

**Milvum Engineering
Services Ltd.**

71-75 Shelton Street
London WC2H 9JQ

t: +44 7472 611560

e: contact@milvumgroup.com

www.milvumgroup.com

FLOOD RISK ASSESSMENT

MINET JUNIOR & INFANT SCHOOLS
AVONDALE DRIVE
HAYES
UB3 3NR

Ref:	MES/2104/MS070
Rev:	01
Date:	April 2021
Prepared:	Chris Emms MEng
Approved:	Graham Kite BSc MSc DIC FGS MAPM

Table of Contents

1.0	Executive Summary.....	- 2 -
2.0	Introduction.....	- 3 -
3.0	Preliminary Flood Risk Appraisal.....	- 5 -
4.0	Flood Risk Assessment	- 6 -
5.0	Drainage Strategy	- 7 -
6.0	Conclusion	- 8 -
Appendix 1	Outline Proposed Development Plan	- 1 -
Appendix 2	Proposed Drainage Layout.....	- 2 -
Appendix 3	Preliminary Flood Risk Assessment	- 3 -
Appendix 4	Disclaimer	- 4 -

1.0 Executive Summary

At the request of Morgan Sindall, a Level 2 Flood Risk Assessment has been carried for Minet Junior & Infant Schools, Avondale Drive, Hayes, UB3 3NR (the site).

The purpose of the assessment is to provide supplementary assessment to the Preliminary Flood Risk Appraisal (PFRA) to consider the risk of flooding as a result of the proposed development. The proposed drainage strategy should ensure that measures are taken as necessary such that the risk is not increased on or off site and is ameliorated where possible.

A review of the PFRA with respect to current data and guidance indicates that its conclusions are still appropriate. The principal source of flooding that has the potential to be impacted by the proposed development is surface water runoff.

The drainage strategy confirms that the hierarchy of surface water disposal options has been followed sequentially. It is considered that the drainage proposals for the management of surface water runoff will adequately prevent an increase in the risk of flooding due to surface water runoff as a result of the proposed development. Additionally, the proposals will also offer water quality benefits.

2.0 Introduction

At the request of Morgan Sindall, a Level 2 Flood Risk Assessment has been carried for Minet Junior & Infant Schools, Avondale Drive, Hayes, UB3 3NR (the site). The purpose of the assessment is to:

- provide supplementary assessment to the Preliminary Flood Risk Appraisal (Robert West Consulting Limited, November 2016);
- to consider the risk of flooding as a result of the proposed development;
- to consider whether the proposed drainage strategy ensures that the risk is not increased on or off site and is ameliorated where possible.

2.1 Sources of Information

The following baseline data have been referenced to complete the assessment in relation to the proposed development:

- Preliminary Flood Risk Appraisal (ref: 2915/045/R10), November 2016, Robert West Consulting Limited.
- Drainage Strategy Report (ref: TER-REP-1000003-PO1), March 2021, Terrell Ltd.
- Proposed Drainage Drawings MIN-TER-00-GF-DD-C-920030 Rev P01 and MIN-TER-00-GF-DD-C-920031 Rev P01.
- Geo-Environmental Assessment (ref: MES/2104/MS062), April 2021, Milvum Engineering Services Ltd.
- Flood Risk Mapping Data, 2021, Environment Agency.
- West London Strategic Flood Risk Assessment, March 2018, The West London Boroughs of Barnet, Brent, Ealing, Harrow, Hillingdon and Hounslow (<https://westlondonfra.london/>).
- Drain London, May 2011, Greater London Authority.
- SuDS Manual (ref: C753), December 2015, CIRIA.

2.2 Proposed Development

An outline proposed development plan is presented in Appendix 1.

The proposed development comprises:

- Provision of a temporary classroom block over an existing sports field for a 2 year period whilst refurbishment / construction works are being undertaken to the school buildings;
- Refurbishment of existing school buildings;

- Construction of a 2 storey extension to the Junior School;
- Construction of a 1 storey extension to the Infant School;
- Associated areas of hard and soft landscaping.

In addition, drainage will be provided, as described in the Drainage Strategy Report and discussed in Section 5.0.

3.0 Preliminary Flood Risk Appraisal

A Preliminary Flood Risk Appraisal (PFRA) was prepared in 2016 by Robert West Consulting Engineers in support of proposals for the refurbishment of Minet Junior & Infant Schools.

The PFRA considered various sources of flooding, the findings of which are summarised in Table 1.

Source / Type of Flooding	Comments	Conclusion
Fluvial Flooding	The Environment Agency's (EA) flood mapping data shows that the site lies entirely within Flood Zone 1.	The residual risk of fluvial flooding to the site is considered to be low.
Tidal Flooding	The site is remote from the nearest shore and there is an absence of tidally influenced watercourses in the vicinity.	Tidal flooding does not pose a risk.
Pluvial Flooding	The EA's 'Risk of Flooding from Surface Water' mapping data indicates that areas within the site boundary vary from very low to low and medium risk.	The overall risk of pluvial flooding to the site is considered to be low.
Flooding from Artificial Sources	The Grand Union Canal is approximately 830m from site. The EA's 'Risk of Flooding from Reservoirs' mapping data confirms that the development site is outside the areas designated at risk.	The risk of flooding from artificial sources to the site is considered to be low.
Sewer Flooding	The London Borough of Hillingdon's Preliminary Flood Risk Assessment (LBH-PFRA) 2017 does not indicate any sewer flooding incidents impacting the site.	The risk of sewer flooding is low.
Groundwater Flooding	The British Geological Survey's mapping data indicates that the entirety of the site is underlain by the London Clay Formation, with Langley Silt Member and River Terrace superficial deposits overlying. The LBH-PFRA 'Summary Map of Past Floods – Ground Water Incidents' indicates that there have been no groundwater flooding incidents recorded within the vicinity of the site.	The risk of groundwater flooding is low.

Table 1: Summary of PFRA Conclusions

The PFRA recommends that as the application site is larger than 1 hectare, a Level 2 Flood Risk Assessment (FRA) will be required with an emphasis on the management of surface water run-off to demonstrate that SuDS can control run-off rates and volumes from the proposed site development to existing run-off rates.

4.0 Flood Risk Assessment

Following the PFRA, the sources of flooding have been reviewed via reference to the West London Strategic Flood Risk Assessment (WLSFRA) as it is considered to provide the most up-to-date information. The WLSFRA is available online and includes interactive mapping which has been inspected and compared to the findings the PFRA.

The review indicates that there is no change to fluvial, tidal and pluvial flood extents at the site location and similarly that the site is not within the zone of influence of flooding from a reservoir failure event.

With regard to fluvial flooding, the WLSFRA Fluvial and Tidal Flood Risk Map includes the extents of flooding for a 1 in 100 year return period with an increase in flow of +70% for climate change for the River Crane. This is based on an update to the EA's 2008 hydraulic model for the River Crane that was undertaken in 2017, following the relevant climate change allowances (updated in 2016). The site is not indicated to be impacted, with flood extents contained within the watercourse channel alongside and / or limited by the embankment to the A312 (The Parkway) highway.

The WLSFRA Sewer, Groundwater and Artificial Flood Risk mapping data does not indicate the site to be within an area where Thames Water have received reports of sewer flooding. The site is within a 1km square area where the proportion of land deemed to be susceptible to groundwater flood emergence is greater than or equal to 25% but less than 50%. The site is also shown to be outside the extent of land that is considered to have an increased potential to experience elevated groundwater levels in response to higher than average recharge from rainfall or from elevated river levels, with reference to data provided by Drain London 2011.

It can therefore be concluded that the findings of the PFRA are still appropriate. It is important that the risk of flooding as a result of the proposed development should be considered and measures taken as necessary to ensure that the risk is not increased on or off site and is ameliorated where possible. The principal source of flooding that has the potential to be affected by the proposed development is surface water runoff.

5.0 Drainage Strategy

A drainage strategy report has been prepared by Terrell Ltd which sets out the philosophy and design approach followed in respect of surface water and foul water drainage at the proposed development site.

The drainage strategy report confirms that the hierarchy of surface water disposal options has been followed sequentially with consideration given to draining to the ground in the first instance. In-situ testing undertaken at the site to measure percolation rates have not been successful (MES/2104/MS062) and so a positive outfall is required. The existing schools drain to the ordinary watercourse that flows adjacent to the site, alongside the northern boundary, and so this has been deemed an appropriate outfall.

A permeable pavement is to be provided to the car parking area with a surface finish of permeable asphalt. The sub-base depth required for hydraulic adequacy to manage 1 in 100 year +20% rainfall has been assessed and deemed to be suitable for accommodating traffic loading allowing a design formation CBR of 5%. Whilst the approach has not yet been demonstrated to be numerically rigorous, it does provide a tangible improvement to the existing management of surface water runoff at the site. There is no net increase in runoff area due to the proposed roof and paved areas replacing existing roof and paved areas, so the increase in capacity to the drainage system afforded by the pavement sub-base voids will allow attenuation of runoff that did not occur pre-development.

Aside from ameliorating existing flood risks by the provision of increased volumetric capacity, the permeable paving proposed will also offer water quality benefits as it provides a stage of treatment to runoff that is in line with best practice (comparing pollution mitigation indices for permeable paving in table 26.3 of the SuDS Manual with pollution hazard indices for school car parking in table 26.2 of the SuDS Manual).

Further improvements are provided via the proposed use of raised planters that will be fed with runoff from roof areas that currently discharge without restriction to the below ground drainage system. Whilst seemingly a piecemeal approach, the use of this form of source control will have an overall benefit in terms of retarding runoff for a significant proportion of events (with extreme events managed via overflow) and likely preventing any runoff for frequent rainfall events. The interception of runoff in this manner contributes to changing the hydraulic response of the schools' drainage system to mimic greenfield characteristics and also offers amenity benefit due to the living nature of the planters.

6.0 Conclusion

In conclusion:

- The risk of flooding on site from all sources is low.
- It is considered that the drainage proposals for the management of surface water runoff as described in the drainage strategy and detailed in the proposed drainage drawings will adequately prevent an increase in the risk of flooding due to surface water runoff, both on and off site.
- Overall, the surface water drainage strategy will ameliorate the risk of surface water flooding at the site due to the proposed development.

Appendix 1 Outline Proposed Development Plan



NB-
SECURE LINE
FENCING SHOWN
FOR NURSERY &
INFANTS SCHOOL
TEMPS PHASE.
JUNIOR SCHOOL
TEMPS PHASE TO
INCLUDE ACCESS
TO THEIR HARD
PLAY AREA (WITH
NETBALL COURTS),
LIBRARY AND
EASTERN PLAYING
FIELD

- REMOVE FENCING & GATES
- NEW FENCING & GATES
- DEMOLITION
- NEW BUILD EXTENSIONS
- REMODEL & REFURBISHMENT
- UNSUCCESSFUL BLOCK
- RERUBISH/REPLACE EXISTING CANOPIES
- NEIGHBOURING BUILDING OUT OF SCOPE
- CAR PARK RECONFIGURATION WORKS
- LANDSCAPING WORKS (HARD & SOFT) TO ALL AREAS AFFECTED BY THE PROPOSED BUILDING WORKS
- REINSTATE CONTRACTOR'S ACCESS & COMPOUND REFER TO TOPOGRAPHICAL SURVEY FOR SERVICES & DRAINAGE
- NOTE ROUTE OF THAMES WATER PUBLIC SEWER IN RELATION TO FOOTPRINT OF JUNIOR EXTENSION
- CYCLE SHELTERS FOR PERMANENT SOLUTION AS PER PLANNERS' REQUIREMENTS
- PROTECT TREES THROUGHOUT THE SITE
- MINET CLINIC & SITE MANAGER'S HOUSE TO REMAIN OPERATIONAL DURING CONSTRUCTION WORKS
- MAKING GOOD WORKS RELATING TO SERVICES & DRAINAGE- ROUTES TO CONTRACTOR'S DETAILED DESIGN
- TEMPORARY ACCOMMODATION FOOTPRINT TO CONTRACTOR'S DETAILED DESIGN TO MINIMISE IMPACT ON FIELD
- TEMP EXTERNAL WORKS TO INCLUDE: FENCING & GATES (SITE MUST BE SECURE)
- ACCESS CONTROL
- SEPARATE HARD PLAY AREAS FOR NURSERY, RECEPTION & INFANTS
- COVERED PLAY FOR NURSERY & RECEPTION
- PATHWAYS- 1800mm MIN. WIDTHS
- RAMPS & STEPS
- CYCLE SHELTERS
- EMERGENCY VEHICLE ACCESS
- REFUSE ENCLOSURE
- ACCESSIBLE ROUTE TO TRANSFER PREPARED FOOD FROM MAIN SHARED KITCHEN TO TEMPS
- EXTERNAL LIGHTING TO PATHWAYS & PARKING
- NO INTERNAL MODIFICATIONS ANTICIPATED TO TEMPS
- ACCOMMODATION TO CATER FOR TRANSITION FROM NURSERY & INFANTS TO JUNIOR SO HEIGHTS MUST BE DESIGNED ACCORDINGLY & TOILETS MUST BE CLUSTERED AND ACCESSED FROM THE CORRIDORS- NOT DIRECTLY FROM CLASSROOMS
- NURSERY & INFANTS TEMPS PHASE WILL INCLUDE TEMPS ACCOMMODATION PLUS 2NO. CLASSROOMS WITHIN THE TERRAPIN BUILDING
- JUNIOR TEMPS PHASE WILL INCLUDE TEMPS ACCOMMODATION PLUS TERRAPIN, LIBRARY BUILDING & EASTERN PLAYING FIELD SO THE SECURE LINE MUST BE ADJUSTED ACCORDINGLY

Rev	By	Description	Date	CHKD
-----	----	-------------	------	------



Mace Group
Stag House
Old London Road
Hertford
SG13 7YY
Telephone 01992 515100
Facsimile 01992 515111
www.macegroup.com

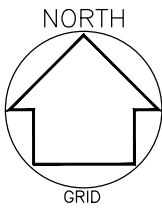
PROJECT
MINET NURSERY & INFANT AND JUNIOR SCHOOL PSBP2 FEASIBILITY REPORT

DRAWING TITLE
REVISED CONTROL OPTION PROPOSED SITE PLAN

DRAWN BY	AC	DATE	13/01/2020
CHECKED	-	SCALE	1:750
PROJECT No.	DISCL Code	SEQ. No.	REV.
33583	A	01	C

LBH ASSET CODE ASSET_NO
FILED ON AUTOCAD AS:C:\Users\aham\cont\Desktop\Minet Base 240220.dwg

Appendix 2 Proposed Drainage Layout



KEY

- Prop SW Drainage
- Prop 150mm perforated drain in base of permeable paving subbase
- Prop FW Drainage
- Existing drain runs to be abandoned
- Prop SW Inspection Chamber 225mm dia
- Prop SW Inspection Chamber 450mm dia
- Prop Yard Gully
- Prop FW Inspection Chamber

NOTE: Figures for Inspection Chambers are

Chamber Number	Cover Level	Invert Level	Chamber depth	Chamber Type
Prop Timber raised planter with overflow to SW system (See Note 4)				
Prop Rain Garden (See Note 5)				
Proposed Permeable Asphalt Car park				
Prop FW above ground connections (Red to new below ground connection Green to existing below ground connection)				

Drainage notes:

1. All foul and surface water drains must be constructed in accordance with Part H of the Building Regulations 2000, BS EN 752 (parts 1-7) and where appropriate the relevant Agreement Certificates.
2. Unless noted otherwise all private drains are to be 100mm and to be constructed using either uPVC, polypropylene or vitrified clay pipes to Specification Classes R12/154, R12/155 or R12/157 respectively. Trench Bed Type 5 and bedded in accordance with the manufacturers instructions and the publications listed in Note 1. Buried 225mm sewer to be constructed using vitrified clay pipes in Trench Bed Type 5.
3. Unless noted otherwise pipes of differing diameters within the same manhole shall be laid with common soffits.
4. Rain water down pipes into raised planters to be fitted with suitable baffles to dissipate the water and avoid scouring out of soil. Raised planters to be 2m x 1m in plan, 750mm high (TBC). Outlet pipe to be provided at bottom of planter to discharge into yard gully before connecting to the existing surface water system.
5. Details of rain garden (notionally 0.5m deep) TBC in conjunction with the Landscape Architect.

Rev	Description	Date	Issued by
1	First Issue	16.03.21	YTR

KEY PLAN

ORIGINATOR:

Consulting Engineers Ingénieurs Conseils

Arthur's Mission
30 Southfields
London SE15 5NU
t: +44 207 423 0111
www.terrellgroup.co.uk

11 rue Marché
Boulogne-Billancourt
France
t: +33 1 46 21 07 40
pme@terrellgroup.fr

3114 MINET SCHOOL
AVONDALE DRIVE, HAYES UB3 3NR
EXTERNAL DRAINAGE STRATEGY

Designed by	MDG	Name	Signature	Date
Drawn by	MDG			PP.03.21
Checked	SM			
Approval	DAC			

SCALE	1:200 @ A0	FILENAME	00920030
START DATE	14 March 2021	PROPOSED STATUS	
DESIGN STAGE	RIBA 3	FOR APPROVAL	

Appendix 3 Preliminary Flood Risk Assessment

Project Title
PSBP2 - Minets Junior & Infant School

Report Title
Preliminary Flood Risk
Appraisal

Document Reference:
2915/045/R10

Prepared For
Mace Group

Date
November 2016



County House
St. Mary's Street
Worcester
Worcestershire
WR1 1HB

T +44 (0)1905 28288
F +44 (0)207 939 9909
E worcester@robertwest.co.uk
W www.robertwest.co.uk

Consulting Engineers

Registered office: 147A High Street, Waltham Cross, Hertfordshire, EN8 7AP Registered in Cardiff No: 2901674
Robert West Consulting Limited (trading as Robert West) is a subsidiary of Robert West Group Limited

Status	Details of Amendments	Date	Author	Checked	Approved
Planning	First Issue	25/11/16	JNS	RB	RB

CONTENTS

CHAPTER	PAGE
1.0 INTRODUCTION, SITE DESCRIPTION & SCOPE OF REPORT	1
2.0 DEVELOPMENT AND FLOOD RISK POLICY	2
3.0 ASSESSMENT OF FLOOD RISK	4
4.0 CONCLUSION	7

APPENDICES

APPENDIX A – SITE LOCATION

APPENDIX B – EA FLOOD MAPS

APPENDIX C – TW ASSET LOCATION SEARCH

1.0 INTRODUCTION, SITE DESCRIPTION & SCOPE OF REPORT

- 1.1 Mace Group has proposals for the refurbishment of Minets Junior and Infant School (MJIS) at Avondale Drive, Hayes, Middlesex, UB3 3NR. MJIS is part of the Priority School Building Programme 2 (PSBP2) Government initiative to rebuild schools in need of renovation or rebuilding. The location of the site is included in Appendix A.
- 1.2 Mace Group has commissioned Robert West Consulting (RWC) to prepare a Preliminary Flood Risk Appraisal (PFRA) that conforms to the requirements of the National Planning Policy Framework (NPPF), its associated technical guidance and local council planning policy. The aims of the NPPF are as follows:
- Identify the risks of flooding associated with the development of the site from all potential sources
 - Assess the impact that the proposals would have on these risks
 - Seek to demonstrate that, as part of the development proposals, the overall flood risk can be reduced and/or managed
- 1.3 The purpose of this PFRA is to analyse the risk of the site flooding and identify any specific drainage challenges (including likely attenuation requirements). This assessment is an initial high level appraisal of the issues to ascertain whether a Level 2 Flood Risk Assessment (FRA) is required.
- 1.4 The boundary of the site forms an irregular shape; is approximately 3.40 hectare in area; and is located at OS grid reference TQ 10502 80395. The surrounding area is predominantly residential with a county park and industrial buildings to the east. The site is bounded to the south by Avondale Drive; to the west by residential properties associated with Hitherbroom Road; to the north by Hitherbroom Park; and to the east by Abbotswood Way. The site is within the administrative boundary of the London Borough of Hillingdon (LBH).
- 1.5 A topographical survey for the site has not yet been carried out but information contained within the site-specific geo-environmental assessment indicates that the site is generally flat.
- 1.6 School buildings and areas of hard-standing occupy the majority of the centre of the site with grassed covered playing fields covering the east and west.
- 1.7 This appraisal is based on readily-available existing information sources, including the LBH Strategic Flood Risk Assessment (SFRA), Environment Agency's (EA's) Flood Maps, British Geological Survey (BGS) website mapping and Thames Water (TW) public sewer records.

2.0 DEVELOPMENT AND FLOOD RISK POLICY

National Planning Context

- 2.1 The NPPF was issued by the Department for Communities and Local Government in March 2012 and deals specifically with development planning and flood risk using a sequential characterisation of risk based on planning zones and the EA flood mapping.

Regional Policy

- 2.2 MHS is within the LBH and is covered by the London Plan, as amended in March 2015. The London Plan contains various policies pertaining to flood risk and drainage, the relevant aspects of which are reproduced below.

Policy 5.13

Sustainable drainage

Planning decisions

A. Developments should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield runoff rates and ensure that surface water runoff is managed as close to its source as possible in line with the following drainage hierarchy:

- 1) store rainwater for later use*
- 2) use infiltration techniques, such as porous surfaces in non-clay areas*
- 3) attenuate rainwater in ponds or open water features for gradual release*
- 4) attenuate rainwater by storing in tanks or sealed water features for gradual release*
- 5) discharge rainwater direct to a watercourse*
- 6) discharge rainwater to a surface water sewer/drain*
- 7) discharge rainwater to the combined sewer*
- 8) Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation*

- 2.3 The London Plan is supported by the Supplementary Planning Guidance: Sustainable Design and Construction, April 2014. In relation to surface water flooding and sustainable drainage, the guidance states that developers should design Sustainable Drainage Systems (SuDS) that incorporate attenuation for surface water run-off.

Local Planning Policy

2.4 LBH Council Local Plan Part 1 - Strategic Policies (Adopted November 2012) contains the following policy relating to flood risk and drainage:

2.5 *Policy EM6: Flood Risk Management*

- The Council will require new development to be directed away from Flood Zones 2 and 3 in accordance with the principles of the NPPF
- The subsequent Hillingdon Local Plan: Part 2 - Site Allocations will be subject to the Sequential Test in accordance with the NPPF. Sites will only be allocated within Flood Zones 2 or 3 where there are overriding issues that outweigh flood risk. In these instances, policy criteria will be set requiring future applicants of these sites to demonstrate that flood risk can be suitably mitigated
- The Council will require all development across the borough to use SuDS unless demonstrated that it is not viable. The Council will encourage SuDS to be linked to water efficiency methods. The Council may require developer contributions to guarantee the long-term maintenance and performance of SuDS is to an appropriate standard

Strategic Flood Risk Assessment

- 2.6 The site is assessed via the LBH Level 1 SFRA (2008) and the Addendum to the SFRA and Sequential Test (2015).
- 2.7 The SFRA identifies flood risk issues relevant to both existing and proposed developments within the LBH.
- 2.8 The LBH Preliminary Flood Risk Appraisal (PFRA) 2011 has also been reviewed to inform this report.

3.0 ASSESSMENT OF FLOOD RISK

Fluvial Flooding

- 3.1 The River Crane (an Ordinary Watercourse) flows in a southerly direction past the development site to the east at an offset of approximately 165m.
- 3.2 The Yeading Brook (a Main River) flows in a south-westerly direction past the development site to the east at an offset of approximately 730m.
- 3.3 An unnamed stream runs along the northern boundary of the site.
- 3.4 The EA's Flood Map (Appendix B) shows that the site lies entirely within Flood Zone 1. Flood Zone 1 represents land assessed as having a less than 1 in 1000 annual probability of river flooding in any year (<0.1%).
- 3.5 As the site is located in Flood Zone 1, the lowest flood risk category, there is no need to conduct a Sequential or Exception Test.
- 3.6 The EA's website shows that the site does not lie in an area where the EA issues Flood Warning or Flood Alerts.
- 3.7 The NPPF classifies the proposed development as 'More Vulnerable' and confirms that this is permitted in Flood Zone 1.
- 3.8 The residual risk of fluvial flooding to the site is considered to be low.

Tidal Flooding

- 3.9 Tidal flooding does not pose a risk due to the site's distance from the nearest shore and the absence of tidally influence watercourses in the vicinity.

Pluvial Flooding

- 3.10 The EA's website map 'Risk of Flooding from Surface Water' (see Appendix B) indicates that parts of the site are at 'Very Low' risk i.e. a chance of surface water flooding of less than 1 in 1000 (0.1%). The map also shows areas within the site boundary varying in risk from 'Low' (chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%)); and 'Medium' (chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%).
- 3.11 The EA's website specifies that the overall risk of pluvial flooding to the site is considered to be 'Low'.

Flooding from Artificial Sources

- 3.12 Flood risk can result from failure of infrastructure that transmits, retains or controls the flow of water (e.g. blockage of a pipe or culvert). There is no known flood risk to the site from failure of adjacent infrastructure.
- 3.13 The Grand Union Canal flows in a south-westerly direction past the development site to the south-east at an offset of approximately 830m.
- 3.14 The 'Risk of Flooding from Reservoirs' map from the EA's website (see Appendix B) confirms that the development site is outside the areas designated at risk.
- 3.15 The risk of flooding from artificial sources to the site is therefore considered to be low.

Sewer Flooding

- 3.16 TW is the statutory water undertaker and is responsible for the public sewer systems within LBH.
- 3.17 A TW asset location search indicates that there is a TW public foul sewer running through the site in addition to public surface water and foul sewers adjacent to the southern boundary of the site along Avondale Drive.
- 3.18 The details of the sewer network are shown at Appendix C.
- 3.19 The PFRA identifies the number of sewer flooding incidents at postcode level within the Borough. The data shows that, within the UB10 postcode, 1 - 5 properties have flooded from overloaded sewers. The PFRA does not show any sewer flooding incidents affecting the site.
- 3.20 It can therefore be concluded that the risk of sewer flooding is low.

Groundwater Flooding

- 3.21 The BGS website indicates that the entirety of the site is underlain by the London Clay Formation (Clay, Silt and Sand). The site is underlain by Langley Silt Member superficial deposits (Clay and Silt).
- 3.22 The groundwater map on the EA website confirms that the site is not located within a Groundwater Source Protection Zone (GSPZ). The site is underlain by a Major Aquifer High, which implies that there is potential for standing water and groundwater risk.
- 3.23 The PFRA 'Summary Map of Past Floods – Ground Water Incidents' indicates that there have been no groundwater flooding incidents recorded within the vicinity of the site. It can therefore be concluded that the risk of groundwater flooding is low.

Recommendations

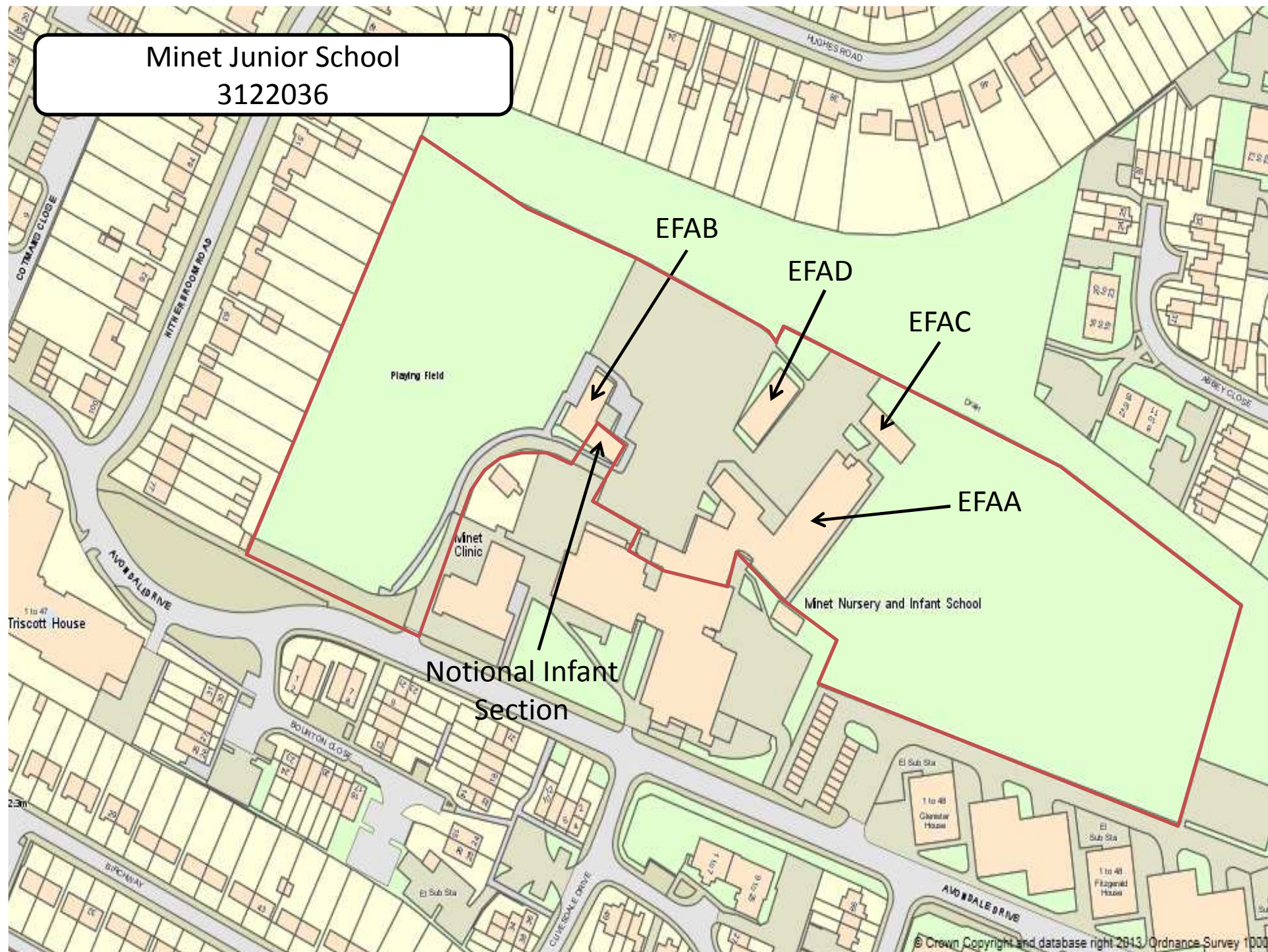
- 3.24 The risk of fluvial, tidal, pluvial, artificial sources, sewer and groundwater flooding is considered to be 'Low', 'Very Low' or 'Non-Existent'.
- 3.25 As the application site is larger than 1 hectare, a Level 2 Flood Risk Assessment (FRA) will be required with an emphasis on the management of surface water run-off and to demonstrate that SuDS can control run-off rates and volumes from the site to existing run-off rates.

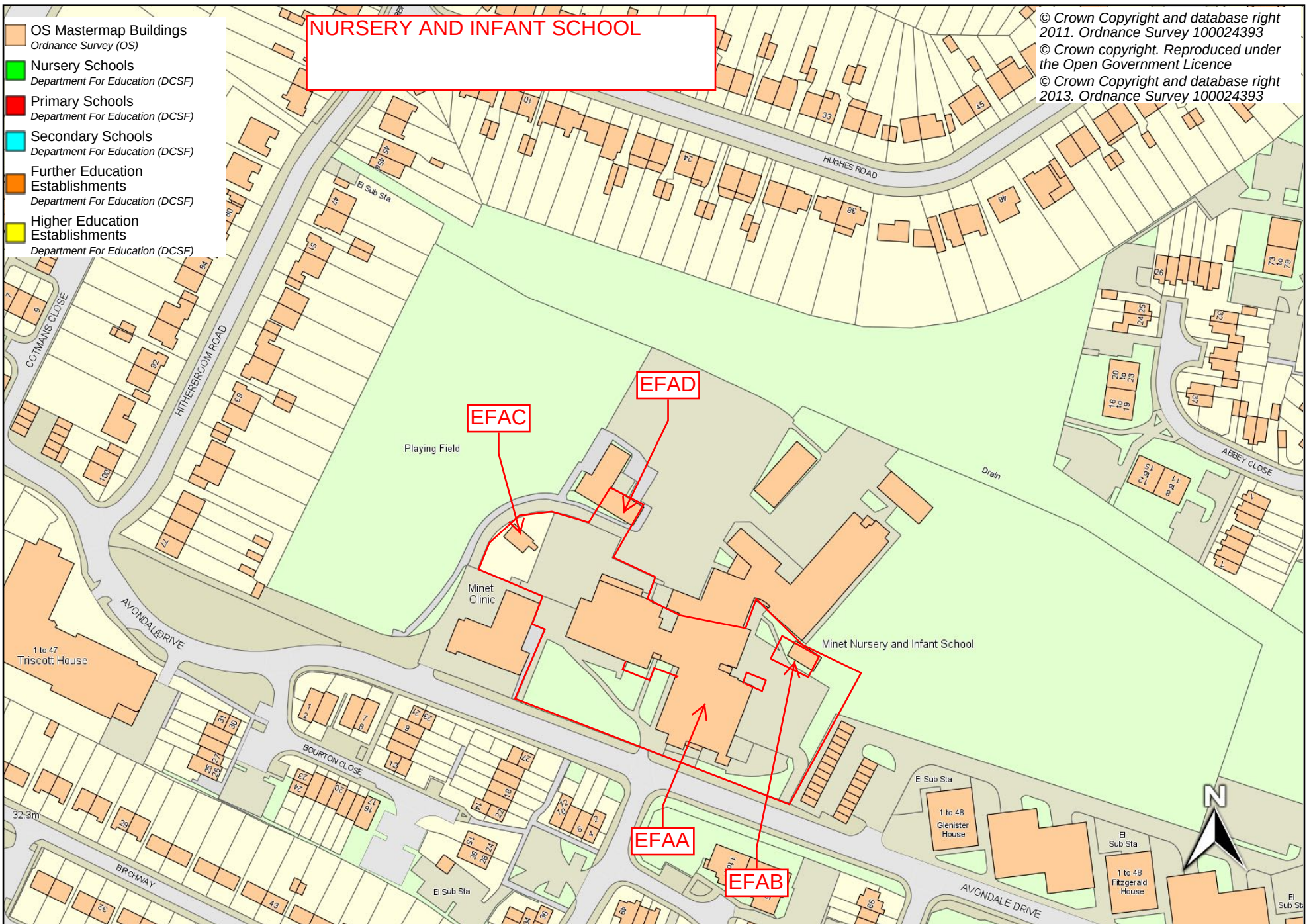
4.0 CONCLUSION

- 4.1 EA modelled flood maps confirm that the site lies in fluvial Flood Zone 1 (Low Risk) i.e. land assessed as having a less than 1 in 1000 annual probability of river flooding in any year (<0.1%).
- 4.2 The risk of flooding to the site from all sources (tidal, pluvial, artificial sources, sewer and groundwater) is either low, very low or non-existent.
- 4.3 The development is classified as 'More Vulnerable', which is appropriate for this site in Flood Zone 1.
- 4.4 As the application site is above 1ha, a Level 2 FRA will be required (in accordance with NPPF guidance) primarily to demonstrate satisfactory management of surface water run-off.

Appendix A – Site Location

Minet Junior School
3122036





© Crown Copyright and database right 2011. Ordnance Survey 100024393
 © Crown copyright. Reproduced under the Open Government Licence
 © Crown Copyright and database right 2013. Ordnance Survey 100024393

This map was printed from SIGnet on 05-Sep-2014 and is not for use within a legal document. The information is indicative only. Approximate scale at A4: 1:1483. Please do not take measurements from this map.

Appendix B – EA Flood Maps



Enter a postcode or place name:

Other topics for this area...

Flood Map for Planning (Rivers and Sea)

UB3 3NR

Go

Flood Map for Planning (Rivers and Sea) ▼

Map legend

Click on the map to see what Flood Zone (National Planning Policy Guidance definitions) the proposed development is in.

☒ Flood Map for Planning (Rivers and Sea) ⓘ

☒ Flood Zone 3

☒ Flood Zone 2

☒ Flood defences (Not all may be shown*)

☒ Areas benefiting from flood defences (Not all may be shown*)

☒ Main River ⓘ

☒ Main River

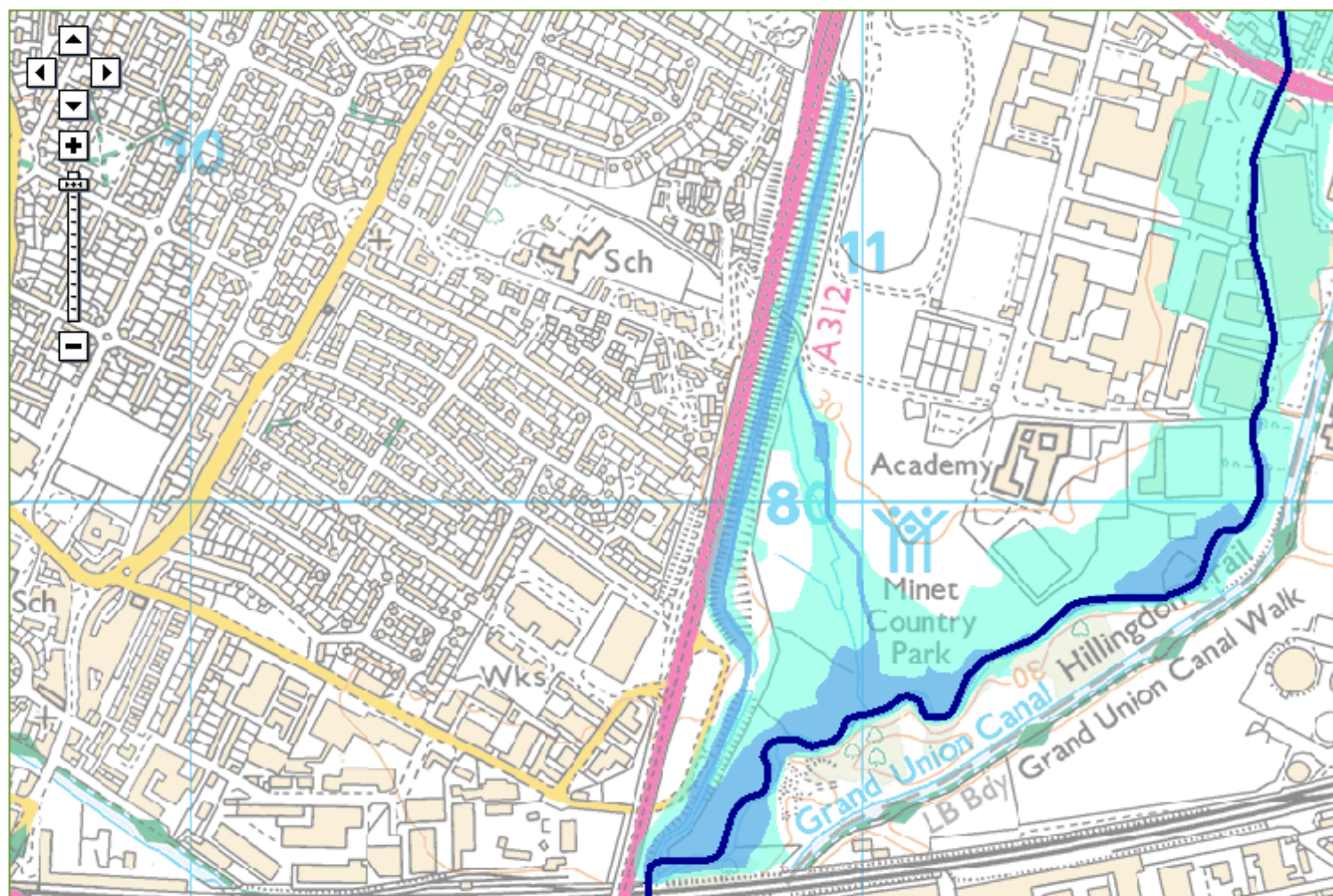
☒ Other national environmental organisations ⓘ

☒ Natural Resources Wales Area of responsibility

☒ Scottish Environment Protection Agency Area of responsibility

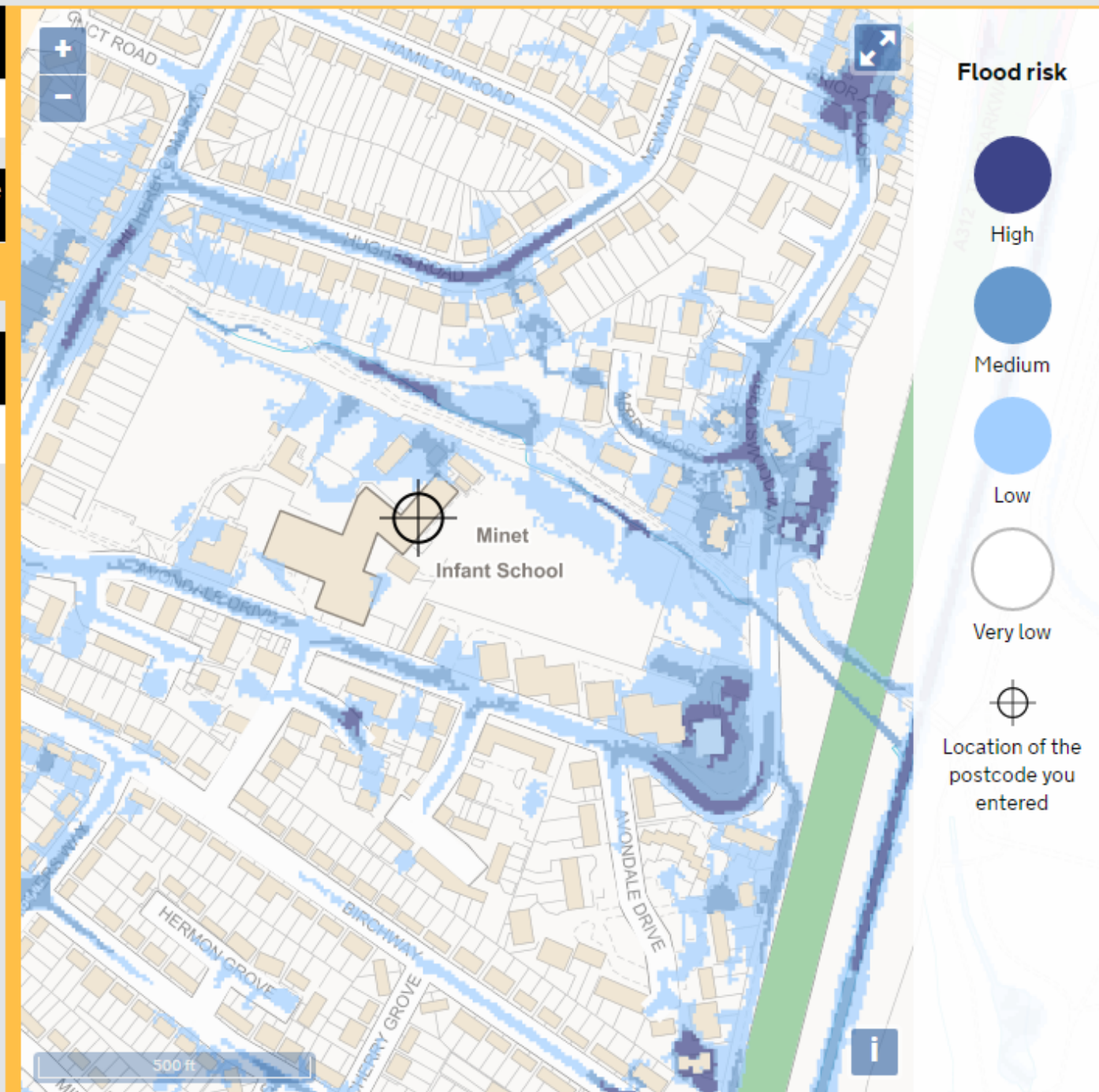
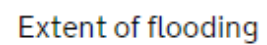
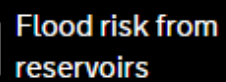
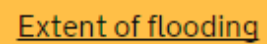
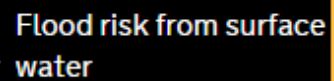
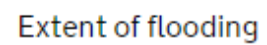
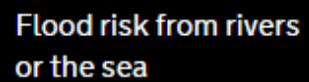
X: 510,727;Y: 180,067 at scale 1:10,000

Other maps ⓘ Data search ⓘ Text only version ⓘ



Customers in Wales - From 1 April 2013 Natural Resources Wales (NRW) has taken over the responsibilities of the Environment Agency in Wales.
© Environment Agency copyright and database rights 2016. © Ordnance Survey Crown copyright. All rights reserved. Environment Agency, 100026380.
Contains Royal Mail data © Royal Mail copyright and database right 2016.

This service is designed to inform members of the public, in line with our [terms and conditions](#). For business or commercial use, please [contact us](#).



Basic view ☐ Detailed view



Flood risk from rivers
or the sea



Extent of flooding



Flood risk from surface
water



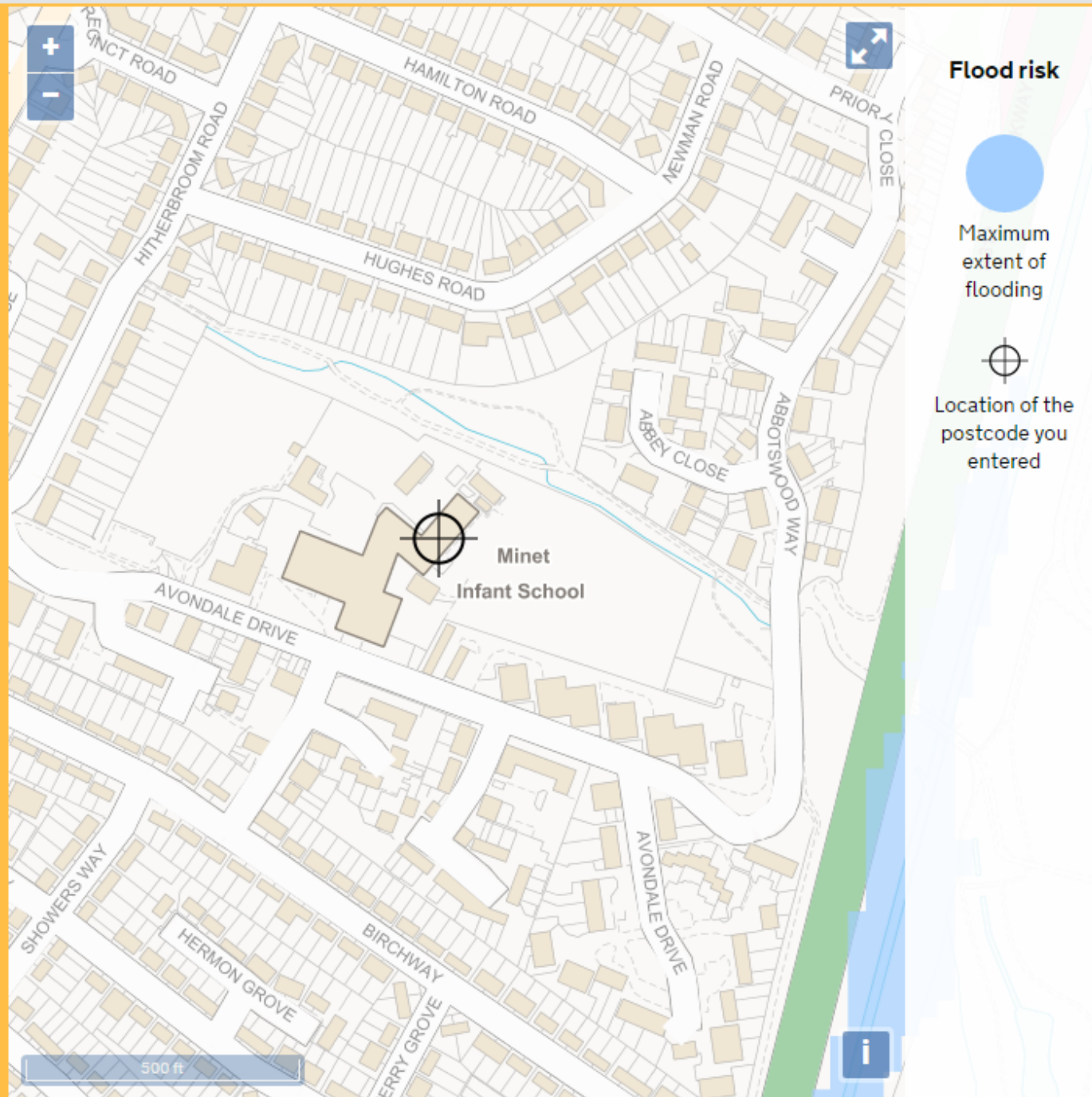
Extent of flooding



Flood risk from
reservoirs



Extent of flooding



Appendix C – TW Asset Location Search

Asset Location Search



CHECKED

Atkins Telecoms
Stats Enquiries Team, The Hub, 5 Aztec
West, Almonds, The Hub

BRISTOL
BS32 4RZ

Search address supplied Avondale Drive, Hayes
UB3 3NR

Your reference LM 37757

Our reference ALS/ALS Standard/2015_3026770

Search date 27 April 2015

You are now able to order your Asset Location Search requests online by visiting
www.thameswater-propertysearches.co.uk



Asset Location Search



Search address supplied: Avondale Drive, Hayes, UB3 3NR

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

Asset Location Search



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:

TQ1080SW
TQ1080NW
TQ1080SE
TQ1080NE

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.

Following examination of our statutory maps, Thames Water has been unable to find

Asset Location Search



any plans of water mains within this area. If you require a connection to the public water supply system, please write to:

New Connections / Diversions
Thames Water
Network Services Business Centre
Brentford
Middlesex
TW8 0EE

Tel: 0845 850 2777
Fax: 0207 713 3858
Email: developer.services@thameswater.co.uk

The following quartiles have not been printed as they are out of Thames' water catchment area. For details of the assets requested please contact the water company indicated below:

TQ1080SW	Affinity Water
TQ1080NW	Affinity Water
TQ1080SE	Affinity Water
TQ1080NE	Affinity Water

Affinity Water Ltd
Tamblin Way
Hatfield
AL10 9EZ

Tel: 0845 7823333

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.

Asset Location Search



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

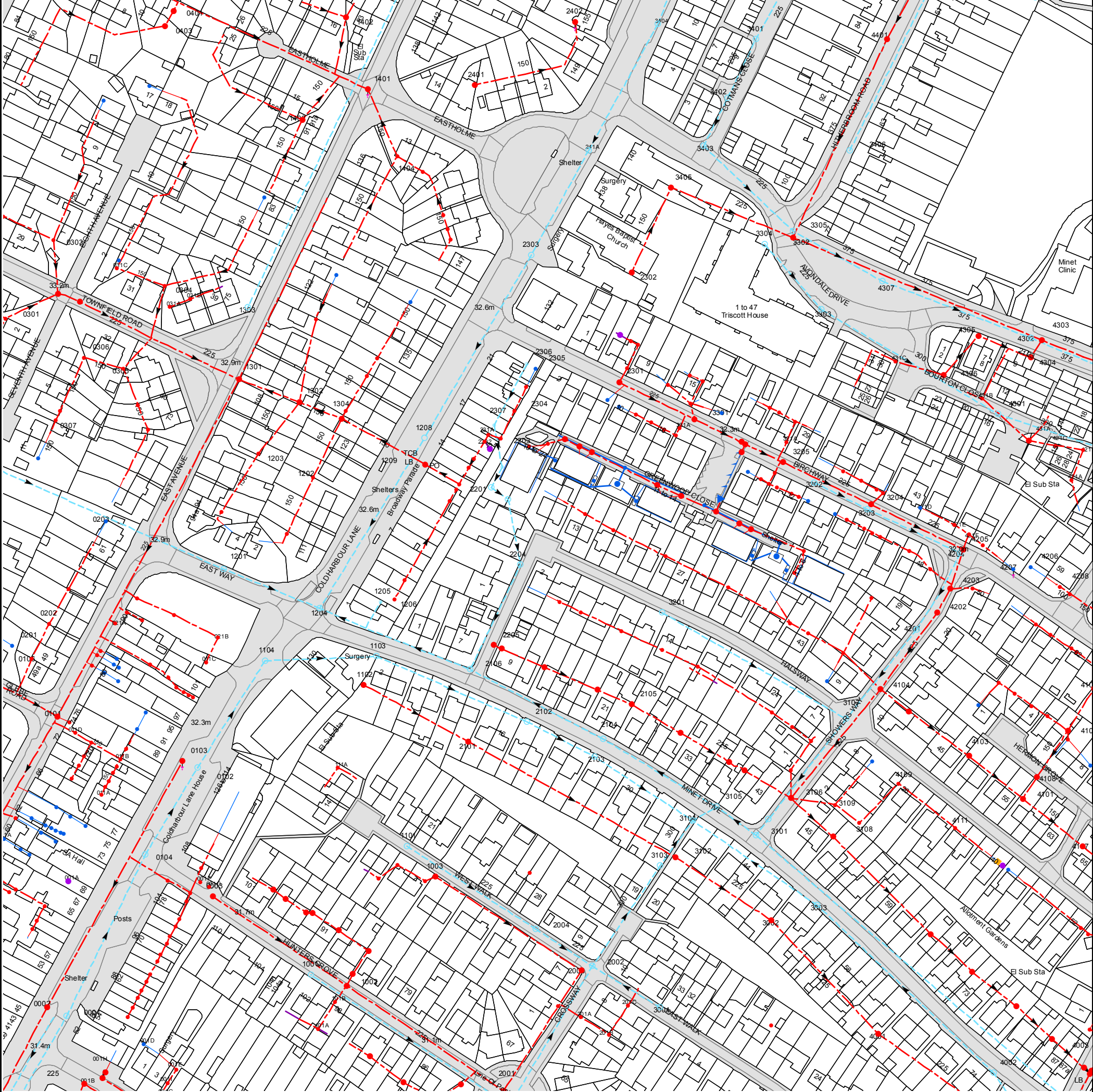
Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

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: 0845 850 2777
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 510250,180250
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
01NX	n/a	n/a
011A	n/a	n/a
01NU	n/a	n/a
01NT	n/a	n/a
01NO	n/a	n/a
01NS	n/a	n/a
01NR	n/a	n/a
01NQ	n/a	n/a
011B	n/a	n/a
01NP	n/a	n/a
01NW	n/a	n/a
01NN	n/a	n/a
011D	n/a	n/a
01NB	n/a	n/a
01JN	n/a	n/a
0101	n/a	n/a
01NV	n/a	n/a
011E	n/a	n/a
01ZF	n/a	n/a
02NC	n/a	n/a
01NL	n/a	n/a
02NA	n/a	n/a
01ZB	n/a	n/a
02NF	n/a	n/a
41ZD	n/a	n/a
4101	n/a	n/a
41ZE	n/a	n/a
4108	n/a	n/a
411G	n/a	n/a
4102	n/a	n/a
41ZH	n/a	n/a
41ZI	n/a	n/a
4105	n/a	n/a
00PJ	n/a	n/a
01ZE	n/a	n/a
00PF	n/a	n/a
0103	n/a	n/a
01ZD	n/a	n/a
00PH	n/a	n/a
01ZC	n/a	n/a
0003	n/a	n/a
01ZA	n/a	n/a
0102	n/a	n/a
001F	n/a	n/a
01GB	n/a	n/a
011C	n/a	n/a
001G	n/a	n/a
0003	n/a	n/a
1104	n/a	n/a
1004	n/a	n/a
1009	n/a	n/a
1007	n/a	n/a
1008	n/a	n/a
111A	n/a	n/a
1010	n/a	n/a
1102	n/a	n/a
101D	n/a	n/a
111B	n/a	n/a
1101	n/a	n/a
101C	n/a	n/a
00PK	n/a	n/a
00ZC	n/a	n/a
00ZA	n/a	n/a
00ZD	n/a	n/a
00NP	n/a	n/a
00ZF	n/a	n/a
001A	n/a	n/a
01GC	n/a	n/a
0104	n/a	n/a
01JM	n/a	n/a
01NG	n/a	n/a
10ND	n/a	n/a
01NA	n/a	n/a
01NF	n/a	n/a
01NM	n/a	n/a
10NH	n/a	n/a
01NK	n/a	n/a
01NJ	n/a	n/a
01NZ	n/a	n/a
01NI	n/a	n/a
01NC	n/a	n/a
01NE	n/a	n/a
01NY	n/a	n/a
311A	n/a	n/a
3002	n/a	n/a
301A	n/a	n/a
31XH	n/a	n/a
3106	n/a	n/a
31XB	n/a	n/a
31XC	n/a	n/a
31XA	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3003	n/a	n/a
31XK	n/a	n/a
31NX	n/a	n/a
3109	n/a	n/a
3107	n/a	n/a
3108	n/a	n/a
31XD	n/a	n/a
4001	n/a	n/a
4104	n/a	n/a
4109	n/a	n/a
41NA	n/a	n/a
40HC	n/a	n/a
4111	n/a	n/a
4103	n/a	n/a
40HB	n/a	n/a
41ZA	n/a	n/a
41ZB	n/a	n/a
4110	n/a	n/a
4112	n/a	n/a
1003	n/a	n/a
2101	n/a	n/a
2106	n/a	n/a
2102	n/a	n/a
211A	n/a	n/a
2004	n/a	n/a
21NC	n/a	n/a
201D	n/a	n/a
201A	n/a	n/a
2003	n/a	n/a
2002	n/a	n/a
2103	n/a	n/a
21ND	n/a	n/a
2104	n/a	n/a
201B	n/a	n/a
201C	n/a	n/a
2105	n/a	n/a
3103	n/a	n/a
3001	n/a	n/a
3102	n/a	n/a
31HA	n/a	n/a
3104	n/a	n/a
31XG	n/a	n/a
3105	n/a	n/a
31NB	n/a	n/a
31NA	n/a	n/a
3101	n/a	n/a
001B	n/a	n/a
001I	n/a	n/a
1012	n/a	n/a
00PB	n/a	n/a
00PA	n/a	n/a
001E	n/a	n/a
1011	n/a	n/a
001D	n/a	n/a
101A	n/a	n/a
00PG	n/a	n/a
0001	n/a	n/a
0002	n/a	n/a
00PT	n/a	n/a
101B	n/a	n/a
00PS	n/a	n/a
00PR	n/a	n/a
1002	n/a	n/a
00PQ	n/a	n/a
1001	n/a	n/a
1006	n/a	n/a
00PP	n/a	n/a
00PN	n/a	n/a
00PM	n/a	n/a
1005	n/a	n/a
00PL	n/a	n/a
4003	n/a	n/a
50AA	n/a	n/a
40WA	n/a	n/a
40WB	n/a	n/a
40XA	n/a	n/a
40HA	n/a	n/a
4005	n/a	n/a
4004	n/a	n/a
4107	n/a	n/a
2005	n/a	n/a
4002	n/a	n/a
3401	n/a	n/a
4401	n/a	n/a
32L4	n/a	n/a
32UG	n/a	n/a
3205	n/a	n/a
421Z	n/a	n/a
421C	n/a	n/a
321A	n/a	n/a
431A	n/a	n/a
33HA	n/a	n/a
4301	31.48	30.16

Manhole Reference	Manhole Cover Level	Manhole Invert Level
33HB	n/a	n/a
33UF	n/a	n/a
431B	n/a	n/a
4306	n/a	n/a
431C	n/a	n/a
4304	n/a	n/a
4303	n/a	n/a
4302	31.38	30.16
4305	n/a	n/a
3303	31.6	30.55
4307	31.64	30.51
3302	n/a	n/a
3305	31.75	30.73
3406	n/a	n/a
321L	n/a	n/a
32L5	n/a	n/a
321O	n/a	n/a
321M	n/a	n/a
32XC	n/a	n/a
32L6	n/a	n/a
321C	n/a	31.36
32L8	n/a	n/a
321D	n/a	31.3
32L7	n/a	n/a
32XJ	n/a	n/a
3202	n/a	n/a
32LB	n/a	n/a
32XB	n/a	n/a
32LG	n/a	n/a
32UR	n/a	n/a
32LF	n/a	n/a
3203	n/a	n/a
3204	n/a	n/a
32XX	n/a	n/a
32LE	n/a	n/a
32UD	n/a	n/a
42LD	n/a	n/a
32UC	n/a	n/a
42LC	n/a	n/a
4201	n/a	n/a
421D	n/a	n/a
42LA	n/a	n/a
4202	n/a	n/a
4203	n/a	n/a
421E	n/a	n/a
4204	n/a	n/a
4205	n/a	n/a
421F	n/a	n/a
42UA	n/a	n/a
42UB	n/a	n/a
4207	n/a	n/a
4206	n/a	n/a
52UB	n/a	n/a
52UA	n/a	n/a
4208	n/a	n/a
42XB	n/a	n/a
51UC	n/a	n/a
421A	n/a	n/a
51UZ	n/a	n/a
221N	n/a	n/a
221S	n/a	n/a
221K	n/a	n/a
221O	n/a	n/a
2309	n/a	n/a
2310	n/a	n/a
22ZB	31.9	30.515
3201	n/a	n/a
32XI	n/a	n/a
3307	n/a	n/a
32XE	n/a	n/a
3306	n/a	n/a
331A	n/a	n/a
32ZE	31.9	30.465
3301	n/a	n/a
321P	n/a	n/a
32ZB	31.89	30.215
32XD	n/a	n/a
32ZC	31.9	30.95
33AA	n/a	n/a
321J	n/a	31.21
32ZF	n/a	n/a
32L1	n/a	n/a
32ZA	31.9	31
321N	n/a	n/a
32L3	n/a	n/a
32L2	n/a	n/a
2402	n/a	n/a
3404	n/a	n/a
22WF	n/a	n/a
22WC	n/a	n/a
2201	n/a	n/a
22WE	n/a	n/a
22WD	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
2202	n/a	n/a
23WA	n/a	n/a
221A	n/a	n/a
221I	n/a	n/a
2205	n/a	n/a
2307	n/a	n/a
2203	n/a	n/a
22NB	n/a	n/a
221G	n/a	n/a
221H	n/a	n/a
2204	n/a	n/a
221B	31.8	31.186
22ZE	31.8	31.186
221L	n/a	n/a
32XL	n/a	n/a
22ZA	31.8	30.965
22ZC	31.89	30.885
22XK	n/a	n/a
22XG	n/a	n/a
22ZD	31.89	30.785
221M	n/a	n/a
22XF	n/a	n/a
33UG	n/a	n/a
23WC	n/a	n/a
2308	n/a	n/a
33UA	n/a	n/a
23LA	n/a	n/a
23WD	n/a	n/a
33UE	n/a	n/a
2301	n/a	n/a
33UB	n/a	n/a
33UC	n/a	n/a
2305	n/a	n/a
23UD	n/a	n/a
2306	n/a	n/a
23UA	n/a	n/a
23UB	n/a	n/a
23UC	n/a	n/a
2302	n/a	n/a
2303	n/a	n/a
3304	31.78	30.8
14JA	n/a	n/a
14JB	n/a	n/a
14JE	n/a	n/a
3405	n/a	n/a
241A	n/a	n/a
3403	31.88	30.98
3402	n/a	n/a
2401	n/a	n/a
0301	n/a	n/a
0306	n/a	n/a
0302	n/a	n/a
0306	n/a	n/a
031C	n/a	n/a
031E	n/a	n/a
0305	n/a	n/a
03MA	n/a	n/a
03MB	n/a	n/a
0304	n/a	n/a
031A	n/a	n/a
031B	n/a	n/a
1301	n/a	n/a
1303	n/a	n/a
1203	n/a	n/a
14A1	n/a	n/a
1302	n/a	n/a
13WC	n/a	n/a
13WB	n/a	n/a
1304	n/a	n/a
13JB	n/a	n/a
13JC	n/a	n/a
13JD	n/a	n/a
1404	n/a	n/a
13JE	n/a	n/a
14JAD	n/a	n/a
1208	n/a	n/a
0106	n/a	n/a
01NH	n/a	n/a
1103	n/a	n/a
02ND	n/a	n/a
02NG	n/a	n/a
0201	n/a	n/a
021B	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.		



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 510250,180750

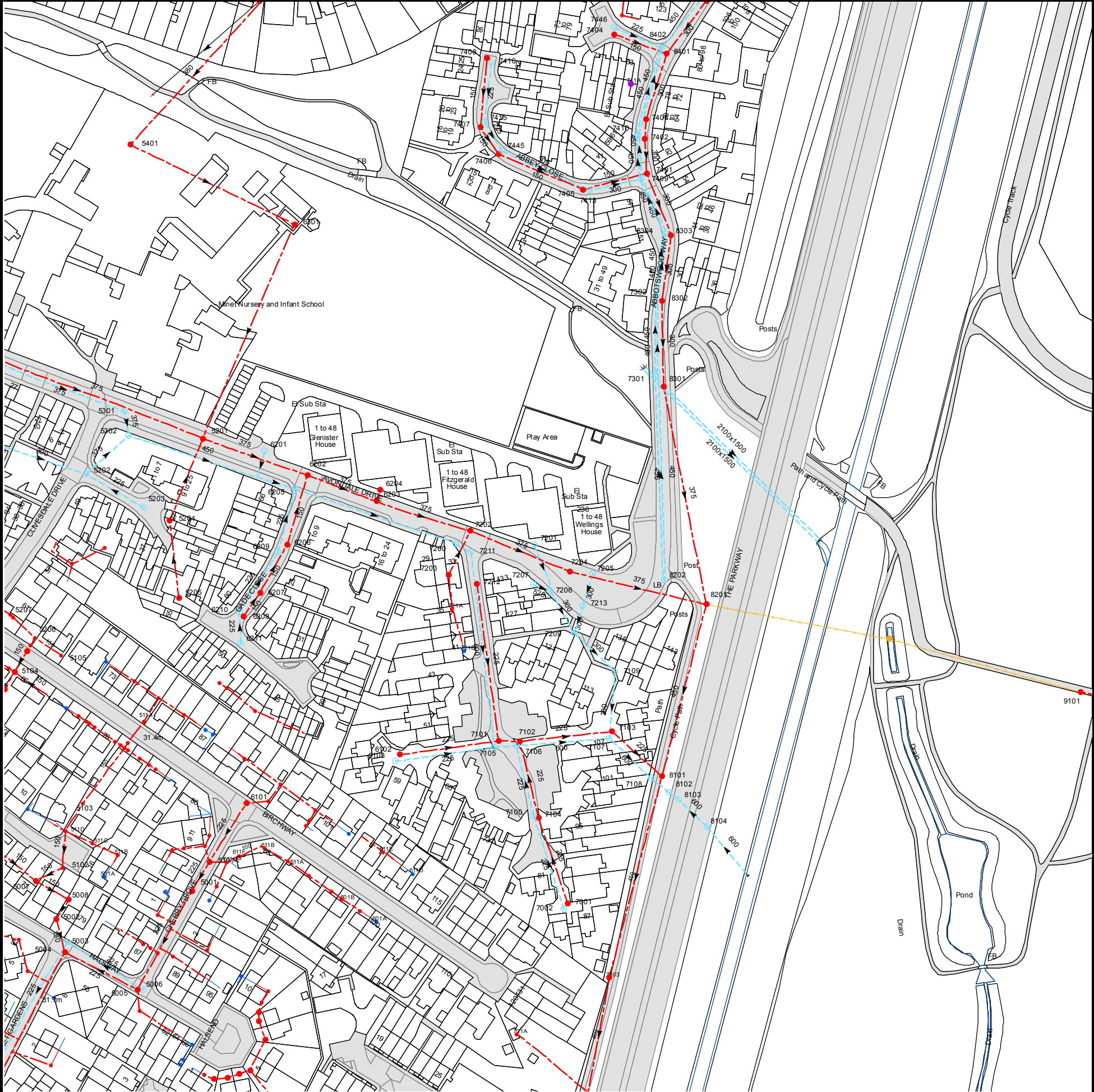
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual 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
4851	33.84	32.26
471A	n/a	n/a
461A	n/a	n/a
461B	n/a	n/a
451G	n/a	n/a
451C	n/a	n/a
451E	n/a	n/a
4552	31.78	30.58
4601	32.38	29.96
451D	n/a	n/a
4558	n/a	n/a
4652	32.31	31.15
4503	31.83	30.42
4502	31.88	30.46
4551	31.78	30.87
4501	31.75	30.17
4554	31.86	30.54
4653	32.01	n/a
4602	32.04	n/a
4555	31.76	30.99
461C	n/a	n/a
3553	32.47	30.88
3551	32.54	30.81
351Q	n/a	n/a
351I	n/a	n/a
351P	n/a	n/a
351S	n/a	n/a
3552	32.52	30.69
3555	32.06	31.41
351J	n/a	n/a
351O	n/a	n/a
351E	32.4	30.8
351F	32.4	30.76
351K	9.29	n/a
3556	32.06	31.33
3603	32.67	29.67
351L	9.42	n/a
351M	n/a	n/a
351H	32.3	30.74
351G	32.3	30.75
451F	n/a	n/a
4504	31.5	28.79
451A	n/a	n/a
451B	n/a	n/a
4553	31.76	30.6
4559	n/a	n/a
2953	34.77	33.19
4952	34.37	32.78
3902	34.61	33.09
3901	34.6	32.96
2952	35.03	32.89
2951	35.13	33.29
391C	n/a	n/a
391B	n/a	n/a
3951	34.91	33.38
4953	n/a	n/a
2653	n/a	n/a
2552	32.32	31.38
2501	32.39	29.81
2551	32.28	31.38
2508	n/a	n/a
2651	n/a	n/a
2652	n/a	n/a
261A	n/a	n/a
2601	32.6	30.13
2507	n/a	n/a
2502	32.24	29.34
2505	n/a	n/a
2506	n/a	n/a
2504	n/a	n/a
2503	31.93	29.43
2603	n/a	n/a
261B	n/a	n/a
251A	n/a	n/a
3501	n/a	n/a
361A	n/a	n/a
3558	32.39	30.96
3502	32.44	29.12
3554	32.44	30.91
3503	32.52	29.55
351R	n/a	n/a
2701	32.85	30.59
2751	32.8	31.37
2954	34.85	33.22
2702	32.83	n/a
281A	n/a	n/a
291A	n/a	n/a
2602	32.53	30.4
2604	32.55	30.8

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3601	32.56	30.42
3754	n/a	n/a
371A	n/a	n/a
3753	33.24	32.66
3752	33.13	31.58
3602	32.95	30.75
3751	33.15	31.68
3651	32.87	31.35
3604	32.98	29.76
3652	33.14	31.5
4651	32.69	31.59
491A	n/a	n/a
4852	33.72	31.89
4751	33.81	31.96
4902	34.09	31.81
481B	n/a	n/a
4951	n/a	n/a
4901	34	31.62
481A	n/a	n/a
1803	33.8	31.89
1854	33.8	32.36
181A	n/a	n/a
1851	34.2	32.76
181B	n/a	n/a
081B	n/a	n/a
0801	n/a	n/a
0904	34.49	33.26
0951	34.67	32.54
0901	34.67	32.15
091B	n/a	n/a
191B	n/a	n/a
191A	n/a	n/a
0903	35.11	n/a
091A	n/a	n/a
0952	35.22	32.7
0902	35.6	32.52
091C	n/a	n/a
071D	n/a	n/a
0752	33.67	31.81
071E	n/a	n/a
1701	33.38	31.24
1751	33.34	31.92
1702	n/a	n/a
0751	33.87	32.26
0702	33.44	31.53
0701	33.92	31.93
171C	n/a	n/a
171B	n/a	n/a
171A	n/a	n/a
181D	n/a	n/a
081A	n/a	n/a
181C	n/a	n/a
1852	33.6	32.36
1802	33.66	31.58
1853	33.73	32.08
181E	n/a	n/a
1801	33.93	n/a
0501	n/a	n/a
151A	n/a	n/a
161A	n/a	n/a
061A	n/a	n/a
1602	n/a	n/a
161B	n/a	n/a
1601	n/a	n/a
0601	34.51	30.72
0652	34.52	32.16
0651	33.53	31.59
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.		



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 510750,180250
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.

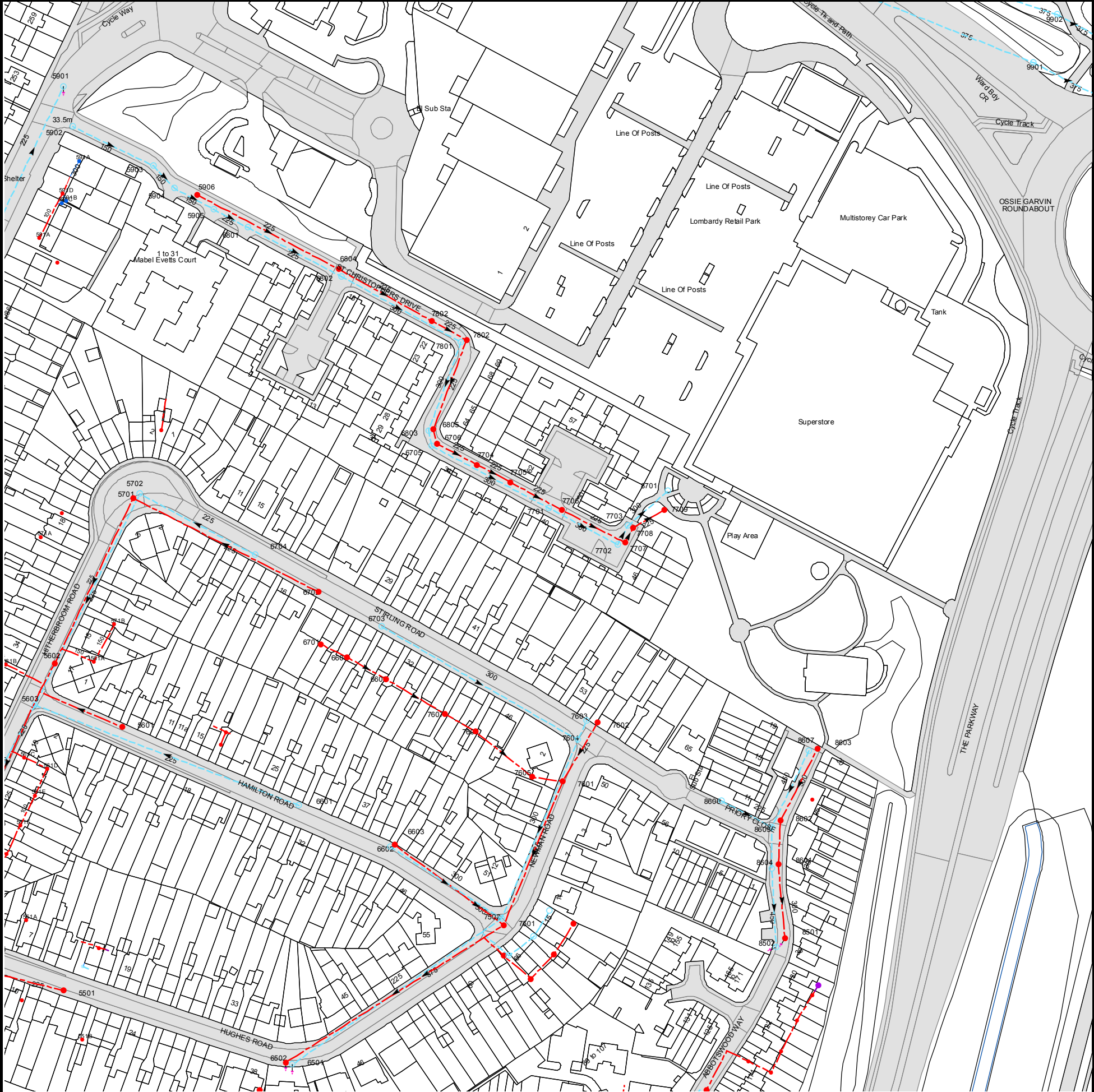
Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

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
61UD	n/a	n/a
61UH	n/a	n/a
7104	n/a	n/a
7100	n/a	n/a
61UE	n/a	n/a
61UC	n/a	n/a
61UB	n/a	n/a
7108	n/a	n/a
6103	n/a	n/a
6102	n/a	n/a
7105	n/a	n/a
7106	n/a	n/a
7102	n/a	n/a
7101	n/a	n/a
7107	n/a	n/a
7103	n/a	n/a
7109	n/a	n/a
721B	n/a	n/a
7209	n/a	n/a
721A	n/a	n/a
7213	n/a	n/a
6207	n/a	n/a
7206	n/a	n/a
7207	n/a	n/a
7212	n/a	n/a
7203	n/a	n/a
7205	n/a	n/a
4105	n/a	n/a
51UX	n/a	n/a
5104	n/a	n/a
51ZC	n/a	n/a
51ZA	n/a	n/a
51UQ	n/a	n/a
51UP	n/a	n/a
5103	n/a	n/a
51UO	n/a	n/a
51UN	n/a	n/a
51ZE	n/a	n/a
51UM	n/a	n/a
51UL	n/a	n/a
51HK	n/a	n/a
51UE	n/a	n/a
51BA	n/a	n/a
51UJ	n/a	n/a
51UD	n/a	n/a
611C	n/a	n/a
5101	n/a	n/a
611F	n/a	n/a
51XP	n/a	n/a
51XS	n/a	n/a
51XR	n/a	n/a
51XT	n/a	n/a
6101	n/a	n/a
51HF	n/a	n/a
51UG	n/a	n/a
51UH	n/a	n/a
61UA	n/a	n/a
5106	n/a	n/a
51UF	n/a	n/a
511A	n/a	n/a
51UK	n/a	n/a
611P	n/a	n/a
51UA	n/a	n/a
61XB	n/a	n/a
61XA	n/a	n/a
6211	n/a	n/a
6208	n/a	n/a
6210	n/a	n/a
5205	n/a	n/a
5204	n/a	n/a
5203	n/a	n/a
5201	31.038	27.588
5009	n/a	n/a
6001	n/a	n/a
50XI	n/a	n/a
6002	n/a	n/a
6003	n/a	n/a
501L	n/a	n/a
50XL	n/a	n/a
50XK	n/a	n/a
6005	n/a	n/a
6006	n/a	n/a
50XJ	n/a	n/a
5006	n/a	n/a
60XF	n/a	n/a
50FA	n/a	n/a
501J	n/a	n/a
50XU	n/a	n/a
50XB	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
50XC	n/a	n/a
50JN	n/a	n/a
50XN	n/a	n/a
50XQ	n/a	n/a
5001	n/a	n/a
50XM	n/a	n/a
40XB	n/a	n/a
40XC	n/a	n/a
5005	n/a	n/a
5011	n/a	n/a
5004	n/a	n/a
5003	n/a	n/a
5010	n/a	n/a
5002	n/a	n/a
5008	n/a	n/a
5007	n/a	n/a
501A	n/a	n/a
5102	n/a	n/a
511B	n/a	n/a
6004	n/a	n/a
701A	n/a	n/a
60XH	n/a	n/a
60XG	n/a	n/a
7003	n/a	5.35
601A	n/a	n/a
60UA	n/a	n/a
7002	n/a	n/a
7001	n/a	n/a
601B	n/a	n/a
60UV	n/a	n/a
60UX	n/a	n/a
611D	n/a	n/a
611A	n/a	n/a
611E	n/a	n/a
611B	n/a	n/a
61UF	n/a	n/a
7404	n/a	n/a
7446	n/a	n/a
741B	n/a	n/a
8402	n/a	n/a
8401	n/a	n/a
5202	n/a	n/a
5302	n/a	n/a
5301	n/a	n/a
5401	n/a	n/a
7204	n/a	n/a
7211	n/a	n/a
6209	n/a	n/a
7201	n/a	n/a
6206	n/a	n/a
7200	n/a	n/a
7202	n/a	n/a
6203	n/a	n/a
6204	n/a	n/a
6205	n/a	n/a
6202	n/a	n/a
6201	n/a	n/a
6301	n/a	n/a
7413	n/a	n/a
7405	n/a	n/a
7409	n/a	n/a
7401	n/a	n/a
7406	n/a	n/a
7445	n/a	n/a
7402	n/a	n/a
7410	n/a	n/a
7407	n/a	n/a
7415	n/a	n/a
7403	n/a	n/a
741A	n/a	n/a
7416	n/a	n/a
7408	n/a	n/a
52XA	n/a	n/a
5207	n/a	n/a
52NB	n/a	n/a
52NA	n/a	n/a
5206	n/a	n/a
5105	n/a	n/a
52ZB	n/a	n/a
52ZC	n/a	n/a
51UB	n/a	n/a
7301	n/a	n/a
7302	n/a	n/a
8302	n/a	n/a
8101	n/a	n/a
8301	n/a	n/a
8202	n/a	n/a
8304	n/a	n/a
8102	n/a	n/a
8303	n/a	n/a
8103	n/a	n/a
8201	n/a	n/a
8104	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
9101	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.		



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 510750,180750

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
7706	31.58	29.68
7709	31.83	29.3
7701	31.6	29.42
8701	31.65	28.18
7705	31.73	29.88
7704	31.82	29.99
6705	31.94	29.81
6706	31.96	30.14
6803	31.99	29.83
6805	n/a	30.18
7801	32.24	30.16
7802	32.23	30.46
7802	32.33	30.57
6802	32.59	30.57
6804	32.61	30.88
6801	32.87	30.9
9901	n/a	n/a
9902	n/a	n/a
561B	n/a	n/a
561C	n/a	n/a
5603	32.28	31
581A	n/a	n/a
571A	n/a	n/a
5602	33	30.95
581B	n/a	n/a
591C	n/a	n/a
571C	n/a	n/a
591D	n/a	n/a
591B	n/a	n/a
561A	n/a	n/a
571B	n/a	n/a
5601	31.61	30.48
5701	n/a	n/a
5702	n/a	n/a
5903	33.16	31.24
581C	n/a	n/a
5904	33.09	31.15
5906	32.91	31.22
5905	32.97	31.02
561G	n/a	n/a
661A	n/a	n/a
561H	n/a	n/a
561F	n/a	n/a
551E	n/a	n/a
551A	n/a	n/a
561E	n/a	n/a
561D	n/a	n/a
5501	n/a	n/a
551B	n/a	n/a
551D	n/a	n/a
551C	n/a	n/a
6704	32.15	31.3
651A	n/a	n/a
6502	31.61	30.17
6501	31.32	28.66
6601	32.14	31.17
6702	32.08	30.99
6701	n/a	n/a
6604	n/a	n/a
6703	31.86	30.79
6605	n/a	n/a
6602	31.81	30.66
6603	31.83	29.69
7607	n/a	n/a
7606	n/a	n/a
7502	n/a	n/a
7501	31.47	29.05
7503	n/a	n/a
7507	n/a	n/a
7504	n/a	n/a
7605	n/a	n/a
7508	n/a	n/a
7509	n/a	n/a
7505	n/a	n/a
7601	31.53	29.31
7506	n/a	n/a
7604	31.38	30.45
7603	n/a	n/a
7602	n/a	n/a
7702	31.4	29.16
7707	31.4	29.5
7703	31.6	29.08
7708	31.6	29.43
851A	n/a	n/a
8606	30.75	29.57
851G	n/a	n/a
851F	n/a	n/a
8605	30.22	29.28
8604	30.94	29.19

Manhole Reference	Manhole Cover Level	Manhole Invert Level
8502	30.69	29.03
8601	30.34	27.9
8602	30.2	28.14
851E	n/a	n/a
8501	30.69	27.87
851D	n/a	n/a
8607	30.57	29.4
851C	n/a	n/a
861A	n/a	n/a
8603	30.65	28.3
851B	n/a	n/a
591A	n/a	n/a
5902	33.38	31.5
5901	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		

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.

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

- 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.

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 him 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.	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 4 Disclaimer

This report has been prepared by Milvum Engineer Services in its professional capacity as geotechnical, environmental and civil engineering specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client, and is provided by Milvum Engineering Services solely for the use of its client (Morgan Sindall Infrastructure & Construction).

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to Milvum Engineering Services at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, Milvum Engineering Services may, by prior written agreement, agree to such release, provided that it is acknowledged that Milvum Engineering Services accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. Milvum Engineering Services accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against Milvum Engineering Services except as expressly agreed with Milvum Engineering Services in writing.