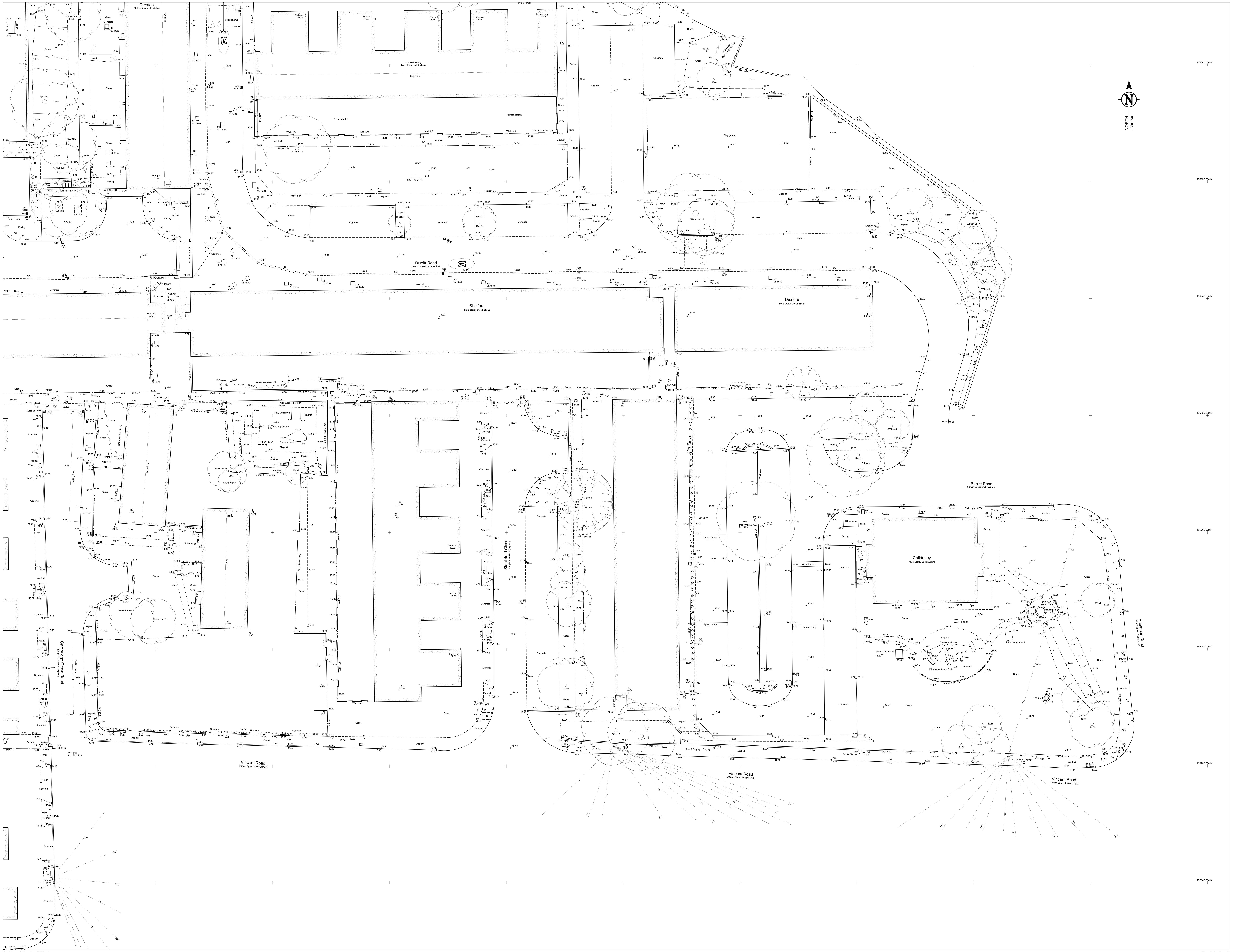


Original Sheet Size A0H

TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
AV	Air Valve	FH	Fire Hydrant	SP	Arch Spring Point Height
BB	Belisha Beacon	FL	Floor Level	SV	Stop Valve
BH	Bore Hole	FP	Flag Pole	SW	Surface Water
BL	Bed Level	FW	Foul Water	SY	Stay
BO	Bollard	GG	Gully Grate	Tac	Tactile Paving
BrP	Brace Post	GV	Gas Valve	TC	Telecom Cover
BS	Bus Stop	HH	Head Height	TH	Trial Pit
BU	Bush	IC	Inspection Cover	THL	Threshold Level
B/W	Barbed Wire Fence	IL	Invert Level	TL	Traffic Light
BX	Box (Utilities)	I/R	Iron Railings	ToW	Top of Wall
C/B	Close Board Fence	KO	Kerb Outlet	TP	Telegraph Pole
CH	Cill Height	LP	Lamp Post	TV	Cable TV Cover
CL	Cover Level	MH	Manhole	UB	Universal Beam
C/L	Chain Link Fence	MP	Marker Post	UC	Unknown Cover
C-Lev	Ceiling Level	NB	Name Board	UK	Unknown Tree
Col	Column	OHL	Overhead Line (approx)	USB	Under Side Beam
C/P	Chestnut Paling Fence	Pan	Panel Fence	UTL	Unable To Lift
CR	Cable Riser	PB	Post Box	VP	Vent Pipe
DC	Drainage Channel	PM	Parking Meter	WB	Waste Bin
DH	Door Head Height	PO	Post	WH	Weep Hole
DP	Down Pipe	P/R	Post & Rail Fence	WL	Water Level
DR	Drain	P/W	Post & Wire Fence	WM	Water Meter
EL	Eaves Level	P/Wall	Partition Wall	WO	Wash Out
EP	Electric Pole	RE	Rodding Eye	(x.xx)	Floor to Ceiling Height
ER	Earth Rod	RL	Ridge Level		
ET	EP+Transformer	RP	Reflector Post	(x.xx)F/C	Floor to False Ceiling Ht
FB	Flower Bed	RS	Road Sign		
FBD	Floor Board Direction	RSD	Roller Shutter Door	△	Survey Control Station

DRAWING NOTE

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

Do not scale from this drawing.

SURVEY GRID AND LEVEL DATUM

The co-ordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using GPS Smartnet, then orientated to Grid North with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies, any co-ordinated data used in conjuction with this survey must be derived directly from this control data.

The major contour interval is 1 metre, the minor contour interval is 0.500 metres.

CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
MC01	519154.446	169002.318	12.406	PK Nail
MC02	519157.413	168862.324	16.835	PK Nail
MC03	519068.000	168859.818	14.131	PK Nail
MC04	519058.081	168951.033	11.611	PK Nail
MC05	519063.603	169046.361	10.845	PK Nail
MC06	518996.614	169041.448	10.545	PK Nail
MC07	518995.003	169075.054	10.288	PK Nail
MC08	518972.331	169159.453	10.263	PK Nail
MC09	519055.991	169153.956	10.173	PK Nail
MC10	519055.112	169225.320	9.780	PK Nail
MC11	519159.544	169224.801	11.618	PK Nail
MC12	519240.586	169163.038	15.444	PK Nail
MC13	519304.916	169121.445	16.293	PK Nail
MC14	519291.108	169095.400	15.381	PK Nail
MC15	519321.325	169086.927	15.354	PK Nail
MC16	519358.400	169058.460	15.593	PK Nail
MC17	519369.340	169022.620	16.371	PK Nail
MC18	519405.445	168979.229	17.378	PK Nail
MC19	519310.404	168963.325	16.505	PK Nail
MC20	519221.924	168963.601	14.132	PK Nail
MC21	519232.901	168879.903	17.947	PK Nail

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood

Tel No: 0845 0405 969 Fax No: 0845 0405 970
www.survey-solutions.co.uk enquiries@survey-solutions.co.uk

LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE
CAMBRIDGE ROAD ESTATE,
KINGSTON UPON THAMES, KT1 3JL.

DRAWING DETAIL
TOPOGRAPHICAL SURVEY
Sheet 5 of 5

CLIENT				SCALE
ARDENT CONSULTING ENGINEERS				1:200
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
HF, SB, BB	10.07.2017	AK	JM	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
20085se-05				11.08.2017

Appendix D – Thames Water Asset Plans

Asset location search

Property Searches

Colin Toms & Partners
Suffolk House,154 Suffolk House

SEVENOAKS
TN13 1XE

Search address supplied Cambridge Road
Cambridge Road
Kingston
Kingston
Surrey
KT1 3EF

Your reference A5277 Cambridge Road

Our reference ALS/ALS/24/2018_3824212

Search date 27 June 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

searchcode

Asset location search

Property Searches

Search address supplied: Cambridge Road, Cambridge Road, Kingston, Kingston, Surrey, KT1 3EF

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 searchprovides 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:

TQ1968NW
TQ1869SE
TQ1868NE
TQ1969SW

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:

TQ1968NW
TQ1869SE
TQ1868NE
TQ1969SW

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

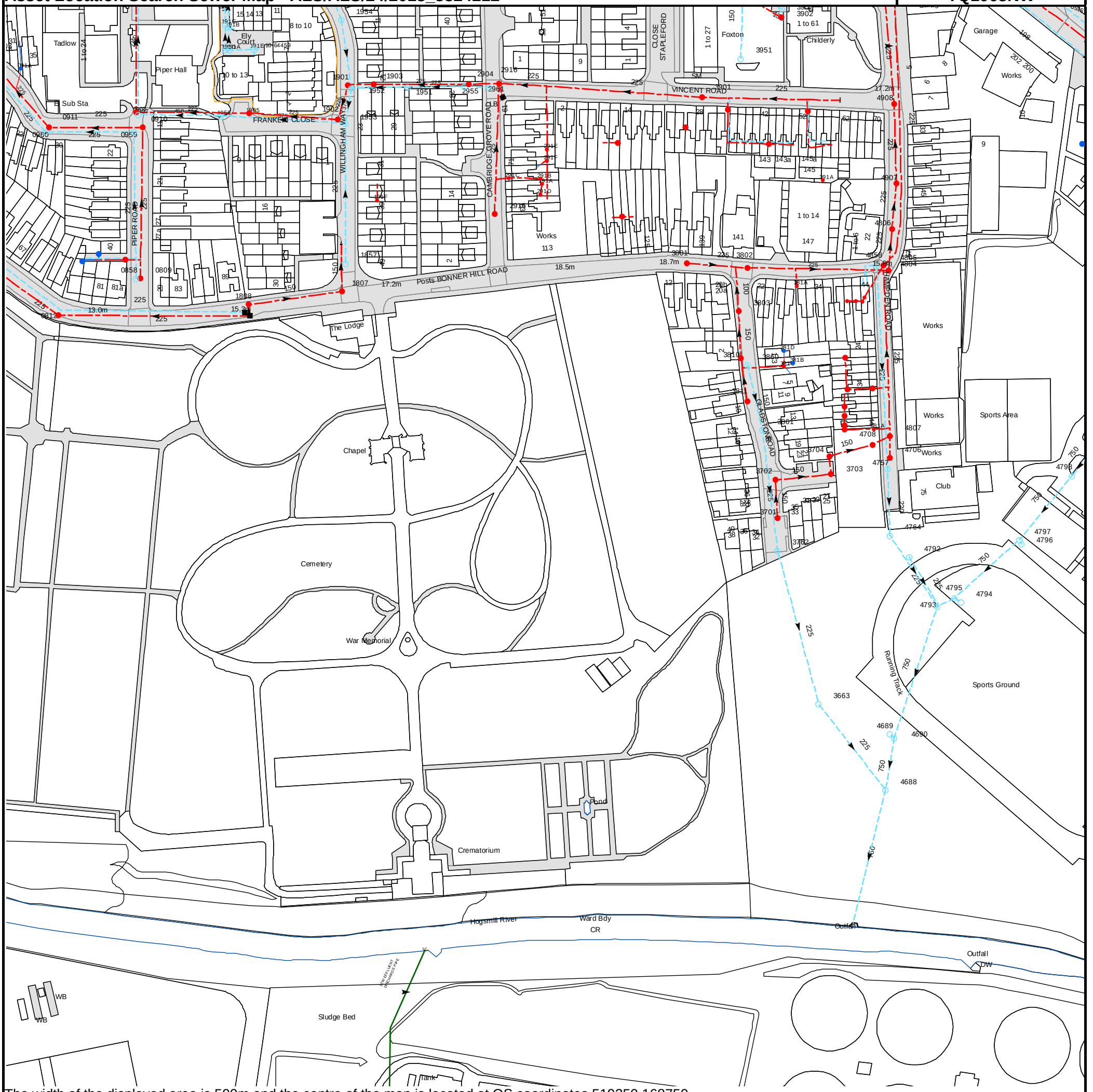
Should you require any advice concerning clean water operational issues or clean water connections, please contact:

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

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

Asset Location Search Sewer Map - ALS/ALS/24/2018_3824212

TQ1968NW



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 519250,168750

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

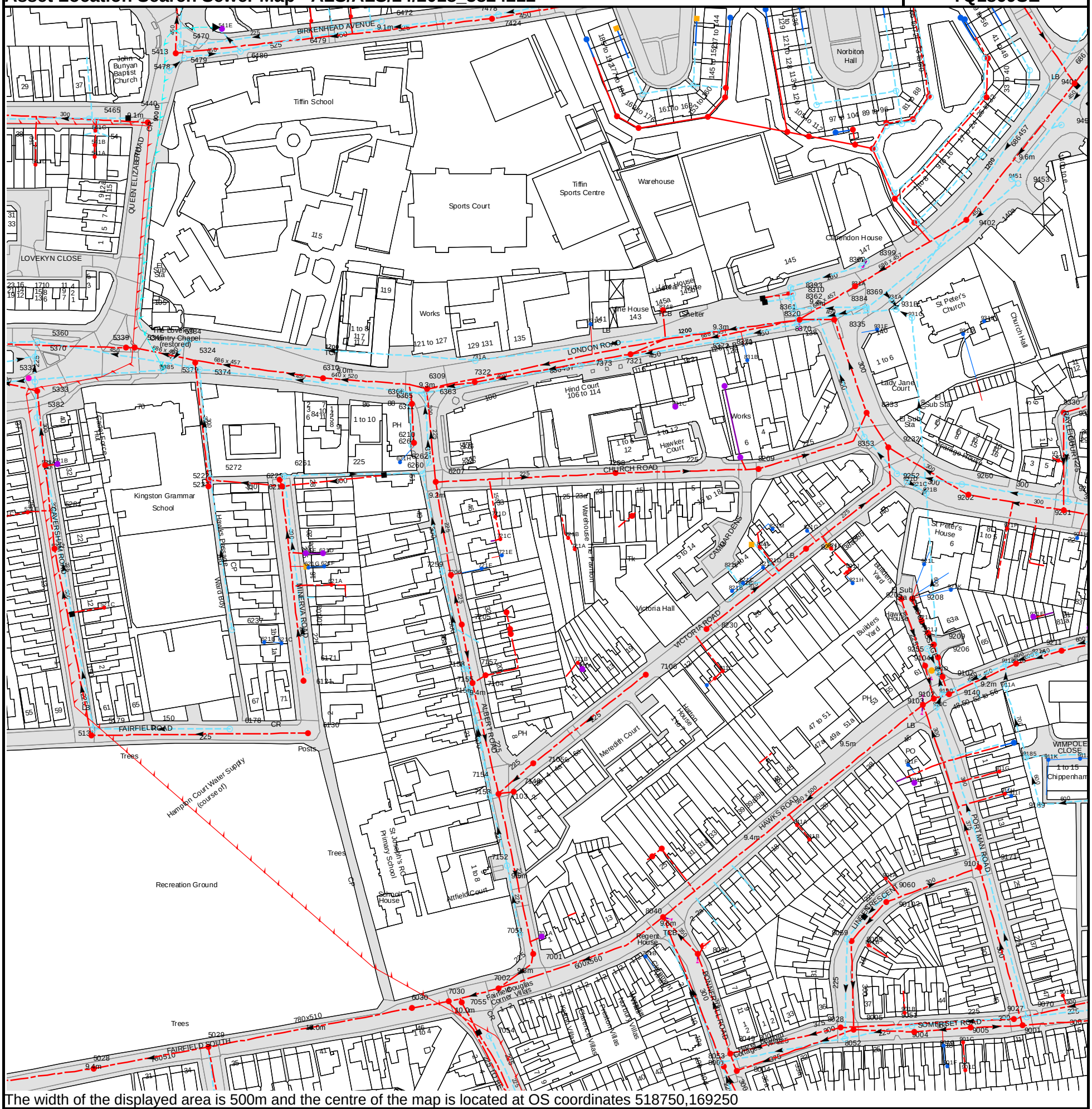
Manhole Reference	Manhole Cover Level	Manhole Invert Level
0809	13.45	n/a
0910	11.68	9.89
1956	12.41	9.85
191C	11.68	10.02
191D	12	10.03
191B	11.68	10.7
191A	12	10.777
1808	15.59	13.61
1905	12.57	10.45
191E	12.3	11.55
1902	13.97	11.83
1954	12.51	11.01
1807	16.33	13.08
1953	14.19	10.45
1857	16.59	14.29
1901	13.53	11.96
1952	13.56	10.61
1903	13.25	12.18
191F	n/a	n/a
1951	13.14	10.88
2955	13.92	n/a
2904	13.92	12.58
2961	14.07	11.51
291E	n/a	n/a
291F	n/a	n/a
091A	n/a	n/a
0960	11.31	9.99
0911	11.34	9.5
0812	12.64	9.6
08GH	n/a	n/a
08HF	n/a	n/a
08HA	n/a	n/a
0959	11.73	10.4
0858	13.52	n/a
0906	11.49	10.07
0957	11.56	9.45
3952	n/a	n/a
2915	16.59	14.51
2916	14.22	n/a
291C	n/a	n/a
291D	n/a	n/a
291B	n/a	n/a
291A	n/a	n/a
29GJ	n/a	n/a
2964	n/a	n/a
39HD	n/a	n/a
3801	18.54	n/a
3901	16.9	14.27
39FI	n/a	n/a
3803	17.48	15.57
3810	16.96	15.61
3951	n/a	n/a
3802	17.8	15.29
3860	16.64	14.78
39HC	n/a	n/a
3902	17.69	14.26
381D	n/a	n/a
381B	n/a	n/a
381A	n/a	n/a
39GH	n/a	n/a
391A	n/a	n/a
38IC	n/a	n/a
38BI	n/a	n/a
38BJ	n/a	n/a
38CA	n/a	n/a
38JJ	n/a	n/a
4858	15.83	13.43
4805	15.76	10.65
4804	15.78	14.26
4806	16.13	14.19
4908	17.15	13.95
4907	16.62	14.11
49BJ	n/a	n/a
4793	13.27	9.94
4794	13.28	11.75
4795	13.18	10.96
4792	13.21	12.15
3762	13.92	11.53
4796	13.17	11.47
4797	13.19	11.06
4764	12.11	n/a
3701	14.24	13.17
3702	14.51	11.96
4798	13.18	11.13
3703	13.89	11.6
4757	12.31	11.36
4706	12.43	11.23
3704	n/a	n/a
4708	12.89	11.35
4807	12.8	11.14
38IH	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3861	15.42	13.34
481A	n/a	n/a
38IG	n/a	n/a
38IF	n/a	n/a
38IE	n/a	n/a
3811	16.47	15.7
38IB	n/a	n/a
48GC	n/a	n/a
381C	n/a	n/a
4688	14.8	9.81
4690	13.33	9.83
4689	13.28	12.58
3663	14.33	10.79

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.

Asset Location Search Sewer Map - ALS/ALS/24/2018_3824212

TQ1869SE



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 518750,169250

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.

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
541E	n/a	n/a
6480	n/a	n/a
6479	n/a	n/a
64IB	n/a	n/a
64ID	n/a	n/a
6472	n/a	n/a
7424	9.17	n/a
7478	n/a	n/a
94DB	n/a	n/a
9401	n/a	n/a
94EB	n/a	n/a
94BH	n/a	n/a
94DF	n/a	n/a
94BF	n/a	n/a
94DD	n/a	n/a
84CI	n/a	n/a
74JB	n/a	n/a
84CF	n/a	n/a
84CE	n/a	n/a
74IF	n/a	n/a
84CC	n/a	n/a
94CB	n/a	n/a
94DA	n/a	n/a
931F	n/a	n/a
94CE	n/a	n/a
94CJ	n/a	n/a
931A	9.53	7.36
94DI	n/a	n/a
94BD	n/a	n/a
931B	9.45	.44
94CI	n/a	n/a
931C	9.4	.974
94CD	n/a	n/a
94CH	n/a	n/a
94BE	n/a	n/a
94DJ	n/a	n/a
94CC	n/a	n/a
94CG	n/a	n/a
931D	n/a	n/a
9402	n/a	n/a
94ED	n/a	n/a
94DG	n/a	n/a
931E	n/a	n/a
94BI	n/a	n/a
9451	9.46	7.91
9453	9.46	7.91
94EC	n/a	n/a
9452	n/a	n/a
7321	n/a	n/a
8372	n/a	n/a
8371	n/a	n/a
731C	n/a	n/a
8370	n/a	n/a
8320	n/a	n/a
8335	n/a	n/a
8348	n/a	n/a
8361	n/a	n/a
8384	n/a	n/a
8369	n/a	n/a
8362	n/a	n/a
8310	n/a	n/a
8393	n/a	n/a
831A	n/a	n/a
8392	n/a	n/a
8399	n/a	n/a
84DF	n/a	n/a
84DA	n/a	n/a
84DD	n/a	n/a
84CD	n/a	n/a
84DE	n/a	n/a
74II	n/a	n/a
84BJ	n/a	n/a
74IH	n/a	n/a
84DC	n/a	n/a
84CA	n/a	n/a
921H	n/a	n/a
9251	n/a	n/a
901E	n/a	n/a
9189	10.145	7.955
921C	10.12	8.22
921I	n/a	n/a
921L	n/a	n/a
921B	9.5	1.698
921J	n/a	n/a
9209	n/a	n/a
921K	n/a	n/a
9260	n/a	n/a
9202	9.478	6.958
921F	n/a	n/a
921E	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
921G	n/a	n/a
9201	n/a	n/a
9330	n/a	n/a
9380	n/a	n/a
911E	n/a	n/a
9103	n/a	n/a
9104	n/a	n/a
9255	n/a	n/a
9102	n/a	n/a
911C	9.8	8.29
9206	n/a	n/a
911D	9.65	2.55
9107	n/a	n/a
9190	9.37	6.16
9140	n/a	n/a
911G	n/a	n/a
911H	n/a	n/a
911B	9.3	6.4
911A	9.521	6.512
91BD	n/a	n/a
9110	9.61	7.93
9185	n/a	7.969
921A	9.4	6.7
911K	n/a	n/a
9211	9.52	7.82
911J	n/a	n/a
901D	n/a	n/a
901F	n/a	n/a
901G	n/a	n/a
901C	n/a	n/a
9004	n/a	n/a
9005	n/a	n/a
9001	n/a	n/a
9051	n/a	n/a
9027	n/a	n/a
9070	n/a	n/a
901B	n/a	n/a
9060	n/a	n/a
901A	n/a	n/a
9101	n/a	n/a
9171	n/a	n/a
911I	n/a	n/a
8004	n/a	n/a
8001	n/a	n/a
8053	n/a	n/a
8049	n/a	n/a
8052	n/a	n/a
8005	n/a	n/a
8028	n/a	n/a
8030	n/a	n/a
80KB	n/a	n/a
801B	n/a	n/a
8009	n/a	n/a
8059	n/a	n/a
9010	n/a	n/a
811B	n/a	n/a
811A	n/a	n/a
7208	n/a	n/a
72HJ	n/a	n/a
831C	n/a	n/a
83100	n/a	n/a
8232	n/a	n/a
831B	n/a	n/a
8209	n/a	n/a
821L	n/a	n/a
821A	n/a	n/a
821D	n/a	n/a
821M	n/a	n/a
8231	n/a	n/a
821G	n/a	n/a
821K	n/a	n/a
8353	n/a	n/a
8333	n/a	n/a
9232	n/a	n/a
9252	n/a	n/a
921D	10.12	8.27
911F	n/a	n/a
81DD	n/a	n/a
81DE	n/a	n/a
7106	n/a	n/a
811C	n/a	n/a
711A	n/a	n/a
8230	n/a	n/a
9208	n/a	n/a
9205	n/a	n/a
821B	n/a	n/a
821E	n/a	n/a
821H	n/a	n/a
821C	n/a	n/a
821J	n/a	n/a
821F	n/a	n/a
7103	n/a	n/a
7148	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
7154	n/a	n/a
7105	n/a	n/a
7156	n/a	n/a
7155	n/a	n/a
7104	n/a	n/a
71IB	n/a	n/a
7157	n/a	n/a
711B	n/a	n/a
72GJ	n/a	n/a
72GI	n/a	n/a
72GH	n/a	n/a
721F	n/a	n/a
721E	n/a	n/a
721A	n/a	n/a
721C	n/a	n/a
6178	n/a	n/a
6237	n/a	n/a
621B	n/a	n/a
621C	n/a	n/a
6121	n/a	n/a
621E	n/a	n/a
6130	n/a	n/a
6171	n/a	n/a
621G	n/a	n/a
621D	n/a	n/a
621F	n/a	n/a
621A	n/a	n/a
7259	n/a	n/a
7206	n/a	n/a
7205	n/a	n/a
7158	n/a	n/a
5029	n/a	n/a
7054	n/a	n/a
6030	n/a	n/a
7055	n/a	n/a
7030	n/a	n/a
7002	n/a	n/a
701B	n/a	n/a
7001	n/a	n/a
701A	n/a	n/a
7051	n/a	n/a
8040	n/a	n/a
7152	n/a	n/a
71GA	n/a	n/a
81AI	n/a	n/a
7153	n/a	n/a
5385	9.027	.533
5384	9.12	-.48
5379	9.07	7.14
5324	9	n/a
5374	9.14	7.92
5222	n/a	n/a
5223	n/a	n/a
5272	n/a	n/a
6223	n/a	n/a
6213	n/a	n/a
6261	n/a	n/a
6310	9.12	5.72
621H	n/a	n/a
6366	n/a	n/a
6365	n/a	n/a
6311	n/a	n/a
6264	n/a	n/a
6210	n/a	n/a
6260	n/a	n/a
6363	n/a	n/a
6309	9.379	5.819
6262	n/a	n/a
6207	n/a	n/a
7322	n/a	n/a
731A	9.3	-.1
721D	n/a	n/a
721B	n/a	n/a
7373	n/a	n/a
5478	n/a	n/a
5413	9.11	6.47
5470	9.15	8.1
5479	n/a	n/a
5382	n/a	n/a
5333	n/a	n/a
5383	n/a	n/a
5332	n/a	n/a
5370	n/a	n/a
5345	n/a	n/a
5339	n/a	n/a
5360	n/a	n/a
541D	n/a	n/a
541A	n/a	n/a
541B	n/a	n/a
541C	n/a	n/a
5440	9.09	n/a
5465	n/a	n/a
5131	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5179	n/a	n/a
521C	n/a	n/a
5232	n/a	n/a
5281	n/a	n/a
521E	n/a	n/a
521A	n/a	n/a
521B	n/a	n/a
5028	n/a	n/a

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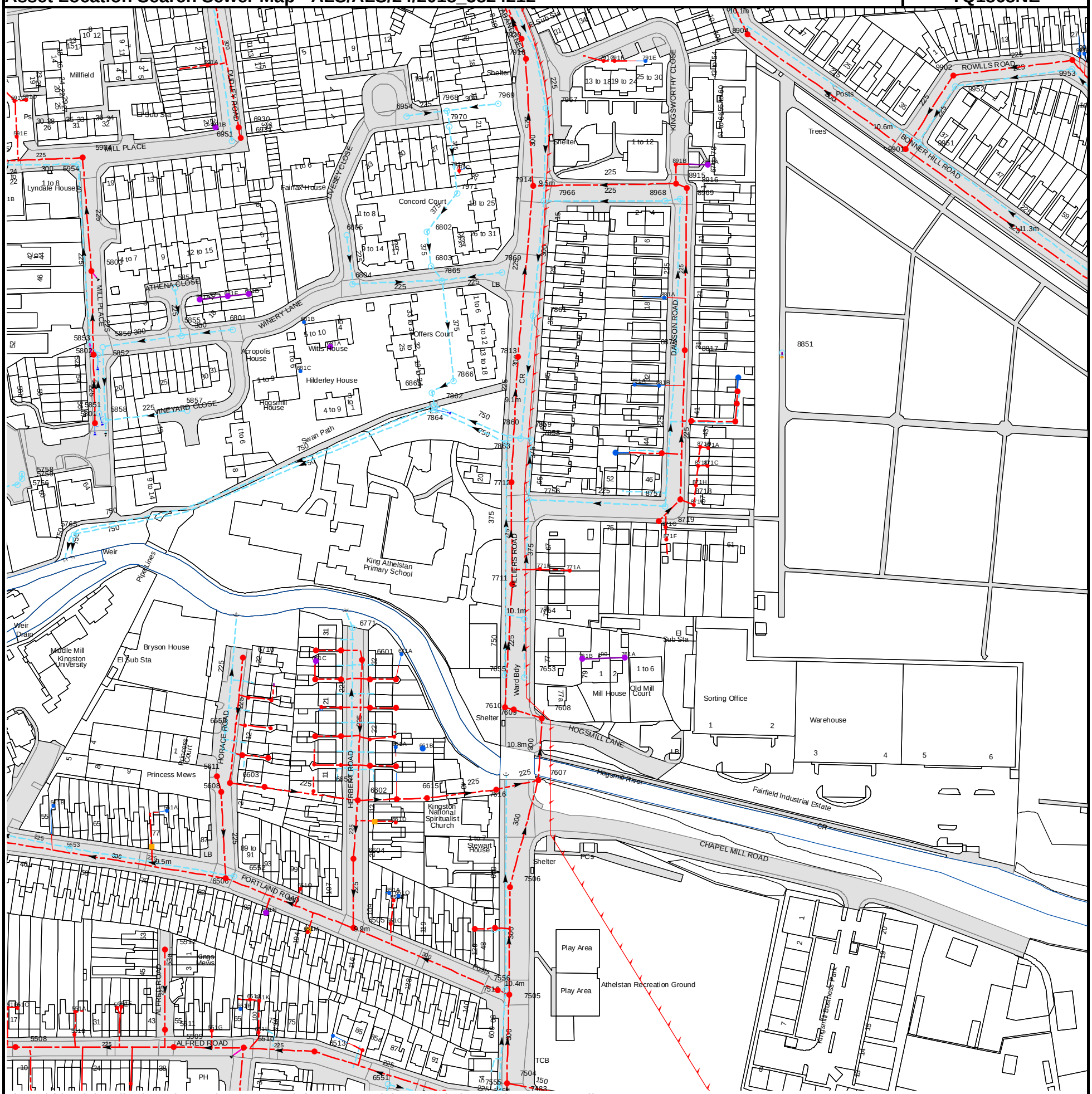
Asset Location Search Sewer Map - ALS/ALS/24/2018_3824212

TQ1868NE



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 518750,168750

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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
9903	10.94	9.28
991B	n/a	n/a
991A	n/a	n/a
8904	10.27	8.14
871E	n/a	n/a
871H	n/a	n/a
871D	n/a	n/a
871B	n/a	n/a
871C	n/a	n/a
891A	n/a	n/a
871A	n/a	n/a
88HE	n/a	n/a
88HD	n/a	n/a
88HC	n/a	n/a
88HB	n/a	n/a
8851	n/a	n/a
9901	10.76	9.07
9951	10.78	9.42
9902	10.95	8.95
9952	10.94	9.46
9953	11.25	9.77
7711	10.08	7.59
771A	n/a	n/a
771B	n/a	n/a
871F	n/a	n/a
871G	n/a	n/a
8719	9.91	8.59
8757	10.03	8.56
7756	9.39	8.11
8718	10.07	8.54
7712	9.32	7.54
87FI	n/a	n/a
77JF	n/a	n/a
7858	9.28	7.95
7859	9.21	7.87
7860	9.39	7.63
88HF	n/a	n/a
7813	9.43	7.47
8817	9.96	8.23
8870	9.84	8.38
7861	9.42	7.99
881A	n/a	n/a
8968	n/a	n/a
7966	9.71	8.11
8969	n/a	n/a
8916	9.8	7.97
7914	9.92	7.4
8915	n/a	n/a
891B	n/a	n/a
6930	9.88	7.65
7970	n/a	8.41
6954	n/a	8.63
7968	n/a	8.49
7967	9.7	8.16
7969	n/a	8.53
591A	n/a	n/a
791F	n/a	n/a
791G	n/a	n/a
791E	n/a	n/a
7916	9.62	7.09
7920	n/a	n/a
5854	9.7	8.56
5855	9.66	8.41
5857	n/a	8.41
581A	n/a	n/a
591B	n/a	n/a
681E	n/a	n/a
6951	n/a	n/a
6801	n/a	8.47
6931	n/a	n/a
681D	n/a	n/a
681C	n/a	n/a
681B	n/a	n/a
681A	n/a	n/a
6805	n/a	8.66
6804	n/a	8.58
6802	9.65	8.33
6803	9.8	8.31
6865	n/a	8.12
7864	9.1	7.81
7862	9.13	7.84
7865	9.75	8.29
7866	n/a	8.21
791A	n/a	n/a
7971	n/a	8.36
791C	n/a	n/a
7869	n/a	8.59
7863	9.14	n/a
5853	9.21	8.31
5803	9.31	7.22

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5954	9.35	7.73
5904	9.35	6.61
591E	n/a	n/a
591C	n/a	n/a
591D	n/a	n/a
5765	8.32	7.62
5756	9.08	7.95
5759	n/a	n/a
5758	n/a	n/a
5801	9.56	7.85
5858	9.45	8.2
5851	9.49	8.59
5852	9.19	8.4
5802	9.22	7.5
5856	9.22	8.32
6771	n/a	n/a
6601	9.8	8.68
66CD	n/a	n/a
66IF	n/a	n/a
66CC	n/a	n/a
66IE	n/a	n/a
671A	n/a	n/a
7655	10.35	8.42
7610	10.66	7.89
7609	10.49	7.78
7754	10.21	8.36
7653	16.37	8.46
761B	n/a	n/a
761A	n/a	n/a
781A	n/a	n/a
881B	n/a	n/a
7506	10.53	8.09
6604	n/a	n/a
661D	n/a	n/a
6602	9.85	8.21
66IC	n/a	n/a
6615	10.36	8.04
7616	10.73	7.98
7607	10.8	7.87
66HJ	n/a	n/a
66IA	n/a	n/a
661B	n/a	n/a
661A	n/a	n/a
66HH	n/a	n/a
66HG	n/a	n/a
7608	10.4	7.83
651Q	n/a	n/a
6506	9.61	8.57
6552	n/a	n/a
5653	n/a	n/a
561A	n/a	n/a
5608	9.71	8.78
66JG	n/a	n/a
66GG	n/a	n/a
6603	9.71	8.5
5611	9.72	8.71
6653	9.81	8.85
66II	n/a	n/a
66IH	n/a	n/a
66GD	n/a	n/a
66GE	n/a	n/a
66JB	n/a	n/a
66JA	n/a	n/a
6655	9.75	8.61
66GA	n/a	n/a
66GB	n/a	n/a
66JE	n/a	n/a
66JD	n/a	n/a
66FH	n/a	n/a
66FI	n/a	n/a
66CG	n/a	n/a
66CF	n/a	n/a
661C	n/a	n/a
6710	9.8	8.8
67HB	n/a	n/a
67HC	n/a	n/a
7555	10.64	9.39
6551	10.85	9.89
7504	10.49	8.94
65GJ	n/a	n/a
7505	10.41	8.35
7516	10.39	8.94
7556	10.4	8.25
75HB	n/a	n/a
7557	n/a	n/a
75HD	n/a	n/a
651C	n/a	n/a
651B	n/a	n/a
651O	n/a	n/a
651A	n/a	n/a
6513	10.4	9.45
5510	9.99	9.13
65GI	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
651L	n/a	n/a
551G	n/a	n/a
651P	n/a	n/a
651K	n/a	n/a
651J	n/a	n/a
651M	n/a	n/a
6505	9.95	8.86
651N	n/a	n/a
5508	9.25	8.61
551D	n/a	n/a
551C	n/a	n/a
561B	n/a	n/a
551B	n/a	n/a
551A	n/a	n/a
551E	n/a	n/a
551F	n/a	n/a
5513	n/a	n/a
5512	9.43	8.95
5511	9.64	8.82
5509	9.66	8.85

Asset Location Search Sewer Map - ALS/ALS/24/2018_3824212

TQ1969SW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 519250,169250

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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
14HD	n/a	n/a
14HC	n/a	n/a
041A	n/a	n/a
041B	n/a	n/a
0451	9.465	8.095
0302	n/a	n/a
0351	n/a	n/a
031B	n/a	n/a
031A	n/a	n/a
031C	n/a	n/a
031D	n/a	n/a
141A	n/a	n/a
1402	n/a	n/a
1350	n/a	n/a
131A	n/a	n/a
1301	n/a	n/a
13GI	n/a	n/a
13GD	n/a	n/a
13GE	n/a	n/a
13GF	n/a	n/a
231A	n/a	n/a
231B	n/a	n/a
1351	n/a	n/a
231C	n/a	n/a
1302	n/a	n/a
13GB	n/a	n/a
13GG	n/a	n/a
1303	n/a	n/a
331B	n/a	n/a
2302	n/a	n/a
331A	n/a	n/a
2352	n/a	n/a
1404	n/a	n/a
1452	n/a	n/a
2403B	n/a	n/a
141B	n/a	n/a
2453	n/a	n/a
1405	n/a	n/a
0055	n/a	n/a
1056	n/a	n/a
2013	n/a	n/a
2063	n/a	n/a
0054	n/a	n/a
0105	n/a	n/a
31BJ	n/a	n/a
31BC	n/a	n/a
2113	n/a	n/a
2112	n/a	n/a
2164	n/a	n/a
2104	n/a	n/a
2105	n/a	n/a
0101	n/a	n/a
1103	n/a	n/a
2162	n/a	n/a
0102	n/a	n/a
0151	n/a	n/a
0152	n/a	n/a
1153	n/a	n/a
2152	n/a	n/a
1156	n/a	n/a
1157	n/a	n/a
2163	n/a	n/a
1105	n/a	n/a
2133	n/a	n/a
1158	n/a	n/a
101C	11.419	10.005
101A	11.444	10.58
101B	12.03	9.97
101D	11.95	10.535
2024	n/a	n/a
1011	n/a	n/a
1012	11.95	10.395
2023	n/a	n/a
2090	n/a	n/a
2015	n/a	n/a
1073	12.01	9.842
101F	n/a	n/a
101I	n/a	n/a
101E	n/a	n/a
101G	n/a	n/a
201A	n/a	n/a
2007	n/a	n/a
1008	n/a	n/a
2069	n/a	n/a
1070	n/a	n/a
0099	n/a	n/a
0076	n/a	n/a
0009	n/a	n/a
1009	n/a	n/a
0074	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
1071	n/a	n/a
1072	n/a	n/a
2098	n/a	n/a
2031	n/a	n/a
0010	n/a	n/a
2099	n/a	n/a
2165	n/a	n/a
1159	n/a	n/a
0104	n/a	n/a
2134	n/a	n/a
1198	n/a	n/a
0207	n/a	n/a
0274	n/a	n/a
0208	n/a	n/a
0275	n/a	n/a
1235	n/a	n/a
0210	n/a	n/a
1236	n/a	n/a
0209	n/a	n/a
0241	n/a	n/a
0281	n/a	n/a
221G	n/a	n/a
021I	n/a	n/a
02IE	n/a	n/a
221C	n/a	n/a
02BC	n/a	n/a
221F	n/a	n/a
221E	n/a	n/a
221H	n/a	n/a
221I	n/a	n/a
221D	n/a	n/a
2351	n/a	n/a
2301B	n/a	n/a
021A	9.5	7.04
021B	9.44	6.97
0271	n/a	n/a
021G	n/a	n/a
0273A	9.623	7.213
0273	9.592	8.102
0243	9.592	8.012
021H	n/a	n/a
021E	n/a	n/a
0245	n/a	n/a
021D	n/a	n/a
02IC	n/a	n/a
021F	n/a	n/a
0329	n/a	n/a
0090	n/a	n/a
0019	n/a	n/a
0017	n/a	n/a
0018	n/a	n/a
0082	n/a	n/a
0079	n/a	n/a
0081	n/a	n/a
0044	n/a	n/a
0080	n/a	n/a
0089	n/a	n/a
0027	n/a	n/a
0078	n/a	n/a
0015	n/a	n/a
0028	n/a	n/a
0023	n/a	n/a
0020	n/a	n/a
0022	n/a	n/a
001B	n/a	n/a
0077	n/a	n/a
001A	n/a	n/a
0021	n/a	n/a
0188	n/a	n/a
0187	n/a	n/a
011A	n/a	n/a
0169	n/a	n/a
0124	n/a	n/a
0168	n/a	n/a
0130	n/a	n/a
0131	n/a	n/a
0155	n/a	n/a
0170	n/a	n/a
3406	14.73	11.45
3456	14.75	11.93
44JB	n/a	n/a
44JD	n/a	n/a
44JE	n/a	n/a
1453	n/a	n/a
231E	n/a	n/a
231D	n/a	n/a
3303	14.4	12.17
3353	14.42	12.77
3404	13.59	11.76
3454	13.6	12.3
341A	n/a	n/a
3405	13.99	11.59
3343	14.52	12.27

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3393	14.53	12.93
44IA	n/a	n/a
44IJ	n/a	n/a
44JC	n/a	n/a
4403	15.72	12.85
4453	15.73	13.45
4342	16.08	13.56
4392	16.15	14.34
44FH	n/a	n/a
41JG	n/a	n/a
41IJ	n/a	n/a
41AE	n/a	n/a
41JF	n/a	n/a
41AD	n/a	n/a
4152	n/a	n/a
3074	16.35	14.28
3034	16.46	9.46
30IB	n/a	n/a
30ID	n/a	n/a
30IF	n/a	n/a
30HH	n/a	n/a
40HF	n/a	n/a
30HG	n/a	n/a
31BF	n/a	n/a
31CB	n/a	n/a
31BE	n/a	n/a
31BB	n/a	n/a
31BG	n/a	n/a
31BA	n/a	n/a
31AJ	n/a	n/a
311B	n/a	n/a
311A	n/a	n/a
31AI	n/a	n/a
41JA	n/a	n/a
4102	n/a	n/a
4173	n/a	n/a
4201	17.22	15.39
4251	17.19	15.71
421A	n/a	n/a
421B	n/a	n/a
3252	16.37	14.62
3202	16.16	13.76
4054	n/a	n/a
4010	n/a	n/a
4009	n/a	n/a
401B	n/a	n/a
4056	n/a	n/a
4058	n/a	n/a
401A	n/a	n/a
4004	n/a	n/a
4005	n/a	n/a
4053	n/a	n/a
4057	n/a	n/a
4052	n/a	n/a
3066	n/a	n/a
3903	n/a	n/a
3052	n/a	n/a
3075	16.42	13.71
3002	n/a	n/a
3053	n/a	n/a
3003	n/a	n/a
301E	16.7	15.56
301C	16.8	14.95
301D	16.8	15.72
4055	n/a	n/a
4012	n/a	n/a
3006	n/a	n/a
4011	n/a	n/a
2006	n/a	n/a
2056	n/a	n/a
2005	n/a	n/a
2014	n/a	n/a
2064	n/a	n/a
2055	n/a	n/a
2072	n/a	n/a
2016	n/a	n/a
2020	n/a	n/a
2071	n/a	n/a
3070	n/a	n/a
3004	n/a	n/a
3010	n/a	n/a
3054	n/a	n/a

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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

Gulley

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 milimetres. 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.

Asset Location Search Water Map - ALS/ALS/24/2018_3824212

TQ1968NW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 519250,168750

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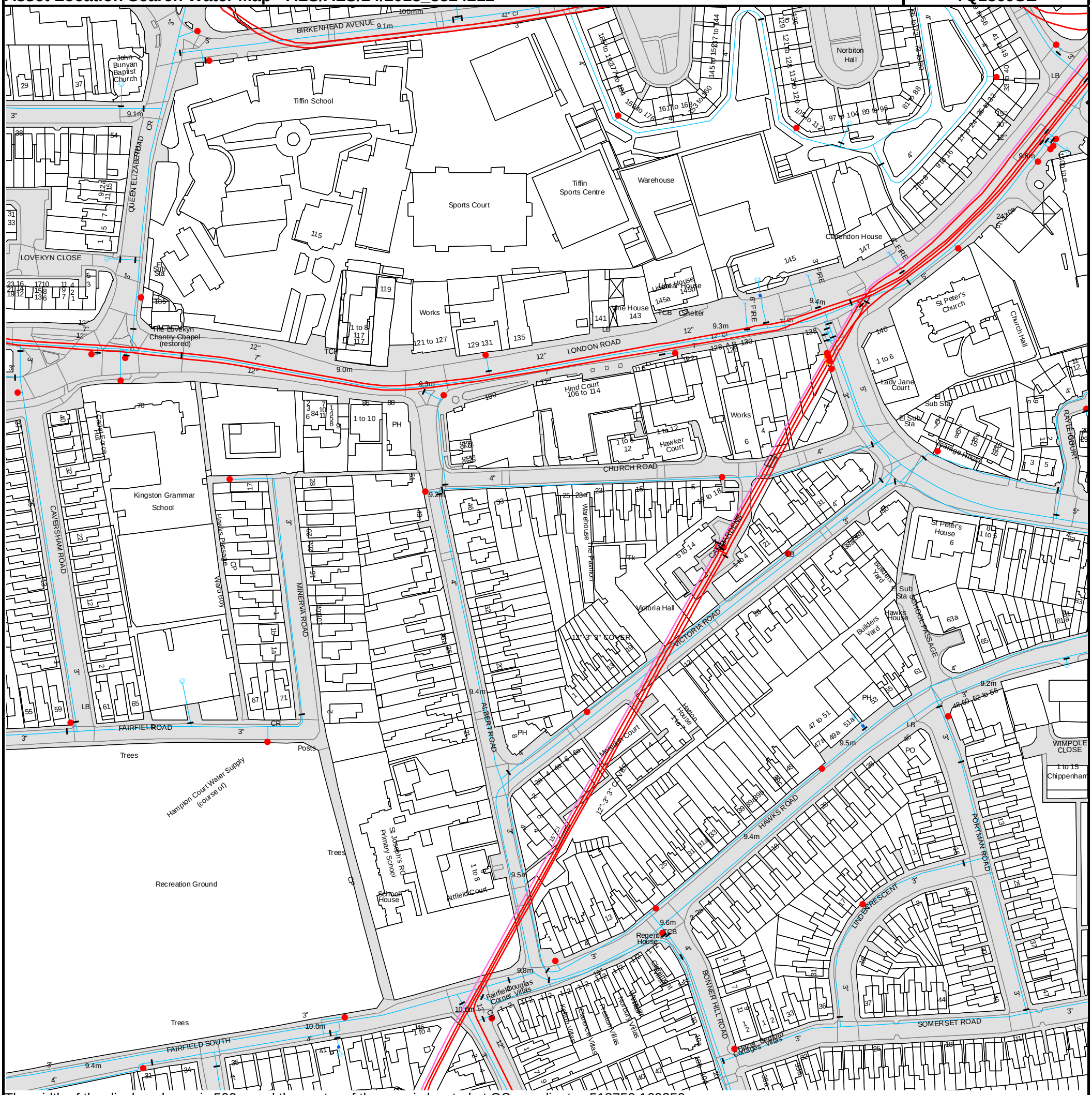
Asset Location Search Water Map - ALS/ALS/24/2018_3824212

TQ1869SE

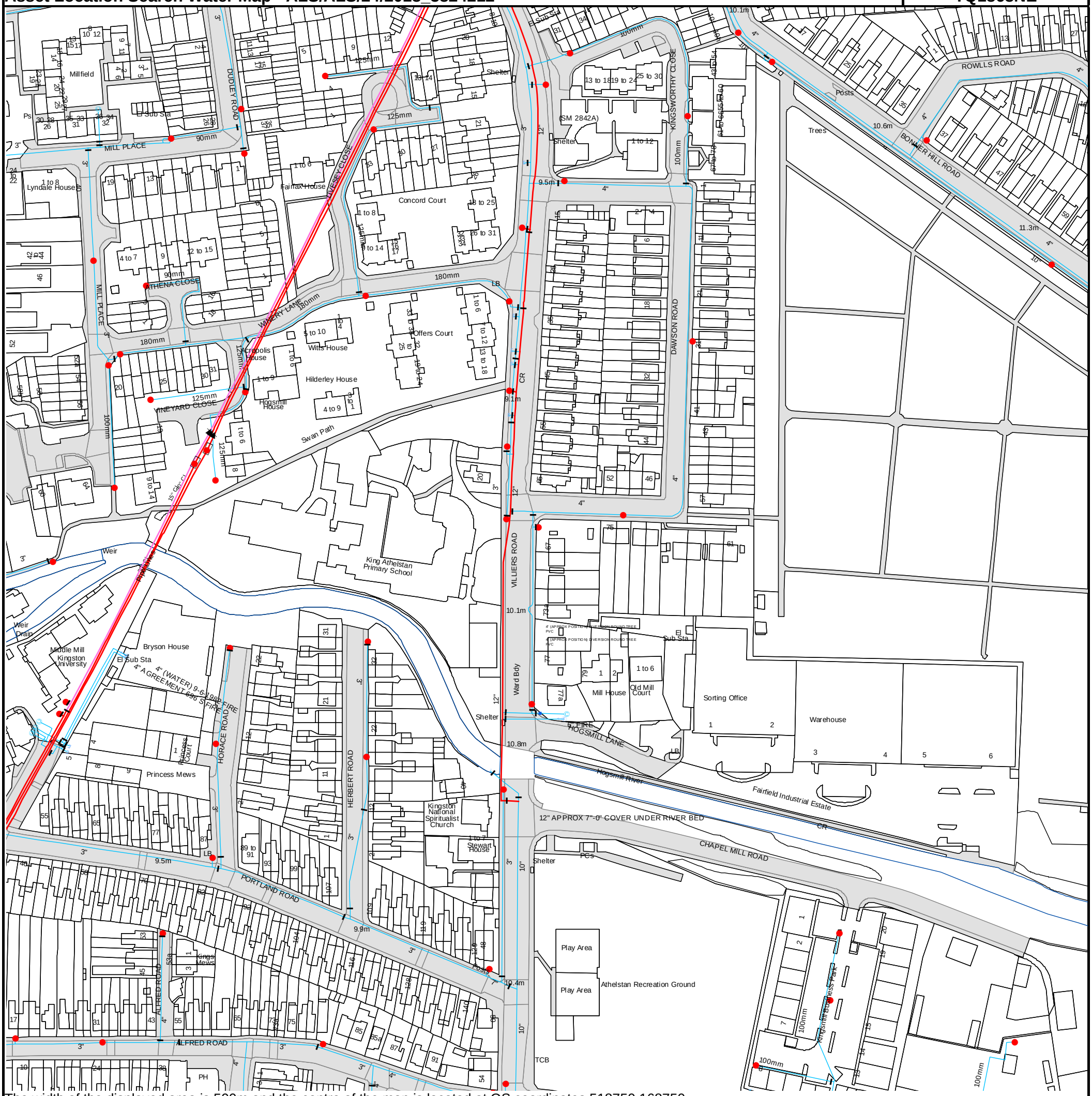


The width of the displayed area is 500m and the centre of the map is located at OS coordinates 518750,169250

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.

Asset Location Search Water Map - ALS/ALS/24/2018_3824212

TQ1868NE



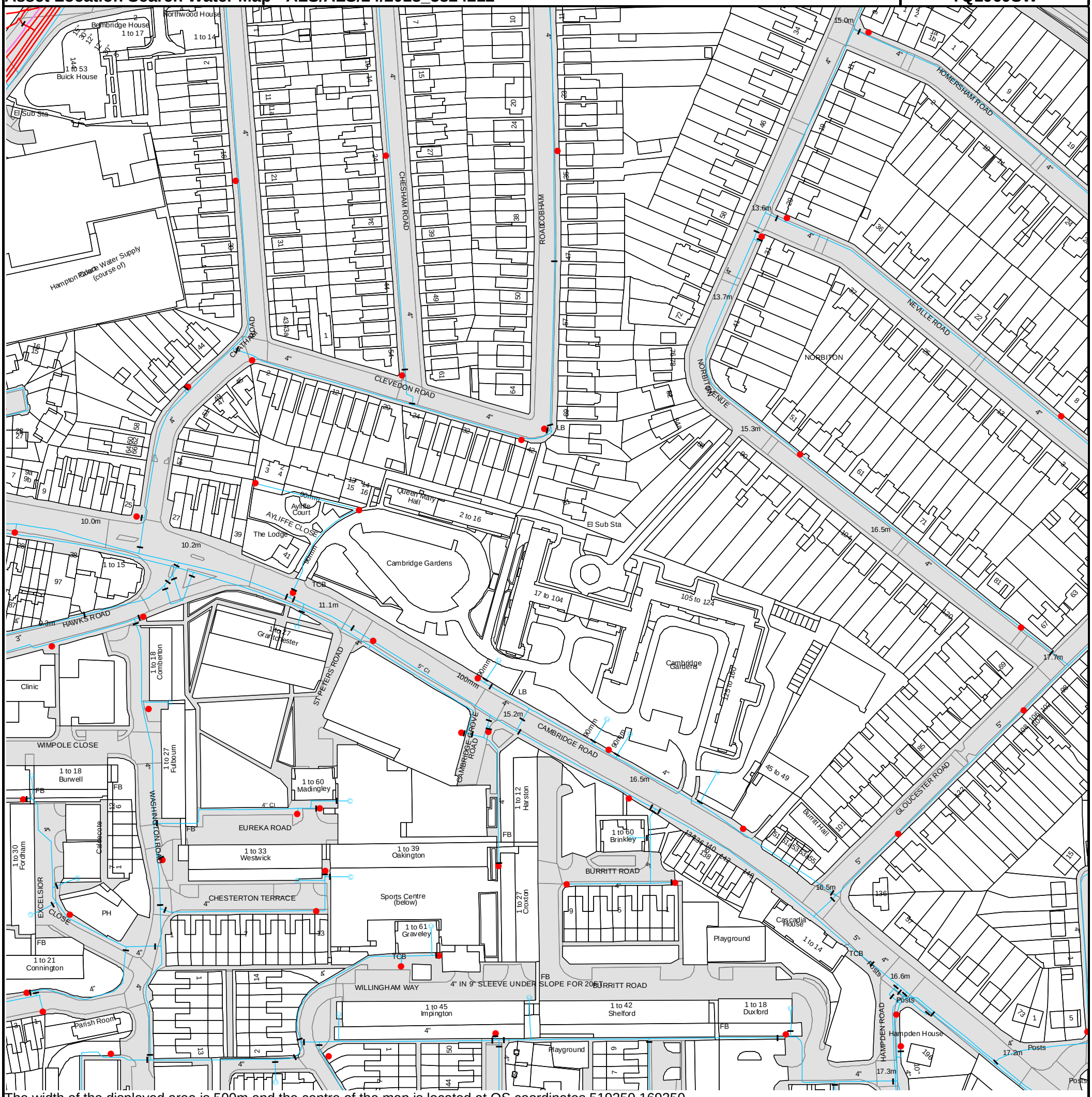
The width of the displayed area is 500m and the centre of the map is located at OS coordinates 518750,168750

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.

Asset Location Search Water Map - ALS/ALS/24/2018_3824212

TQ1969SW



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 519250,169250

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 Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

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.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

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.

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

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')

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: Indiates 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**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS	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**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	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**

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.

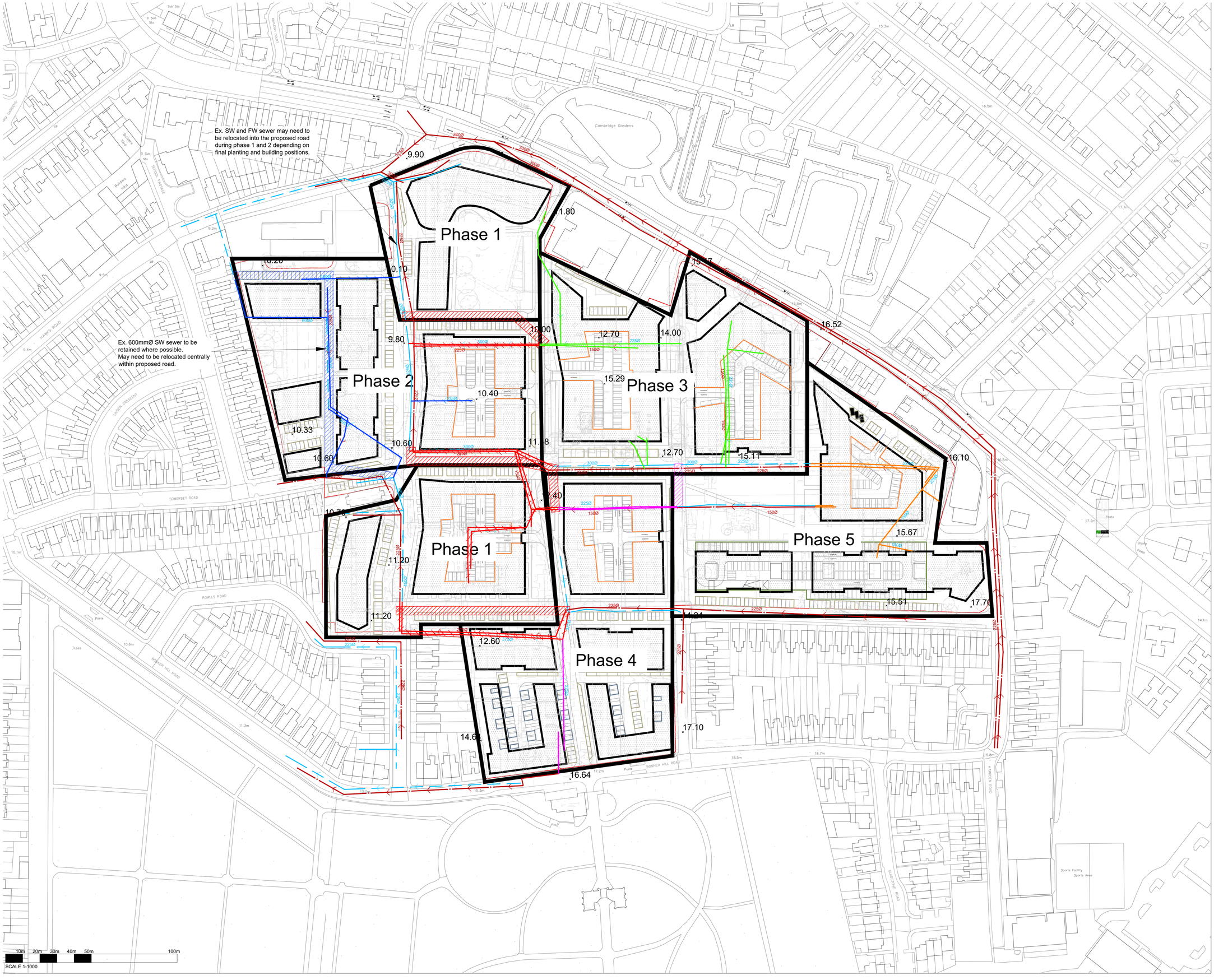
TPOs Contact Details

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

Appendix E – Proposed Diversion Strategy



NOTES

1. DO NOT SCALE THIS DRAWING. WORK TO FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS NOTED OTHERWISE.
2. This drawing is to be read in conjunction with all relevant Architect's, Engineer's and Specialist's drawings and their respective Specifications.
3. All work to comply with the relevant British Standards, Codes of Practice and the Building Regulations.
4. Any discrepancies between all working drawings, specifications and schedules of all disciplines to be immediately notified to CTP for clarification/correction prior to construction of relevant structure.
5. LV cables not shown. To maintain drawing clarity.

Key

- Phase 1 diversion routes
- Phase 1 pipes to be abandoned
- Phase 2 diversion routes
- Phase 2 pipes to be abandoned
- Phase 3 diversion routes
- Phase 3 pipes to be abandoned
- Phase 4 diversion routes
- Phase 4 pipes to be abandoned
- Phase 5 diversion routes
- Phase 5 pipes to be abandoned
- Surface Water
- Foul Water

PRELIMINARY

Revision	Amendments	Date	Rev'd	Chk'd
P1	Preliminary Issue	22.06.18	CRR	AK

Created by: CRR | Date created: June 2018 | Discipline: CIVIL

ctp consulting engineers
Suffolk House 154 High Street
Sevenoaks Kent TN13 1XE UK
UK: +44 (0)1732 740195
Malta: +356 2778 0051
www.ctp-llp.com

Project Title: Cambridge Road

Drawing Title: Drainage Diversions Plan Option 2

Drawing Number: A5277-1504

Scale: 1:1000@A1 Unless Noted Otherwise

Revision: - P1

Appendix F – Thames Water Correspondence

Mr Adrian Keith
CTP Consulting Engineers
Suffolk House
154 High Street
Kent
TN13 1XE

Wastewater pre-planning
Our ref DS6065036

05 September 2019

Pre-planning enquiry: Confirmation of sufficient capacity

Site Address: Cambridge Road Estate, Kingston, Greater London - KT1 3EQ

Dear Mr Keith,

Thank you for providing information on your development for the proposed 2,170no. flats, 100 seats assembly hall (assumed) and 580m² commercial on previously Brownfield land. We have based our assessment on the information you provided to us and have copied below for clarity:-

Proposed foul flows to discharge via gravity into manhole ref. 0243.
Proposed surface runoff to discharge via gravity into manhole ref. 0273A. Flows restricted to 43.15l/s discharging a total impermeable area of 8.63Ha.

We're pleased to confirm that there will be sufficient **foul and surface water** capacity in our network to serve your development. This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on 0203 5778 102.

Yours sincerely

Rahim Khan

Thames Water

Appendix G – Calculations

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	8.620	Urban	0.750
SAAR (mm)	600	Region Number	Region 6

Results l/s

QBAR Rural	13.1
QBAR Urban	48.8
Q100 years	97.7
Q1 year	41.4
Q30 years	84.7
Q100 years	97.7

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	2.210	Urban	0.750
SAAR (mm)	600	Region Number	Region 6

Results l/s

QBAR Rural	3.4
QBAR Urban	12.5
Q100 years	25.1
Q1 year	10.6
Q30 years	21.7
Q100 years	25.1

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	8.620	Urban	0.000
SAAR (mm)	600	Region Number	Region 6

Results l/s

QBAR Rural	13.1
QBAR Urban	13.1
Q100 years	41.8
Q1 year	11.1
Q30 years	29.7
Q100 years	41.8

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	2.210	Urban	0.000
SAAR (mm)	600	Region Number	Region 6

Results l/s

QBAR Rural	3.4
QBAR Urban	3.4
Q100 years	10.7
Q1 year	2.9
Q30 years	7.6
Q100 years	10.7

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 133 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	11.106	0.346	0.0	8.0	8.0	70.5	O K
30 min Summer	11.196	0.436	0.0	8.2	8.2	89.0	Flood Risk
60 min Summer	11.257	0.497	0.0	8.3	8.3	101.4	Flood Risk
120 min Summer	11.255	0.495	0.0	8.3	8.3	101.1	Flood Risk
180 min Summer	11.227	0.467	0.0	8.2	8.2	95.2	Flood Risk
240 min Summer	11.200	0.440	0.0	8.2	8.2	89.7	Flood Risk
360 min Summer	11.153	0.393	0.0	8.1	8.1	80.1	O K
480 min Summer	11.109	0.349	0.0	8.0	8.0	71.2	O K
600 min Summer	11.068	0.308	0.0	7.9	7.9	62.8	O K
720 min Summer	11.030	0.270	0.0	7.8	7.8	55.0	O K
960 min Summer	10.961	0.201	0.0	7.7	7.7	41.0	O K
1440 min Summer	10.857	0.097	0.0	7.5	7.5	19.8	O K
2160 min Summer	10.774	0.014	0.0	7.3	7.3	2.9	O K
2880 min Summer	10.760	0.000	0.0	6.5	6.5	0.0	O K
4320 min Summer	10.760	0.000	0.0	4.6	4.6	0.0	O K
5760 min Summer	10.760	0.000	0.0	3.6	3.6	0.0	O K
7200 min Summer	10.760	0.000	0.0	3.0	3.0	0.0	O K
8640 min Summer	10.760	0.000	0.0	2.6	2.6	0.0	O K
10080 min Summer	10.760	0.000	0.0	2.3	2.3	0.0	O K
15 min Winter	11.154	0.394	0.0	8.1	8.1	80.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	147.952	0.0	79.8	24
30 min Summer	95.601	0.0	104.0	37
60 min Summer	58.745	0.0	128.7	64
120 min Summer	34.867	0.0	153.1	112
180 min Summer	25.368	0.0	167.1	142
240 min Summer	20.133	0.0	177.3	174
360 min Summer	14.510	0.0	191.5	242
480 min Summer	11.498	0.0	203.1	310
600 min Summer	9.594	0.0	211.5	376
720 min Summer	8.271	0.0	218.7	442
960 min Summer	6.540	0.0	230.7	568
1440 min Summer	4.691	0.0	247.7	802
2160 min Summer	3.360	0.0	265.5	1128
2880 min Summer	2.650	0.0	278.7	0
4320 min Summer	1.894	0.0	297.2	0
5760 min Summer	1.491	0.0	310.4	0
7200 min Summer	1.238	0.0	320.6	0
8640 min Summer	1.063	0.0	328.8	0
10080 min Summer	0.934	0.0	335.5	0
15 min Winter	147.952	0.0	89.5	24

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	11.260	0.500	0.0	8.3	8.3	101.9	Flood Risk
60 min Winter	11.335	0.575	0.0	8.5	8.5	117.2	Flood Risk
120 min Winter	11.349	0.589	0.0	8.5	8.5	120.1	Flood Risk
180 min Winter	11.312	0.552	0.0	8.4	8.4	112.7	Flood Risk
240 min Winter	11.276	0.516	0.0	8.3	8.3	105.2	Flood Risk
360 min Winter	11.208	0.448	0.0	8.2	8.2	91.4	Flood Risk
480 min Winter	11.143	0.383	0.0	8.1	8.1	78.1	O K
600 min Winter	11.081	0.321	0.0	8.0	8.0	65.5	O K
720 min Winter	11.024	0.264	0.0	7.8	7.8	53.8	O K
960 min Winter	10.924	0.164	0.0	7.6	7.6	33.5	O K
1440 min Winter	10.789	0.029	0.0	7.3	7.3	5.9	O K
2160 min Winter	10.760	0.000	0.0	5.9	5.9	0.0	O K
2880 min Winter	10.760	0.000	0.0	4.7	4.7	0.0	O K
4320 min Winter	10.760	0.000	0.0	3.3	3.3	0.0	O K
5760 min Winter	10.760	0.000	0.0	2.6	2.6	0.0	O K
7200 min Winter	10.760	0.000	0.0	2.2	2.2	0.0	O K
8640 min Winter	10.760	0.000	0.0	1.9	1.9	0.0	O K
10080 min Winter	10.760	0.000	0.0	1.6	1.6	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	95.601	0.0	117.0	38
60 min Winter	58.745	0.0	144.1	64
120 min Winter	34.867	0.0	171.5	118
180 min Winter	25.368	0.0	187.6	152
240 min Winter	20.133	0.0	199.5	188
360 min Winter	14.510	0.0	215.3	264
480 min Winter	11.498	0.0	227.7	336
600 min Winter	9.594	0.0	237.4	406
720 min Winter	8.271	0.0	245.7	472
960 min Winter	6.540	0.0	258.7	598
1440 min Winter	4.691	0.0	278.2	806
2160 min Winter	3.360	0.0	298.4	0
2880 min Winter	2.650	0.0	313.0	0
4320 min Winter	1.894	0.0	334.0	0
5760 min Winter	1.491	0.0	349.1	0
7200 min Winter	1.238	0.0	360.7	0
8640 min Winter	1.063	0.0	370.1	0
10080 min Winter	0.934	0.0	377.9	0

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.700	Shortest Storm (mins)	15
Ratio R	0.437	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.300

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.100	4	8	0.100	8	12	0.100

Model Details

Storage is Online Cover Level (m) 11.460

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	20.0
Membrane Percolation (mm/hr)	1000	Length (m)	34.0
Max Percolation (l/s)	188.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	10.760	Cap Volume Depth (m)	0.600

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0115-6000-1000-6000
Design Head (m)	1.000
Design Flow (l/s)	6.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	115
Invert Level (m)	9.250
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	6.0	Kick-Flo®	0.647	4.9
Flush-Flo™	0.298	6.0	Mean Flow over Head Range	-	5.2

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	4.0	1.200	6.5	3.000	10.0	7.000	15.0
0.200	5.8	1.400	7.0	3.500	10.8	7.500	15.5
0.300	6.0	1.600	7.5	4.000	11.5	8.000	16.0
0.400	5.9	1.800	7.9	4.500	12.2	8.500	16.5
0.500	5.7	2.000	8.3	5.000	12.8	9.000	17.0
0.600	5.3	2.200	8.7	5.500	13.4	9.500	17.4
0.800	5.4	2.400	9.0	6.000	14.0		
1.000	6.0	2.600	9.4	6.500	14.5		

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 698 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	10.351	0.396	0.0	6.3	6.3	260.6	O K
30 min Summer	10.463	0.508	0.0	6.6	6.6	334.1	O K
60 min Summer	10.568	0.613	0.0	6.8	6.8	403.1	O K
120 min Summer	10.657	0.702	0.0	7.0	7.0	461.3	O K
180 min Summer	10.694	0.739	0.0	7.1	7.1	485.6	O K
240 min Summer	10.709	0.754	0.0	7.1	7.1	496.0	O K
360 min Summer	10.715	0.760	0.0	7.2	7.2	499.7	O K
480 min Summer	10.704	0.749	0.0	7.1	7.1	492.2	O K
600 min Summer	10.684	0.729	0.0	7.1	7.1	479.1	O K
720 min Summer	10.664	0.709	0.0	7.0	7.0	465.9	O K
960 min Summer	10.626	0.671	0.0	7.0	7.0	441.0	O K
1440 min Summer	10.568	0.613	0.0	6.8	6.8	403.3	O K
2160 min Summer	10.498	0.543	0.0	6.6	6.6	356.8	O K
2880 min Summer	10.435	0.480	0.0	6.5	6.5	315.3	O K
4320 min Summer	10.325	0.370	0.0	6.2	6.2	242.9	O K
5760 min Summer	10.233	0.278	0.0	5.9	5.9	182.6	O K
7200 min Summer	10.157	0.202	0.0	5.7	5.7	133.0	O K
8640 min Summer	10.097	0.142	0.0	5.5	5.5	93.3	O K
10080 min Summer	10.049	0.094	0.0	5.4	5.4	61.5	O K
15 min Winter	10.401	0.446	0.0	6.4	6.4	293.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	147.952	0.0	269.1	26
30 min Summer	95.601	0.0	348.1	41
60 min Summer	58.745	0.0	427.8	70
120 min Summer	34.867	0.0	508.2	128
180 min Summer	25.368	0.0	554.4	186
240 min Summer	20.133	0.0	586.9	246
360 min Summer	14.510	0.0	634.0	364
480 min Summer	11.498	0.0	670.2	480
600 min Summer	9.594	0.0	699.0	552
720 min Summer	8.271	0.0	723.1	606
960 min Summer	6.540	0.0	762.5	728
1440 min Summer	4.691	0.0	820.6	994
2160 min Summer	3.360	0.0	881.7	1408
2880 min Summer	2.650	0.0	927.3	1816
4320 min Summer	1.894	0.0	993.8	2596
5760 min Summer	1.491	0.0	1043.1	3352
7200 min Summer	1.238	0.0	1082.6	4048
8640 min Summer	1.063	0.0	1115.7	4760
10080 min Summer	0.934	0.0	1144.0	5448
15 min Winter	147.952	0.0	301.5	26

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	10.527	0.572	0.0	6.7	6.7	376.0	O K
60 min Winter	10.646	0.691	0.0	7.0	7.0	454.6	O K
120 min Winter	10.750	0.795	0.0	7.2	7.2	522.7	O K
180 min Winter	10.796	0.841	0.0	7.3	7.3	552.9	O K
240 min Winter	10.818	0.863	0.0	7.4	7.4	567.2	O K
360 min Winter	10.833	0.878	0.0	7.4	7.4	576.9	O K
480 min Winter	10.828	0.873	0.0	7.4	7.4	574.1	O K
600 min Winter	10.813	0.858	0.0	7.4	7.4	564.3	O K
720 min Winter	10.792	0.837	0.0	7.3	7.3	550.6	O K
960 min Winter	10.748	0.793	0.0	7.2	7.2	521.1	O K
1440 min Winter	10.668	0.713	0.0	7.1	7.1	468.6	O K
2160 min Winter	10.568	0.613	0.0	6.8	6.8	402.7	O K
2880 min Winter	10.475	0.520	0.0	6.6	6.6	341.7	O K
4320 min Winter	10.315	0.360	0.0	6.2	6.2	236.6	O K
5760 min Winter	10.187	0.232	0.0	5.8	5.8	152.5	O K
7200 min Winter	10.087	0.132	0.0	5.5	5.5	86.7	O K
8640 min Winter	10.012	0.057	0.0	5.3	5.3	37.7	O K
10080 min Winter	9.964	0.009	0.0	5.1	5.1	6.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	95.601	0.0	390.0	40
60 min Winter	58.745	0.0	479.4	68
120 min Winter	34.867	0.0	569.3	126
180 min Winter	25.368	0.0	620.9	184
240 min Winter	20.133	0.0	657.5	242
360 min Winter	14.510	0.0	710.6	356
480 min Winter	11.498	0.0	750.9	468
600 min Winter	9.594	0.0	782.7	576
720 min Winter	8.271	0.0	810.1	680
960 min Winter	6.540	0.0	853.7	770
1440 min Winter	4.691	0.0	918.9	1074
2160 min Winter	3.360	0.0	987.9	1520
2880 min Winter	2.650	0.0	1038.5	1960
4320 min Winter	1.894	0.0	1113.1	2772
5760 min Winter	1.491	0.0	1168.9	3520
7200 min Winter	1.238	0.0	1212.5	4248
8640 min Winter	1.063	0.0	1249.3	4848
10080 min Winter	0.934	0.0	1281.3	5352

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.700	Shortest Storm (mins)	15
Ratio R	0.437	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.972

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.324	4	8	0.324	8	12	0.324

Model Details

Storage is Online Cover Level (m) 11.460

Cellular Storage Structure

Invert Level (m) 9.955 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	692.0	692.0	1.001	0.0	850.4
1.000	692.0	850.4			

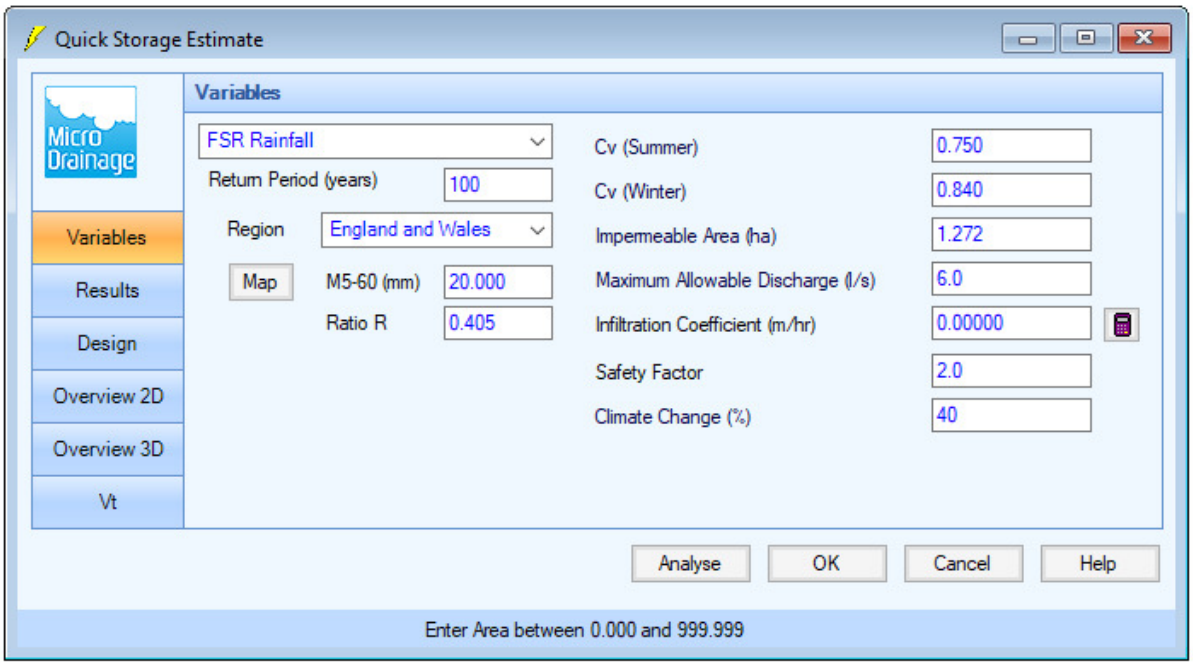
Hydro-Brake® Optimum Outflow Control

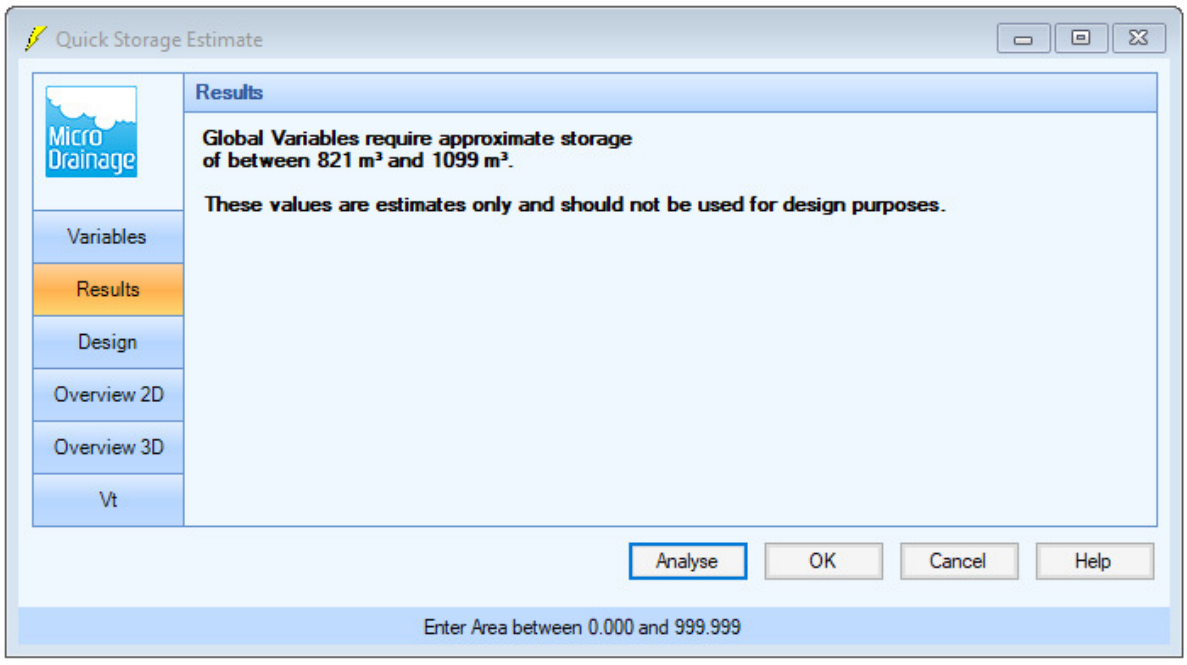
Unit Reference	MD-SHE-0115-6000-1000-6000
Design Head (m)	1.000
Design Flow (l/s)	6.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	115
Invert Level (m)	9.250
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

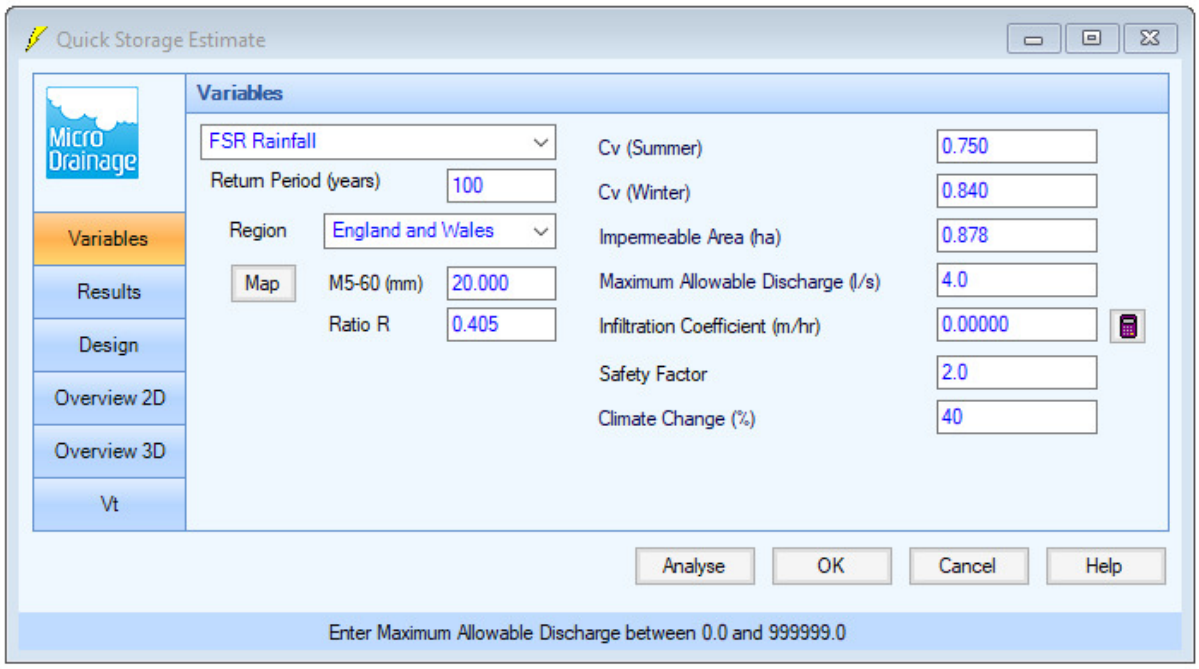
Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	6.0	Kick-Flo®	0.647	4.9
Flush-Flo™	0.298	6.0	Mean Flow over Head Range	-	5.2

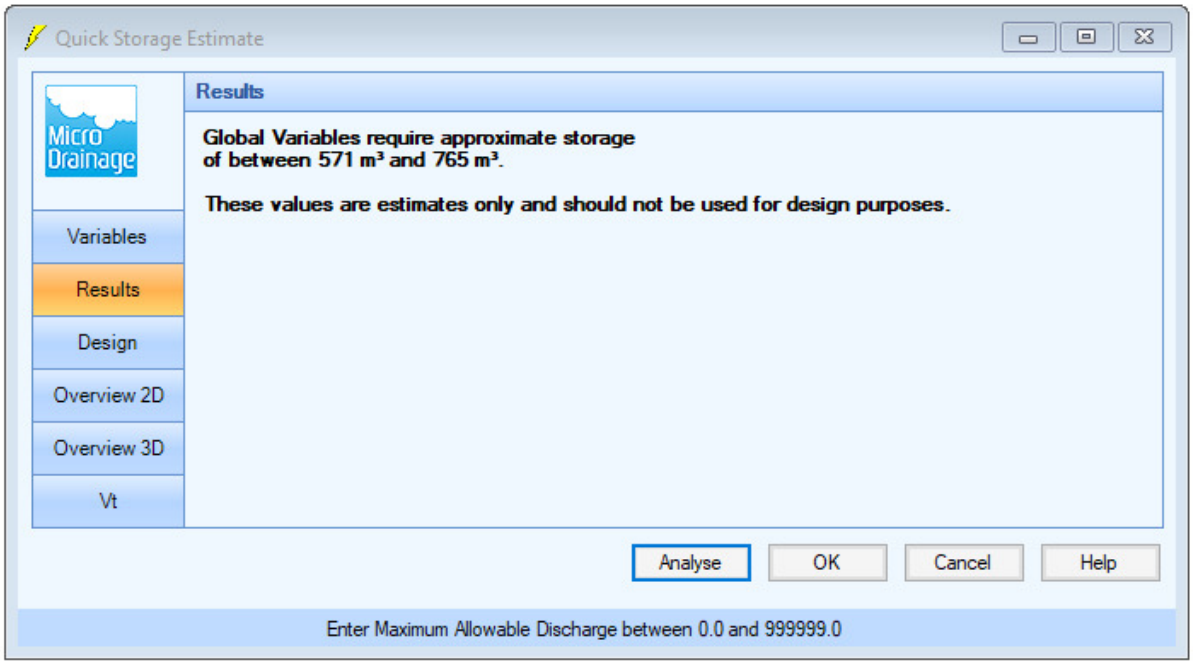
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.0	1.200	6.5	3.000	10.0	7.000	15.0
0.200	5.8	1.400	7.0	3.500	10.8	7.500	15.5
0.300	6.0	1.600	7.5	4.000	11.5	8.000	16.0
0.400	5.9	1.800	7.9	4.500	12.2	8.500	16.5
0.500	5.7	2.000	8.3	5.000	12.8	9.000	17.0
0.600	5.3	2.200	8.7	5.500	13.4	9.500	17.4
0.800	5.4	2.400	9.0	6.000	14.0		
1.000	6.0	2.600	9.4	6.500	14.5		


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FSR Rainfall
Return Period (years) 100
Region England and Wales
Map
M5-60 (mm) 20.000
Ratio R 0.405
Cv (Summer) 0.750
Cv (Winter) 0.840
Impermeable Area (ha) 1.272
Maximum Allowable Discharge (l/s) 6.0
Infiltration Coefficient (m/hr) 0.00000
Safety Factor 2.0
Climate Change (%) 40
Analyse
OK
Cancel
Help
Enter Area between 0.000 and 999.999


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Results
Global Variables require approximate storage
of between 821 m³ and 1099 m³.
These values are estimates only and should not be used for design purposes.
Analyse
OK
Cancel
Help
Enter Area between 0.000 and 999.999


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FSR Rainfall
Return Period (years) 100
Region England and Wales
Map
M5-60 (mm) 20.000
Ratio R 0.405
Cv (Summer) 0.750
Cv (Winter) 0.840
Impermeable Area (ha) 0.878
Maximum Allowable Discharge (l/s) 4.0
Infiltration Coefficient (m/hr) 0.00000
Safety Factor 2.0
Climate Change (%) 40
Analyse
OK
Cancel
Help
Enter Maximum Allowable Discharge between 0.0 and 999999.0


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Results
Global Variables require approximate storage of between 571 m³ and 765 m³.
These values are estimates only and should not be used for design purposes.
Analyse
OK
Cancel
Help
Enter Maximum Allowable Discharge between 0.0 and 999999.0

Drainage Assessment Form

We require applicants to complete this Drainage Assessment Form (DAF) and submit it to the Local Planning Authority, referencing from where the information in the submission document is taken. The form is supported by the Defra/EA guidance on Rainfall Runoff Management document (www.evidence.environment-agency.gov.uk/FCERM/Libraries/FCERM_Project_Documents/Rainfall_Runoff_Management_for_Developments_-_Revision_E.sflb.ashx) and aligns to the tools on www.UKsuds.com.

1. Site Details

SITE DETAILS		NOTES FOR APPLICANTS & LOCAL AUTHORITIES
Site Name	Cambridge Road Estate	
LPA reference (if applicable)		
Address & post code	Cambridge Road, Kingston Upon Thames KT1 3JJ	
Grid reference	519203, 168950	Centre point of the site in eastings, northings (XXXXXX, YYYYYY) format.
Brief description of proposed work	Phase 1 is mixed used development consisting of 452 residential units, 1250m2 community floor space, 290m2 of office space, 395m2 of retail/commercial space and associated access, servicing and landscape areas.	For example, type of development, number of units etc.
Is the existing site Brownfield or Greenfield?	Brownfield	Brownfield = developed. Greenfield = undeveloped.
Total site Area (Ha)	2.21 Hectares	The area, in hectares, of the whole development site including any large parkland areas and public open space.
Significant public open space (Ha)	0.52 Hectares	The area, in hectares, of any large parkland areas or public open space situated within the site which remains largely unchanged and is not provided with positive drainage
Area Positively Drained (Ha)*	1.69 Hectares	This is the total development area that is served by the drainage system. It is the difference between the total site area and the significant public open space.
Is the site currently known to be at risk of flooding from any sources? If so, please state and provide evidence.	No	Please attach surface water and fluvial flood risk maps (as shown on the Environment Agency's website) and any records of known historic flooding at the site.

* The Greenfield runoff rate from the development which is to be used for assessing the requirements for limiting discharge flow rates and attenuation storage from a site should be calculated for the area that forms the drainage network for the site whatever size of site and type of drainage technique. Please refer to the Rainfall Runoff Management document or CIRIA SuDS Manual for details.

2. Impermeable Area

	Existing	Proposed	Difference (Proposed-Existing)	Notes for applicants & Local Authorities
Impermeable area (Ha) Surfaces which do not permit infiltration of water into the ground.	2.21	1.69	0.52	If proposed > existing, then runoff rates and volumes will be increasing.
Drainage Method Rainwater harvesting/infiltration/SuDS/ watercourse/sewer	None	Tanked permeable paving in car park and footways and Underground attenuation cellular crates		See the London Plan Policy 5.13 Drainage Hierarchy. If the existing drainage was via infiltration and the proposed is not, section 3 should provide evidence as to why.

3. Is infiltration on-site suitable? Storage is required for the additional volume from site but also for holding back water to slow down the rate of discharge from the site. This is known as attenuation storage and long term storage. The idea is that the additional volume is not permitted to flow rapidly overland, into watercourses or into the sewer system and hence potentially increase flood risk on site and/or downstream of the site. You can either infiltrate the stored water back into the ground, or if this is not possible, hold it back with on-site storage, allowing gradual discharge at a controlled rate. Please fill in the table to show the extent of your investigations as to whether infiltration is a possible route for runoff to be discharged to.

			Notes for applicants & Local Authorities
Infiltration	**State the site's geology (including superficial deposits where known).**	Ground condition comprises made ground overlying Kempton Park Gravel/Langley silt member and London clay at depth	Infiltration rates are highly variable and infiltrating into made (i.e. unnatural) ground should be avoided.
	State the site's known Source Protection Zones (SPZ).	Flood Zone 1	Please refer to the Environment Agency's website to identify any source protection zones (SPZ).
	What is the development site's infiltration rate?	Infiltration methods for the scheme were investigated, however infiltration has not been recommended, refer to site investigation report	Infiltration rates should be worked out in accordance with BRE 365. If infiltration is the preferred method of drainage, then rates should be no lower than $1x10^{-6}$ m/s.
	Were infiltration rates obtained via a desktop study or from infiltration tests?	Desk top study, refer to Site investigation report	If it is not feasible to access the site to carry out infiltration tests before the application is submitted, a desktop study could be undertaken looking at the underlying geology of the area and assuming a worst-case infiltration rate.

	At what depth below ground is the water table (groundwater level)?	Ground water was encountered at 2.9m below ground level, refer to Site investigation report	Where known, please use borehole test results and state the time of year these were carried out.
	State the distance between the proposed infiltration device base and the water table.	Note applicable, No infiltration device	Need a minimum of 1m between the base of the infiltration device and the water table to protect groundwater quality and ensure groundwater does not enter infiltration devices. Avoid infiltration where this is not possible.
	Is the site contaminated? If yes, consider advice from others on whether infiltration is a safe solution.	Note applicable, No infiltration device	Water should not be infiltrated through land that is contaminated. The Environment Agency may provide bespoke advice in planning consultations for contaminated sites that should be considered.
In light of the above information, is infiltration feasible?		**No**	If infiltration is not feasible the applicant should consider the options in section 4. If infiltration is feasible, then it can be combined with the methods in section 4.

4. Method Proposed to Discharge Surface Water via *(in line with London Plan Policy 5.13 drainage hierarchy).* Please select more than one option where possible.

	YES	NO	EVIDENCE THAT THIS IS OR IS NOT POSSIBLE	NOTES FOR APPLICANTS & LOCAL AUTHORITIES
Rainwater harvesting			Limited space on site, see plan	Rainwater harvesting is where rainwater is stored on site for reuse. For example, water for gardening, domestic use etc.
Infiltration			Poor infiltration rate see Site investigation report	Allowing space for rainwater to soak into the ground, as per natural methods.
Attenuation of rain water in ponds and open water features			Limited room see plan	Please see the CIRIA SuDS Manual (C753) for further details about above ground attenuation techniques.
Attenuation of rain water through tanks or sealed water features			Limited space on site, see plan	Underground storage features which gradually release water. Please note that these are less sustainable than above ground methods and are usually more complex to maintain.

To watercourse			No nearby watercorse	Is there a watercourse nearby? If so please name, stating approximate distance from site.
To surface water sewer			Surface water volume is attenuated in tanked permeable paving and cellular tank crates and restricted to 10 l/s by a hydrobrake before discharging into the public sewer. Thames water has confirmed capacity of public sewer, refer to email from Thames Water	The confirmation from sewer provider that sufficient capacity exists for this connection will be required.
To combined sewer				This would only be acceptable where other options are not reasonably practical and will not be accepted where separate sewer systems currently exist.

5. Supporting Calculations – in order to check that the proposed development is designed to conform to standards, please complete the following three tables showing your calculations.

A. Peak Discharge Rates – This is the maximum flow rate at which storm water runoff leaves the site during a particular storm event.

Please circle which method was used to calculate the Greenfield Runoff Estimation:	IH124 method / FEH method

London Plan policy 5.13*: developers should aim for a Greenfield runoff rate from their developments.*

London Plan Sustainable Design and Construction SPG section 3.4.10: *All developments on Greenfield sites must maintain Greenfield runoff rates. On previously developed sites, runoff rates should not be more than three times the calculated Greenfield rate.*

	GREENFIELD RATES (L/S)	EXISTING RATES (IF PREVIOUSLY DEVELOPED) (L/S)	PROPOSED RATES (L/S)	NOTES FOR APPLICANTS & LOCAL AUTHORITIES
QBAR				QBAR is approximately the 1 in 2 year storm event.
1 in 1 year	2.9	10.6	10	Proposed discharge rates (with mitigation) should be no greater than the Greenfield rates for all corresponding storm events. Please note that discharging all flow, regardless of the corresponding storm event intensity, from site at the existing 1 in 100 year event rate would increase flood risk during smaller events and therefore would not be permitted.
1 in 30 year	7.6	21.7	10	
1 in 100 year	10.7	25.1	10	

1 in 100 year plus climate change (CC)	[redacted]	10	To mitigate for climate change the proposed 1 in 100 year +CC runoff rate must be no greater than the Greenfield 1 in 100 year event runoff rate. 30% should be added to the peak rainfall intensity to represent increases due to climate change.

B. Discharge Volumes Post Development

The Non-Statutory Technical Guidance for SuDS: *Where reasonably practicable, for Greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the Greenfield runoff volume for the same event. Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the Greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.*

	STORAGE VOLUME REQUIRED TO ACHIEVE THE GREENFIELD RUNOFF RATE (M^3)	PROPOSED STORAGE VOLUME ON SITE POST-DEVELOPMENT (M^3)	IF THE PROPOSED STORAGE VOLUME ON SITE POST-DEVELOPMENT IS LESS THAN THE STORAGE VOLUME REQUIRED TO ACHIEVE THE GREENFIELD RUNOFF RATE, PLEASE PROVIDE A JUSTIFICATION AS TO WHY.
1 in 100 year, 6 hour event	336	1200	

C. Storage Methods – Attenuation storage is provided to enable the rate of runoff from the site into the receiving watercourse or sewer to be limited to an acceptable rate to protect against erosion and flooding downstream. The attenuation storage volume is a function of the degree of development relative to the Greenfield discharge rate. Long term storage is similar to attenuation storage, but aims to specifically address the additional volume of runoff caused by the development compared to pre-development runoff. A combination of SuDS features can account for both types of storage.

London Plan Sustainable Design and Construction SPG section 3.4.8 *Most developments referred to the Mayor have been able to achieve at least 50% attenuation of the site's (prior to re-development) surface water runoff at peak times. This is the minimum expectation from development proposals.*

	TYPE OF SUDS FEATURE	VOLUME (M^3)	NOTES FOR APPLICANTS & LOCAL AUTHORITIES
1	**Tanked Permeable Paving**	295	SuDS can be adapted for most situations even where infiltration isn't feasible e.g. impermeable liners beneath some SuDS devices allows treatment but not infiltration. See the CIRIA SuDS Manual (C753). If no storage features have been proposed please explain why this is the case and provide evidence to back up this reasoning in the box below.
2	**Attenuation tank**	905	
3			

4		
5		
6		
7		
8		
9		
10		
TOTAL	1200	This value should be equal to or greater than the 'Proposed storage volume' value in section 5B.

IF NO STORAGE FEATURES HAVE BEEN PROPOSED IN THE SECTION ABOVE, PLEASE EXPLAIN WHY THIS IS THE CASE AND PROVIDE EVIDENCE TO BACK UP THIS REASONING IN THIS BOX: (EVIDENCE MUST BE SUFFICIENTLY DETAILED TO DEMONSTRATE THAT A SUDS BASED SYSTEM IS IMPRACTICAL FOR THIS SITE)

6. Please confirm…

	EVIDENCE (PLEASE NAME RELEVANT EVIDENCE DOCUMENT(S))	**NOTES FOR APPLICANTS & LOCAL AUTHORITIES**

That the drainage system can contain the 1 in 30 storm event without flooding.	To be provided in detail design stage	The Non-Statutory Technical Standards for SuDS states that no part of the site should flood during a 1 in 30 year event (unless that area is designated to hold and/or convey water as part of the design). This is also a requirement for Sewers for Adoption and is good practice.
That any flooding between the 1 in 30 & 1 in 100 plus climate change storm events will be safely contained on site.	To be provided in detail design stage	Safely: not causing property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths. Flood waters must drain away at section 5A rates.
How runoff flows from storm events in excess of 1 in 100 years will be managed on site.	To be provided in detail design stage	As per the Non-Statutory Technical Standards for SuDS, proposed methods for managing excess flows should be demonstrated so as to minimise the risks to people and property, e.g. through evidence of exceedance routes.
How are rates being restricted (hydrobrake etc.)?	Hydrpbrake	Hydrobrakes to be used where rates are between 2l/s to 5l/s. Orifices not to be used below 5l/s as the pipes may block. Pipes with flows < 2l/s are prone to blockage.

7. Adoption and Maintenance – please provide the following information

	ADOPTION AND MAINTENANCE INFORMATION	NOTES FOR APPLICANTS & LOCAL AUTHORITIES
Please confirm the proposed owners/adopters of the entire drainage systems throughout the life of the development. Please list all the owners and contact details.	It is proposed that Thames Water Waste water authority will adopt the drainage network	If there are multiple owners then a drawing illustrating exactly what features will be within each owner's remit must be submitted with this Drainage Assessment Form.

How is the entire drainage system to be maintained?	To be provided in detail design stage	Clear details of the maintenance proposals of all elements of the proposed drainage system over the lifetime of the development must be provided. Poorly maintained drainage can lead to increased flooding problems in the future. If the space provided is not big enough, please attach a separate document containing all relevant information.

8. Evidence. Please identify where the details quoted in the sections above were taken from i.e. plans, reports etc. Please also provide relevant drawings that need to accompany your DAF, in particular exceedance routes and ownership and location of SuDS (maintenance access strips etc.).

FORM SECTION	DOCUMENT REFERENCE WHERE DETAILS QUOTED ABOVE ARE TAKEN FROM	PAGE NUMBER
Section 2	To be provided at detail design stage	
Section 3	Geo-Environmental Site investigation report reference GE18530/GIR/OCT20, dated 6/10/2020	iv
Section 4	To be provided at detail design stage	
Section 5A	Microdrainage calculations	
Section 5B	Microdrainage calculations	
Section 5C	To be provided at detail design stage	

This form should be completed using evidence from the documents submitted with this application. This should include site plans and, if necessary for the site, a Flood Risk Assessment. The form serves as a summary sheet of the drainage proposals and should clearly show that the proposed runoff rate and volume as a result of development will not be increased. If there is an increase in runoff rate and/or volume, the rate and volume sections should be completed to set out how the additional rate/volume will be managed.

Form Completed By: .....
Qualification of person responsible for signing off this Drainage Assessment Form: .....

Company: .....,.....
On behalf of (Client's details): .....

Date: ……..