				7.850
S4.001	S8	60 Summer	1	+0%	100/240 Winter				7.792
S1.004	S5	60 Winter	1	+0%	100/240 Winter				7.565
S1.005	S6	120 Winter	1	+0%	100/60 Summer				7.359

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


PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
S1.000	S1	-0.247	0.000	0.07		4.2	OK	
S2.000	S2	-0.230	0.000	0.12		7.2	OK	
S1.001	S2	-0.201	0.000	0.24		11.4	OK	
S3.000	S4	-0.455	0.000	0.02		3.3	OK	
S1.002	S3	-0.423	0.000	0.09		16.0	OK	
S1.003	S4	-0.456	0.000	0.04		13.5	OK	
S4.000	S7	-0.255	0.000	0.04		2.4	OK	
S5.000	S8	-0.259	0.000	0.04		2.4	OK	
S4.001	S8	-0.237	0.000	0.10		4.9	OK	
S1.004	S5	-0.453	0.000	0.05		15.2	OK	
S1.005	S6	-0.423	0.000	0.08		16.1	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S6.000	S12	360 Winter	1	+0%	100/60 Summer				7.284
S6.001	S13	360 Winter	1	+0%	100/60 Summer				7.284
S6.002	S14	240 Winter	1	+0%	100/60 Summer				7.286
S1.006	S7	240 Winter	1	+0%	100/60 Summer				7.288
S1.007	S8	240 Winter	1	+0%	30/240 Winter				7.286
S1.008	S9	240 Winter	1	+0%	1/60 Summer				7.284

PN	US/MH Name	Surcharged Flooded			Pipe		Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S6.000	S12	-0.490	0.000	0.00	0.2	OK		
S6.001	S13	-0.462	0.000	0.01	0.7	OK		
S6.002	S14	-0.432	0.000	0.00	0.7	OK		
S1.006	S7	-0.371	0.000	0.06	11.2	OK		
S1.007	S8	-0.293	0.000	0.03	6.6	OK		
S1.008	S9	0.192	0.000	0.38	5.0	SURCHARGED		

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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 Storage Structures 7
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 516200 173750 TQ 16200 73750
C (1km) -0.025
D1 (1km) 0.297
D2 (1km) 0.319
D3 (1km) 0.231
E (1km) 0.307
F (1km) 2.536
Cv (Summer) 0.750
Cv (Winter) 0.840

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


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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	60 Summer	30	+0%					8.267
S2.000	S2	60 Summer	30	+0%					8.296
S1.001	S2	60 Summer	30	+0%	100/60 Summer				8.212
S3.000	S4	60 Summer	30	+0%					7.992
S1.002	S3	60 Summer	30	+0%					7.984
S1.003	S4	60 Winter	30	+0%					7.844
S4.000	S7	60 Summer	30	+0%	100/240 Winter				7.871
S5.000	S8	60 Summer	30	+0%	100/240 Winter				7.884
S4.001	S8	60 Summer	30	+0%	100/240 Winter				7.836
S1.004	S5	60 Winter	30	+0%	100/240 Winter				7.649
S1.005	S6	360 Winter	30	+0%	100/60 Summer				7.603

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


PN	US/MH Name	Surcharged Flooded			Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status	
S1.000	S1	-0.206	0.000	0.20	11.7	OK	
S2.000	S2	-0.177	0.000	0.34	20.4	OK	
S1.001	S2	-0.122	0.000	0.65	30.9	OK	
S3.000	S4	-0.359	0.000	0.09	14.4	OK	
S1.002	S3	-0.324	0.000	0.31	58.6	OK	
S1.003	S4	-0.380	0.000	0.17	55.2	OK	
S4.000	S7	-0.218	0.000	0.13	6.9	OK	
S5.000	S8	-0.225	0.000	0.12	6.9	OK	
S4.001	S8	-0.193	0.000	0.28	13.7	OK	
S1.004	S5	-0.369	0.000	0.19	63.6	OK	
S1.005	S6	-0.178	0.000	0.12	24.4	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S6.000	S12	360 Winter	30	+0%	100/60 Summer				7.601
S6.001	S13	360 Winter	30	+0%	100/60 Summer				7.601
S6.002	S14	360 Winter	30	+0%	100/60 Summer				7.601
S1.006	S7	360 Winter	30	+0%	100/60 Summer				7.602
S1.007	S8	360 Winter	30	+0%	30/240 Winter				7.600
S1.008	S9	360 Winter	30	+0%	1/60 Summer				7.667

PN	US/MH Name	Surcharged Flooded			Pipe		Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S6.000	S12	-0.173	0.000	0.00	0.5	OK		
S6.001	S13	-0.145	0.000	0.01	1.1	OK		
S6.002	S14	-0.117	0.000	0.01	1.1	OK		
S1.006	S7	-0.057	0.000	0.07	12.6	OK		
S1.007	S8	0.021	0.000	0.07	12.8	SURCHARGED		
S1.008	S9	0.575	0.000	0.38	5.0	SURCHARGED		

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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 ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	7
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0


Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 516200 173750 TQ 16200 73750
C (1km)	-0.025
D1 (1km)	0.297
D2 (1km)	0.319
D3 (1km)	0.231
E (1km)	0.307
F (1km)	2.536
Cv (Summer)	0.750
Cv (Winter)	0.840

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


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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	60 Summer	100	+40%				
S2.000	S2	60 Summer	100	+40%				
S1.001	S2	60 Summer	100	+40%	100/60 Summer			
S3.000	S4	480 Winter	100	+40%				
S1.002	S3	480 Winter	100	+40%				
S1.003	S4	480 Winter	100	+40%				
S4.000	S7	360 Winter	100	+40%	100/240 Winter			
S5.000	S8	960 Winter	100	+40%	100/240 Winter			
S4.001	S8	360 Winter	100	+40%	100/240 Winter			
S1.004	S5	1440 Winter	100	+40%	100/240 Winter			
S1.005	S6	1440 Winter	100	+40%	100/60 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	8.394	-0.079	0.000	0.39	22.9	OK	
S2.000	S2	8.416	-0.057	0.000	0.68	40.2	OK	
S1.001	S2	8.356	0.022	0.000	1.31	61.9	SURCHARGED	
S3.000	S4	8.155	-0.196	0.000	0.05	7.5	OK	
S1.002	S3	8.156	-0.152	0.000	0.15	28.0	OK	
S1.003	S4	8.158	-0.066	0.000	0.09	29.4	OK	
S4.000	S7	8.163	0.074	0.000	0.05	2.8	SURCHARGED	
S5.000	S8	8.162	0.053	0.000	0.03	1.9	SURCHARGED	
S4.001	S8	8.163	0.134	0.000	0.19	9.3	SURCHARGED	
S1.004	S5	8.170	0.152	0.000	0.05	15.0	SURCHARGED	
S1.005	S6	8.207	0.425	0.000	0.12	23.8	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S6.000	S12	360	Winter	100	+40%	100/60	Summer		8.201
S6.001	S13	360	Winter	100	+40%	100/60	Summer		8.202
S6.002	S14	360	Winter	100	+40%	100/60	Summer		8.206
S1.006	S7	360	Winter	100	+40%	100/60	Summer		8.221
S1.007	S8	1440	Winter	100	+40%	30/240	Winter		8.296
S1.008	S9	1440	Winter	100	+40%	1/60	Summer		8.326

PN	US/MH Name	Surcharged Flooded			Pipe		Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S6.000	S12	0.427	0.000	0.04	4.9	SURCHARGED		
S6.001	S13	0.456	0.000	0.27	32.1	SURCHARGED		
S6.002	S14	0.488	0.000	0.18	31.8	SURCHARGED		
S1.006	S7	0.562	0.000	0.28	52.3	SURCHARGED		
S1.007	S8	0.717	0.000	0.10	18.5	SURCHARGED		
S1.008	S9	1.235	0.000	0.38	5.0	SURCHARGED		

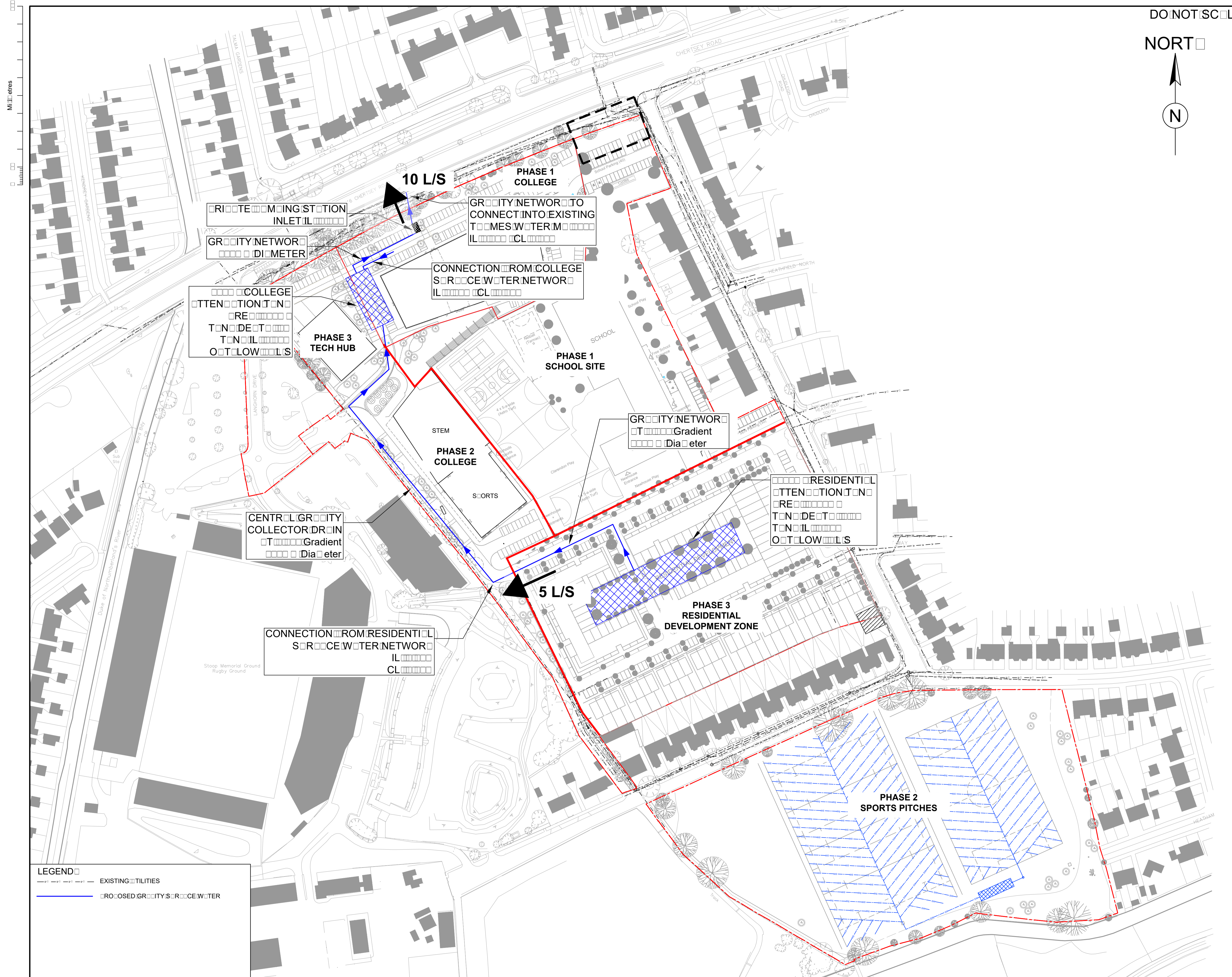


FIGURE 2 - SURFACE WATER STRATEGY

DO NOT SCALE
 NORTH
 N

- SURVEY, ELECTRO-ENVIRONMENTAL INFORMATION**
- CONSTRUCTION:** UNKNOWN BURIED SERVICES – REFER TO SERVICES PLANS AND USE CABLE AVOIDANCE TOOLS BEFORE DIGGING. HIGH PRESSURE GAS MAINS – EXERCISE EXTREME CAUTION IN THEIR VICINITY. CONTAMINATED LAND IN THE PROCESS OF REMEDIATION – CONFIRM THE STATUS OF EACH AREA BEFORE DIGGING AND REGULATIONS TO BE TAKEN AT DIFFERENT LEVELS. IF IN DOUBT – STOP WORK AND ASK.
 - MAINTENANCE/CLEANING:** MULTIPLE BURIED SERVICES INCLUDING HIGH PRESSURE GAS MAINS – CONSULT SERVICES PLANS AND HOST UTILITY COMPANIES AND USE CABLE AVOIDANCE TOOLS BEFORE DIGGING. REMEDIATED BROWN FIELD SITE – DO NOT EXCAVATE BELOW THE MARKER LAYER WITHOUT A SITE SPECIFIC METHOD STATEMENT FOR THE LOCATION IN HAND. IF IN DOUBT – STOP WORK AND ASK.
 - DECOMMISSIONING/DEMOLITION:** MULTIPLE BURIED SERVICES INCLUDING HIGH PRESSURE GAS MAINS – CONSULT SERVICES PLANS AND HOST UTILITY COMPANIES AND USE CABLE AVOIDANCE TOOLS BEFORE DIGGING. REMEDIATED BROWN FIELD SITE – DO NOT EXCAVATE BELOW THE MARKER LAYER WITHOUT A SITE SPECIFIC METHOD STATEMENT FOR THE LOCATION IN HAND. IF IN DOUBT – STOP WORK AND ASK.

- GENERAL NOTES**
- TO BE USED FOR PRICING ONLY WITH REFERENCE TO THE SPECIFICATIONS SCHEDULE
 - ALL LEVELS REFER TO BOUNDARY DATUM

Revised	Date	Description	By	Checked

FIT FOR INFORMATION S2

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RICHMOND UPON THAMES COLLEGE
 REDEVELOPMENT

SITE WIDE
 SURFACE WATER DRAINAGE PLAN
 OPTION 1

Scale	Designed	Drawn	Checked	Authorised
1:1000	SO	SO	JT	JT
Original Date	22/12/2016	22/12/2016	22/12/2016	22/12/2016
Drawing No.	5137894-ATK-00-XX-SK-C-0010			Revision
				P.1.0



Jessica Taylor
Atkins
Euston Tower
286 Euston Road
London
NW1 3AT



Your account number
DS4007616



thameswater.co.uk



0800 009 3921
Mon – Fri 9am-5pm,
01/11/2017

Pre Development Enquiry

Site Address: Richmond College, Twickenham, Middlesex, TW2 7SQ

Development Details: Demolition of existing college buildings, site clearance and groundworks together with the redevelopment of the site to provide:

Phase 1 – RuT College – Main Building

Phase 2 – RuT College – STEM and Sports buildings

Phase 3 – Haymarket Building

Phase 3 (1) – Residential (approximately 90 units)

Phase 3 (2) – Residential (approximately 89 units)

Proposed SW 10l/s into SW sewer in Chertsey Rd, proposed total FW 29.81l/s in Egerton Rd and Craneford Way.

Dear Miss Taylor

I write in relation to the above site regarding the proposed development here.

Please note: your initial fee of £398+ VAT covers the expense of our asset planners reviewing your proposed discharges in relation to the capacity in our existing network. They also carry out flood risk assessments. At this stage if your proposal is accepted, we issue an approval letter for you to progress with your development.

Foul Water

Details approved in principle.

In this instance we have notified our Catchment Planners for the area and they have made comment regarding the capacity of the public sewers. From the information you have provided, I can confirm that the existing foul sewer network does have sufficient capacity to accommodate the proposed foul water discharge from the proposed development.

Surface Water

Please note that discharging surface water to the public sewer network should only be considered after all other methods of disposal have been investigated and proven to be not viable. In accordance with the Building Act 2000 Clause H3.3, positive connection to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable.

The disposal hierarchy being: 1st Store rain water for Later Use; 2nd Use infiltration techniques, such as porous surfaces in non-clay area; 3rd Attenuate rainwater in ponds or open water features for gradual release to a watercourse; 4th Attenuate rainwater by storing in tanks or sealed water features for gradual release to a watercourse; 5th Discharge rainwater direct to a watercourse; 6th Discharge rainwater to a surface water drain; 7th Discharge rainwater to the combined sewer.

Only when it can be proven that soakage into the ground or a connection into the adjacent watercourse is not possible would we consider a restricted discharge into the public surface water sewer network. A reduction of at least 50% on existing flows from the same site area would be sought for a range of storm conditions.

Any approvals are subject to conditions that may be imposed through the planning process.

There is no right of discharge of highway drainage into the public sewerage system. An agreement to allow a discharge may be granted under section 115 (WIA 1991) by negotiation between the Highway Authority and Thames Water.

Details approved in principle.

Please Note

Public sewers are liable to surcharge to ground level. Any property that has a floor level lower than an adjacent manhole may be subject to flooding. Adequate provision shall be made by the developer to guard against this eventuality.

All connection requests are subject to a full Section 106 (Water Industry Act 1991) application before the Company can confirm approval to the connection itself. Please also note that capacity in the public sewerage system cannot be reserved.

The views expressed by Thames Water in this letter are in response to this pre development enquiry at this time and do not represent our final views on any future planning applications made in relation to this site.

Yours sincerely



Natalya Collins
Development Engineer