SHORPLANS DEVELOPMENTS RIBA Chartered Practice

Drainage Strategy Report

14a Bourne Ave, Ruislip, HA4 6TZ

for

Mr Farid Marty

August 2023

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Revision	Date of issue	Comments	Prepared By	Checked By
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Executive Summary

Description	
Shorplans Developments has been instructed by Mr Farid Malty, to produce a Drainage Strategy report to support the Planning Application for the site at 14a Bourne Avenue, Hillingdon, Ruilsip, Surrey, HA4 6TZ	
Site Parameters	
Total Area: Greenfield: Brownfield: Mixed Green and Brownfield: Existing Runoff Location: Ground Conditions: Method of Study: Ground Infiltration Potential:	386sqm² NO NO YES Ground. Clay Desk Investigation High
Flood Risk Assessment	
Coastal: Fluvial: Pluvial: Groundwater: Other sources:	Zone 1 Zone 1 Low Low Low
Drainage Strategy / SuDS	
Infiltration Viable: Discharge Point (SW): Flow Control: Storage Provided: Discharge Point (FW):	YES Ground N/A 1 in 100 Year + 40% Climate Change Sewer
SuDS Elements: Water Quality Measures: Exceedance flows:	Soakaways Catchpits Managed within site
Conclusions	
Infiltration is likely to be viable on site and so soakaways are promoted for the scheme.	

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Contents

Appendices

1.0 Introduction

1.1.1 Mr Farid Marty gained planning permission in 2018 for a new build development on the site at 14a Bourne Avenue, Hillingdon, Ruislip, Surrey, HA4 6TZ.

1.1.2 Shorplans Developments has been instructed by Mr Farid Marty, to produce a Drainage Strategy Report to support the Planning Application.

1.1.3 This report aims to demonstrate that a reduction in surface water run-off from the site can be achieved.

1.1.4 This report will assess the new building only. It is anticipated that the car parking modifications are constructed in a porous surfacing, with direct infiltration into the ground.

1.1.5 The general limitations of this assessment are that:

- Several data sources have been used in compiling this report. Whilst Shorplans Developments believe them to be trustworthy; it is unable to guarantee the accuracy of the information that has been provided by others.
- This report is based on information available at the time of preparation. There is potential for further information to become available, which may create a need to modify conclusions drawn in this report.

2.0 Location of Site

2.1.1 The site is located on Bourne Avenue in Ruislip. A location plan is enclosed in **Appendix**

A. 2.1.2 The Local Authority is the London Borough of Hillingdon.

3.0 Site Description

3.1 Existing Site

3.1.1 A Topographical Survey has been commissioned for the site and can be found in **Appendix B**.

3.1.2 The site falls from north west to south east, with levels ranging between 36.50m AOD and 36.35m AOD.

3.2 Existing Drainage System

3.2.1 Survey information from previous works to the site have been obtained and can be found at **Appendix C**. There is a private foul water sewer exiting the site to the south and an existing soakaway system on the site.

3.2.2 The new soakaway was installed during the construction stages of the development.

3.2.3 The proposed soakaway system is sized for the entire catchment served (existing and proposed) at detailed design stage, subject to infiltration testing.

3.3 Existing Geology

3.3.1 The geology of the site has been ascertained by reference to the 1:50,000 British Geological Survey website. The data provided on the website indicates the bedrock and superficial drift geology for the site.

3.3.2 The strata of the site (bedrock geology) comprises clay formation, described as follows:

Ground Conditions: According to the BGS records (accessed online August 2023), the site is underlain by London Clay formation (clay, silt and sand). Based on borehole logs for the adjacent site (north) show a very thin layer (up to 2m thickness) of sand and gravel at a depth of 2.2m (beneath a layer of silty/sandy clay.

3.4 Geological Assessment

3.4.1 Boreholes in the local area indicate predominantly London Clay (clay, silt and sand).

3.4.2 It has not been possible to undertake site investigations at the time of writing this report to determine the underlying geology. It is recommended that a full geotechnical investigation be completed prior to any detailed design of the scheme.

3.4.3 Based on the desk study information on the geology of the site, infiltration is likely to be suitable for the development.

3.4.4 Full soakage testing and stability testing is recommended prior to the detailed design of the scheme to determine the hydraulic capacity of the proposed soakaway and the most suitable location.

3.5 Hydrogeology Setting

3.5.1 The Environment Agency (EA) mapping service, as provided by Magic Map, indicates the aquifer designation for the bedrock and superficial drift geology and the groundwater vulnerability in the area. The mapping, as included at **Appendix D**, provide the following information for the site:

Geology Map	Site Description
Aquifer Designation (Bedrock)	Principal
Aquifer Designation (Superficial Drift)	Unproductive
Groundwater Vulnerability	High
Groundwater Source Protection Zone	Zone II – Outer Protection

3.6 Hydrology

3.6.1 There are no strategic watercourses within 5km of the site.

4.0 Site Run-Off

4.1 Existing Surface Water Runoff

4.1.1 The site has been not been previously developed, but an analysis of the run-off rate is appropriate and will be made for the developable site area of 0.286 hectares.

4.1.2 The run-off rates have been calculated for the existing site. The existing site run-off rates have been calculated based on the Interim Code of Practice for Sustainable Drainage Systems, Chapter 6 using the Micro Drainage design software. The output from the software analysis can be found at **Appendix E**.

4.1.3 The Qbar (rural) value for the site is 1.6 litres per second. A conservative value of 30% hardstanding has been used to calculate the urban run-off from site. The Qbar (urban) value for the site is 2.5 litres per second.

4.1.4 A technical assessment has been made for the site of the most appropriate flow rate suiting the site constraints as follows:

Flow Rate (Standard)	Flow Rate (l/s)	Method of control	Constraints
Qbar Rural	1.6	-	Too low for a flow control
Qbar Urban	2.5	Hydro-Brake	1. Low flow rate indicates high level of silt removal required. 2. Hydrobrake chamber must be constructible.
3 x Qbar	4.8	Hydro-Brake	1. Low flow rate indicates high level of silt removal required. 2. Hydrobrake chamber must be constructible.
-	2.0	Hydro-Brake	1. Low flow rate indicates high level of silt removal required. 2. Hydrobrake chamber must be constructible.
-	5.0	Orifice	Minimum flow rate of 5.0 l/s to prevent blockages (or 50mm diameter orifice)
Infiltration	0	None	Site must be suitable for infiltration

4.2 Greenfield Run-Off Assessment

4.2.1 An assessment of the most appropriate flow restriction on site can be made with an engineering judgement made on the following parameters:

- Proposed depth of surface water system. Shallow systems will not be able to construct certain flow controls.
- Risk of blockages, open drainage systems and conventional piped systems will have a significantly higher chance of blockage.
- Potential for soakage or a hybrid solution with some infiltration and some positive discharge.
- The existing use of the site (green/brown field) and the most appropriate reduction in surface water flows from the proposed development.
- Potential development costs and the viability of achieving very low flow rates on sites.

- Manufacturer limits, with Hydro-International stating they can achieve between 0.7 and 550 l/s on their product range.

4.2.2 Infiltration has been selected, based on the geotechnical information provided within this report.

5.0 Proposed Development

5.1.1 The proposal is for 4 No. residential units. A site layout can be found at **Appendix**

5.2 F. Infiltration Potential

5.2.1 The geotechnical information provided in this report indicates that standard infiltration methods will be suitable on site, subject to BRE testing undertaken as part of the detailed design of the scheme.

5.2.2 The table below summarises the potential for infiltration.

Low infiltration potential: There is a low potential for infiltration SuDS in parts of the Site. **Comments:** It is likely that the underlying geology at the Site, or in areas of the site, is relatively impermeable which would limit the effectiveness of a proposed infiltration SuDS scheme. **Recommendations:** Infiltration SuDS should be focused in more suitable parts of the site. If a site investigation confirms that infiltration SuDS are not possible at the site, then attenuation SuDS with a controlled discharge into a nearby surface water feature or existing surface water drainage is recommended.	**YES**
Moderate infiltration potential: There is a moderate potential for infiltration SuDS in parts of the Site. **Comments:** It is likely that the permeability of the underlying material at the site would be suitable for infiltration drainage. However, there may be constraints on the use of infiltration SuDS because of any of the following: a high water-table, the limited thickness of the receiving formation, the potential for a significant range in permeability in the underlying geology and confirmation of the infiltration capacity is recommended. **Recommendations:** A site investigation is recommended to investigate groundwater levels and formation thickness and to confirm that infiltration rates at the site are sufficient to accommodate an infiltration SuDS feature. If a site investigation confirms that infiltration SuDS are possible at the Site then assorted options can be considered for infiltration SuDS and these include infiltration trenches, soakaways, swales, permeable pavements and infiltration basins without outlets.	**NO**
High infiltration potential: There is a high potential for infiltration SuDS in parts of the Site. **Comments:** It is likely that the underlying geology at the Site is highly permeable and an infiltration SuDS scheme should be possible at the Site. Groundwater levels are expected to be sufficiently deep at the site. **Recommendations:** A site investigation is recommended to confirm the high infiltration capacity and the depth of the winter water table. Assorted options can be considered for infiltration SuDS and these include infiltration trenches, soakaways, swales, permeable pavements and infiltration basins without outlets.	**NO**

6.0 Sustainable Drainage Assessment

6.1 SuDS Hierarchy

6.1.1 Options for the destination for the run-off generated on site have been assessed in line with the prioritisation set out in the Building Regulations Part H document and DEFRA's Draft National Standards for SuDS as follows:

Discharge to Ground	Selected option based on desk study
Discharge to Watercourse	N/A
Discharge to Surface Water Sewer	N/A
Discharge to Other Sewer	N/A

6.1.2 The indicative potential for different SuDS devices has been assessed and can be seen in the table below:

SuDS Feature	Environmental benefits	Water quality improvement	Suitability for low permeability soils ($k<10^{-6}$)	Ground-water recharge	Suitable for small / confined sites?	Site specific restrictions	Appropriate for subject site?
Wetlands	✓	✓	✓	X	X	Site Constraints	No
Retention ponds	✓	✓	✓	X	X	Site Constraints	No
Detention basins	✓	✓	✓	X	X	Site Constraints	No
Infiltration basins	✓	✓	X	✓	X	Site Constraints	No
Soakaways	X	✓	X	✓	✓	None	Yes
Underground storage	X	X	✓	X	✓	None	Yes
Swales	✓	✓	✓	✓	X	Sloping site	No
Filter strips	✓	✓	✓	✓	X	Sloping site	No
Rainwater harvesting	X	✓	✓	✓	✓	Minimal Scope	No
Permeable paving	X	✓	✓	✓	✓	Sloping site	No
Green roofs	✓	✓	✓	X	✓	None	Yes
Rain Garden (external)	✓	✓	✓	X	X	Sloping site	No
Rain Garden (planter)	✓	✓	✓	X	X	Sloping site	No

6.2 Detailed SuDS Assessment

6.2.1 To maximize the potential use of SuDS at the site, a review has been undertaken in accordance with the SuDS Hierarchy (refer to SuDS: A Practical Guide prepared by the Environment Agency).

6.2.2 The following table indicates the potential setting for SuDS elements:

	Description	Setting	Required Area
Green Roof	A planted soil layer is constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation.	Building	Building integrated
Rainwater Harvesting	Rainwater is collected from the roof of a building or from other paved surfaces and stored in an overground or underground tank for treatment and reuse locally. Water could be used for toilet flushing and irrigation.	Building	Water storage (underground or above ground)
Soakaway	A soakaway is designed to allow water to quickly soak into permeable layers of soil. Constructed like a dry well, an underground pit is dug filled with gravel or rubble. Water can be piped to a soakaway where it will be stored and allowed to gradually seep into the ground.	Open Space	Dependant on Run-off volumes and soils
Filter Strip	Filter strips are grassed or planted areas that runoff can run across to promote infiltration and cleansing.	Open Space	Maximum length 5 metres
Permeable Paving	Paving which allows water to soak through. Can be in the form of paving blocks with gaps between solid blocks or porous paving where water filters through the block itself. Water can be stored in the sub-base beneath or allowed to infiltrate into ground below.	Street / Open Space	Can typically drain double its area
Bioretention Area	A vegetated area with gravel and sand layers below designed to channel, filter and cleanse water vertically. Water can infiltrate into the ground below or drain to a perforated pipe and be conveyed elsewhere. Bioretention systems can be integrated with tree-pits or gardens.	Street / Open Space	Typically, surface area is 5-10% of drained area with storage below.
Swale	Swales are vegetated shallow depressions designed to convey and filter water. These can be 'wet' where water gathers above the surface, or 'dry' where water gathers in a gravel layer beneath. Can be lined or unlined to allow infiltration.	Street / Open Space	Account for width to allow safe maintenance typically 2-3 metres wide.
Hardscape Storage	Hardscape water features can be used to store run-off above ground within a constructed container. Storage features can be integrated into public realm areas with a more urban character.	Open Space	Could be above or below ground and sized to storage need.
Pond / Basin	Ponds can be used to store and treat water. 'Wet' ponds have a constant body of water and run-off is additional, while 'dry' ponds are empty during periods without rainfall. Ponds can be designed to allow infiltration into the ground or to store water for a period of time before discharge.	Open Space	Dependant on runoff volumes and soils.
Wetland	Wetlands are shallow vegetated water bodies with a varying water level. Specially selected plant species are used to filter water. Water flows horizontally and is gradually treated before being discharged. Wetlands can be integrated with a natural or hardscape environment.	Open Space	Typically, 5-15% of drainage area to provide good treatment.
Underground Storage	Water can be stored in tanks, gravel or plastic crates beneath the ground to provide attenuation.	Open Space	Dependant on runoff volumes and soils.

6.2.3 This review highlights the components referenced in the SuDS Hierarchy and provides recommendations on whether the components could be incorporated into the development.

Component	Recommendation / Opinion	
Green (living) roofs or Blue/Green roof systems	There is scope for green or blue roof systems on the development and a green roof has been promoted as part of the scheme.	↓
Basins and Ponds	There is no potential for basins and ponds on the site.	↓
Filter Strips and Swales	There is no scope for use of surface mounted SuDS on the scheme to convey water.	↓
Infiltration Devices	Infiltration devices should be viable on site, subject to further geotechnical investigations.	↓
Permeable Surfaces and Filter Drains	Porous surfaces may not be viable based on the slope of the site.	↓
Tanked Systems	It is unlikely that these will be required.	↓

6.2.4 The proposed drainage system incorporates sustainable drainage features in accordance with the SuDS hierarchy, current legislation and best practice as much as practicable on site.

6.2.5 There may be opportunity for small scale bespoke SuDS elements (such as planters and filtration beds) to be included as part of the landscaping proposals. These should be considered fully before construction commences.

7.0 Drainage Proposal

7.1 Surface Water Drainage

7.1.1 Surface water drainage at the site will follow the Sustainable Drainage Systems (SuDS) management train. The surface water from the site will discharge into the ground via infiltration, subject to full infiltration testing. A Drainage Plan can be found at **Appendix G**.

7.1.2 New climate change allowances have been in force since February 19th 2016. The new allowances take into consideration the design life of the development, flood zone, development type and geographical location.

7.1.3 Based on these parameters, the Central value for rainfall intensity should be used. Based on Table 2 (shown below), this is a range between 20% and 40% for the central and upper end values. Therefore, it is appropriate to use 40% on this development for design.

Table 2 peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline)

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

7.1.4 Any water up to a 1 in 100 year storm event including 40% climate change will be attenuated within the curtilage of the site in the proposed drainage system.

7.1.5 National SuDS standards and Sewers for Adoption recommend that the 1 in 30 year storm event is managed below ground with exceedance flows managed above ground.

7.1.6 As any exceedance flows would go downhill and off site at a reasonable pace, the soakaway structure has been designed for the 100 year event with climate change to minimise surface run-off in an extreme storm.

7.1.7 The green roof system will also assist in reducing the overall run-off in an extreme storm event.

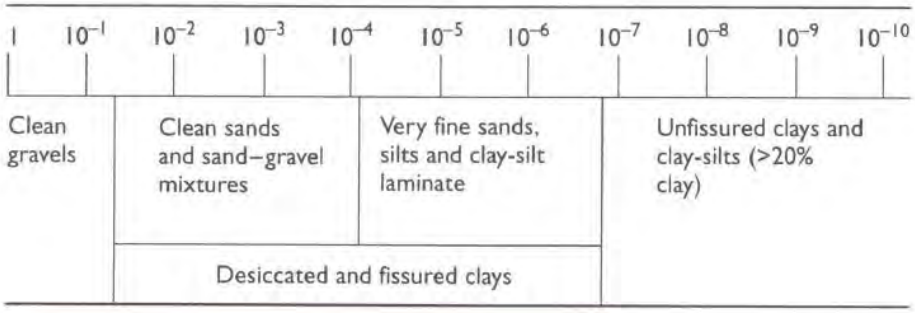
7.1.8 MicroDrainage calculations have been undertaken, which can be found at **Appendix H**.

7.1.9 These preliminary calculations are to give an indication of the soakaway requirements for the proposed building. The detailed design of the scheme must include the full catchment, including the existing hardstanding and roof areas as part of the existing soakaway diversion. This cannot be completed until geotechnical testing has been undertaken.

7.2 Geological Concept Design

7.2.1 The soil water regime is greatly controlled by the permeability of the soil mass. All soils are, to an extent, 'permeable' and allow the movement of water through interconnected pores.

7.2.2 However, it is the rate of this movement that differs between soil types, with coarser (sand/gravel) soils generally being more permeable than that of fine (clay/silt) soils. The figure below provides example infiltration rates for different soil types.



7.2.3 The soil type across the site should be identified by an appropriate number of trial holes, with infiltration testing as required to determine the proposed rate of soakage into the ground and predicted water table level.

7.2.4 For the purposes of this assessment, an arbitrary rate of soakage has been used to provide proof of concept for the drainage scheme. A conservative rate of 1 x 10^{-6} metres per second has been selected for the conceptual design.

7.3 Designing for Exceedance Events

7.3.1 Current best practice guidance on flood risk requires an evaluation of how rainfall events beyond the design capacity of the proposed drainage system would be managed and what effects they are likely to have on flood risk at the site or surrounding areas.

7.3.2 Should a rainfall event exceeding the 1.0% AEP (1 in 100 year) event plus climate change event occur, the proposed storage and flow paths of surface water should be considered.

7.3.3 The site ground conditions indicate that surplus water is adquate for the existing soakaway system.

7.3.4 The surface water SuDS features included for the 1 in 100 year storm will be designed with sufficient resilience to manage and convey exceedance flows away from any properties to minimise risk.

7.3.5 Indicative exceedance pathways have been shown on the drainage layout, with further information to be defined once the detailed levels of the scheme have been developed.

7.4 Designing for System Failure

7.4.1 Current best practice on sustainable drainage design should consider failure of the surface water system and potential blockages from multiple sources.

7.4.2 The potential risks to the surface water system have been indicated below:

Risk	Description	Comments / Recommendations
Blockage	Potential blockage of outfall from surface water system	Not applicable for site as infiltration is used.
Failure	Potential blockage of outfall from flow control failure or build-up of debris	Not applicable for site as infiltration is used.
Surcharge	Potential back-up of system due to surcharging or poorly maintained public surface water infrastructure or watercourse	Not applicable for site as infiltration is used.
Blockage	Potential risk of flooding due to build-up of sediment within system	Catchpit manholes have been provided upstream of all soakaways to removed solids and sediment. Regular inspection and maintenance of the drainage system should be undertaken in line with the findings of this report.
Failure	Potential risk of surface water flows from poor maintenance of surface mounted SuDS features (such as porous paving or swales)	Regular inspection and maintenance of the surface mounted SuDS should be undertaken in line with the findings of this report.
Surcharge	Potential risk of additional surface water flows or overland flows from extreme (exceedance storm) events in adjacent sites causing the surface water system to be overloaded.	Exceedance flow routes have been assessed and shown on the drainage layout.
Failure	Potential risk from failure of third-party specialist equipment such as pump stations or interceptors	Any pump stations or interceptors installed on site should be maintained in line with the specialist manufacturer's recommendations. Any foul water pump systems contain 24 hours emergency storage.
Blockage	Potential risk from poor maintenance of gullies	Regular inspection and maintenance of the underground drainage system should be undertaken in line with the findings of this report.
Blockage	Potential reduction in infiltration on site from compaction of soils during the construction phase	It is assumed that surface mounted SuDS will have minimal infiltration due to the potential clay cap on site. Therefore, ground consolidation should not have a major impact. However, ground should be suitably perforated to ensure that any infiltration into the natural soil is not impeded.
Failure	Poor planting and maintenance of green areas could reduce the hydraulic properties of SuDS devices (and amenity/biodiversity benefits)	Not applicable.

7.5 Urban Creep

7.5.1 Urban Creep is the conversion of permeable surfaces to impermeable over time. e.g. impermeable surfacing of front gardens to provide additional parking spaces, extensions to existing buildings, creation of large patio areas. The consideration of urban creep (is best) assessed on a site by site basis but is limited to residential development only.

7.5.2 It is important that the appropriate allowance for urban creep is included in the design of the drainage system over the lifetime of the proposed development. The allowances set out below are applied to the impermeable area within the property curtilage:

Residential development density Dwellings per hectar	Change allowance % of impermeable area
≤ 25	10
30	8
35	6
45	4
≥ 50	2
Flats & apartments	0

7.5.3 Note where the inclusion of the appropriate allowance would increase the total impermeable area to greater than 100%, 100% should be used as the maximum.

7.5.4 The proposed development has limited scope for expansion. Based on this, zero allowance for urban creep is required for the development.

7.6 Construction Phase Drainage

7.6.1 It is an offence to cause or knowingly permit the entry of poisonous, noxious or polluting material into the water environment. Prosecution may ensue if the pollution is serious enough to lower the ecological status of the water body in terms set by the Water Framework Directive (2000/60/EC).

7.6.2 The polluter does not have to be prosecuted first for remediation of damage to be required. If water pollution is serious enough to be classed as environmental damage the damage will require to be remediated such that the area is returned to the condition it would have been in if the damage had not occurred.

7.6.3 An offence may also be committed if environmental damage or the threat of environmental damage is not reported by the polluter or if no action is taken by the polluter to prevent further damage. Third parties (e.g. private water supply users, landowners, recreational users and the public) who may be affected by possible damage may also report 'risk' of environmental damage to the enforcing authority; in this instance an offence may be committed if action is not taken to prevent the potential environmental damage occurring.

7.6.4 The principles of Sustainable Drainage Systems (SuDS) shall be applied to all components of design and construction regarding surface water management. Any design or site works that may impact on the site drainage or water quality shall:

- Soakaway where soils allow
- Consider and manage erosion
- Retain any silts on site and prevent silts from discharging into watercourses or drains
- Remove pollutants in surface water
- Keep runoff rates at existing greenfield runoff

- Prevent accidental spillages reaching watercourses.

7.6.5 As infiltration is expected to be viable on site, the temporary drainage for the development will be in the form of land drainage with discharge into the ground, with the appropriate levels of treatment.

7.6.6 Pollution will be controlled via the use of catchpit manholes and geotextiles.

7.6.7 Any potentially hazardous substances (i.e. form plant / deliveries) will be within a controlled compound with a separate drainage system that will contain a penstock valve / containment kit in the event of a spillage.

7.7 Foul Water Drainage

7.7.1 The foul water for the development will discharge into the existing public sewer. Foul water flows are anticipated to be 0.370 litres per second based on 4000 litres per dwelling per day in accordance with Sewers for Adoption 7th Edition.

7.7.2 Existing foul drainage will be redirected around the proposed building footprint as marked on the drainage layout.

7.7.3 The existing outfall pipe must be hydraulically checked for the loads from the new development and upgraded as necessary.

8.0 Water Quality

8.1 Water Quality Overview

8.1.1 A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution. This can be effectively managed by an appropriate "train" or sequence of SuDS components that are connected in series.

8.1.2 The frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals and various organic and inorganic contaminants). Therefore, the first 5-10 mm of rainfall (first flush) should be adequately treated with SuDS.

8.1.3 The minimum number of treatment stages will depend on the sensitivity of the receiving water body and the potential hazard associated with the proposed development SuDS Manual (CIRIA, 2015).

8.1.4 The proposed development is of very low (roof water) hazard as indicated on the table below:

Hazard	Source of Hazard	Present
Very Low	Residential Roof drainage.	**YES**
Low	Residential amenity uses including low usage car parking spaces and roads, other roof drainage	**NO**
Medium	Commercial, industrial uses including car parking spaces and roads (excluding low usage road, trunk roads and motorways)	**NO**
High	Areas used for handling and storage of chemicals and fuels, handling of storage and waste	**NO**

8.1.5 The site does lie within a source protection zone and therefore additional treatment stages are required.

8.1.6 The treatment processes provided by different SuDS components will have varying capabilities for removal of different types of contaminants as per the table below:

Hazard	Requirements for discharge to surface water and groundwater	Present
Very Low	Removal of gross solids and sediments only.	**YES**
Low	Simple index approach	**NO**
Medium	Surface water: Simple index approach Ground water: Simple index approach and risk screening	**NO**
High	Guidance and risk assessment process in HA (2009). Discharge may require environmental permit or licence. Obtain pre-permitting advice from environmental regulator. Risk assessment likely to be required.	**NO**

8.2 Simple Index Approach

8.2.1 The index approach as defined by CIRIA C753 (the SuDS Manual) defines the index approach to water quality in three steps as defined in Box 26.2 below:

BOX 26.2 Steps of the simple index approach

Step 1 – Allocate suitable pollution hazard indices for the proposed land use

Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index

Step 3 – Where the discharge is to protected[1] surface waters or groundwater, consider the need for a more precautionary approach

Note:
1 Designated as those protected for the supply of drinking water (Table 4.3).

8.3 Step 1- Allocate Potential Hazards

8.3.1 To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type):

Total SuDS mitigation index ≥ pollution hazard index

(for each contaminant type) (for each contaminant type)

8.3.2 Where the only destination of the runoff is to a surface water – that is there is no infiltration from the SuDS to groundwater – the surface water indices should be used.

8.3.3 In England and Wales, where the principal destination of the runoff is to a surface water, but small amounts of infiltration may occur from unlined components (Interception), then the groundwater indices should be used for the discharge to groundwater, and the surface water indices should be used for the main surface water discharge (as suggested in Table 26.3).

8.3.4 Where the principal destination of the runoff is to groundwater, but discharges to surface waters may occur once the infiltration capacity is exceeded, the groundwater indices should be used, as suggested in Table 26.4. The risk to surface waters will be low, as dilution will be high for large events, so treatment is not required.

8.3.5 The pollution indices for this site have been selected using the guidance in CIRIA C753 and are as per Table 26.2 below:

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	~~0.2 (up to 0.6~~ where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Notes

1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

Where a site land use falls outside the defined categories, the indices should be adapted (and agreed with the drainage approving body) or else the more detailed risk assessment method should be adopted.

Where nutrient or bacteria and pathogen removal is important for a particular receiving water, equivalent indices should be developed for these pollutants (if acceptable to the drainage approving body) or the risk assessment method adopted.

8.3.6 The identified hazard levels are as follows:

- Total Suspended Solids (TSS) 0.20
- Metals 0.20
- Hydrocarbons 0.05

8.3.7 Treatment has been provided in the form of catchpit manholes to remove sediment.

8.4 Treatment with Discharge to Ground

8.4.1 As the site is discharging to ground, Table 26.4 of the CIRIA C753 manual is used to evaluate the water quality mitigation measures offered by the proposed drainage system.

8.4.2 The identified hazard remediation levels are as follows:

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates[1]	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.6[4]	0.5	0.6
A soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.8[4]	0.8	0.8
Proprietary treatment systems[5, 6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Notes

1 All designs must include a minimum of 1 m unsaturated depth of aquifer material between the infiltration surface and the maximum likely groundwater level (as required in infiltration design – Chapter 25).

2 For example as recommended in Sniffer (2008a and 2008b), Scott Wilson (2010) or other appropriate guidance.

3 Alternative depths may be considered where it can be demonstrated that the combination of the proposed depth and soil characteristics will provide equivalent protection to the underlying groundwater – see note 1.

4 If significant volumes of sediment are allowed to enter an infiltration system, there will be a high risk of rapid clogging and subsequent system failure.

5 See Chapter 14 for approaches to demonstrate product performance. Note: a British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: **www.britishwater.co.uk/Publications/codes-of-practise.aspx**

6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution, where there is a requirement to retrofit treatment. WAT-RM-08 (SEPA, 2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

	Hazard	Treatment	Result
– Total Suspended Solids (TSS)	0.20	TBA	0
– Metals	0.20	TBA	0
– Hydrocarbons	0.05	TBA	0

9.0 Flooding Information

9.1.1 As set out in the National Planning Policy Framework (NPPF), inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. For these purposes:

- "areas at risk of flooding" means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems, and which has been notified to the local planning authority by the Environment Agency;
- "flood risk" means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

9.1.2 Flooding information for Planning from the Environment Agency (EA) has shown that the site lies within Flood Zone 1, as found in the map at **Appendix J**.

9.1.3 As the site is within Flood Zone 1, no further data was requested from the Environment Agency.

9.1.4 As part of the data capture, data and mapping from the Hillingdon Strategic Flood Risk Assessment (SFRA) was sought. This will be included and references in the relevant sections below.

10.0 Flood Risk

10.1.1 The data on the EA's website in their updated mapping, shows the site has a "very low" risk of flooding.

10.1.2 The EA confirmed that the proposed development site is located in Flood Zone 1 for Planning.

10.1.3 According to Table 2 of National Planning Policy Framework (NPPF), the development, being residential, is classed as 'more vulnerable'.

10.1.4 According to NPPF Table 3 'Flood Risk Vulnerability and Flood Zone Compatibility', the development should be permitted.

Table 3: Flood risk vulnerability and flood zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
× Development should not be permitted.

10.2 Sequential Test

10.2.1 Local Planning Authorities (LPA) are encouraged to take a risk-based approach to proposals for development in or affecting flood risk areas through the application of the Sequential Test and the objectives of this test are to steer new development away from high risk areas towards those at lower risk of flooding.

10.2.2 However, in some areas where developable land is in short supply, there can be an overriding need to build in areas that are at risk of flooding. In such circumstances, the application of the Sequential Test is used to ensure that the lower risk sites are developed before the higher risk ones.

10.2.3 NPPF (PPS25) states that the Sequential Test should be applied at all stages of the planning process and the starting point is generally the Environment Agency's flood zone maps.

10.2.4 These maps and the associated information are intended for guidance and cannot provide details for individual properties. They do not consider other considerations such as existing flood defences, alternative flooding mechanisms and detailed site-based surveys. They do, however, provide high level information on the type and likelihood of flood risk in any area of the country.

10.2.5 The site is within Flood Zone 1 and therefore the sequential test is not applicable.

10.3 Exception Test

10.3.1 The Exception Test is an additional test to be applied by decision-makers following application of the Sequential Test. The Exception Test has two elements as shown below, both of which must be satisfied for development in a flood risk area to be considered acceptable.

10.3.2 The Exception Test is only appropriate for use when there are large areas in Flood Zones 2 and 3, where the Sequential Test alone cannot deliver acceptable sites, but where some continuing development is needed for wider sustainable development reasons, considering the need to avoid social or economic blight and the need for essential civil infrastructure to remain operational during floods.

10.3.3 For the Exception Test to be passed:

a. It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA; and,
b. A site-specific FRA must demonstrate that the development will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, reducing flood risk overall.

10.3.4 The NPPF does not request an exception test.

10.4 Fluvial Flooding Risk

10.4.1 The Environment Agency flood information there is no risk of fluvial flooding on site.

10.5 Historic Flood Data

10.5.1 The Environment Agency and Hillingdon Council have no information indicating that the was flooded historically from fluvial sources.

site

10.6 Groundwater

10.6.1 Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata. A ground water flood event results from a rise in ground water level, enough for the water table to intersect the ground surface and inundate low lying land. Groundwater floods may emerge from either a single point or diffuse locations.

10.6.2 The underlying strata throughout the area and investigations into the SFRA geology data suggest that there is a risk of groundwater emergence which is likely to relate to the geology of the area. However, groundwater flooding risks are often highly localised, and dependent upon geological interfaces between permeable and impermeable subsoils. Therefore, sustainable construction techniques for surfacing will minimise any potential groundwater risk.

10.6.3 The Hillingdon SFRA (Figure 2.4) does not give a clear indication of the potential groundwater risk. Geotechnical investigations are required to examine the potential groundwater level for the site, which should be completed as part of the recommended BRE testing.

10.7 Flooding from Sewers

10.7.1 Flooding from sewers can occur because of different reasons; if sewers are blocked during the heavy rainfalls, or if sewer cannot provide adequate capacity, then flooding can cause a large amount of damage.

10.7.2 The Hillingdon SFRA (Figure 2.6) indicates the area has experienced 0 flood incidents in the last 10 years.

10.8 Flooding from Reservoirs

10.8.1 Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensures that reservoirs are inspected regularly, and essential safety work is carried out.

10.8.2 However, in the unlikely event that a reservoir dam failed, a large volume of water would escape at once and flooding could happen with little or no warning. If the site is within a risk area, plans should be made for safe evacuation and escape. Residents may need to evacuate

immediately, know the safest route to safety, and be ready to follow the advice of emergency services.

10.8.3 The EA data indicates that the site is not at risk from reservoir flooding.

10.9 Surface Water Flooding

10.9.1 Overland flow / surface water flooding typically arise because of intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems. It can run quickly off land and result in localised flooding.

10.9.2 The Environment Agency has produced illustrative mapping (Flood Map for Surface Water) relating to flooding risks from surface water. They are classified as Flood Hazard Maps for the purpose of the Flood Risk Regulations 2009. These maps are the next generation on from the previous "Area Susceptible to Surface Water Flooding" maps, which are contained within the SFRA.

10.9.3 The EA maps show high resolution image and indicative flow paths for pluvial events. The maps are based on coarse level data and indicate ridges, valleys and flat spots where water would collect. Typically, the flow paths follow valleys, rivers and watercourses.

10.9.4 The surface water maps and the associated information are intended for guidance only and cannot provide details for individual properties. They do, however, provide high level information and indicate areas in which surface water flooding issues should be investigated further. The risk categories are classified as follows:

- Very low probability of flooding – This zone is assessed as having less than a 1 in 1000 annual probability of surface water flooding.
- Low probability of flooding – This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of surface water flooding.
- Medium probability of flooding - This zone comprises land assessed as having between a 1 in 30 and 1 in 100 annual probability of surface water flooding.
- High probability of flooding – This zone is assessed as having greater than a 1 in 30 annual probability of surface water flooding.

10.9.5 A review of the EA mapping indicates there is no risk of surface water flooding to the site.

11.0 Maintenance

11.1.1 Maintenance of SuDS drainage should be in accordance with the guidance presented in CIRIA Factsheet "Maintenance of SuDS" May 2017. A detailed maintenance plan for the scheme will be generated by the appointed owner/maintainer of the site or a selected maintenance company and this section is for guidance only.

11.1.2 Maintenance operations can be divided into the following categories:

- Regular (or routine frequent) - this covers items that are carried out typically with a frequency from monthly to annually. It includes item such as inspection and monitoring, litter removal, grass cutting or other vegetation management, sweeping permeable pavements.
- Infrequent (or routine infrequent) - this covers items that are required typically with a frequency from annually up to 25 years (or possibly greater). It includes items such as wetland vegetation management, silt removal from swales, ponds or wetlands, scarifying and spiking infiltration basins and gravel replacement to filter drains.
- Remedial (or reactive) - this covers maintenance that is not usually required, but may be necessary as a result of vandalism, accidental damage, rainfall that exceeds the design capacity or similar events. Examples include repair of erosion in a swale or repair of permeable surfaces blocked for example by mixing concrete on them.

11.2 Riparian Responsibility

11.2.1 If a resident owns land adjoining, above or with a portion of the drainage system running through it, they have certain rights and responsibilities. In legal terms they are a 'riparian owner'. If they rent the land, they should agree with the owner who will manage these rights and responsibilities.

11.2.2 It is recommended that the owner's appointed Management Company handle the maintenance of all underground drainage and all SuDS devices, with the following exceptions:

- Inspecting and cleaning out any surface mounted hard drainage systems (such as channel drains);
- Inspecting and cleaning out (or reporting) SuDS systems on a small scale (such as garden ditches and swales).

11.3 Allowing for Replacement

11.3.1 The design life of some SuDS elements and drainage elements of the proposed system is shorter than the predicted design life of the development. Therefore, the design and maintenance regime consider any potential replacement works (such as replacing permeable paving).

11.3.2 Regular inspection of the drainage system should be as per the tables below.

Operation and maintenance requirements for Surface Water Systems		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Inspect for sediment and debris in catchpit manholes and gullies. Clean out as required	Twice Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from catchpits, gullies, attenuation devices and inside of concrete manhole rings	As required, based on inspections
Remedial Actions	Reconstruct and/or replace components, if performance deteriorates or failure/blockage occurs	As required
	Replacement of clogged components (flow restriction)	As required
Monitoring	Inspect silt traps/gullies/catchpits and note rate of sediment accumulation	Monthly in the first year and then annually
	Check flow control chamber and attenuation devices	Annually

Operation and maintenance requirements for Green Roofs		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required
	During establishment (ie year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial Actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

Operation and maintenance requirements for Soakaways		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial Actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

Operation and maintenance requirements for Pervious Pavements		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

12.0 Summary and Conclusions

12.1.1 Mr Farid Malty has built the proposed development on the site at 14a Bourne Avenue, Ruislip Ruislip, HA4 6TQ

12.1.2 Shorplans Developments has been instructed by Mr Farid Malty, to produce a Drainage Strategy Report to support the Planning Application.

12.1.3 No documentary or anecdotal evidence has been found to show previous flooding events for this site.

12.1.4 The surface water system will discharge into the ground via infiltration. The system will be designed for the proposed development and also the existing soakaway catchment.

12.1.5 The foul water will discharge into the existing public sewer.

12.1.6 The report has demonstrated that the proposed drainage measures ensure that no property will be at risk of flooding if the development proceeds and that suitable means of surface water and foul drainage can be achieved for the proposed development.

SHORPLANS DEVELOPMENTS RIBA Chartered Practice

Appendix A

Location Plan

1 L-100 Location Plan
1 : 1250

2 L-100 Existing Site Plan
1 : 200

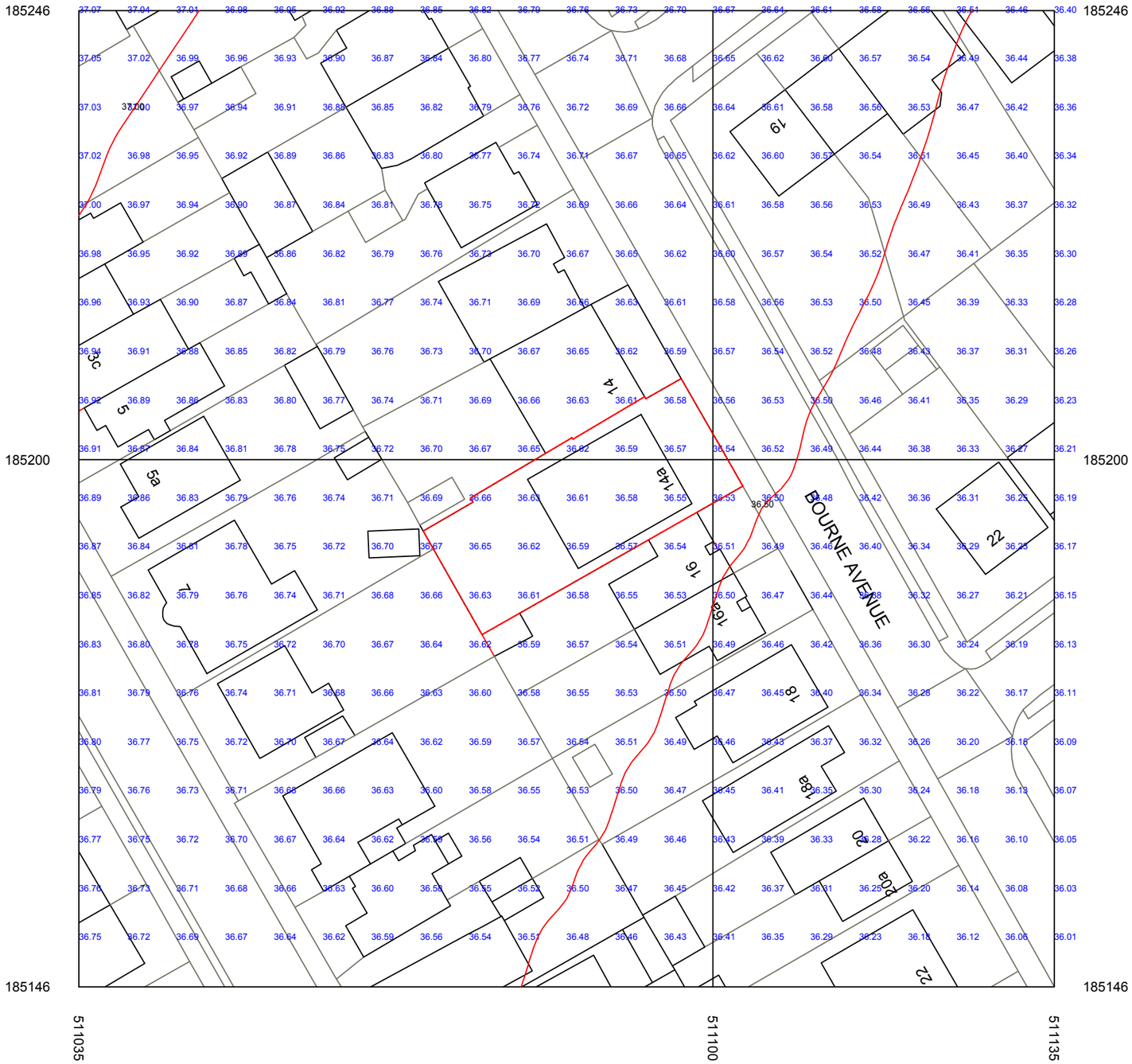
Rev. No.	Description	Date

- **Project:** Demolition of existing bungalow, proposed two storeyed dwelling and conversion into multiple flats
- **Address:** 14A, Bourne Avenue, Ruislip, HA4 6TZ
- **Client:** Mr Farid malty
- **Title:** Location Plan and Existing Site Plan
- **Project No:** 16P0511 - 010 • **Drg No:** L-100 • **Rev:**
- **Scale:** As indicated@A3 • **Date:** July 2017

SHORPLANS DEVELOPMENTS RIBA Chartered Practice

Appendix B

Topographical Survey



N

0 5m 10m 50m

1:500

01 EXISTING TOPO SURVEY
SCALE 1:500 @ A3

SHORPLANS ARCHITECTURAL SERVICES
17-21 GEORGE STREET
CROYDON, SURREY
CR0 1LA
WWW.SHORPLANS.COM
ADMIN@SHORPLANS.COM
020 38806164
RIBA Chartered Practice

NOTES:
SHORPLANS architects

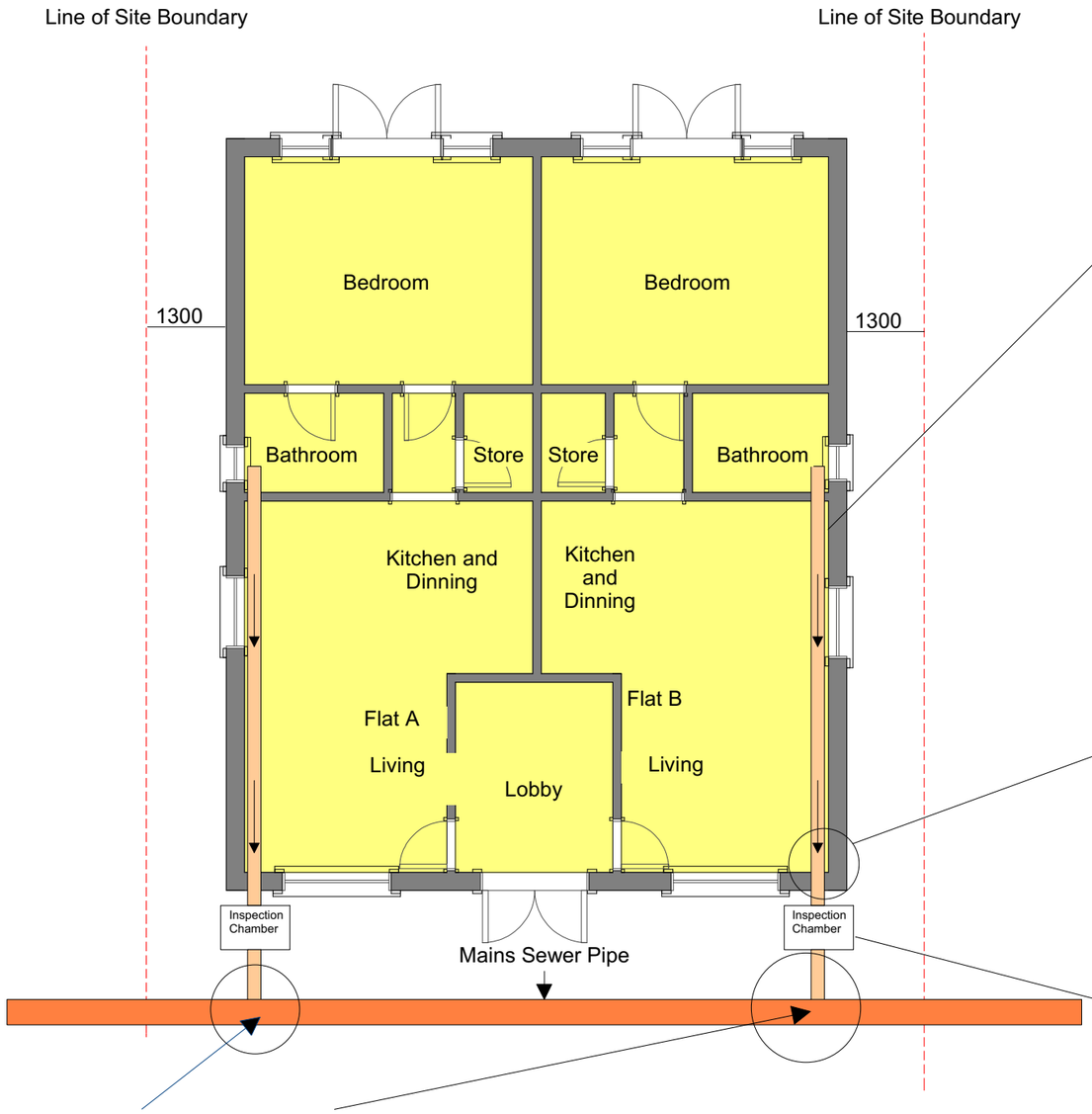
Figured dimensions only are to be used. All dimensions to be checked on site. Differences between drawings and between drawings and specification or bills of quantities to be reported to SHORPLANS architects.

A 00 Elevation & Drw Location
A 00 Section & Drw Location

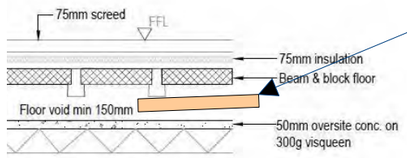
DRAWING NO	DATE	DRAWING	PROJECT
14A-001	03.08.23	EXISTING TOPO SURVEY	14A BOURNE AVENUE
DRAWN	SCALE		
MS	1:500 @ A3		

Appendix C

Existing Sewer Information



Drainage Plan



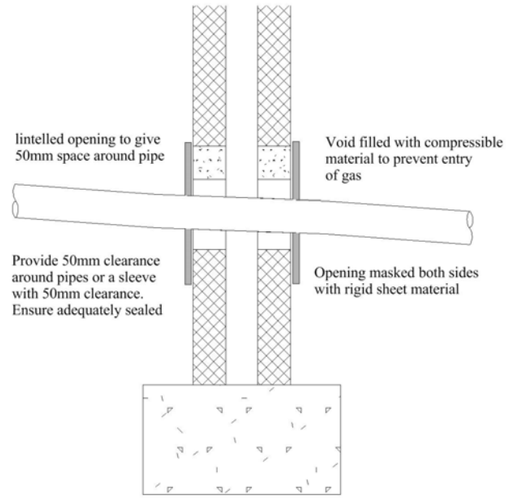
Typical foundation Detail

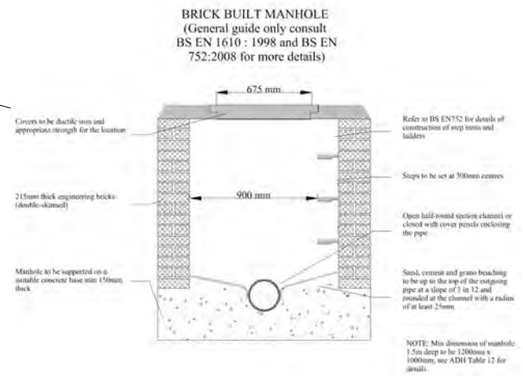
Scale - 1:25 @ A1

600wide C30 mass concrete Trench foundation Min.1000 between GL and top of footing, to building inspector approval

Slope to be confirmed and approved by building control officer and installed in void area and supported as necessary.

PIPES PASSING THROUGH WALL (LINTEL)





ALPHA DRAINS	**Notes** All dimensions to be checked and verified on site. These drawings are for planning permission purposes only and are not construction drawings. Drawings to be read with other relevant associated third party consultants information and specifications.	**Project Description** Demolition of existing bungalow, proposed two storeyed dwelling and conversion into multiple flats		**Drawing Description** Drainage Plans	
		Site Address	14A BOURNE AVENUE HA4 6TZ	Drawing Number	001 - 02

Date	30/01/2018
Drawing Scale	Not to scale, Check on Site
Drawing Status	BC

BUILDING REGULATIONS NOTES

INSPECTION CHAMBERS
Underground quality proprietary UPVC 450mm diameter inspection chambers to be provided at all changes of level, direction, connections and every 45m in straight runs. Inspection chambers to have bolt down double sealed covers in buildings and be adequate for vehicle loads in driveways.

ABOVE GROUND DRAINAGE
All new above ground drainage and plumbing to comply with BS EN 12056-2:2000 for sanitary pipework. All drainage to be in accordance with part H of the Building Regulations. Wastes to have 75mm deep anti vac bottle traps and rodding eyes to be provided at changes of direction.

Size of wastes pipes and max length of branch connections (if max length is exceeded then anti vacuum traps to be used)
Wash basin - 1.7m for 32mm pipe 3m for 40mm pipe
Bath/shower - 3m for 40mm pipe 4m for 50mm pipe
W/c - 6m for 100mm pipe for single WC
All branch pipes to connect to 110mm soil and vent pipe terminating min 900mm above any openings within 3m.
Or to 110mm upvc soil pipe with accessible internal air admittance valve complying with BS EN 12380, placed at a height so that the outlet is above the trap of the highest fitting.
Waste pipes not to connect within 200mm of the WC connection. Supply hot and cold water to all fittings as appropriate.

PIPEWORK THROUGH WALLS
Where pipework passes through external walls form rocker joints either side wall face of max length 600mm with flexible joints with short length of pipe bedded in wall.
Alternatively provide 75mm deep pre-cast concrete plank lintels over drain to form opening in wall to give 50mm space all round pipe: mask opening both sides with rigid sheet material and compressible sealant to prevent entry of fill or vermin.

UNDERGROUND FOUL DRAINAGE
Underground drainage to consist of 100mm diameter UPVC proprietary pipe work to give a 1:40 fall. Surround pipes in 100mm pea shingle. Provide 600mm suitable cover (900mm under drives). Shallow pipes to be covered with 100mm reinforced concrete slab over compressible material. Provide rodding access at all changes of direction and junctions. All below ground drainage to comply with BS EN 1401-1: 2009.

DEMOLITION
Measures to be put in place during and after the demolition to ensure the protection of the public, public amenities and adjoining properties.
Such measures to include:
- The shoring of adjoining buildings.
- The control of dust and noise generation.
- The weatherproofing of any parts of adjoining buildings which are left exposed by the demolition.
- The repairing and making good any damage to any adjacent building effected by the demolition.
- The removal of material or rubbish resulting from the clearance and demolition of the site.
- The disconnection, sealing or removal of any drain or sewer, as required.
- The making good of any disturbed ground.
- Any arrangements necessary for the disconnection off all services (e.g. gas, water, electricity).

Consultation with the Health and Safety Executive, and Fire Authority should be sought if burning structures or materials on site.
If the demolition is more than 50m³ in volume a formal notice of demolition is to be given to building control at least six weeks before any demolition work starts, in accordance with The Building Act 1984: Sections 80-83.
Consultation to be undertaken with the occupiers of adjacent buildings where applicable and a Party Wall agreement put in place. A planning application to demolish to be made where required.
All demolition work to comply with the Construction (Design and Management) Regulations 1994 and a Health and Safety plan is to be provided by the principal contractor.

SITE INVESTIGATION
A survey of the site is to be carried out by a suitably qualified person including an initial ground investigation, a desk study and a walk over survey. A copy of all reports and surveys to be sent to building control for approval before works commence on site.
Any asbestos, contaminated soil or lead paint found on the site is to be removed by a specialist. Asbestos is to be dealt with in accordance with the Control of Asbestos Regulations 2006.

SITE PREPARATION
Ground to be prepared for new works by removing all unsuitable material, vegetable matter and tree or shrub roots to a suitable depth to prevent future growth. Seal up, cap off, disconnect and remove existing redundant services as necessary. Reasonable precautions must also be taken to avoid danger to health and safety caused by contaminants and ground gases e.g. landfill gases, radon, vapours etc on or in the ground covered, or to be covered by the building.

PARTY WALL ACT
The owner, should they need to do so under the requirements of the Party Wall Act 1996, has a duty to serve a Party Structure Notice on any adjoining owner if building work on, to or near an existing Party Wall involves any of the following:
- Support of beam
- Insertion of DPC through wall
- Raising a wall or cutting off projections
- Demolition and rebuilding
- Underpinning
- Insertion of lead flashings
- Excavations within 3 metres of an existing structure where the new foundations will go deeper than adjoining foundations, or within 6 metres of an existing structure where the new foundations are within a 45 degree line of the adjoining foundations.

A Party Wall Agreement is to be in place prior to start of works on site.

THERMAL BRIDGING
Care shall be taken to limit the occurrence of thermal bridging in the insulation layers caused by gaps within the thermal element, (i.e. around windows and door openings). Reasonable provision shall also be made to ensure the dwelling is constructed to minimise unwanted air leakage through the new building fabric.

HEALTH AND SAFETY
The contractor is reminded of their liability to ensure due care, attention and consideration is given in regard to safe practice in compliance with the Health and Safety at Work Act 1974.

MATERIALS AND WORKMANSHIP
All works are to be carried out in a workmanlike manner. All materials and workmanship must comply with Regulation 7 of the Building Regulations, all relevant British Standards, European Standards, Agreement Certificates, Product Certification of Schemes (Kite Marks) etc. Products conforming to a European technical standard or harmonised European product should have a CE marking.

ALPHA DRAINS

Notes

All dimensions to be checked and verified on site. These drawings are for planning permission purposes only and are not construction drawings. Drawings to be read with other relevant associated third party consultants information and specifications.

Project Description

Demolition of existing bungalow, proposed two storeyed dwelling and conversion into multiple flats

Site Address: 14A BOURNE AVENUE HA4 6TZ

Drawing Description

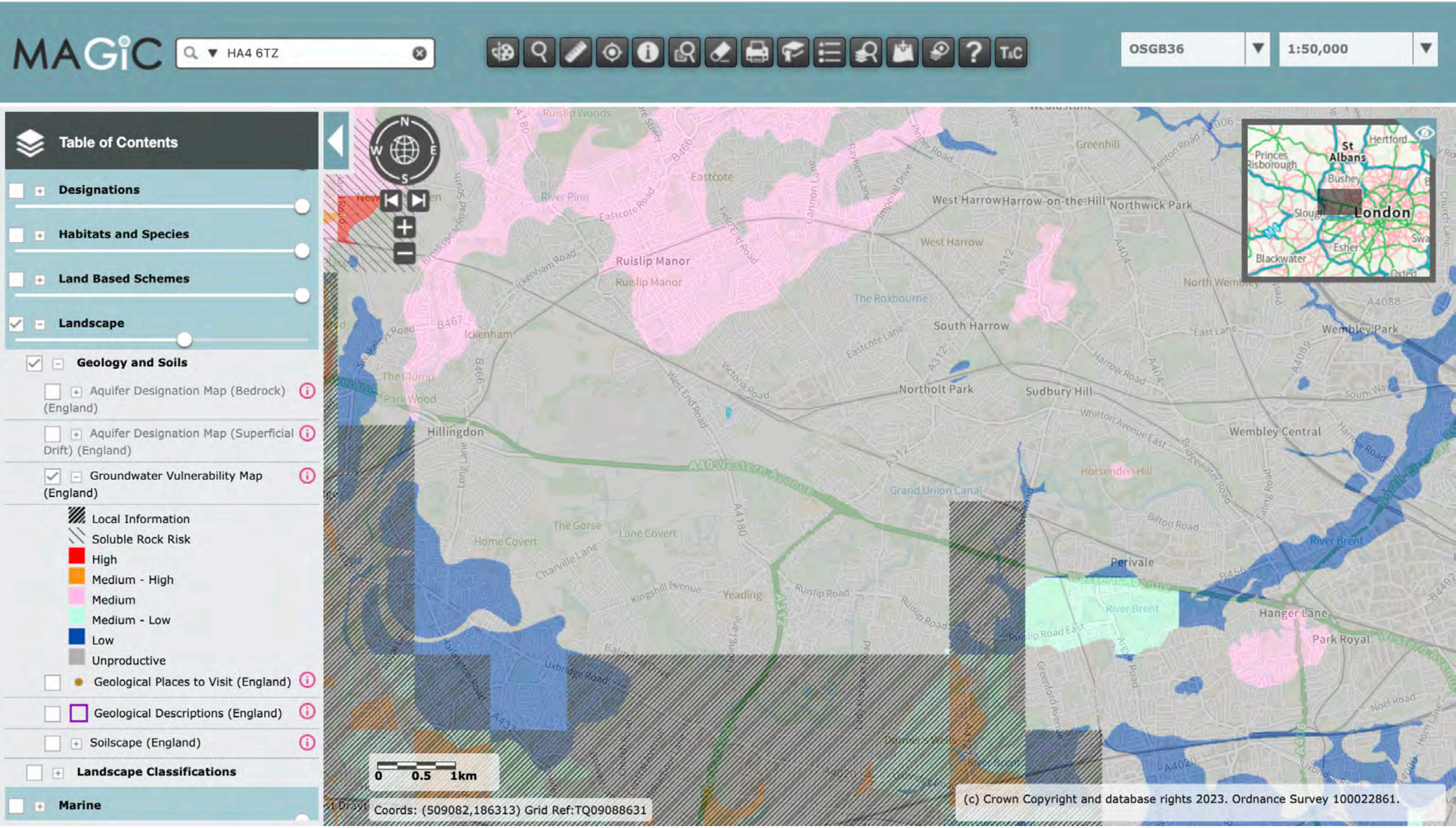
Drainage Plans

Drawing Number: 002 - 02

Date	30/01/2018
Drawing Scale	Not to scale, Check on Site
Drawing Status	BC

Appendix D

Magic Map Geology Information


MAGIC
HA4 6TZ
OSGB36
1:50,000
Table of Contents
Designations
Habitats and Species
Land Based Schemes
Landscape
Geology and Soils
Aquifer Designation Map (Bedrock) (England)
Aquifer Designation Map (Superficial Drift) (England)
Groundwater Vulnerability Map (England)
Local Information
Soluble Rock Risk
High
Medium - High
Medium
Medium - Low
Low
Unproductive
Geological Places to Visit (England)
Geological Descriptions (England)
Soilscape (England)
Landscape Classifications
Marine
Ruislip Manor
Eastcote
West Harrow
Harrow-on-the-Hill
Northwick Park
South Harrow
Northolt Park
Sudbury Hill
Wembley Central
Wembley Park
Hillingdon
Ickenham
Perivale
Hanger Lane
Park Royal
Yeading
Grand Union Canal
River Brent
0 0.5 1km
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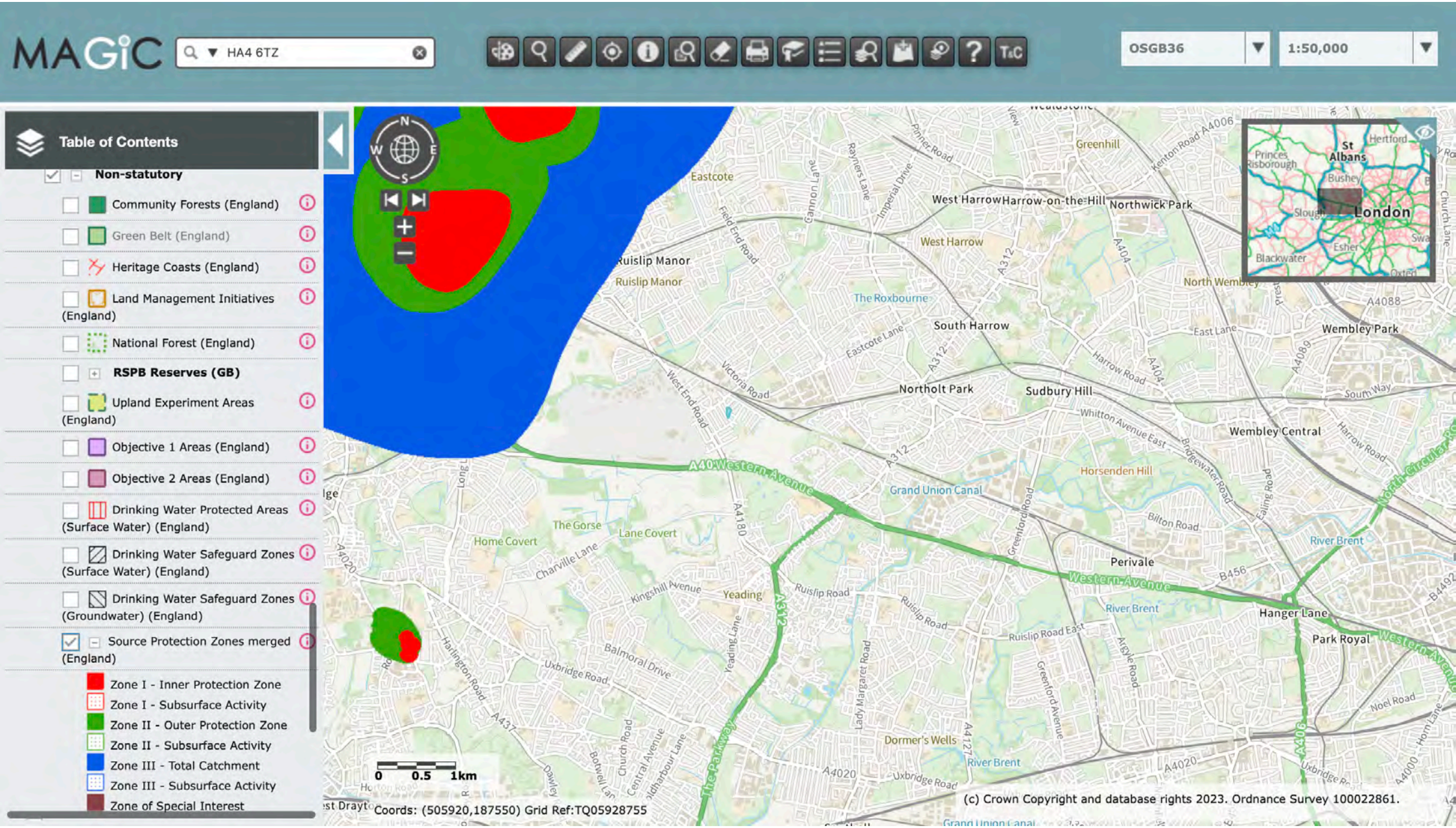
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HA4 6TZ
OSGB36
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Zone III - Total Catchment
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The Roxbourne
South Harrow
Northolt Park
Sudbury Hill
Wembley Park
Wembley Central
Horsenden Hill
Perivale
Hanger Lane
Park Royal
Yeading
Dormer's Wells
A40 Western Avenue
Grand Union Canal
River Brent
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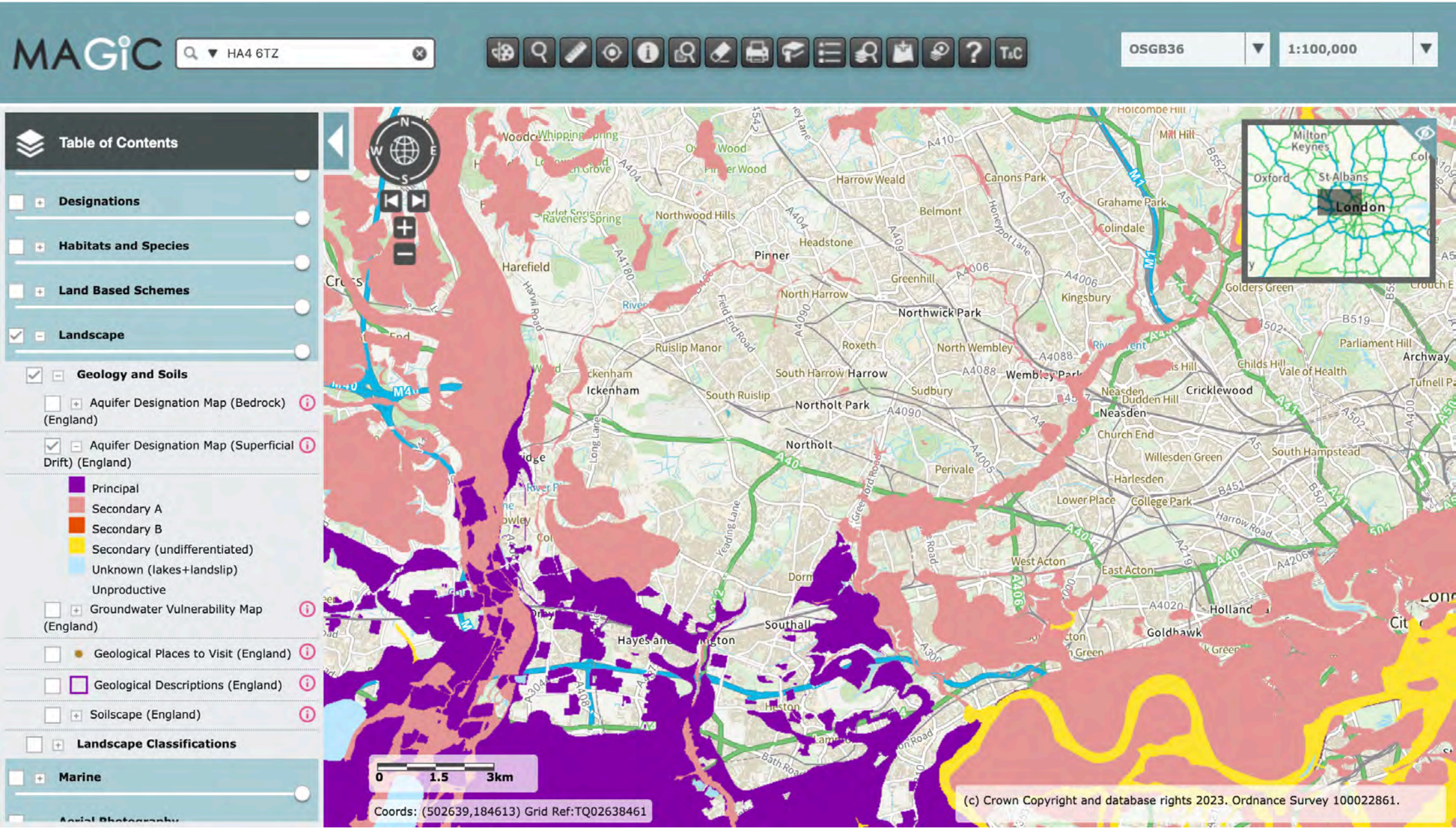
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Aquifer Designation Map (Superficial Drift) (England)
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Secondary A
Secondary B
Secondary (undifferentiated)
Unknown (lakes+landslip)
Unproductive
Groundwater Vulnerability Map (England)
Geological Places to Visit (England)
Geological Descriptions (England)
Soilscape (England)
Landscape Classifications
Marine
Aerial Photography
0 1.5 3km
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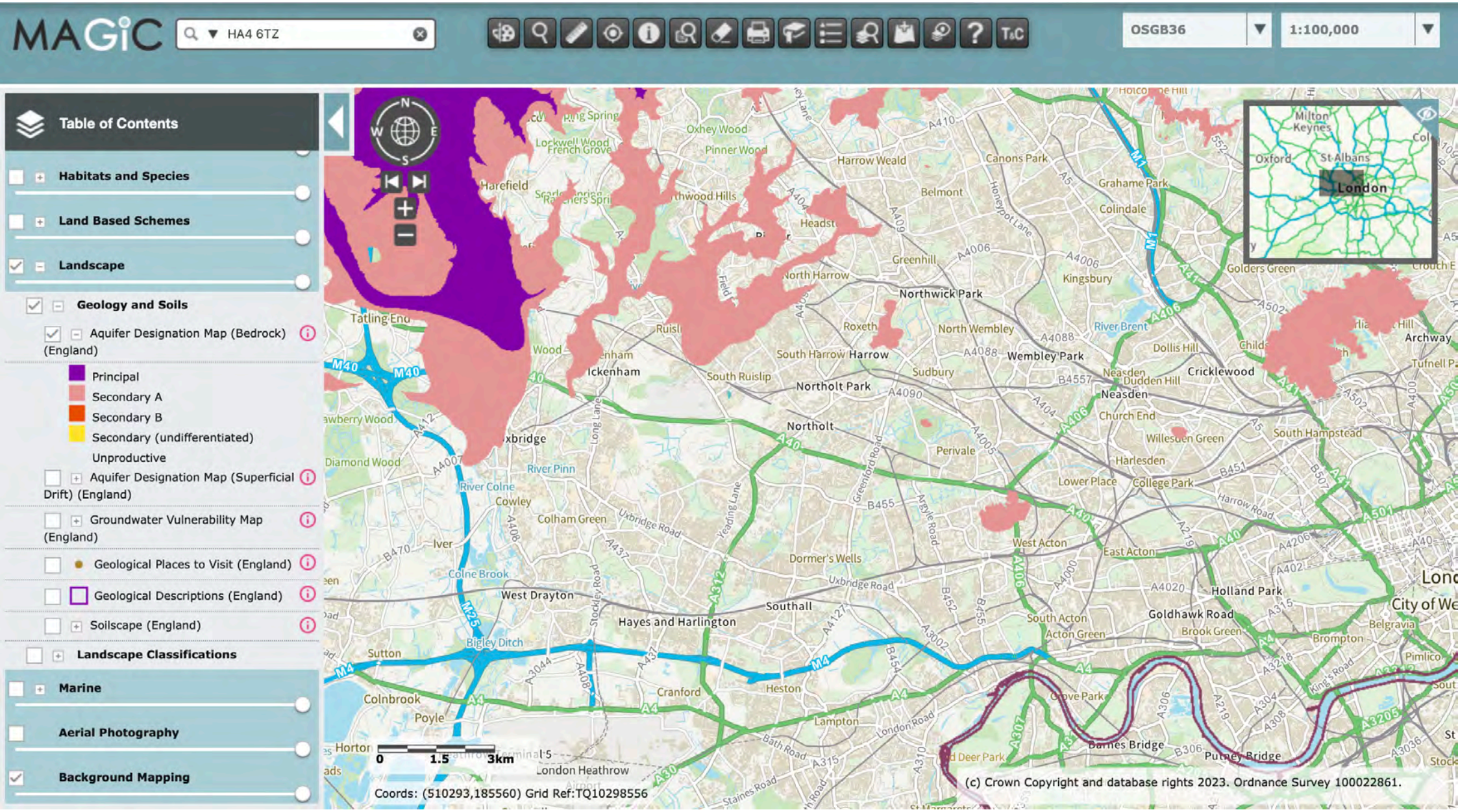
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Soilscape (England)
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Marine
Aerial Photography
Background Mapping
0 1.5 3km
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Appendix F

Proposed Site Plan

Flat A and B - 1b2p
Proposed amenity area for each flat - 35 sq.m

Flat C and D - 1b1p
Proposed amenity area for each flat - 36 sq.m

Recommended amenity area
Hillingdon HDAS - 1 bedroom flat - 20 sq.m

Rev. No.	Description	Date
A	Front landscape area extended	11/10/17

- **Project:** Demolition of existing bungalow, proposed two storeyed dwelling and conversion into multiple flats
- **Address:** 14A, Bourne Avenue, Ruislip, HA4 6TZ
- **Client:** Mr Farid malty
- **Title:** Proposed Site Plan
- **Project No:** 16P0511 - 010 • **Drg No:** L-101 • **Rev:** A
- **Scale:** 1 : 200 @A3 • **Date:** July 2017

Appendix G

Thames Water Sewage

Drainage Layout

Residential

The Law Society's CON29DW
Drainage & Water Enquiry

Thames Water Property Searches

shorplans developments
71-75
Shelton Street
London
WC2H 9JQ

Search address supplied	14a, Bourne Avenue, Ruislip, HA4 6TZ
Your reference	14 Bourne Ave
Our reference	DWS/DWS Standard/2023_4866829
Received date	3 August 2023
Search date	4 August 2023

Keeping you up-to-date

Notification of Price Changes

From 1st April 2023 Thames Water Property Searches will be increasing the prices of its CON29DW, CommercialDW Drainage & Water Enquiries and Asset Location Searches. Historically costs would rise in line with RPI but as this currently sits at 14.2%, we are capping it at 10%.

Customers will be emailed with the new prices by January 1st 2023.

Any orders received with a higher payment prior to the 1st April 2023 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk

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

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

0800 009 4540

CON29DW RESIDENTIAL DRAINAGE & WATER SEARCH

DRAINAGE + WATER SEARCHES NETWORK DWSN

The Property Ombudsman

Residential

The Law Society's CON29DW
Drainage & Water Enquiry

Thames Water Property Searches

Question		Summary Answer
Maps		
1.1	Where relevant, please include a copy of an extract from the public sewer map.	Map Provided
1.2	Where relevant, please include a copy of an extract from the map of waterworks.	Map Provided
Drainage		
2.1	Does foul water from the property drain to a public sewer?	See Details
2.2	Does surface water from the property drain to a public sewer?	See Details
2.3	Is a surface water drainage charge payable?	See Details
2.4	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	No
2.4.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?	No
2.5	Does the public sewer map indicate any public sewer within 30.48 metres(100 feet) of any buildings within the property?	See Details
2.5.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the 50metres of any buildings within the property?	No
2.6	Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
2.7	Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	No
2.8	Is the building which is or forms part of the property, at risk of internal flooding due to overloaded public sewers?	Not At Risk
2.9	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	8.151 Kilometres
Water		
3.1	Is the property connected to mains water supply?	See Details
3.2	Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	No
3.3	Is any water main or service pipe serving or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
3.4	Is the property at risk of receiving low water pressure or flow?	See Details
3.5	What is the classification of the water supply for the property?	See Details
3.6	Please include details of the location of any water meter serving the property.	See Details
Charging		
4.1.1	Who are the sewerage undertakers for the area?	Thames Water
4.1.2	Who are the water undertakers for the area?	Affinity Water
4.2	Who bills the property for sewerage services?	Not Billed
4.3	Who bills the property for water services?	Not Billed
4.4	What is the current basis for charging for sewerage and/or water services at the property?	No Charge
4.5	Will the basis for charging for sewerage and water services at the property change as a consequence of a change of occupation?	No

Search address supplied: 14a, Bourne Avenue, Ruislip, HA4 6TZ

Any new owner or occupier will need to contact Thames Water on 0800 316 9800 or log onto our website www.thameswater.co.uk and complete our online form to change the water and drainage services bills to their name.

The following records were searched in compiling this report: - the Map of Public Sewers, the Map of Waterworks, Water and Sewer billing records, Adoption of Public Sewer records, Building Over Public Sewer records, the Register of Properties subject to Internal Foul Flooding, the Register of Properties subject to Poor Water Pressure and the Drinking Water Register. Thames Water Utilities Ltd (TWUL), Clearwater Court, Vastern Road, Reading RG1 8DB, holds all of these.

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

Interpretation of CON29DW Drainage and Water Search

Appendix 1 contains definitions of terms and expressions used in this report.

For your guidance:

- Thames Water Property Searches Complaints Procedure:
  - Thames Water Property Searches offers a robust complaints procedure. Complaints can be made by telephone, in writing, by email (searches@thameswater.co.uk) or through our website (www.thameswater-propertysearches.co.uk)

As a minimum standard Thames Water Property Searches will:

- endeavour to resolve any contact or complaint at the time of receipt. If this isn't possible, we will advise of timescales;
- investigate and research the matter in detail to identify the issue raised (in some cases third party consultation will be required);
- provide a response to the customer within 10 working days of receipt of the complaint;
- provide compensation, if no response or acknowledgment that we are investigating the case is given within 10 working days of receipt of the complaint;
- keep you informed of the progress and, depending on the scale of investigation required, update with new timescales as necessary;
- provide an amended search, free of charge, if required;
- provide a refund if we find your complaint to be justified; take the necessary action within our power to put things right.

If you want us to liaise with a third party on your behalf, just let us know.

If you are still not satisfied with the outcome provided we will refer the matter to a Senior Manager for resolution who will respond again within 5 working days.

If you remain dissatisfied with our final response you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk

Maps

1.1 – Where relevant, please include a copy of an extract from the public sewer map.

A copy of an extract of the public sewer map is included, showing the public sewers, disposal mains and lateral drains in the vicinity of the property.

For your guidance:

- The Water Industry Act 1991 defines Public Sewers as those which Thames Water have responsibility for. Other assets and rivers, watercourses, ponds, culverts or highway drains may be shown for information purposes only.
- 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.
- Assets other than public sewers may be shown on the copy extract, for information.

1.2 – Where relevant, please include a copy of an extract from the map of waterworks.

A copy of an extract from the map of waterworks is included in which the location of the property is identified.

For your guidance:

- The "water mains" in this context are those, which are vested in and maintainable by the water company under statute.
- Assets other than public water mains may be shown on the plan, for information only.
- Water companies are not responsible for private supply pipes connecting the property to the public water main and do not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.
- 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.

Drainage

2.1 – Does foul water from the property drain to a public sewer?

The enquiry appears to relate to a plot of land or a recently built property. It is recommended that drainage proposals are checked with the developer.

For your guidance:

- Water companies are not responsible for any private drains that connect the property to the public sewerage system and do not hold details of these. The property owner will normally have sole responsibility for private drains serving the property. These may pass through land outside the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.
- If foul water does not drain to the public sewerage system, the property may have private facilities in the form of a cesspit, septic tank or other type of treatment plant.
- An extract from the public sewer map is enclosed. This will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

2.2 – Does surface water from the property drain to a public sewer?

Records indicate that this enquiry relates to a plot of land or a recently built property. It is recommended that the drainage proposals are checked with the developer. If the property was constructed after 6th April 2015 the Surface Water drainage may be served by a Sustainable Drainage System (SuDS). Further information may be available from the Developer.

For your guidance:

- Sewerage Undertakers are not responsible for any private drains that connect the property to the public sewerage system, and do not hold details of these.
- The property owner will normally have sole responsibility for private drains serving the property. These private drains may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.
- In some cases, 'Sewerage Undertakers' records do not distinguish between foul and surface water connections to the public sewerage system.
- At the time of privatisation in 1989, Sewerage Undertakers were sold with poorly-kept records of sewerage infrastructure. The records did not always show which properties were connected for surface water drainage purposes. Accordingly, billing records have been used to provide an answer for this element of the drainage and water search.
- Due to the potential inadequacy of 'Sewerage Undertakers' infrastructure records with respect to surface water drainage, it is the customer's responsibility to inform the Sewerage Undertaker that they do not receive the surface water drainage service. If on inspection, the buyer finds that surface water from the property does not drain to a public sewer, then the property may be eligible for a rebate of the surface water drainage charge. For further information, please contact Thames Water on Tel: 0800 316 9800, or refer to the website at www.thameswater.co.uk.
- If surface water from the property does not drain to the public sewerage system, the property may have private facilities in the form of a soakaway or private connection to a watercourse.
- An extract from the public sewer map is enclosed. This will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

2.3 – Is a surface water drainage charge payable?

This enquiry appears to relate to a plot of land or a recently built property. It is recommended that charging proposals are checked with the developer. If the property was constructed after 6th April 2015 the Surface Water drainage may be served by a Sustainable Drainage System (SuDS). Further information may be available from the Developer.

For your guidance:

- If surface water from the property drains to a public sewer, then a surface water drainage charge is payable.
- Where a surface water drainage charge is currently included in the property's water and sewerage bill but, on inspection, the buyer finds that surface water from the property does not drain to a public sewer, then the property may be eligible for a rebate of the surface water drainage charge. For further information, please contact Thames Water on Tel: 0800 316 9800 or refer to the website www.thameswater.co.uk.

2.4 – Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?

The public sewer map indicates that there are no public sewers, disposal mains or lateral drains within the boundaries of the property. However, from the 1st October 2011 there may be lateral drains and/or public sewers which are not recorded on the public sewer map but which may prevent or restrict development of the property.

For your guidance:

- Thames Water has a statutory right of access to carry out work on its assets. Employees of Thames Water or its contractors may, therefore, need to enter the property to carry out work.
- Please note if the property was constructed after 1st July 2011 any sewers and/or lateral drain within the boundary of the property are the responsibility of the householder.
- The approximate boundary of the property has been determined by reference to the Ordnance Survey Record or the map supplied.
- The presence of a public sewer running within the boundary of the property may restrict further development. The company has a statutory right of access to carry out work on its assets, subject to notice. This may result in employees of the company, or its contractors, needing to enter the property to carry out work.
- 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.

2.4.1 – Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?

The public sewer map included indicates that there is no public pumping station within the boundaries of the property.

For your guidance:

- Private pumping stations installed before 1 July 2011 will be transferred into the ownership of the sewerage undertaker.
- The approximate boundary of the property has been determined by reference to the Ordnance Survey Record or the map supplied.
- The presence of a public Pumping station running within the boundary of the property may restrict further development. The company has a statutory right of access to carry out work on its assets, subject to notice. This may result in employees of the company, or its contractors, needing to enter the property to carry out work.
- 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.

2.5 – Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?

The public sewer map indicates that there are no public sewers within 30.48 metres (100 feet) of any buildings within the property.
However, from the 1st October 2011 many private sewers were transferred into public ownership and may not be recorded on the public sewer map and it is our professional opinion that if the property is connected to a foul sewer it is likely that there will be a public sewer within 30.48 metres (100 feet) of any buildings within the property.

For your guidance:

- This is because there are no buildings from which to measure the distance to any public sewers.
- The presence of a public sewer within 30.48 metres (100 feet) of the building(s) within the property can result in the local authority requiring a property to be connected to the public sewer.
- The measurement is estimated from the Ordnance Survey record, between the building(s) within the boundary of the property and the nearest public sewer.
- 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.

2.5.1 – Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?

The public sewer map included indicates that there is no public pumping station within 50 metres of any buildings within the property.

For your guidance:

- Private pumping stations installed before 1 July 2011 will be transferred into the ownership of the sewerage undertaker.
- The presence of a public pumping station within 50 metres of the building(s) within the property can result in the local authority requiring a property to be connected to the public sewer.
- The measurement is estimated from the Ordnance Survey record, between the building(s) within the boundary of the property and the nearest public sewer.
- 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.

2.6 – Are any sewers or lateral drains serving or which are proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?

Records confirm that Foul sewers serving the development, of which the property forms part are not the subject of an existing adoption agreement or an application for such an agreement.

The Surface Water sewer(s) and/or Surface Water lateral drain(s) are not the subject of an adoption agreement.

For your guidance:

- Any sewers and/or lateral drains within the boundary of the property are not the subject of an adoption agreement and remain the responsibility of the householder. Adoptable sewers are normally those situated in the public highway.
- This enquiry is of interest to purchasers of new homes who will want to know whether or not the property will be linked to a public sewer.
- Where the property is part of a very recent or ongoing development and the sewers are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains and sewers for which they will hold maintenance and renewal liabilities.
- Final adoption is subject to the developer complying with the terms of the adoption agreement under Section 104 of the Water Industry Act 1991 and meeting the requirements of 'Sewers for Adoption' 6th Edition.

2.7 – Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?

There are no records in relation to any approval or consultation about plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. However, the sewerage undertaker might not be aware of a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain.

For your guidance:

- From the 1st October 2011 most private sewers, disposal mains and lateral drains were transferred into public ownership and the sewerage undertaker may not have been approved or consulted about any plans to erect a building or extension on the property over or in the vicinity of these.
- Buildings or extensions erected over a sewer in contravention of building controls may have to be removed or altered.

2.8 – Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?

The property is not recorded as being at risk of internal flooding due to overloaded public sewers.

From the 1st October 2011 most private sewers, disposal mains and lateral drains were transferred into public ownership It is therefore possible that a property may be at risk of internal flooding due to an overloaded public sewer which the sewerage undertaker is not aware of. For further information it is recommended that enquiries are made of the vendor.

For your guidance:

- For reporting purposes buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- "At Risk" properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

2.9 – Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.

The nearest sewage treatment works is Iver (North) STW which is 8.151 kilometres to the south west of the property.

For your guidance:

- The nearest sewage treatment works will not always be the sewage treatment works serving the catchment within which the property is situated.
- The sewerage undertaker's records were inspected to determine the nearest sewage treatment works.
- It should be noted that there may be a private sewage treatment works closer than the one detailed above that has not been identified.
- As a responsible utility operator, Thames Water Utilities seeks to manage the impact of odour from operational sewage works on the surrounding area. This is done in accordance with the Code of Practice on Odour Nuisance from Sewage Treatment Works issued via the Department of Environment, Food and Rural Affairs (DEFRA). This Code recognises that odour from sewage treatment works can have a detrimental impact on the quality of the local environment for those living close to works. However DEFRA also recognises that sewage treatment works provide important services to communities and are essential for maintaining standards in water quality and protecting aquatic based environments. For more information visit www.thameswater.co.uk

Water

3.1 – Is the property connected to mains water supply?

The enquiry appears to relate to a plot of land or a recently built property. It is recommended that the water proposals are checked with the developer.

For your guidance:

- The Company does not keep details of private supplies. The situation should be checked with the current owner of the property.

3.2 – Are there any water mains, resource mains or discharge pipes within the boundaries of the property?

The map of waterworks does not indicate any water mains, resource mains or discharge pipes within the boundaries of the property.

For your guidance:

- The boundary of the property has been determined by reference to the plan supplied. Where a plan was not supplied the Ordnance Survey Record was used. If the Water company mentioned in 4.1.2 is not Thames Water Utilities Ltd the boundary of the property has been determined by the Ordnance Survey.
- The presence of a public water main within the boundary of the property may restrict further development within it. Water companies have a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of the company, or its contractors, needing to enter the property to carry out work.

3.3 – Is any water main or service pipe serving or which is proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?

Records confirm that water mains or service pipes serving the property are not the subject of an existing adoption agreement or an application for such an agreement.

For your guidance:

- This enquiry is of interest to purchasers of new homes who will want to know whether or not the property will be linked to the mains water supply.

3.4 – Is the property at risk of receiving low water pressure or flow?

Records confirm that the property is not recorded on a register kept by the water undertaker as being at risk of receiving low water pressure or flow.

For your guidance:

- The boundary of the property has been determined by reference to the plan supplied. Where a plan was not supplied the Ordnance Survey Record was used.
- "Low water pressure" means water pressure below the regulatory reference level, which is the minimum pressure when demand on the system is not abnormal.
- Water Companies are required to include in the Regulatory Register that is presented annually to the Director General of Water Services, properties receiving pressure below the reference level, provided that allowable exclusions do not apply (i.e. events which can cause pressure to temporarily fall below the reference level)
- The reference level of service is a flow of 9 litres/minute at a pressure of 10metres / head on the customer's side of the outside stop valve (osv). The reference level of service must be applied on the customer's side of a meter or any other company fittings that are on the customer's side of the main stop tap. The reference level applies to a single property. Where more than one property is served by a common service pipe, the flow assumed in the reference level must be appropriately increased to take account of the total number of properties served. For two properties, a flow of 18 litres/minute at a pressure of 10metres/head on the customers' side of the osv is appropriate. For three or more properties the appropriate flow should be calculated from the standard loadings provided in BS806-3 or the Institute of Plumbing handbook.
- **Allowable exclusions** The Company is required to include in the Regulatory Register properties receiving pressure below the reference level, provided that allowable exclusions listed below do not apply.
- **Abnormal demand:** This exclusion is intended to cover abnormal peaks in demand and not the daily, weekly or monthly peaks in demand, which are normally expected. Companies should exclude from the reported figures properties which are affected by low pressure only on those days with the highest peak demands. During the report year companies may exclude, for each property, up to five days of low pressure caused by peak demand.
- **Planned maintenance:** Companies should not report low pressures caused by planned maintenance. It is not intended that companies identify the number of properties affected in each instance. However, companies must maintain sufficiently accurate records to verify that low-pressure incidents that are excluded because of planned maintenance are actually caused by maintenance.
- **One-off incidents:** This exclusion covers a number of causes of low pressure; mains bursts; failures of company equipment (such as pressure reducing valves or booster pumps); firefighting; and action by a third party. However, if problems of this type affect a property frequently, they cannot be classed as one-off events and further investigation will be required before they can be excluded
- **Low-pressure incidents of short duration:** Properties affected by low pressures, which only occur for a short period, and for which there is evidence that incidents of a longer duration would not occur during the course of the year, may be excluded from the reported figures.
- Please contact your water company mentioned in Question 4.1.2 if you require further information on water pressure.

3.5 – What is the classification of the water supply for the property?

The water supplied to the property has an average water hardness of 118mg/l calcium which is defined as Hard by Affinity Water.

For your guidance:

- Water hardness can be expressed in various indices for example the hardness settings for dishwashers are commonly expressed in Clark's degrees, but check with the manufacturer as there are also other units. The following table shows the normal ranges of hardness.
- Sample table for information only:

Hardness Category	Calcium (mg/l)	Calcium Carbonate (mg/l)	English Clarke degrees	French degrees	General/ German degrees
Soft	0 to 20	0 to 50	0 to 3.5	0 to 5	0 to 2.8
Moderately Soft	21 to 40	51 to 100	3.6 to 7	6 to 10	2.9 to 5.6
Slightly hard	41 to 60	101 to 150	8 to 10.5	11 to 15	5.7 to 8.4
Moderately hard	61 to 80	151 to 200	10.6 to 14	16 to 20	8.5 to 11.2
Hard	81 to 120	201 to 300	15 to 21	21 to 30	11.3 to 16.8
Very hard	Over 120	Over 300	Over 21	Over 30	Over 16.8

3.6 – Please include details of the location of any water meter serving the property.

This enquiry appears to relate to a plot of land or a recently built property. It is recommended that drainage proposals are checked with the developer.

For your guidance:

- Where a meter does not serve the property and the customer wishes to consider this method of charging, they should contact the water undertakers mentioned in Question 4.1.2.

Charging

4.1.1 – Who is responsible for providing the sewerage services for the property?

Thames Water Utilities Limited, Clearwater Court, Reading, RG1 8DB is the sewerage undertaker for the area.

4.1.2 – Who is responsible for providing the water services for the property?

Affinity Water Ltd, Tamblin Way, Hatfield, AL10 9EZ, is the water undertaker for the area.

4.2 – Who bills the property for sewerage services?

The property is not billed for sewerage services.

4.3 – Who bills the property for water services?

The property is not billed for water services.

4.4 – What is the current basis for charging for sewerage and/or water services at the property?

This enquiry appears to relate to a plot of land or a recently built property.

For your guidance:

-
- Records indicate that the Water Company does not levy charges to the property.Water and sewerage companies' full charges are set out in their charges schemes which are available from the company free of charge upon request.
- The Water Industry Act 1991 Section 150, The Water Resale Order 2001 provides protection for people who buy their water or sewerage services from a person or company instead of directly from a water or sewerage company. Details are available from the Office of Water Services (OFWAT) website is www.ofwat.gov.uk.
- Where charges are given these are based on the data available at the time of the report.
- The Company may install a meter at the premises where a buyer makes a change of use of the property or where the buyer uses water for:
    - Watering the garden other than by hand (this includes the use of sprinklers).
    - Automatically replenishing a pond or swimming pool with a capacity greater than 10,000 litres.
    - A bath with a capacity in excess of 230 litres.
    - A reverse osmosis unit.

4.5 – Will the basis for charging for sewerage and water services at the property change as a consequence of a change of occupation?

Records indicate that this enquiry relates to a plot of land or a recently built property. It is recommended that the charging proposals are checked with the developer.

For your guidance:

- Water and sewerage companies' full charges are set out in their charges schemes which are available from the company free of charge upon request.
- The Water Industry Act 1991 Section 150, The Water Resale Order 2001 provides protection for people who buy their water or sewerage services from a person or company instead of directly from a water or sewerage company. Details are available from the Office of Water Services (OFWAT) website is www.ofwat.gov.uk.
- It is policy to meter all new water connections. This would result in charges being levied according to the measured tariff.
- The Company may install a meter at the premises where a buyer makes a change of use of the property or where the buyer uses water for:
    - Watering the garden other than by hand (this includes the use of sprinklers).
    - Automatically replenishing a pond or swimming pool with a capacity greater than 10,000 litres.
    - A bath with a capacity in excess of 230 litres.
    - A reverse osmosis unit.

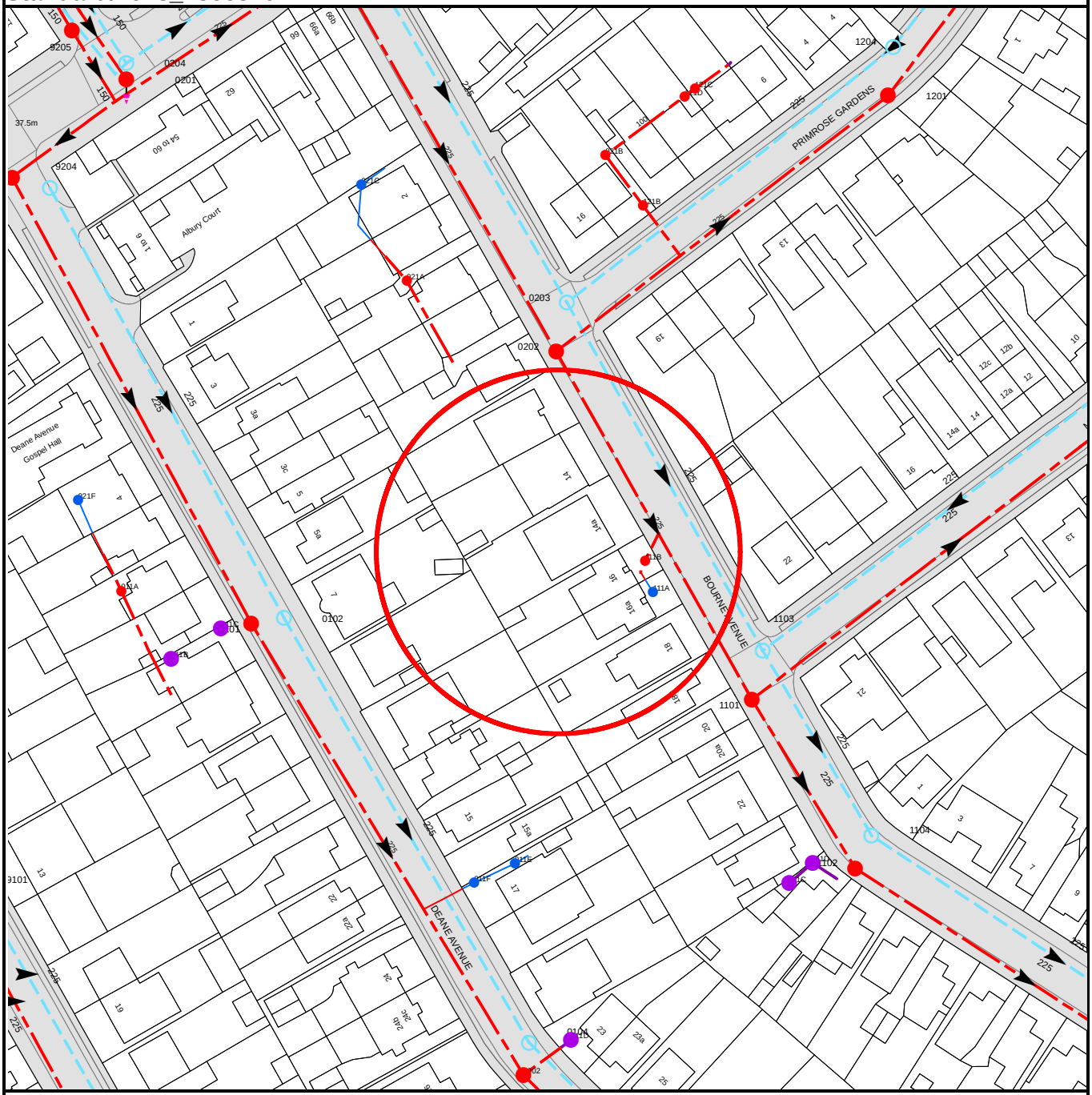
Payment for this Search

A charge will be added to your suppliers account.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information.

All prices are in accordance with the standard terms of Property Searches; discounts are available, please contact us on 0800 009 4540 to obtain further details.

Residential CON29DW Drainage & Water Search Sewer Map-DWS/DWS Standard/2023_4866829



The width of the displayed area is 200m

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 (2020) with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

Con29DW Residential Drainage and Water Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Sewer: A strategic sewer which collects either foul or surface water flow from a number of subsidiary catchments and transfers this flow to a pumping station, river outfall or treatment works.

Storm Overflow Sewer: A sewer designed to convey excess rainfall to rivers or watercourses so that the flow does not exceed the capacity of normal sewers (which could cause flooding).

Sludge Sewer: A sewer designed to convey sludge from one treatment works to another.

Vent Pipe: A section of sewer pipe connected between the top of a sewer and vent column, used to prevent the accumulation of gas in a sewer and thus allowing the system to operate properly.

Rising Main: A pipe carrying pumped flow under pressure from a low point to a high point on the sewerage network. The direction of the fleck indicates the direction of flow within the pipe.

Vacuum: A foul sewer designed to remove foul sewage under pressure (vacuum sewers cannot accept direct new connections).

Thames Water Proposed Sewer

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

Foul Sewer: Any foul sewer that is not owned by Thames Water.

Gulley: A sewer designed to convey surface water from large roads, motorways, etc. to watercourses or to public surface water sewers. These sewers are generally maintained by the relevant highway authority.

Culverted Watercourse: A watercourse running through a culvert or pipe which is the responsibility of the property owner or the Environment Agency.

Decommissioned Sewer: A disused sewer. Usually filled with cement mixture or removed from the ground.

Content of this drainage network is currently unknown.

Ownership of this drainage network is currently unknown.

Other Symbols

Undefined Ends: These symbols represent the point at which a pipe continues but no records of its position are currently held by Thames Water. These symbols are rare but may be found on any of the public sewer types.

Public / Private Pumping Station: Foul or Surface Water pumping station.

Casement: Ducts may contain high voltage cables. Please check with Thames Water

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the 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 indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters.

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, please contact Property Searches on 0800 009 4540

Affinity Water

Reference No. 2023_4866829

This map is centred upon Ordnance Survey grid reference 511,086,185,195

N

1:500
8/3/2023

Water Main	Hydrants, Valves, etc
Abandoned Water Main	Borehole, Pumping Facility, etc

It shows water mains and associated apparatus but should not be relied upon as evidence of ownership or evidence of responsibility for maintenance. Privately owned service pipes (which may serve one or more properties) are unlikely to be shown.

The position of Company apparatus shown on this plan is provided for guidance only and the Company accepts no responsibility in the event of Inaccuracy

For further information about the contents of this plan, please contact Affinity Water at the address below

Affinity Water, Tamblin Way, Hatfield, Hertfordshire, AL10 9EZ. www.affinitywater.co.uk/central

Appendix J

Environment Agency Flood Map

Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**511087/185195**	**7 Aug 2023 12:46**

Your selected location is in flood zone 1, an area with a low probability of flooding.

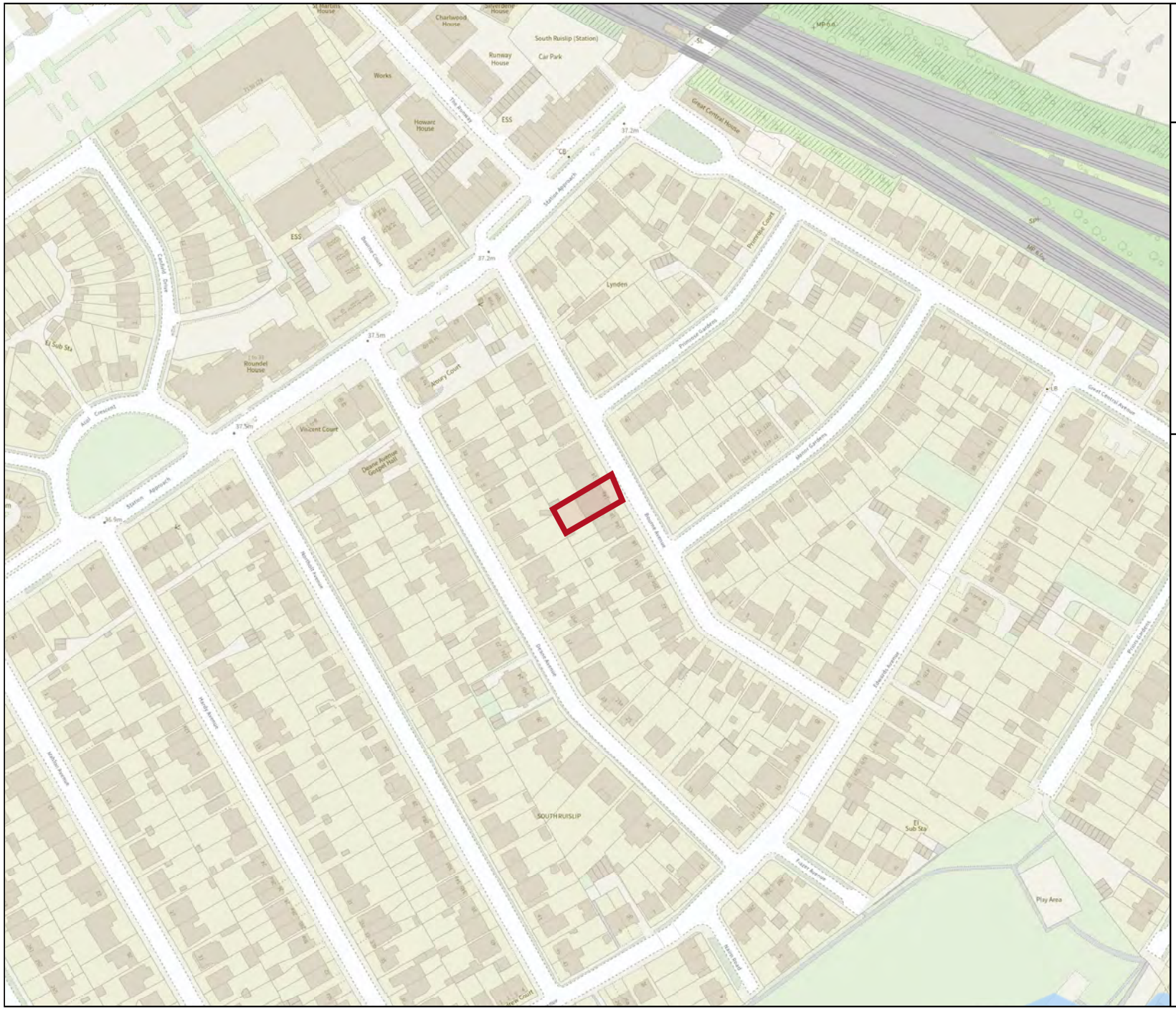
You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.



Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
511087/185195

Scale
1:2500

Created
7 Aug 2023 12:46

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60m