



Flood Risk Assessment

Former Belmore Allotments

Burns Close

Hayes

07.01.19

Prepared by Rod Green/John Roberts

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SUMMARY

Site Location	Belmore Allotments. OS: TQ 10189 82010
Proposed Development	Housing Development
Vulnerability Classification	More Vulnerable
Climate Change	Allow 40% increase in rainfall intensity
Flood Zone	Flood Zone 1
Tidal Flooding	Low and acceptable risk
Fluvial Flooding	Low and acceptable risk
Pluvial Flooding	Mitigated risk, low and acceptable
Groundwater Flooding	Low and acceptable risk
Sewer Flooding	Low and acceptable risk
Reservoirs, Canal & Artificial Sources	Low and acceptable risk
Flooding from the Development	Low and acceptable risk
Ground Conditions	Firm Clay/Silty Clay
Surface Water Drainage Proposals	Provision of appropriate SuDs with a 40% allowance for climate change on the 1in100 year event.
Flood Risk Vulnerability and Flood Zone Compatibility	Site is within Flood Zone 1 therefore the development is identified as acceptable.
Sequential & Exception Test	N/A
Additional Mitigation Measures	N/A
Conclusions & Recommendations	The conclusion of the report is that the scheme should be approved with appropriate conditions to be addressed as part of the detailed design.

1. INTRODUCTION

The London Borough of Hillingdon has appointed The Environmental Protection Group Ltd (EPG) to provide a Flood Risk Assessment (FRA) for the proposed residential development at Belmore Allotments, Burns Close, Hayes, UB4 0EJ. The FRA has been requested by the London Borough of Hillingdon to accompany the planning submission. It should be noted that the unmitigated pluvial flood risk is low to medium. The FRA shall review mitigation measures to prevent risk on-site and offsite.

1.1 Flood Risk Aims

The key aims of this flood risk assessment are to:

- Assess the flood risk to the development and to demonstrate the feasibility of designing the development so that the risk of flooding is acceptable.
- Assess the potential impact of the development on flood risk elsewhere and demonstrate that this can be mitigated by using sustainable drainage systems to drain the site.
- Satisfy the requirements of National Planning Policy.

This assessment has been carried out in accordance with the National Planning Policy Framework (NPPF). The aim of the NPPF is to ensure that flood risk is taken into account at all stages in the planning process and to direct development run-off away from the areas at highest risk. Where new development is necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible to reduce flood risk overall.

Further regional and local planning policies which apply to this area include:

- London Plan March 2016.
- TE2100 Plan, Environment Agency, Nov 2012
- Thames Catchment Flood Management Plan, Environment Agency, Dec 2009
- London Borough of Hillingdon, Local plan Part 1, Strategic Policies, Nov 2012
- London Borough of Hillingdon, Local plan Part 2, Development Management Policies, (Proposed submission version)
- London Borough of Hillingdon, Preliminary Flood Risk Assessment, 2011
- London Borough of Hillingdon, Storm Water Management Plan
- London Borough of Hillingdon, Local Flood Risk management Strategy, 2016
- Sustainable Design and Construction - Supplementary Planning Guidance April 2014.

These documents have been referred to and their guidance incorporated into the development proposals where appropriate.

1.2 Sources of Flooding

NPPF requires an assessment of flood risk to consider all forms of flooding, and lists six forms of flooding that should be considered as part of a flood risk assessment. These forms of flooding are listed in below, along with an explanation of each form of flooding.

1.2.1 Flooding From Rivers (Fluvial Flooding)

Watercourses flood when the amount of water in them exceeds the flow capacity of the river channel. Flooding can either develop gradually or rapidly, depending on the characteristics of the catchment. Land use, topography and the development can have a strong influence on flooding from rivers.

1.2.2 Flooding From the Sea (Tidal Flooding)

Flooding to low-lying land from the sea and tidal estuaries is caused by storm surges and high tides. Where tidal defences exist, they can be overtopped or breached during a severe storm, which may be more likely with climate change.

1.2.3 Flooding from Land (Pluvial Flooding)

Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding. In developed areas, this flood water can be polluted with domestic sewage where foul sewers surcharge and overflow. Local topography and built form can have a strong influence on the direction and depth of flow. The design of development down to a micro-level can influence or exacerbate this. Overland flow paths should be taken into account in spatial planning for urban developments. Flooding can be exacerbated if development increases the percentage of impervious area.

1.2.4 Flooding from Groundwater

Groundwater flooding can occur from three main sources:

- raised water tables;
- seepage; and
- percolation and groundwater recovery or rebound.

Groundwater flooding occurs when groundwater levels rise above ground levels. Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). Chalk is the most extensive source of groundwater flooding.

1.2.5 Flooding from Sewers and Drains

In urban areas, rainwater is frequently drained into sewers. Flooding can occur when sewers are overwhelmed by heavy rainfall, or become blocked. Sewer flooding continues until the water drains away.

1.2.6 Flooding from Other Artificial Sources

Non-natural or artificial sources of flooding can include reservoirs, canals and lakes. Reservoir or canal flooding may occur as a result of the facility being overwhelmed and/or as a result of dam or bank failure.

1.3 Flood Zones & Classification

For river and tidal flooding, NPPF uses four Flood Zones to characterise flood risk. These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences, and are detailed in Table 1.

Table 1 NPPF Flood Zones

Flood Zone	Definition
1	Low probability (less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1%))
2	Medium probability (between 1 in 100 and 1 in 1,000 annual probability of river flooding (1%-0.1%) or between 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5%-0.1%) in any year).
3a	High probability (1 in 100 or greater annual probability of river flooding (>1%) in any year or 1 in 200 or greater annual probability of sea flooding (>0.5%) in any given year).
3b	Functional floodplain. This zone comprises land where water has to flow or be stored in times of flood. Land which would flood with an annual probability of 1 in 20 (5%), or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain.

NPPF classifies the vulnerability of developments to flooding into five categories. These categories are detailed in Table 2. Based on the vulnerability of a development, NPPF states within what Flood Zone(s) a development is appropriate. The flood risk vulnerability and Flood Zone ‘compatibility’ of developments is summarised in Table 3.

Table 2 Vulnerability Classification

Flood Risk Vulnerability Classification	Examples of Development Types
Essential Infrastructure	Transport Infrastructure Utility Infrastructure (e.g. water treatment works and wind turbines)
Water Compatible	Flood Control Infrastructure Water and Sewerage Infrastructure Navigation Facilities Water Based Recreation
Highly Vulnerable	Emergency Services Basement Dwellings Mobile home parks
More Vulnerable	Hospitals and other health services Residential Establishments Educational Establishments
Less Vulnerable	Commercial Establishments (e.g. shops, restaurants and offices)

Table 3 Development Compatibility

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	✓	Exception test required	✓	✓
Flood Zone 3a	Exception test required	✓	x	Exception test required	✓
Flood Zone 3b	Exception test required	✓	x	x	x

✓ Development is appropriate x Developments should not be permitted

1.4 The Sequential Test, Exception Test and Sequential Approach

The Sequential Test is a risk-based test that should be applied at all stages of development and aims to steer new development to areas with the lowest probability of flooding (Zone 1). This is applied by the Local Planning Authority by means of a Strategic Flood Risk Assessment (SFRA). The SFRA and NPPF may require the Exception Test to be applied to certain forms of new development. The test considers the vulnerability of the new development to flood risk and, to be passed, must demonstrate that:

- There are sustainability benefits that outweigh the flood risk and;
- The new development is safe and does not increase flood risk elsewhere.

The Sequential Approach is also a risk-based approach to development. In a development site located in several Flood Zones or with other flood risks, the sequential approach directs the most vulnerable types of development towards the areas of least risk within the site.

1.5 Climate Change

NPPF makes it a planning requirement to account for climate change in the proposed design. The recommended allowances are summarised in Table 4 below (Sourced from the Environment Agency).

Table 4 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%

2. THE SITE AND DEVELOPMENT

2.1 Existing Site

The area on which the proposed development is to be sited is currently used as allotments and is owned by The London Borough of Hillingdon with access from Burns Close and Melrose Close. The boundary covers approximately 1.20 hectares and is generally rectangular in shape with the long axis running southeast to northwest. The site is bounded to the northwest by an existing respite care home, to the northeast by public open space that is designated as greenbelt land, to the southeast by the rear gardens of properties at the end of Marvel Avenue and to the southeast by the rear gardens of properties at the end of Melrose Close and Burns Close.

The site location plan and topographical survey are located within Appendix A & B respectively.

2.2 Geology

British Geological Survey (BGS) maps indicate that the site is characterised by low permeability, brown silty clay, (Boyn Hill Gravel member) overlying clayey soils (London clay). This is supported by the London Borough of Hillingdon Geological Map South, Figure 12.2 in Appendix C.

2.3 Drainage Infrastructure

An existing surface water drain extends along Melrose Close before connecting into an existing 600mm surface water carrier drain. This drain falls from the southwest, heading along the site boundary in a northeast direction to outfall into the Yeading Brook. Refer to the Thames Water asset information identified in Appendix D. An appropriate easement from the existing 600mm diameter drain should be agreed with Thames Water.

The ditch along the northern boundary of the development discharges into Yeading Brook to the east of site.

The London Borough of Hillingdon summary map of past flooding incidents, figure A-4.2 indicates that there have been no recorded sewer flooding records within the UB4 0 area of the borough. Table 4-1 of the Preliminary Flood Risk Assessment, titled, Past Floods and Consequences does not identify any recorded flooding incidents within the vicinity of the site. Refer to Appendix H.

2.4 Watercourses

The Grand Union Canal (Paddington Arm) travels in a southerly direction through the borough before connecting to the River Thames at Brentford via the Thames Lock and Brentford Dock. The Canal passes to the east of the development.

The Ordnance Survey map for the area shows an existing drain/ditch adjacent to the northwest boundary of the site that continues southeast of the site before turning through 90° and going northeast and connecting into Yeading Brook at the existing footbridge.

The Yeading Brook main branch travels through green open space to the southeast of Yeading to eventually become the river Crane at Craneford Park. The brook is approximately 240m northeast of the site in an area of public open space and runs roughly parallel to the north-eastern boundary

2.5 Hydrogeology

The environment agency maps show that the site is not situated over any groundwater source protection zones, or principle or secondary aquifers.

2.6 Proposals

The London Borough of Hillingdon's proposal is to create 111 residential apartments on the site including parking for occupants. The proposed site layout can be found in Appendix E.

The impermeable areas have been calculated to be 0.427 ha of roof area and 0.428 ha of hardscaping.

3. FLOOD RISK ASSESSMENT

3.1 Flood Zone Allocation

The Environment Agency (EA) Flood map (Appendix F - Figure 1.0) for planning indicates that the development site is in a Zone 1 flood risk area (i.e. there is little or no flood risk). It is the zone outside zones 2 and 3 where the annual probability of either river or tidal and coastal flooding is less than 0.1% (i.e. less than 1 in 1000 years).

In accordance with Table 2 of the flood risk vulnerability classification of the technical guidance to the NPFF, the development would be classed as More Vulnerable. The flood risk vulnerability table (Section 1.3 - Table 3) indicates that if the Residential development is located in Flood Zone 1 and is More Vulnerable the development can be considered appropriate for the site.

3.2 Sequential and Exception Test

As the development is considered to be located within Flood Zone 1 the Sequential test is not required. The development compatibility table shows that the development does not require the Exception test applying.

3.3 Fluvial & Tidal Flooding

Appendix F – Figure 2.0 indicates that the site is not susceptible to fluvial and tidal flooding. The PFRA does not indicate any historic flooding on the development site. However, it should be noted that the area to the north, near to Yeading Brook is classified as being within Flood Zones 2/3. As the development site is in Flood Zone 1, the risk is considered low and acceptable.

3.4 Pluvial Flooding

The Environment Agency Pluvial Flood Risk is shown in Appendix F – Figure 3.0. The map indicates that the majority of the development site is at a Very Low risk of flooding from overland sources. The London Borough of Hillingdon surface water flood map, shown in Appendix G corresponds to the flood risk stipulated in the Environment Agency's records.

There is a Low to Medium risk of flooding associated with overland flow entering the site from the southeastern boundary via Melrose Close. The area of risk extends to the proposed units at the eastern edge of site. Figure 3.4 details the flow direction and velocity in the Medium Risk event.

Figures 3.1, 3.2 & 3.3 in Appendix F show the Low risk, Medium risk & the High risk flooded depths respectively. Generally, the flood depth will be minor and below 300mm in the High risk and Medium risk scenarios. The Low risk scenario shows a depth between 300mm and 900mm. It should be noted that the Low risk scenario has a 0.1% to 1% chance of flooding.

A high-risk area is located within the confines of the adjacent watercourse (north) but does not extend onto the development site.

The SWMP CDA map shows that the development does not lie within a Critical Drainage Area (see Appendix J).

The modelled 1in100 year plus climate change pluvial rainfall event in Appendix K from the SWMP shows that a maximum depth of 100-250mm flooding could affect site during the storm event.

Without mitigation the flood risk from pluvial sources can be considered Low to Medium risk.

3.5 Flooding from Reservoirs, Canals, and other artificial sources

The Environment Agency Reservoir Flood Map in Appendix F – Figure 4.0 shows that the site is outside the zone of influence should a reservoir fail. Desktop study shows that there are no other artificial sources close to the development which could present a flood risk. Flood risk from reservoirs, canals and other artificial sources is therefore deemed low and acceptable

3.6 Groundwater Flooding

The Environment Agency Ground Water Vulnerability map shows that the land below the development is unproductive, see Appendix F Figure 5.0 Ground Water map. The London Borough of Hillingdon Potential for Elevated Ground Water map (SWMP) indicates that there have been no historic flooding events on the proposed site (Appendix L). Given the underlying clay strata, it is likely that a perched water table exists. Further work should be undertaken to establish ground water depths across site. The risk of groundwater flooding is low and acceptable.

3.7 Sewer and Drain Flooding

There is a Thames Water drainage network located within Melrose Close adjacent to the development. The network in Melrose Close connects to a 600mm diameter pipe which spans the eastern edge of the site. The London Borough of Hillingdon Sewer Incidents map in the PFRA and SWMP (Appendix H) indicate that there are no recorded incidents in the UB4 0 area. It is assumed that the highway drainage system may have a capacity issue given that the highways act as a conduit in the flood pluvial event. However, mitigation shall be presented to overcome the pluvial risk. Therefore, flood risk arising from sewer and drain flooding is deemed low and acceptable.

3.8 Flooding from the Development

The proposed development will have a larger impermeable area than existing allotment site which is predominately green. However, incorporating the Sustainable Urban Drainage System (SUDS) detailed in Section 5.3 and in drawing 8800-EPG-ZZ-XX-DR-Y-0001 (Appendix M) will control all runoff associated with the proposed development.

An allowance for 40% additional flow for Climate change will be added to the design calculations and discharge is to be restricted to 5 l/s. Therefore, the risk of flooding from the development is low and acceptable.

4. MITIGATION SUMMARY

4.1 Pluvial Flooding

The pluvial flooding to the eastern edge of site has been shown to be under 300mm. Modelled data shows that the maximum depth in the 1in100 year + climate change event will be between 100-250mm. Therefore, the two eastern apartment buildings shall have a raised finished floor level at 300mm above the existing ground level.

The surface water drainage strategy shall allow an extra 750sq.m of catchment to account for any overland flow displaced by the buildings. In addition to the 750sq.m of catchment added to the car park, a further 132m³ of attenuation volume has been added to the entire system. See the hydraulic calculations in Appendix N for further details.

With the suggested mitigation measures implemented, the risk of flooding from pluvial sources is a low and acceptable risk

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT TO FLOOD RISK

Development Considerations

In accordance with NPPF guidance, the development will need to demonstrate that it will:

- Remain operational and safe for users in times of flood;
- Result in no net loss of floodplain storage; and
- Not impede water flows and not increase flood risk elsewhere

5.1 Safe Access

NPPF states that the development must provide safe access and egress during a flood event. During fluvial events, the site access is shown to be unaffected. During pluvial events the access may be subjected to flooding at a depth below 300mm. This indicates that the access point from Burns Close is not impeded for emergency response vehicles and will allow safe access and egress from the site. Should the area in which the development is sited be reclassified by the Environment Agency to be within Flood Zones 2 or 3 it is recommended that the facilities management team sign up to the Environment Agency's Flood Line Warnings Direct Service.

5.2 Loss of Floodplain Storage

As the site is located within Flood Zone 1 no loss of active floodplain will occur as a result of the development.

5.3 Sustainable Drainage Strategy

The NPPF requires that surface water arising from a developed site should as far as practicable be managed in a sustainable manner to mimic the surface water flows arising from the site prior to re-development. Opportunities to reduce the surface water run-off and the associated flood risk should be identified and climate change should be taken into account. Building Regulations

(Part H), NPPF and Environment Agency advice notes require the consideration of sustainable drainage techniques for new developments. Surface water drainage should be considered in accordance with a prescribed hierarchy aimed at minimizing the impact of the development.

Surface water flows should be designed to discharge to:

1. Infiltration based systems e.g. soakaways / porous pavements etc.
2. Watercourses
3. Surface water sewers

4. Combined water sewers

Discharge via infiltration

Where possible, infiltration should be incorporated into the final design of the drainage. Infiltration should be the first consideration for drainage outfall but given the presence of London Clay this would not be a practical solution. Site investigation to clarify ground conditions and depth to the water table.

Discharge to a watercourse

There is a watercourse adjacent to site at the northern boundary which leads to Yeading Brook. It is proposed that the site outfalls to the watercourse at a restricted rate.

Table 5 SUDS Checklist

SUDS Feature	Applicability
Pond/Basin	N
Permeable Paving	Y
Reservoir Paving	Y
Green Roof	N
Blue Roof	N
Infiltration Features	N
Tank Systems (e.g. cellular systems)	Y
Filter Drains and/or Swales	N

Table 5 lists various SUDS features and their applicability for use within the proposed development. Some of the features are not practical to construct within the site or do not form part of the building design.

The proposed drainage layout 8800-EPG-XX-00-DR-Y-0001 is shown in Appendix M.

The rationale surrounding the proposed layout is based on achieving source control treatment of the run-off from potentially contaminated surfaces such as car parks, whilst optimizing the layout to overcome level issues. The proposal is also based on positioning the storage around the site such that storage is provided as close to source as is feasible. By introducing source control systems (rather than end-of-pipe treatment) it is possible to minimise construction depths, reduce pipe sizes and minimize construction risks.

Therefore, the SuDS has been designed so that the surface water runoff from roofs are discharged to adjacent Polystorm PSM1a attenuation tanks situated within the landscaping areas, via filtered back inlet gullies. It is assumed that roofs will be collected and drained conventionally with gutters and downpipes, siphonic roof drainage will alter the design.

The trafficked areas are proposed to be collected and treated by pervious paving where it will percolate through into a 400mm thick modified open graded porous sub-base. The runoff attenuated within the porous sub-base will diffuse through the stone and into 450mm thick Permavoid conduits, which serve a dual purpose of collecting the runoff for discharge and providing additional attenuation to ensure the 100-year storm event plus 40% for climate change is managed below the surface. The pervious paving will be separated into smaller catchments to overcome the falls on the development via an impermeable checkdam. The runoff will pass through the Porous paving compartments, being flow controlled at the end of each compartment, until it discharges into the 800mm thick Polystorm PSM1a tank.

Once within the attenuation tank the combined runoff from the external hard standings and the roof areas, will be discharged at a restricted discharge rate of 5l/s into the existing ditch that runs along the northern boundary. Prior to construction commencing a survey of this ditch will be required to determine the invert of the ditch and the connection level of the drainage into the ditch.

Discharge has been restricted to 5 l/s to allow the half empty time of the system to be below 24 hours. The existing Greenfield flow rate was calculated as 2 l/s which would result in half empty times in excess of 24 hours, therefore a minimum rate of 5 l/s was chosen for design.

Summary of Calculations

Total site area:	=	1.31 ha (approx.)
Existing Greenfield Flow Rate	=	2 l/s
Proposed impermeable area	=	0.868 ha (approx.)
Assumed 1in100+ 40% CC storm flow:	=	5 l/s (design flow)
Surface water storage requirements		
100yr + 40% CC	=	596m ³

The existing Greenfield and proposed system calculations can be found in Appendix N.

Foul Drainage

The foul water drainage system will pick up the above ground drainage connections at various locations at ground level and discharge to the sewer infra-structure via a system of below slab drainage access chambers.

The foul drainage will be routed in a 150mm carrier drain and discharge to the existing Thames Water Foul drainage system located within Burns Close.

5.4 Maintaining Flow Paths

The flow path affecting the eastern edge of the development shall be maintained where possible. Underground storage shall be provided for the 750 sq.m of area displaced by the proposed structures.

The extra storage shall be made available in the proposed car park. Permeable pavements with permeable sub-base and attenuation tanks shall allow capture and storage of any displaced flow. An additional 132m³ of storage is available throughout the entire proposed system to allow capture and storage on any future overland flow above the current 100 year + climate change event.

6. CONCLUSION

The site is located within Flood Zone 1 and the proposed use is appropriate for development of the site.

This report has considered potential sources of flooding to the site, including sea, rivers, groundwater, land, existing sewers, artificial sources and the proposed development. Surface flooding is indicated and is shown to be a low to medium risk, however, it is deemed to be a low risk with the mitigation measures proposed.

The site is not susceptible to groundwater flooding; however, trial hole works will need to be carried out to establish if perched water is contained in areas above the London Clay layer.

Overall, this report demonstrates that the flood risk to the site is low, reasonable and acceptable.

The proposed drainage strategy presented in Appendix M shows that the run-off can be managed at 5 l/s with a 40% allowance for climate change during the 100-year event

Appendix A – Site Location Plan



Site Location Plan

Appendix B – Topographical Survey

Appendix C – London Borough of Hillingdon Geological Map South

THIS DOCUMENT MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

- Borough Administrative Boundary
- Superficial Geology
 - Alluvium (ALV)
 - Boyn Hill Gravel Member (BHT)
 - Black Park Gravel Member (BPGR)
 - Gerrards Cross Gravel Formation (GCGR)
 - Head (HEAD)
 - Langley Silt Member (LASI)
 - Lynch Hill Gravel Member (LHOR)
 - Sand And Gravel of Uncertain Age And Origin (SGAO)
 - Shepperton Gravel Member (SHGR)
 - Stammore Gravel Formation (STGR)
 - Taplow Gravel Formation (TPGR)
 - Winter Hill Gravel (WHIG)
- Bedrock Geology
 - Claygate Member
 - London Clay Formation (LC)
 - Lewes Nodular Chalk Formation (LECH)
 - Lambeth Group (LMBE)
 - Seaford Chalk Formation (Undifferentiated) (SNCK)

London Borough of
Hillingdon



Surface Water Management Plan

© Crown Copyright. All rights reserved. GLA (LA10032379) 2011
Covers all data that has been supplied and distributed under
license for the Drain London project.
Digital geological data reproduced from British Geological Survey
(c) NERC Licence No 2011/053A

Scale at A3	Date	Drawn by	Approved by
1:40,000	07/04/2011	R. MOORE	PHIL NOVSKY

Geological Map

Consultant
CAPITA SYMONDS
Flood Risk Management

Drain London Programme Board Members

Greater London Authority
Environment Agency
Thames Water
London Councils

Capita Symonds
London Borough of Hillingdon
London Borough of Ealing
London Borough of Hounslow
London Borough of Spelthorpe
www.dlpu.org.uk

FIGURE 12.2

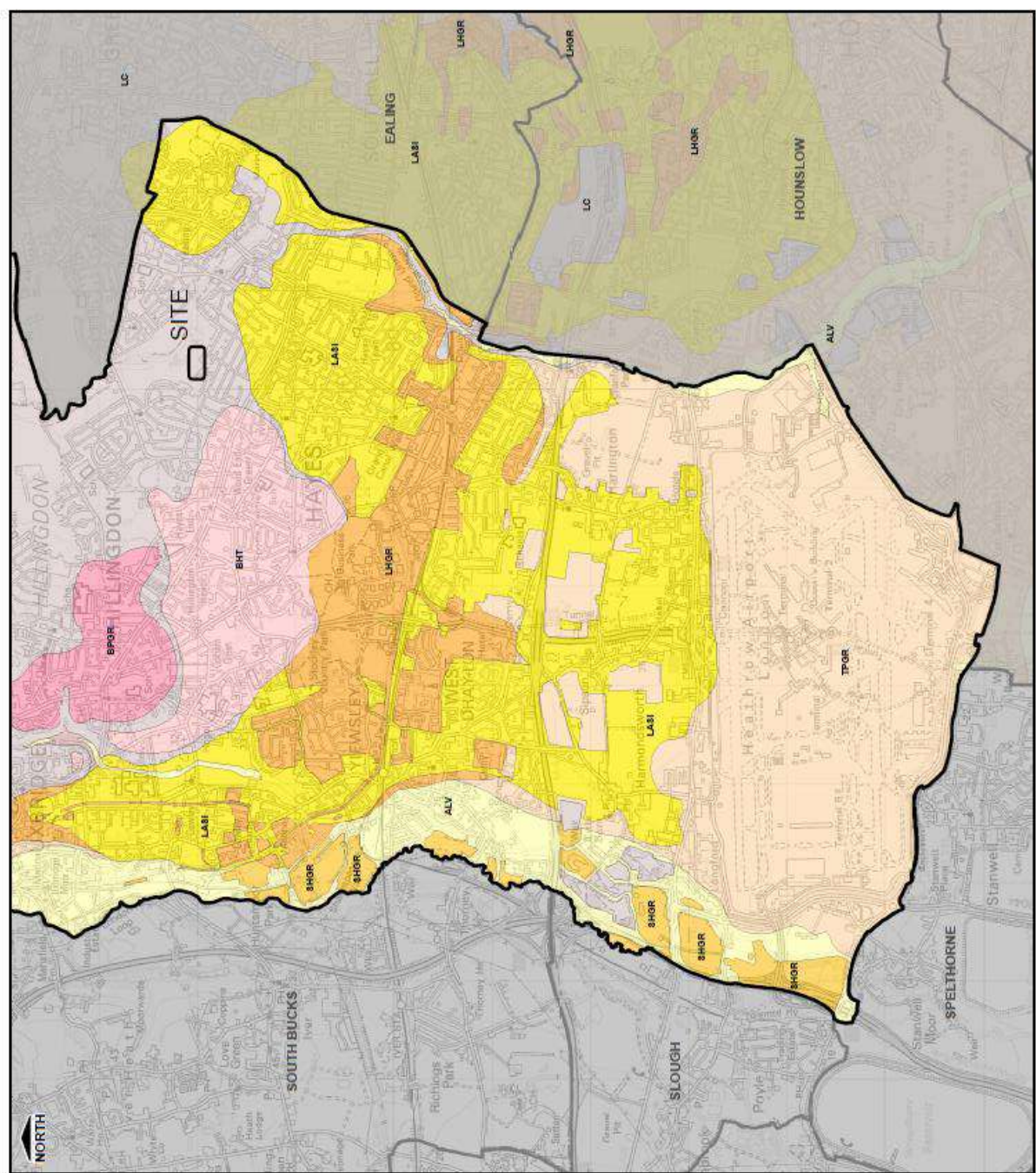


Figure 12.2: Surface Water Management Plan. Hillingdon Council. 2011. All rights reserved. This document may be used only for the purpose intended.

Appendix D – Thames Water Asset Location Sewer Map

SearchFlow Limited
42
Kings Hill Avenue
Kings Hill
West Malling
ME19 4AJKent

Search address supplied	Belmore Allotments, Burns Close, HAYES, UB4 0EJ
Your reference	Anji Trivedi
Our reference	CDWS/CDWS Standard/2017_3509984
Received date	17 February 2017
Search date	24 February 2017

Notification of Price Changes...

From 1 September 2016 Thames Water Property Searches will be increasing the prices of its CON29DW, CommercialDW Drainage & Water Enquiries and Asset Location Searches.

This will be the first price rise in three years and is in line with the RPI at 1.84%. The increase follows significant capital investment in improving our systems and infrastructure, including the recent updates to the content of the Law Society's CON29DW and the CommercialDW Enquiries.

Enquiries received with a higher payment prior to 1 September 2016 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
DX 151280 Slough 13



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



0845 070 9148

CON29DW
DRAINAGE AND WATER ENQUIRY



Question

Summary Answer

Maps, Wayleaves, Easements, Manhole Cover and Invert levels

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
1.3	Is there a wayleave/easement agreement giving Thames Water the right to lay or maintain assets or right of access to pass through private land in order to reach the Company's assets?	Yes
1.4	On the copy extract from the public sewer map, please show manhole cover, depth and invert levels where the information is available.	See Details

Drainage

2.1	Does foul water from the property drain to a public sewer?	Connected
2.2	Does surface water from the property drain to a public sewer?	Connected
2.3	Is a surface water drainage charge payable?	Charge Payable
2.4	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	Yes
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?	Yes
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.	6.103 Kilometres

Water

3.1	Is the property connected to mains water supply?	Connected
3.2	Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	Yes
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?	No
3.5	What is the classification of the water supply for the property?	Hard
3.6	Please include details of the location of any water meter serving the property.	See Details

Question

Summary Answer

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?	Thames Water
4.3	Who bills the property for water services?	Affinity Water
4.4	What is the current basis for charging for sewerage and/or water services at the property?	Metered
4.5	Are there any trade effluent consents relating to this site/property for disposal of chemically enhanced waste?	No

Search address supplied: Belmore Allotments, Burns Close, HAYES, UB4 0EJ

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) 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) any negligent or incorrect recording of that interpretation in the search report
- (iv) and compensation payments

Please refer to the attached [Terms & Conditions](#). Customers and clients are asked to note these terms, which govern the basis on which this Commercial Drainage and Water search is supplied.



Thames Water Property Searches is an Executive member of CoPSO (Council of Property Search Organisations).

Maps, Wayleaves, Easements, Manhole Cover and Invert levels

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.

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.

1.3 Wayleaves & Easements

Is there a wayleave/easement agreement giving Thames Water the right to lay or maintain assets or right of access to pass through private land in order to reach the Company's assets?

Yes, records indicate that there is a wayleave and/or an easement affecting this site. Please note that if you require further information about wayleaves and/or easements, these enquiries can not be dealt with over the phone and are dealt with by post only. To request more details about the wayleave and/or an easement please send a copy of your site plan, with the site clearly marked on it, together with copies of the Thames Water plans provided from this search to: Thames Water Property, Clearwater Court, Reading, RG1 8DB, and we will endeavour to respond within 14 days. Alternatively, for further information, please contact either treasa.walsh@thameswater.co.uk or linda.rushton@thameswater.co.uk.

1.4 Manhole

On the copy extract from the public sewer map, please show manhole cover, depth and invert levels where the information is available.

Details of any manhole cover and invert levels applicable to this site are enclosed.

Drainage

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

Records indicate that foul water from the property drains to a public sewer.

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

Records indicate that surface water from the property drains to a public sewer.

2.3 Is a surface water drainage charge payable?

Records confirm that a surface water drainage charge is payable for the property.

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

The public sewer map included indicates that there is a public sewer, disposal main or lateral drain within the boundaries of the property. However, from the 1st October 2011 there may be additional public sewers, disposal mains or lateral drains which are not recorded on the public sewer map but which may further prevent or restrict development of the property.

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.

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 included indicates that there is a public sewer within 30.48 metres (100 feet) of a building within the property.

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.

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.

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.

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.

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 Iwer (North) STW which is 6.103 kilometres to the west of the property.

Water

3.1 Is the property connected to mains water supply?

Records indicate that the property is connected to mains water supply.

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

The map of waterworks indicates that there are water mains, resource mains or discharge pipes within the boundaries of the property.

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.

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.

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 115mg/l calcium which is defined as Hard by Affinity Water.

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

Records indicate that the property is served by a water meter, which is not located within the property.

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 billed for sewerage services by:

Thames Water Utilities Limited
Clearwater Court
Vastern Road
Reading
Berkshire
RG1 8DB

Tel: 0845 9200 888
Website: www.thameswater.co.uk.

4.3 Who bills the property for water services?

The property is billed for water services by:

Affinity Water Ltd
Tamblin Way
Hatfield
AL10 9EZ

Tel: 0845 7823333

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

Clean and waste services are charged separately. With respect to clean water services, the property is charged based on actual volumes of water measured through a water meter ("metered supply"). With respect to waste water services, the property is charged based on actual volumes of water measured through a water meter ("metered supply").

4.5 Trade Effluent Consent

Are there any trade effluent consents relating to this site/property for disposal of chemically enhanced waste?

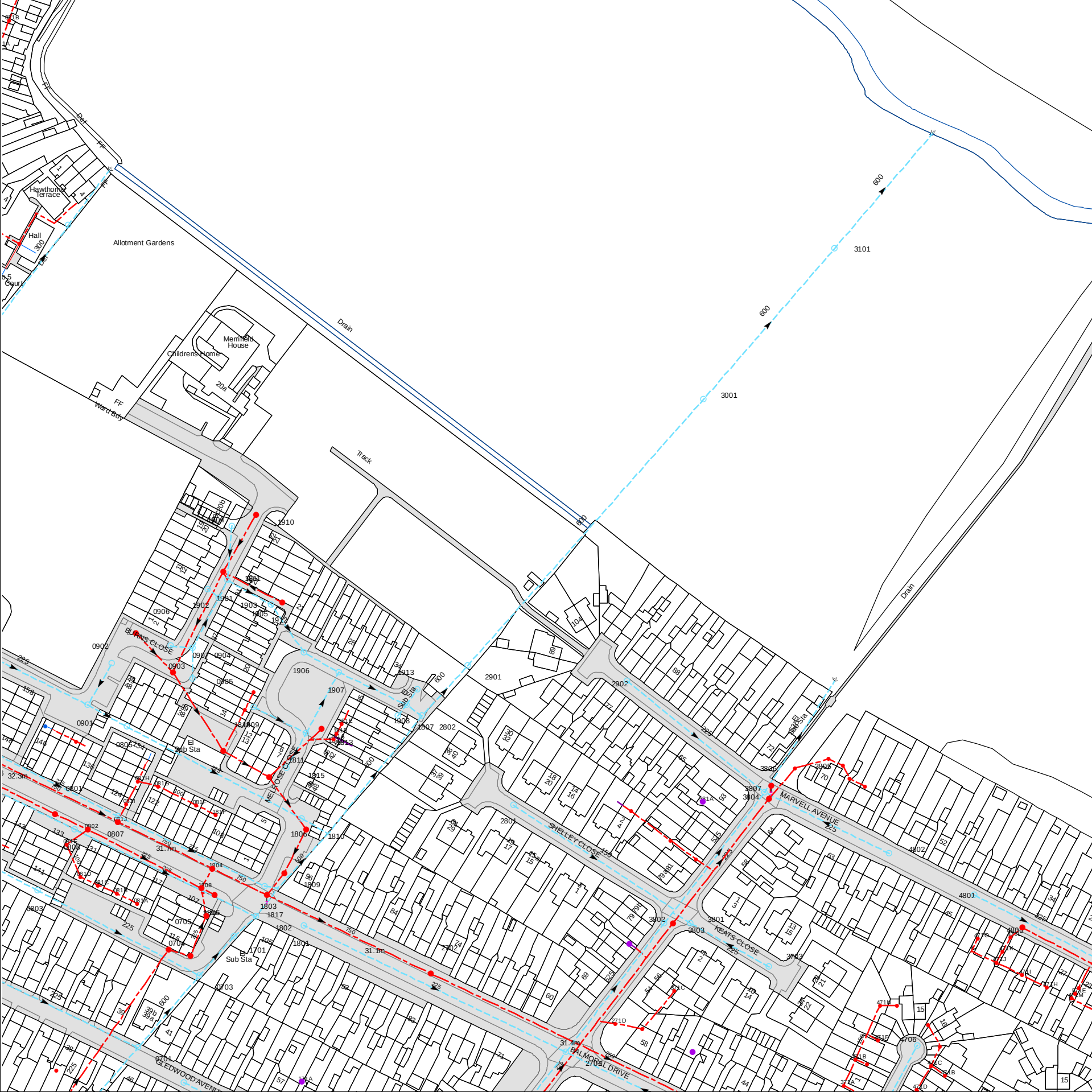
No.

Payment for this Search

The charge will be added to the NLIS Account. This search was ordered through National Land Information Services, Russell Square House, 10-12 Russell Square, London WC1B 5LF.

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

CommercialDW Drainage and Water Enquiry Sewer Map- CDWS/CDWS Standard/2017_ 3509984



The width of the displayed area is 500m

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

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
281A	n/a	n/a
3802	30.07	28.46
381E	n/a	n/a
3803	32.52	29.8
3801	31.09	29.8
381F	n/a	n/a
381A	n/a	n/a
3807	30.77	29.12
3804	30.82	28.94
3806	30.72	28.96
3805	30.91	29.21
381D	n/a	n/a
381C	n/a	n/a
381B	n/a	n/a
481A	n/a	n/a
4802	31.22	30.33
271E	n/a	n/a
081F	n/a	n/a
1808	31.7	29.07
181D	n/a	n/a
1804	31.66	26.18
1805	31.63	29.21
181F	n/a	n/a
1812	31.61	28.62
1701	n/a	n/a
1802	31.56	30.4
1803	31.27	30.36
1817	31.21	26.27
1811	31.29	28.34
1809	31.35	27.92
1815	31.1	30.03
1806	n/a	n/a
1801	31.22	30.17
1810	31.18	28.14
181A	n/a	n/a
2801	30.74	30.22
1816	31.12	29.88
181B	n/a	n/a
1813	31.09	29.85
181E	n/a	n/a
2802	30.99	29.63
1807	30.03	29.72
191B	n/a	n/a
1909	31.25	30.01
1908	30.99	29.63
191A	n/a	n/a
1913	31.26	29.72
2902	30.52	29.71
0905	31.48	30.36
0907	31.62	29.07
1907	30.63	29.8
2901	31.13	29.46
1906	30.97	29.96
0904	31.49	30.34
1905	31.32	30.07
1912	31.51	29.71
1903	31.55	30.2
1902	31.69	30.29
1901	31.5	30.18
1911	31.46	29.51
1904	31.56	30.28
1910	31.77	29.87
3001	n/a	n/a
081G	n/a	n/a
3101	n/a	n/a
0903	31.67	30.39

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.



Sewer Key - Commercial Drainage and Water Enquiry

Public Sewer Types (Operated & Maintained by Thames Water)

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

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

Sewer Fittings

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

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

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

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

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

	Outfall
	Undefined End
	Inlet

Other Symbols

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

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

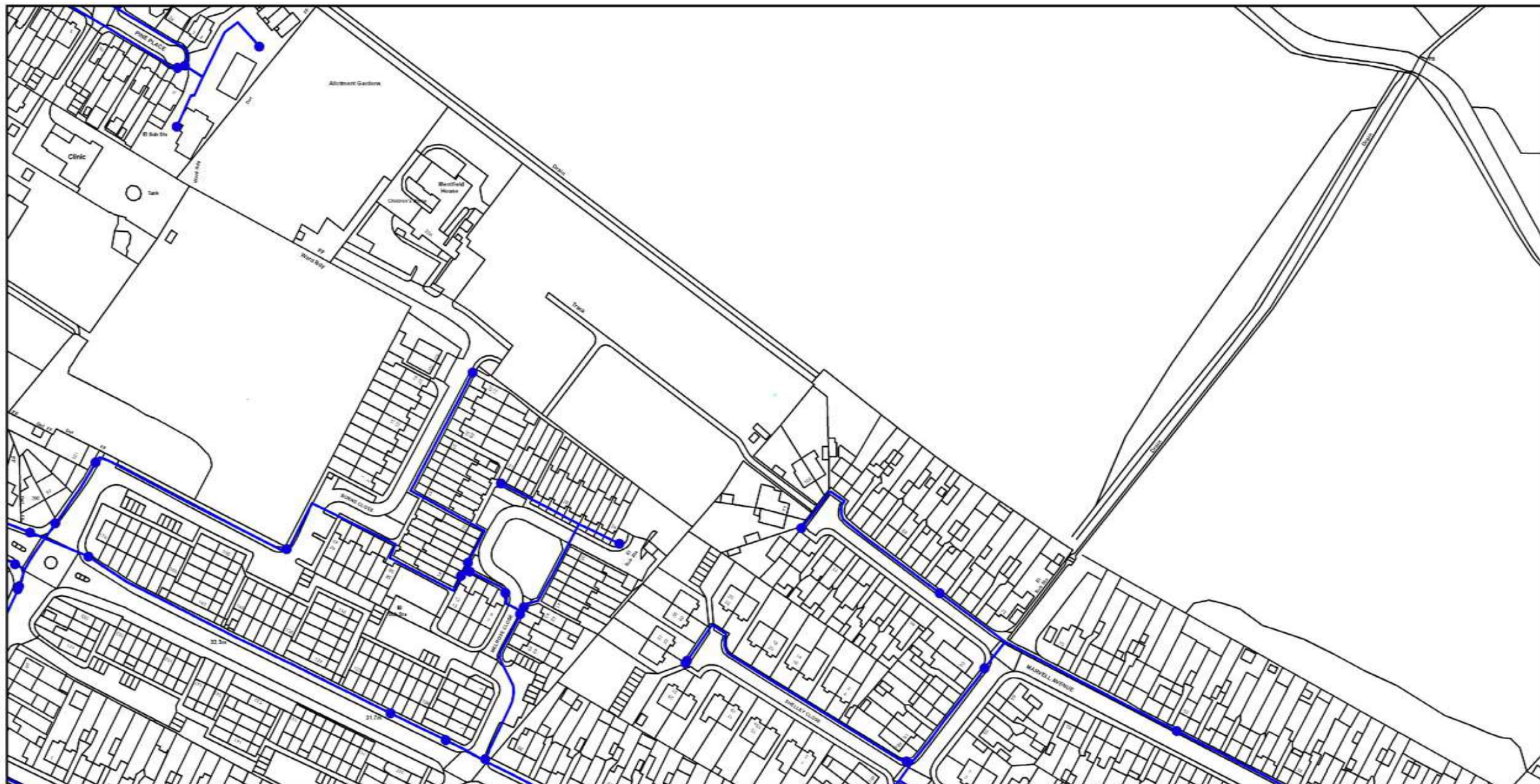
Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

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

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



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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 on 0845 7823333 or at the address below.

Affinity Water, Tamblin Way, Hatfield, Hertfordshire, AL10 9EZ. www.affinitywater.co.uk/central
(c) Affinity Water Limited
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This map is centred upon Ordnance Survey grid reference

510259,181977

— Water Main
.... Abandoned Water Main
● Hydrants, Valves, etc
■ Borehole, Pumping Facility, etc



1:1700

22/02/2017

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). Please refer to the final page of the search for further details.

Question 1.1

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.

Question 1.2

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.

Question 2.1

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.

Question 2.2

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.

Question 2.3

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.

Question 2.4

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.

Question 2.4.1

For your guidance:

- Private pumping stations installed before 1 July 2011 will be transferred into the ownership of the sewerage undertaker.
- From the 1st October 2016 private pumping stations which serve more than one property have been transferred into public ownership but may not be recorded on the public sewer map.
- 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.

Question 2.5

For your guidance:

- From the 1st October 2011 there may be additional lateral drains and/or public sewers which are not recorded on the public sewer map but are also within 30.48 metres (100 feet) of a building within the property.
- 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.

Question 2.5.1

For your guidance:

- Private pumping stations installed before 1 July 2011 will be transferred into the ownership of the sewerage undertaker.
- From the 1st October 2016 private pumping stations which serve more than one property have been transferred into public ownership but may not be recorded on the public sewer map.
- 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.

Question 2.6

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 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.

Question 2.7

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.

Question 2.8

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

Question 2.9

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

Question 3.2

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.
- 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.

Question 3.3

For your guidance:

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

Question 3.4

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 BS6700 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.

Question 3.5

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

Question 3.6

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.

Question 4.4

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.
- 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

Question 4.5

For your guidance:

- If a Trade effluent consent applies to the premises which are the subject of this search, it is for the applicant to satisfy itself as to the suitability of the consent for its client's requirements. The occupier of any trade premises in the area of a sewerage undertaker may discharge any trade effluent proceeding from those premises into the undertaker's public sewers if he does so with the undertaker's consent. If, in the case of any trade premises, any trade effluent is discharged without such consent or other authorisation, the occupier of the premises shall be guilty of an offence.
- Please note any existing consent is dependent on the business being carried out at the property and will not transfer automatically upon change of ownership.
- For further information regarding Trade Effluent consents please contact: Trade Effluent Control, Crossness STW, Belvedere Road, Abbey Wood London SE2 9AQ.

CommercialDW Drainage and Water Enquiry Terms and Conditions

Customer and Clients are asked to note these terms, which govern the basis on which this CommercialDW Drainage & Water Enquiry is supplied

Definitions

'Client' means the person, company or body who is the intended recipient of the Report with an actual or potential interest in the Property.

'Company' means a water service company or their data service provider producing the Report.

'Customer' means the person, company, firm or other legal body placing the Order, either on their own behalf as Client, or, as an agent for a Client.

'Order' means any request completed by the Customer requesting the Report.

'Property' means the address or location supplied by the Customer in the Order.

'Report' means the drainage and/or water report prepared by The Company in respect of the Property.

'Thames Water' means Thames Water Utilities Limited registered in England and Wales under number 2366661 whose registered office is at Clearwater Court, Vastern Road, Reading, Berks, RG1 8DB;

Agreement

- 1 Thames Water agrees to supply the Report to the Customer and the Client subject to these terms. The scope and limitations of the Report are described in paragraph 2 of these terms. Where the Customer is acting as an agent for the Client then the Customer shall be responsible for bringing these terms to the attention of the Client. The Customer and Client agree that the placing of an Order for a Report indicates their acceptance of these terms.

The Report

2. Whilst Thames Water will use reasonable care and skill in producing the Report, it is provided to the Customer and the Client on the basis that they acknowledge and agree to the following:-
 - 2.1 The information contained in the Report can change on a regular basis so Thames Water cannot be responsible to the Customer and the Client for any change in the information contained in the Report after the date on which the Report was produced and sent to the Client.
 - 2.2 The Report does not give details about the actual state or condition of the Property nor should it be used or taken to indicate or exclude actual suitability or unsuitability of the Property for any particular purpose, or relied upon for determining saleability or value, or used as substitute for any physical investigation or inspection. Further advice and information from appropriate experts and professionals should always be obtained.
 - 2.3 The information contained in the Report is based upon the accuracy, completeness and legibility of the address and other information supplied by the Customer or Client.
 - 2.4 The Report provides information as to the location and connection of existing services and should not be relied on for any other purpose. The Report may contain opinions or general advice to the Customer and the Client and Thames Water cannot ensure that any such opinion or general advice is accurate, complete or valid and accepts no liability therefore.
 - 2.5 The position and depth of apparatus shown on any maps attached to the Report are approximate, and are furnished as a general guide only, and no warranty as to its correctness is given or implied. The exact positions and depths should be obtained by excavation trial holes and the maps must not be relied on in the event of excavation or other works made in the vicinity of apparatus shown on any maps.

Liability

- 3 Thames Water shall not be liable to the Client for any failure, defect or non-performance of its obligations arising from any failure of, or defect in any machine, processing system or transmission link or anything beyond Thames Water's reasonable control or the acts or omissions of any party for whom Thames Water are not responsible.
 - 3.1 Where the Customer sells this report to a Client (other than in the case of a bona fide legal adviser recharging the cost of the Report as a disbursement) Thames Water shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) be liable for any loss or damage whatsoever and the Customer shall indemnify Thames Water in respect of any claim by the Client.
 - 3.2 Where a report is requested for an address falling within a geographical area where Thames Water and another Company separately provide Water and Sewerage Services, then it shall be deemed that liability for the information given by Thames Water or the Company as the case may be will remain with Thames Water or the Company as the case may be in respect of the accuracy of the information supplied. Where Thames Water is supplying information which has been provided to it by another Company for the purposes outlined in this agreement Thames Water will therefore not be liable in any way for the accuracy of that information and will supply that information as agent for the Company from which the information was obtained.
 - 3.3 Except in respect of death or personal injury caused by negligence, or as expressly provided in these Terms:
 - 3.3.1 The entire liability of Thames Water or the Company as the case may be in respect of all causes of action arising under or in connection with the Report (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) shall not exceed £2,000,000 (two million pounds); and
 - 3.3.2 Thames Water shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) be liable for any loss of profit, loss of goodwill, loss of

reputation, loss of business or any indirect, special or consequential loss, damage or other claims, costs or expenses;

Copyright and Confidentiality

4. The Customer and the Client acknowledge that the Report is confidential and is intended for the personal use of the Client. The copyright and any other intellectual property rights in the Report shall remain the property of Thames Water or the Company as the case may be. No intellectual or other property rights are transferred or licensed to the Customer or the Client except to the extent expressly provided
 - 4.1 The Customer or Client is entitled to make copies of the Report but is not permitted to copy any maps contained in, or attached to the Report
 - 4.2 The maps contained in the Report are protected by Crown Copyright and must not be used for any purpose outside the context of the Report.
 - 4.3 The Customer and Client agree (in respect of both the original and any copies made) to respect and not to alter any trademark, copyright notice or other property marking which appears on the Report.

Payment

5. Unless otherwise stated all prices are inclusive of VAT. The Customer shall pay for the price of the Report specified by Thames Water, without any set off, deduction or counterclaim.
 - 5.1 Unless payment has been received in advance, Customers shall be invoiced for the agreed fee once their request has been processed. Any such invoice must be paid within 14 days. Where the Customer has an account with Thames Water, payment terms will be as agreed with Thames Water.
 - 5.2 No payment shall be deemed to have been received until Thames Water has received cleared funds.
 - 5.3 If the Customer fails to pay Thames Water any sum due Thames Water shall be entitled but not obliged to charge the Customer interest on the sum from the due date for payment at the annual rate of 2% above the base lending rate from time to time of Natwest Bank, accruing on a daily basis until payment is made. Thames Water reserves the right to claim interest under the Late Payment of Commercial Debts (Interest) Act 1998.
 - 5.4 Thames Water reserves the right to increase fees on reasonable prior written notice at any time.

Cancellations or Alterations

6. Once an Order is placed, Thames Water shall not be under any obligation to accept any request to cancel that Order and payment for the Order shall still be due upon completion of the Report. In cases where an error has been made in the original Order (e.g. the Customer has supplied an incorrect address), the Customer will need to place a second Order, detailing the correct information, and shall be liable to pay a second charge in accordance with clause 5 above.

Delivery

7. On receiving your order the reports will be posted to you within 10 working days from receipt.
 - 7.1 Delivery is subject to local post conditions and regulations. All items should arrive within 12 working days, but Thames Water cannot be held responsible should delays be caused by local post conditions, postal strikes or other causes beyond the control of Thames Water.

General

8. If any provision of these terms is or becomes invalid or unenforceable, it will be taken to be removed from the rest of these terms to the extent that it is invalid or unenforceable. No other provision of these terms shall be affected.
 - 8.1 These terms shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts.
 - 8.2 Nothing in this notice shall in any way restrict the Customer or Clients statutory or any other rights of access to the information contained in the Report.

These Terms & Conditions are available in larger print for those with impaired vision.

Terms and Conditions

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

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

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

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

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

If the goods or services covered by this invoice falls under the regulation of the Water Industry Act 1991, and you remain dissatisfied you can refer your complaint to CC Water on 0845 039 2837 (it will cost you the same as a local call) or write to them at 11 Belgrave Road, London SW1V 1RB.

Ways to pay your bill

By Post – Cheque only, made payable to 'Thames Water Utilities Ltd' writing your Thames Water account number on the back. Please fill in the payment slip below and send it with your cheque to Thames Water Utilities Ltd., PO Box 223, Swindon SN38 2TW	By BACS Payment direct to our bank on account number 90478703, sort code 60-00-01 may be made. A remittance advice must be sent to Thames Water Utilities Ltd., PO Box 223, Swindon SN38 2TW. Or fax to 01793 424599 or email: cashoperations@thameswater.co.uk	Telephone Banking By calling your bank and quoting your invoice number and the Thames Water's bank account number 90478703 and sort code 60-00-01	By Swift Transfer You may make your payment via SWIFT by quoting NWBKGB2L together with our bank account number 90478703, sort code 60-00-01 and invoice number
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Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.



Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

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

The Search Code:

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

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

The Code's core principles

Firms which subscribe to the Search Code will:

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

Complaints

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

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

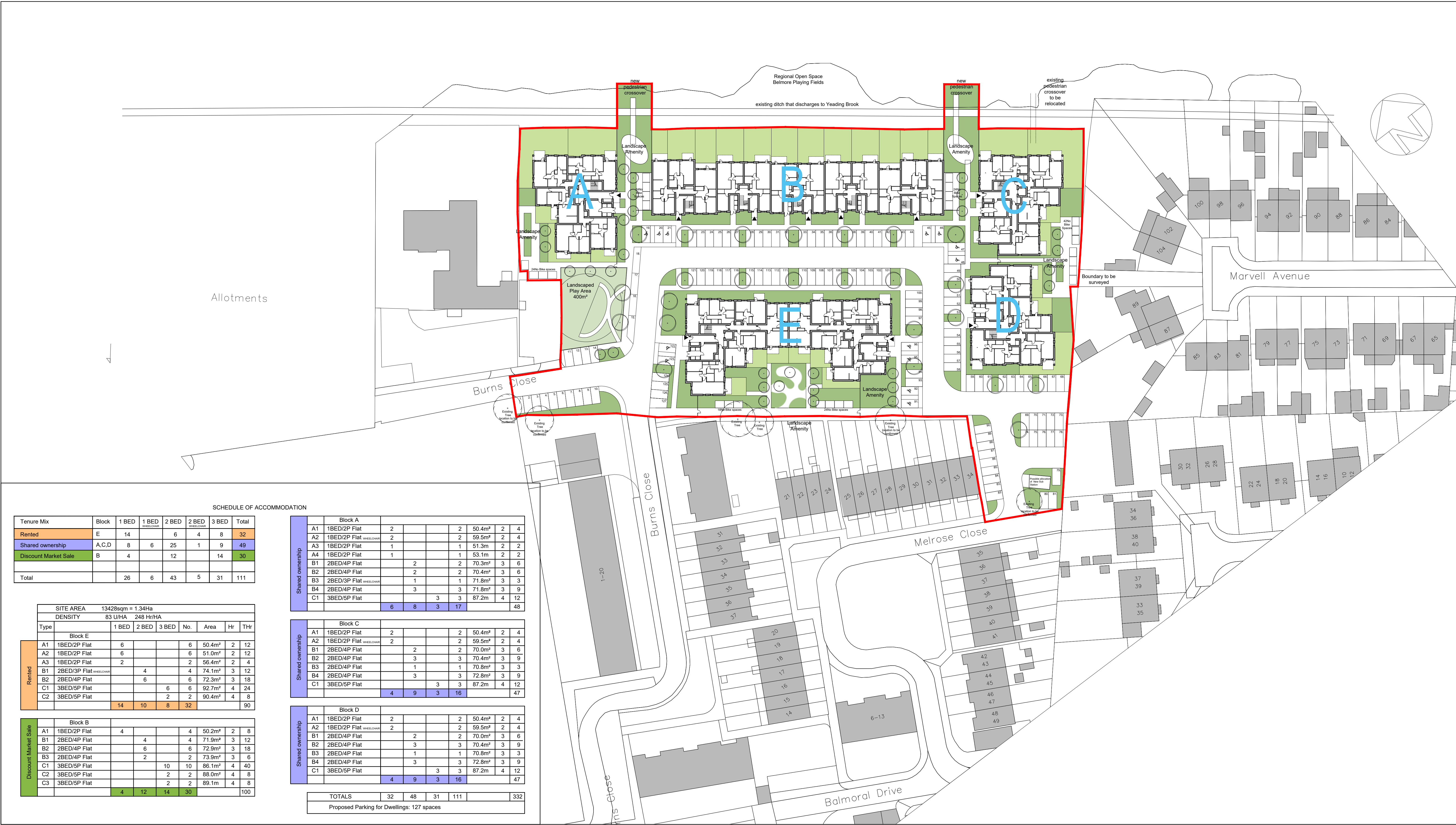
TPOs Contact Details

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

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

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

Appendix E – Proposed Site Plans



SCHEDULE OF ACCOMMODATION						
Tenure Mix	Block	1 BED	1 BED	2 BED	2 BED	3 BED
Rented	E	14	14	6	4	8
Shared ownership	A,C,D	8	6	25	1	9
Discount Market Sale	B	4		12		14
Total		26	6	43	5	31

SITE AREA 13428sqm = 1.34Ha						
DENSITY 83 U/HA 248 Ht/HA						
Type	1 BED	2 BED	3 BED	No.	Area	Hr
Block E						
A1 1BED/2P Flat	6			6	50.4m²	2 12
A2 1BED/2P Flat	6			6	51.0m²	2 12
A3 1BED/2P Flat	2			2	56.4m²	2 4
B1 2BED/3P Flat		4		4	74.1m²	3 12
B2 2BED/4P Flat		6		6	72.3m²	3 18
C1 3BED/5P Flat			6	6	92.7m²	4 24
C2 3BED/5P Flat			2	2	90.4m²	4 8
	14	10	8	32		90
Block B						
A1 1BED/2P Flat	4			4	50.2m²	2 8
B1 2BED/4P Flat		4		4	71.9m²	3 12
B2 2BED/4P Flat		6		6	72.9m²	3 18
B3 2BED/4P Flat		2		2	73.9m²	3 6
C1 3BED/5P Flat			10	10	86.1m²	4 40
C2 3BED/5P Flat			2	2	88.0m²	4 8
C3 3BED/5P Flat			2	2	89.1m²	4 8
	4	12	14	30		100

Block A						
A1 1BED/2P Flat	2			2	50.4m²	2 4
A2 1BED/2P Flat	2			2	59.5m²	2 4
A3 1BED/2P Flat	1			1	51.3m²	2 2
A4 1BED/2P Flat	1			1	53.1m²	2 2
B1 2BED/4P Flat		2		2	70.3m²	3 6
B2 2BED/4P Flat		2		2	70.4m²	3 6
B3 2BED/3P Flat		1		1	71.8m²	3 3
B4 2BED/4P Flat		3		3	71.8m²	3 9
C1 3BED/5P Flat			3	3	87.2m²	4 12
	6	8	3	17		48

Block C						
A1 1BED/2P Flat	2			2	50.4m²	2 4
A2 1BED/2P Flat	2			2	59.5m²	2 4
B1 2BED/4P Flat		2		2	70.0m²	3 6
B2 2BED/4P Flat		3		3	70.4m²	3 9
B3 2BED/4P Flat		1		1	70.8m²	3 3
B4 2BED/4P Flat		3		3	72.8m²	3 9
C1 3BED/5P Flat			3	3	87.2m²	4 12
	4	9	3	16		47

Block D						
A1 1BED/2P Flat	2			2	50.4m²	2 4
A2 1BED/2P Flat	2			2	59.5m²	2 4
B1 2BED/4P Flat		2		2	70.0m²	3 6
B2 2BED/4P Flat		3		3	70.4m²	3 9
B3 2BED/4P Flat		1		1	70.8m²	3 3
B4 2BED/4P Flat		3		3	72.8m²	3 9
C1 3BED/5P Flat			3	3	87.2m²	4 12
	4	9	3	16		47

TOTALS	32	48	31	111		332
Proposed Parking for Dwellings: 127 spaces						



Proposed Block Plan

146-148 ELTHAM HILL
LONDON SE9 5DY
T. 020 8294 1000
F. 020 8294 1320
e. general@bailivgarner.co.uk

Appendix F – The Environment Agency Flood Maps

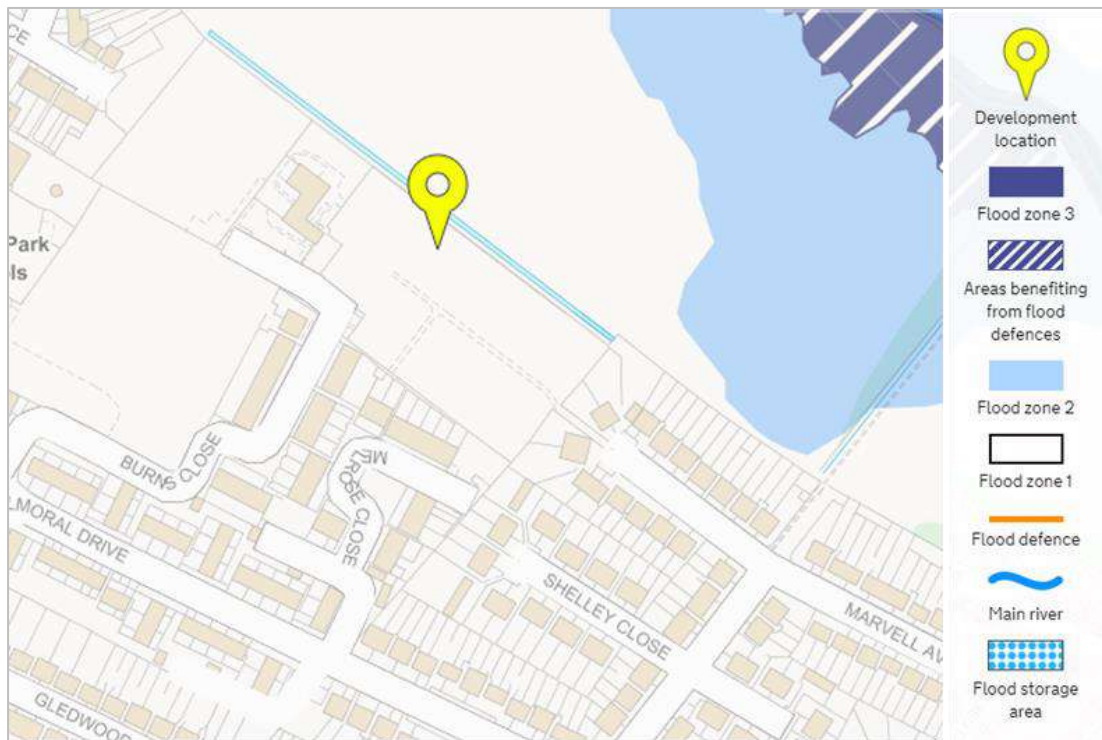


Figure 1.0 EA Flood map for Planning

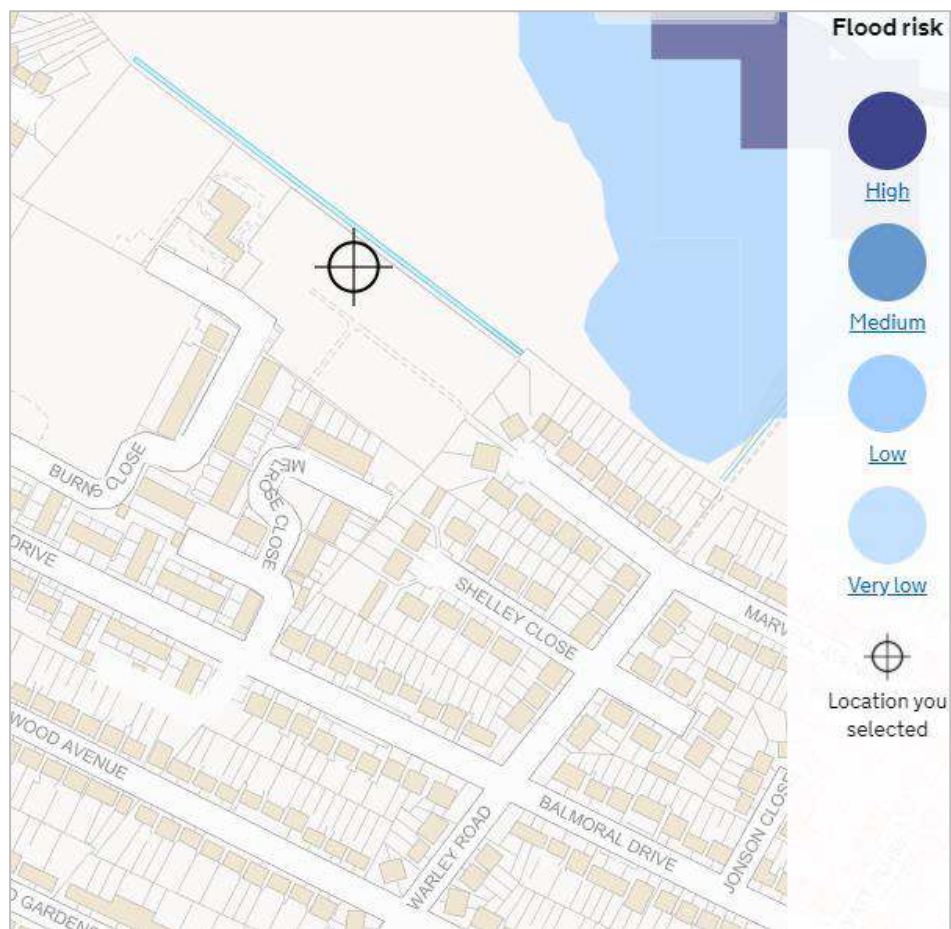


Figure 2.0 Long term flood risk from fluvial or tidal flooding map

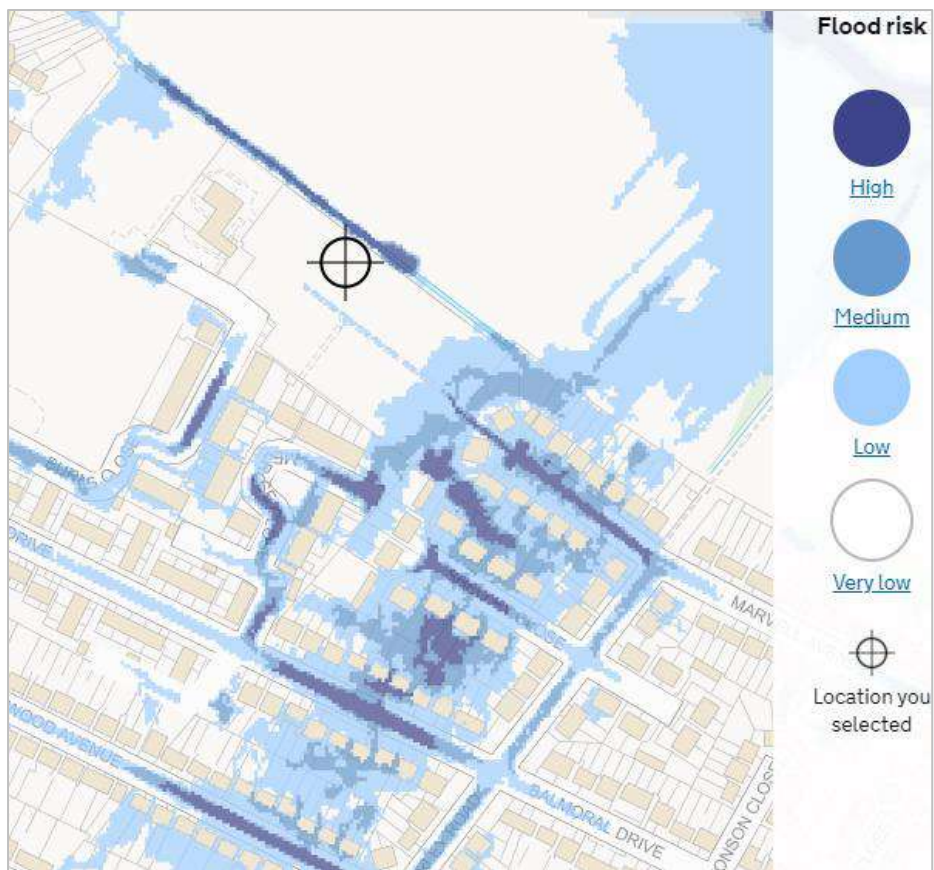


Figure 3.0 Long term flood risk from pluvial flooding map

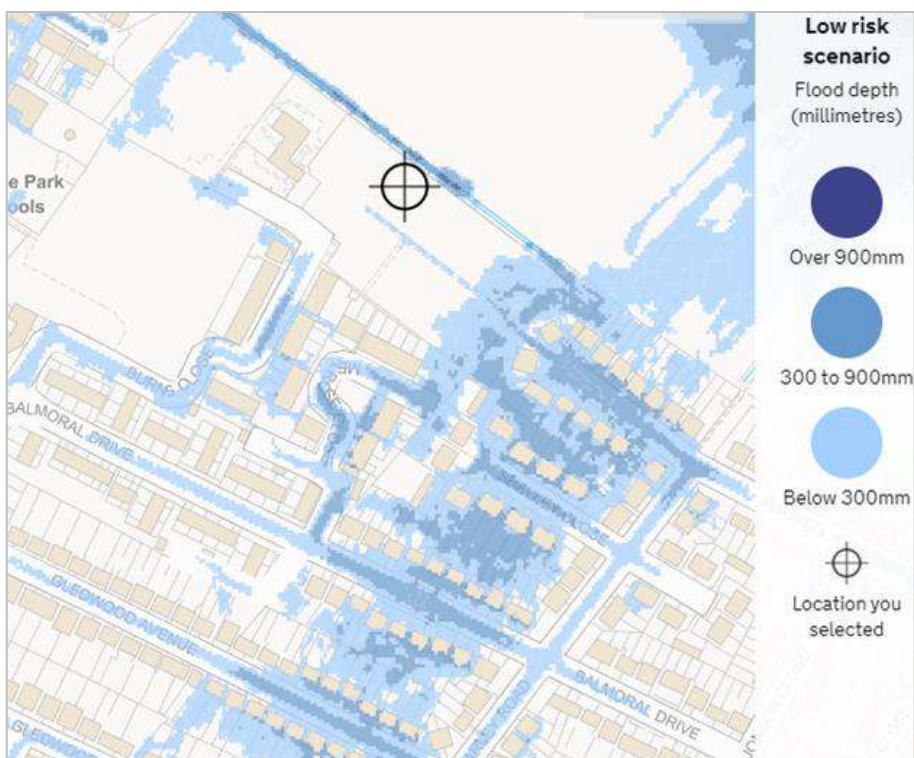


Figure 3.1 Low risk scenario flood pluvial flooding map



Figure 3.2 Medium risk scenario flood pluvial flooding map

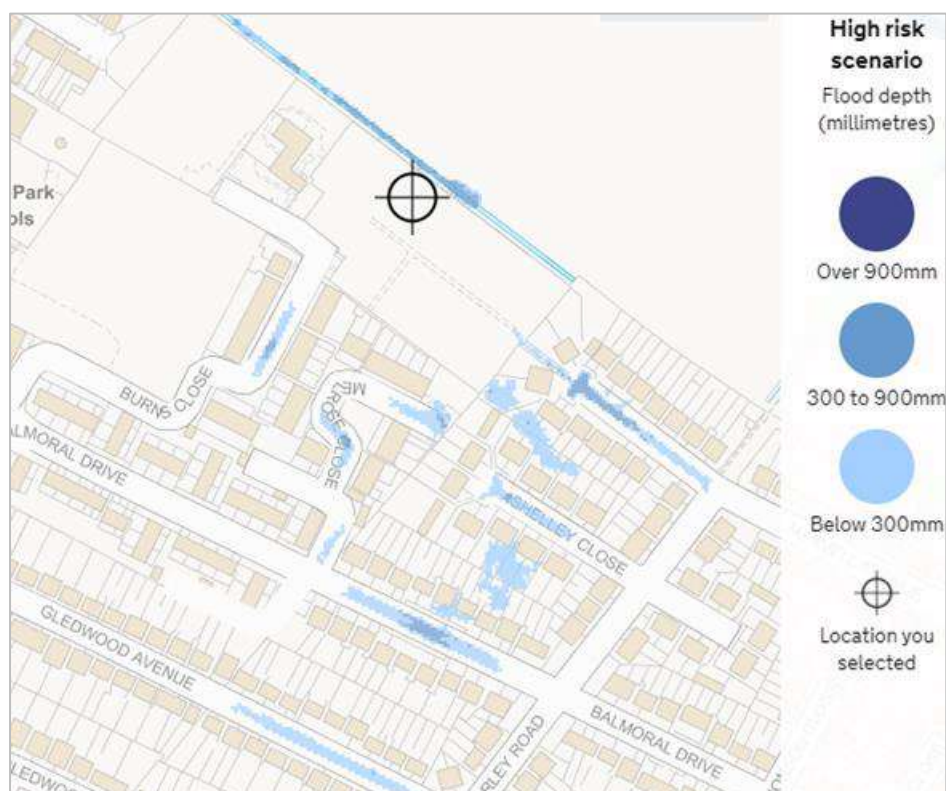


Figure 3.3 High risk scenario flood pluvial flooding map

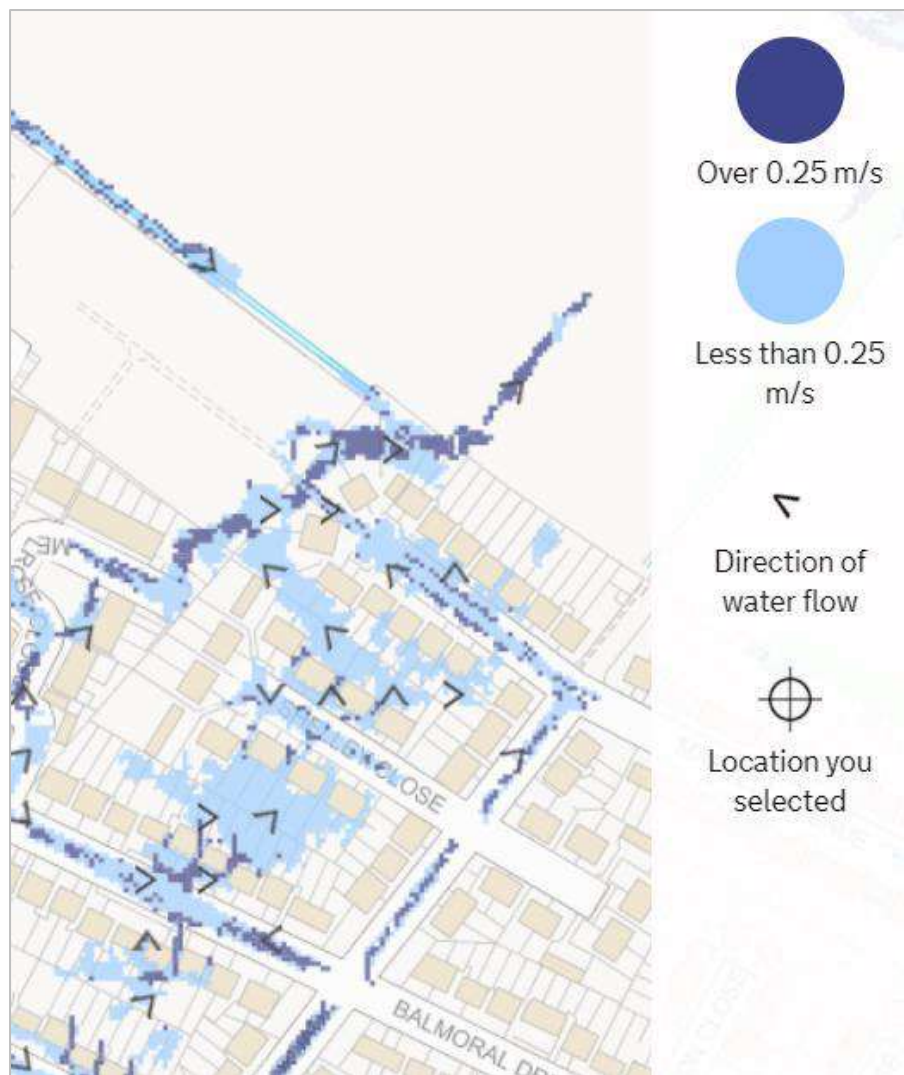


Figure 3.4 Medium Risk Velocity and Direction

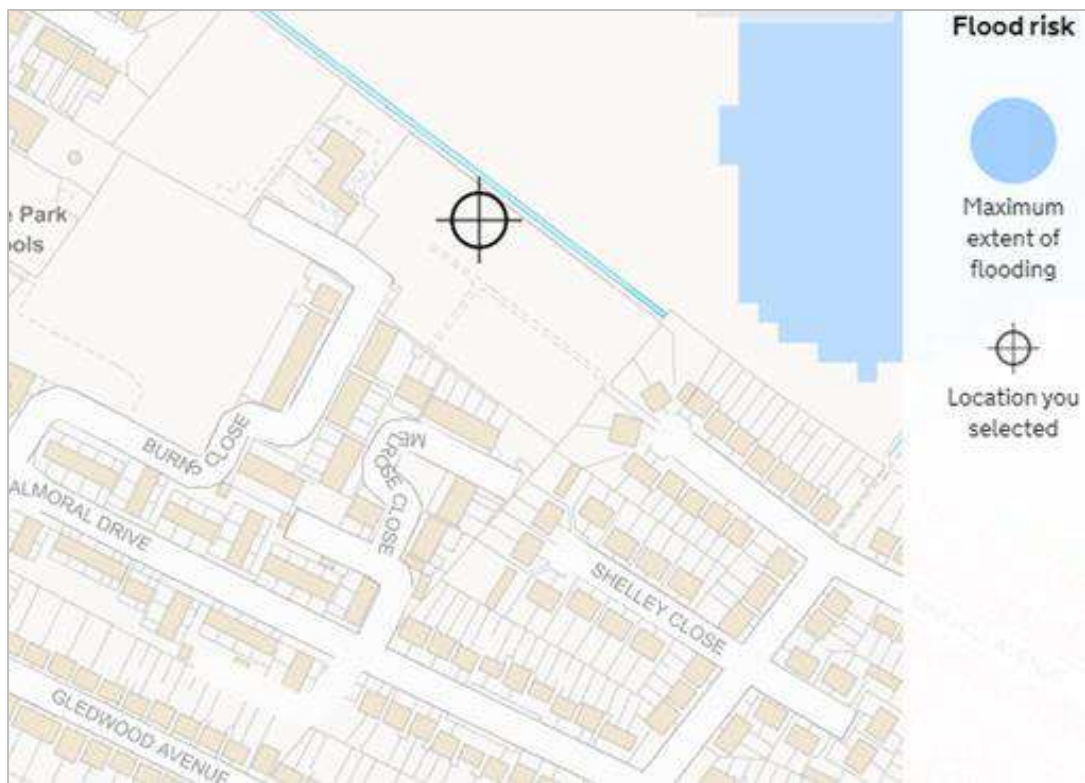


Figure 4.0 Long term flood risk from reservoirs map

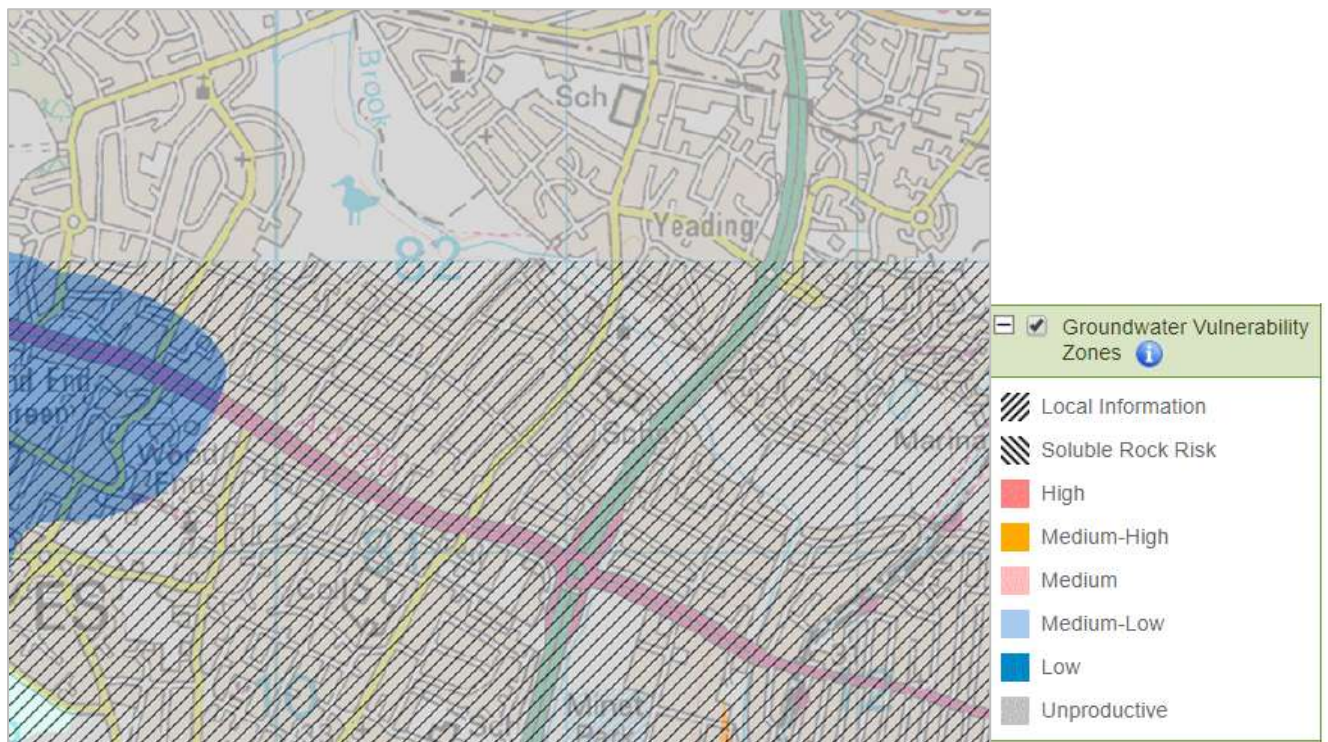


Figure 5.0 EA Ground water vulnerability map (unproductive)

**Appendix G – London Borough of Hillingdon Environment Agency Flood Map
for Surface Water**

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSES INTENDED

Legend

-  Borough Administrative Boundary
-  200yr Surface Water Event (Shallow)
-  200yr Surface Water Event (Deep)

Notes

London Borough of
Hillingdon



Surface Water Management Plan

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license for the Drain London project.
Digital geospatial data reproduced from British Geological Survey
(© NERC Licence No 20110034)

Scale at A3	Date	Drawn by	Approved by
1:40,000	08/04/2011	R. MOORE	P. HINDS

**Environment Agency Flood Map
for Surface Water**

Consultants

CAPITA SYMONDS
Flood Risk Management

Greater London Programme Board Members

Environment Agency

London Councils

GREATER LONDON AUTHORITY

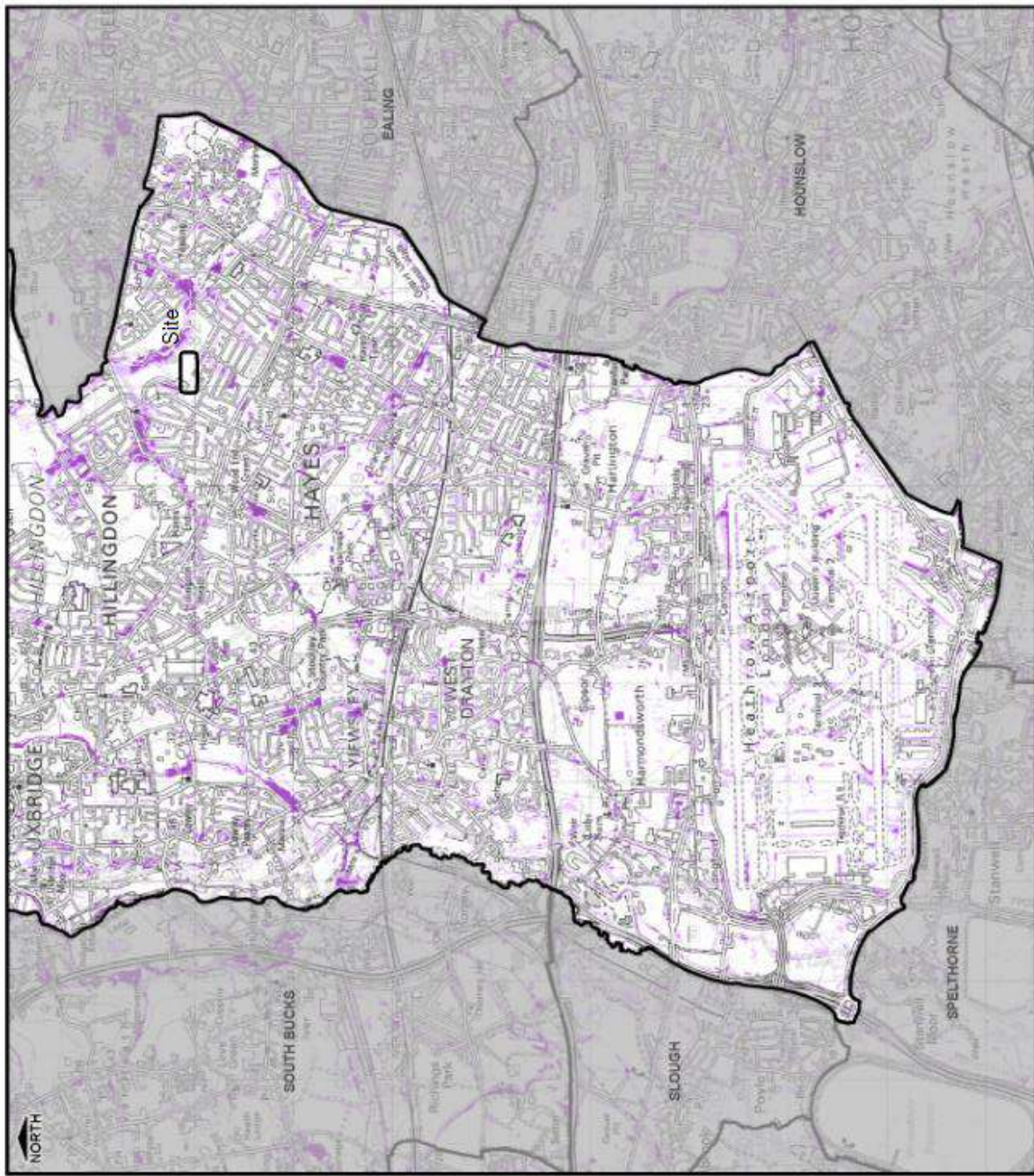
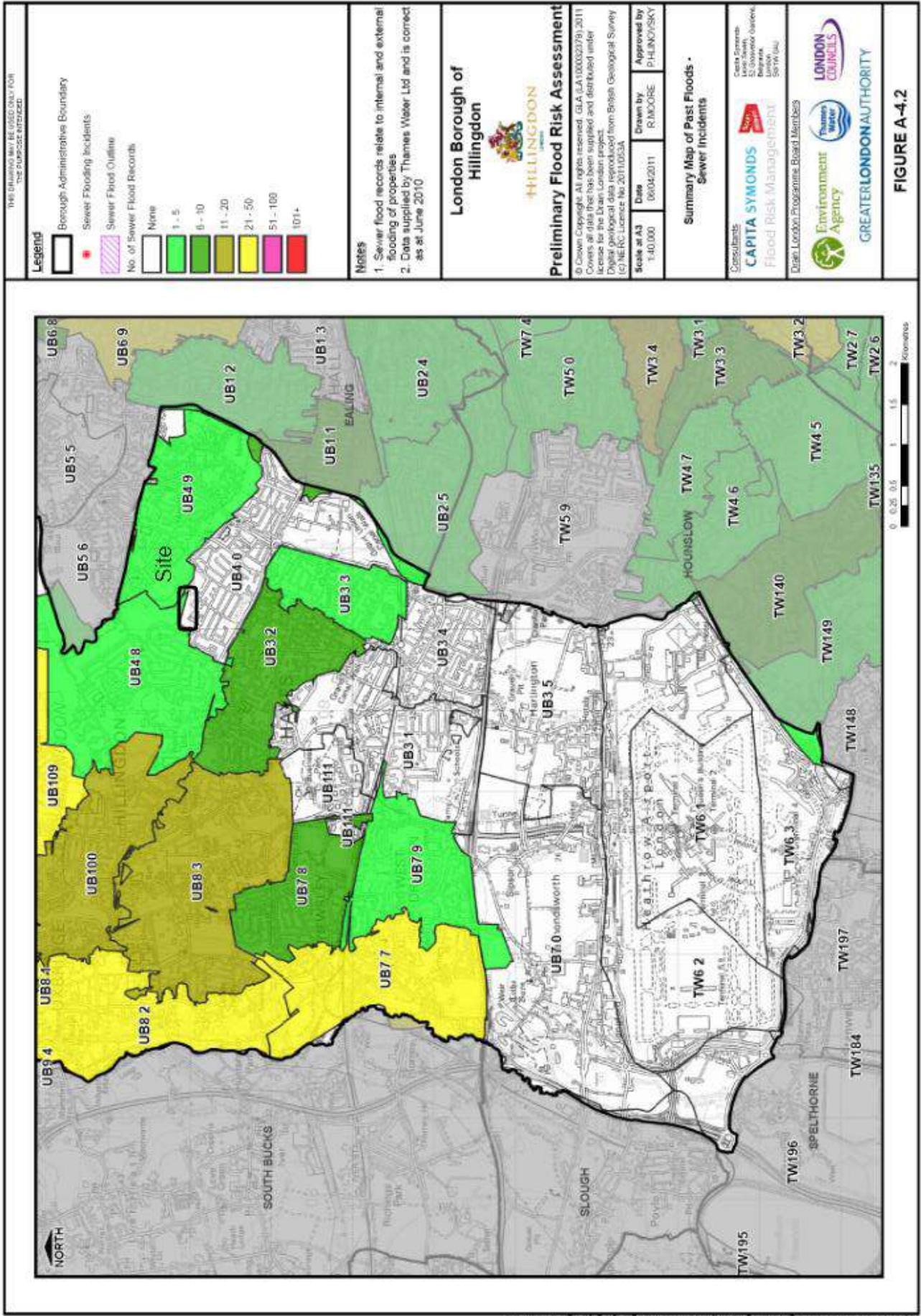
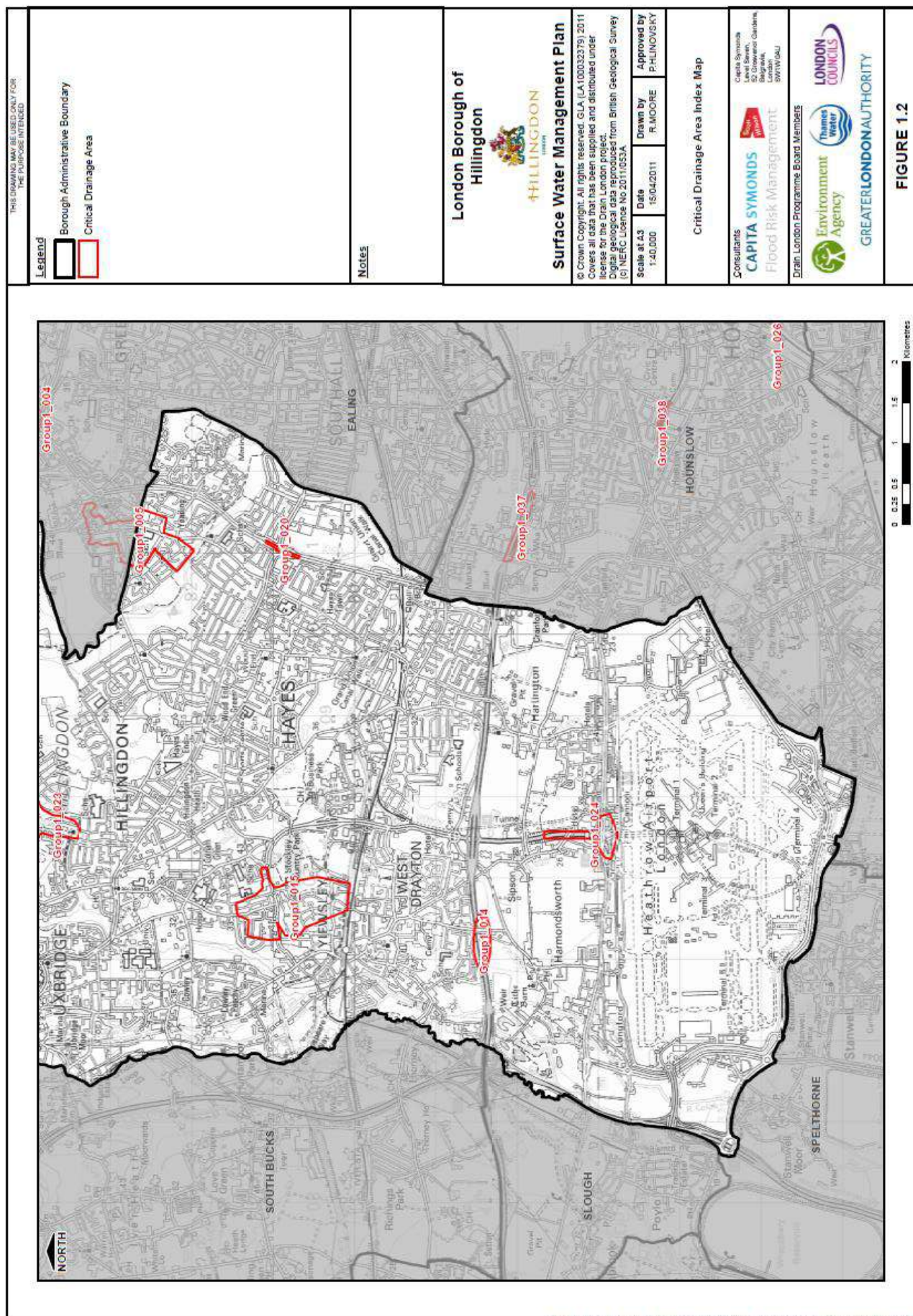


FIGURE 4.2

Appendix H – London Borough of Hillingdon Summary Map of Past Sewer Incidents



Appendix J – London Borough of Hillingdon Critical Drainage Area Map



**Appendix K – London Borough of Hillingdon Modelled 1in100+Climate Change
Surface Water Flood Map**

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

- Borough Administrative Boundary
- Main River
- Ordinary Watercourse
- Culverted Watercourse (Main River)
- Permanent Water Bodies
- Critical Drainage Area

Flood Depth

- < 0.1m
- 0.1m - 0.25m
- 0.25m - 0.5m
- 0.5m - 1.0m
- 1.0m - 1.5m
- > 1.5m

Notes

- This map only shows the predicted likelihood of surface water flooding (this includes flooding from sewers, drains, small watercourses and ditches that occurs in heavy rainfall) for defined areas, and due to the coarse nature of the source data used, are not detailed enough to account for precise addresses. Users of this map should refer to section 3.2 of the Surface Water Management Plan for a complete description of limitations and accuracy of the flood hazard extents shown.

London Borough of Hillingdon



Surface Water Management Plan

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(c) NERC Licence No 20110334

Scale at A3	Date	Drawn by	Approved by
1:40,000	11/04/2011	R. MOORE	P. HUNTER

Surface Water Depth (m)

1 in 100 plus climate change chance of rainfall
event occurring in any given year (1% AEP + CC)

Consultants

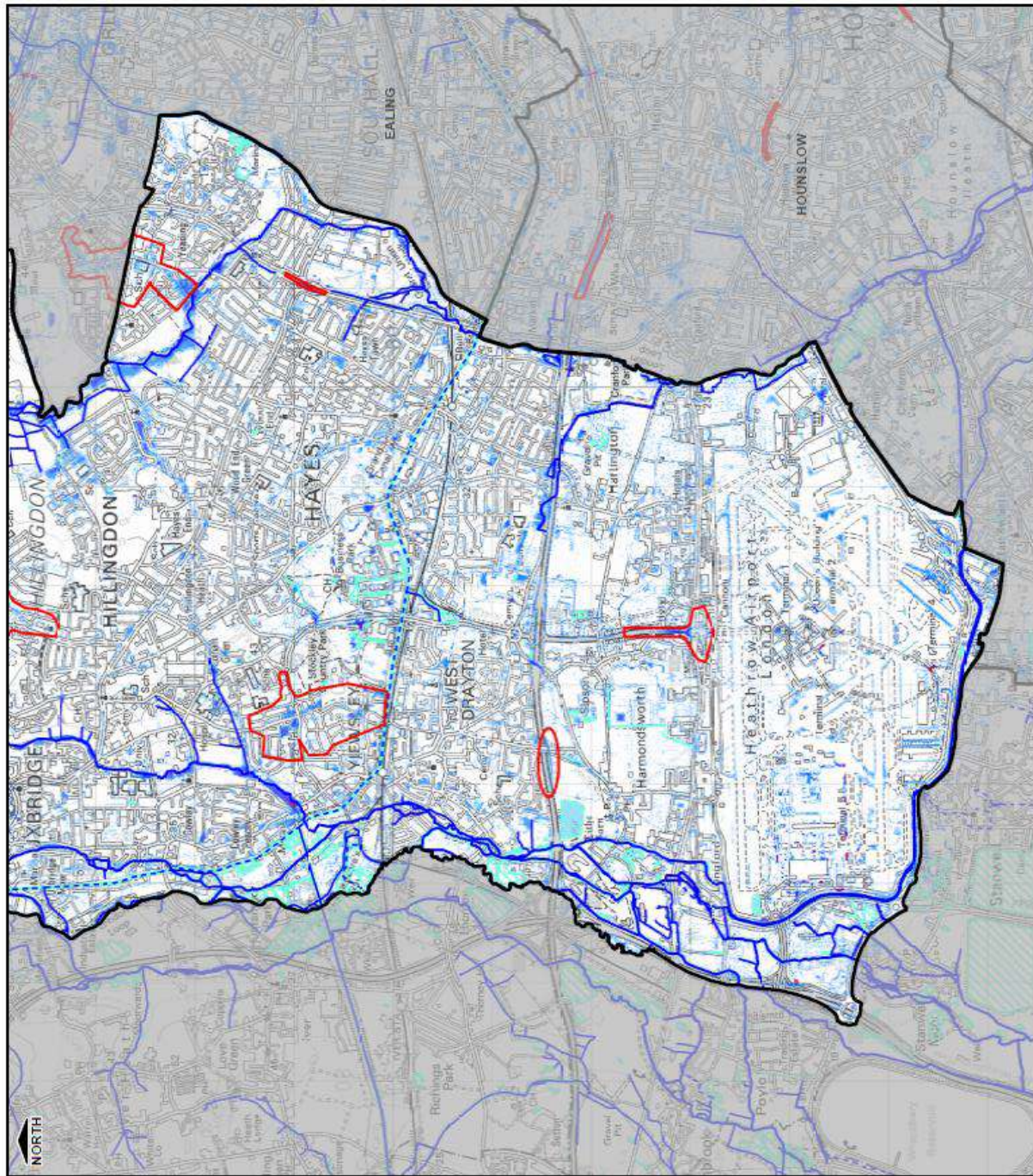
CAPITA SYMONDS
Flood Risk Management

Capita Symonds
25 Abchurch Lane
London EC4N 3DF
020 7460 8000

Drain London Programme Board Members

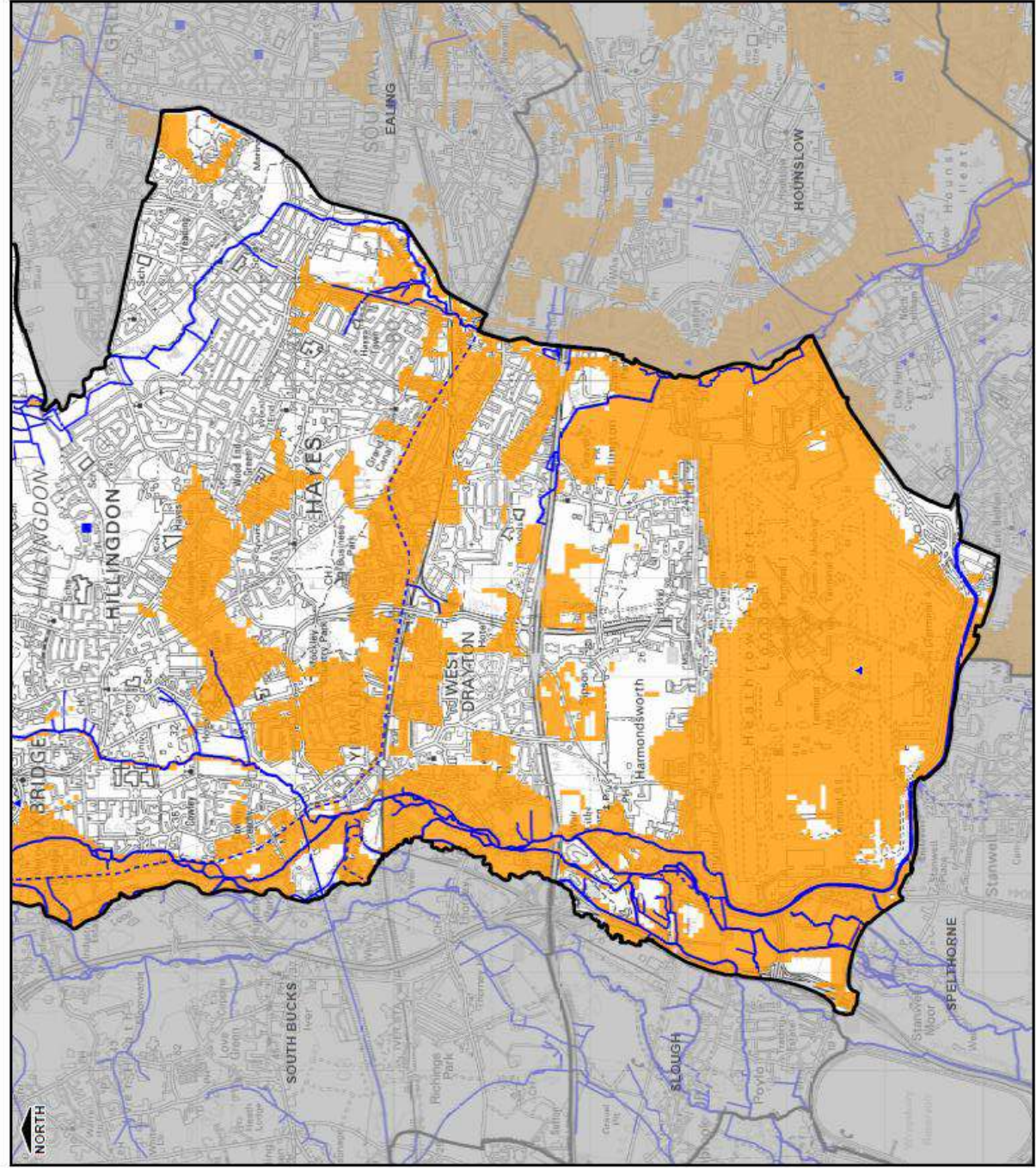


FIGURE 19.2



**Appendix L – London Borough of Hillingdon Potential for Elevated
Groundwater Map**

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED



Notes

1. The increased potential for elevated groundwater map shows those areas within the London boroughs where there is an increased potential for groundwater to rise sufficiently to interact with the ground surface or the water table of the ground surface. This map is based on data supplied by the Environment Agency. It does not show the following:
 - flooding of basements of buildings below ground level;
 - flooding of buried services or other assets below ground level;
 - inundation of farmland, roads, commercial, residential and amenity areas;
 - flooding of ground floors of buildings above ground level; and
 - overflowing of sewers and drains.
2. Incident records shown are generally unconfirmed and may include issues such as water main bursts or non-groundwater related problems.
3. Areas not shown to have increased potential for elevated groundwater should be considered to have a low potential for elevated groundwater - Lack of information does not imply no potential of elevated groundwater in that area.
4. Includes groundwater flood mapping provided by JBA Consulting. Copyright © Jeremy Berr Associates Limited 2008 - 2011. Data derived from data supplied by the Environment Agency.

London Borough of Hillingdon



Surface Water Management Plan

© Crown Copyright. All rights reserved. GLA LA 100032379, 2011
Covers all data that has been supplied and distributed under license for the Drain London project.
Digital geological data reproduced from British Geological Survey (© NERC Licence No 2011/053A)

Scale at A3	Date	Drawn by	Approved by
1:40,000	05/04/2011	R. MOORE	P. HILNOVSKY

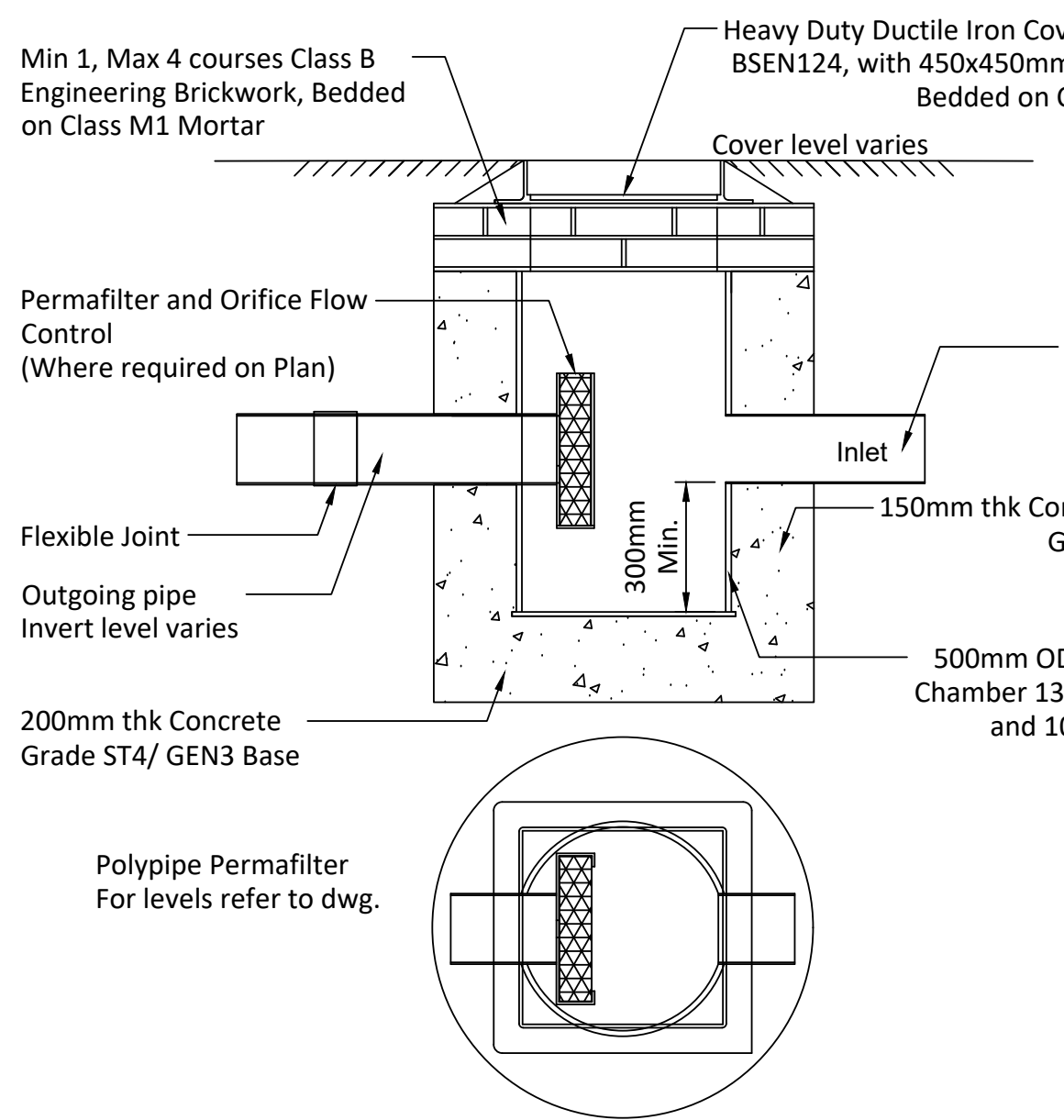
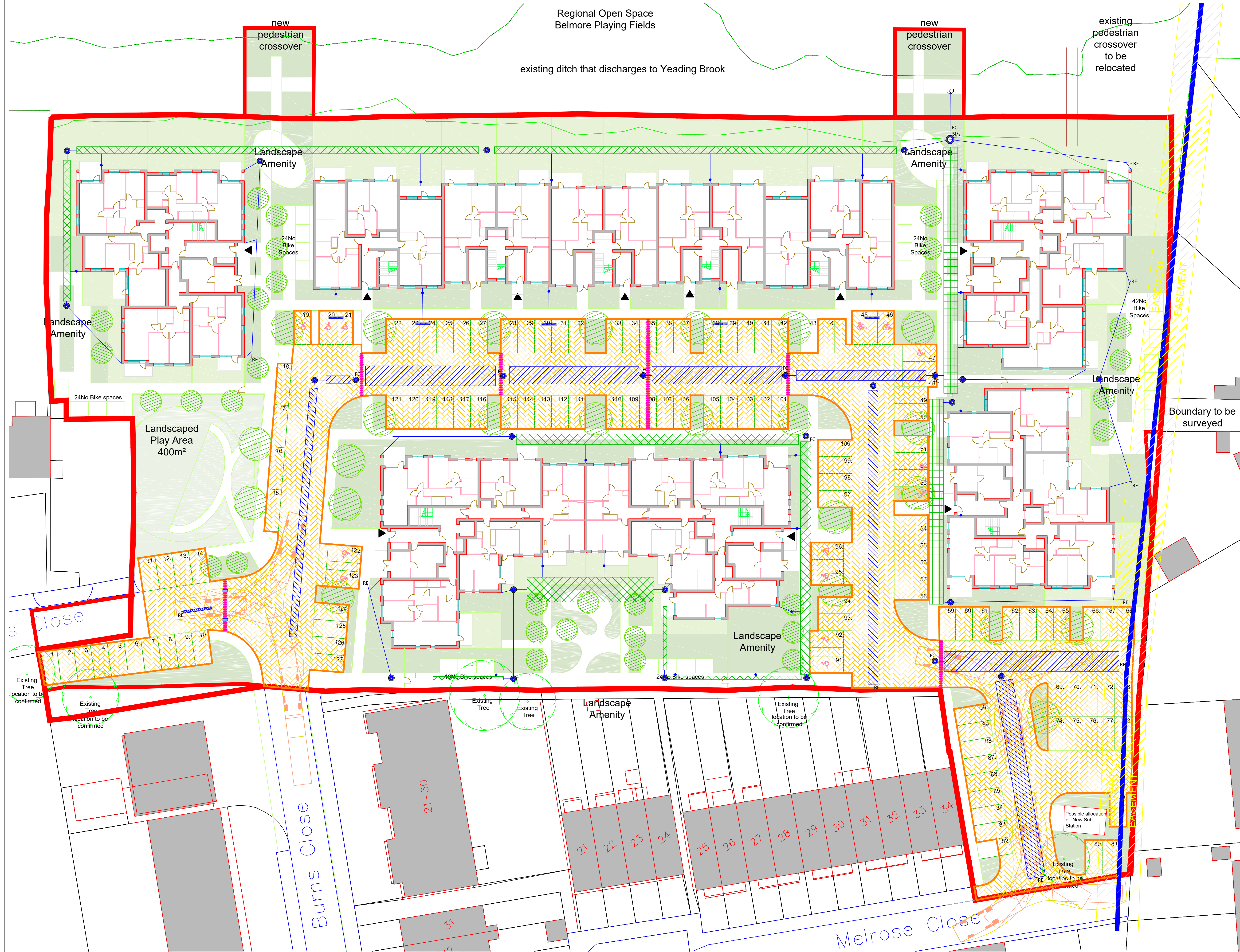
Increased Potential for Elevated Groundwater Map

Consultants
CAPITA SYMONDS
Flood Risk Management
Capita Symonds
52 Grosvenor Gardens
London
SW1W 0EU

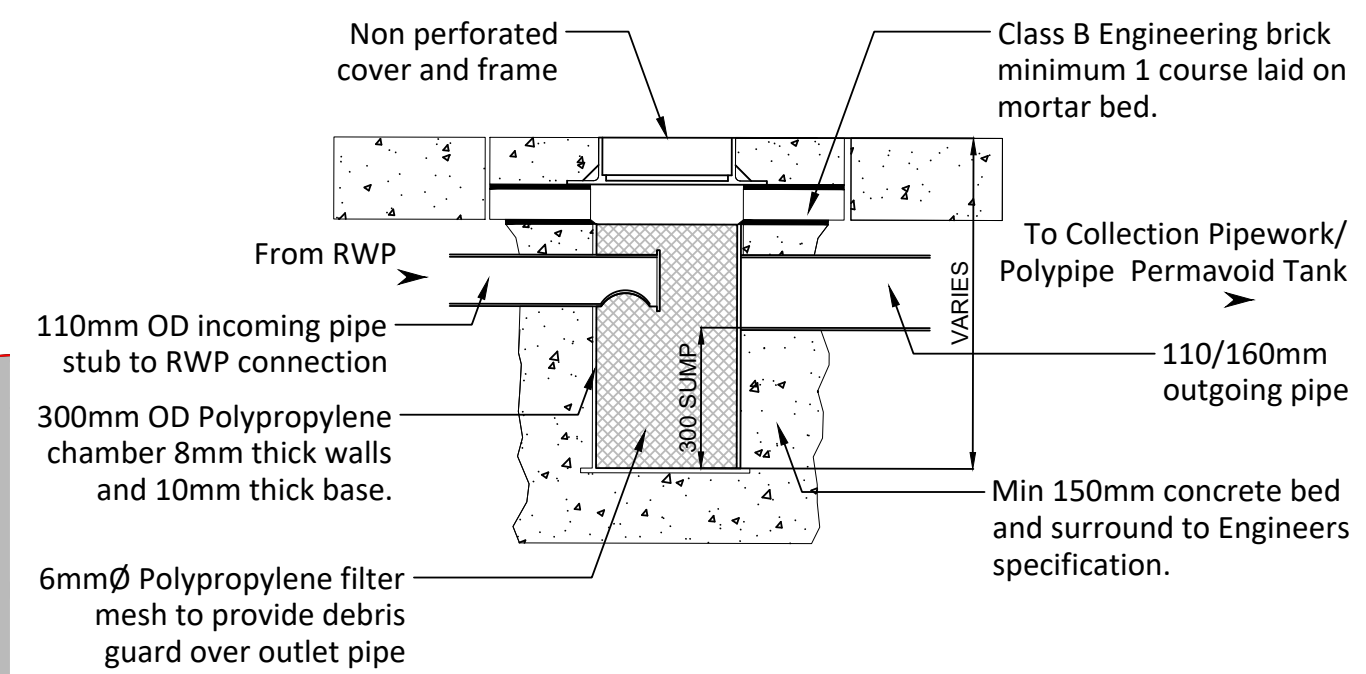
Drain London Programme Board Members
Environment Agency
Thames Water
LONDON COUNCILS
GREATER LONDON AUTHORITY

FIGURE 10.2

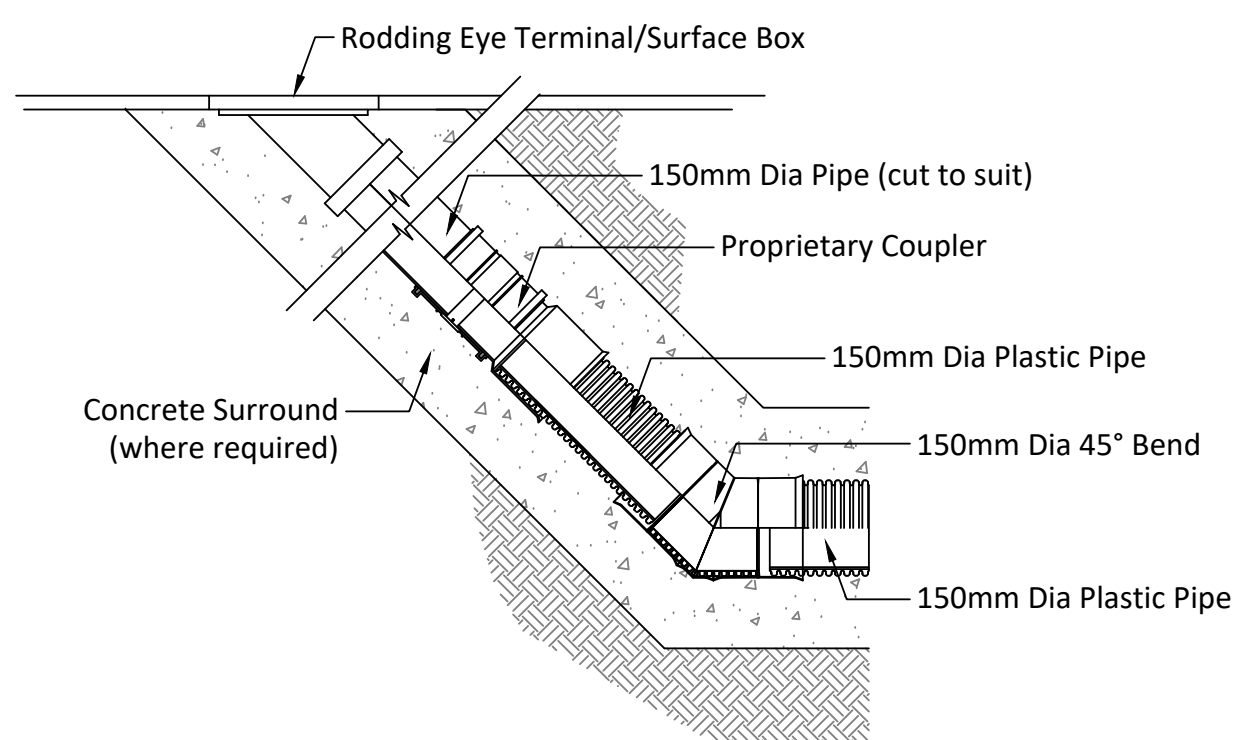
Appendix M – Proposed SuDS Layout



500Ø PERMAVOID CATCHPIT INSPECTION CHAMBER INCORPORATING FLOW CONTROL AND DEBRIS DEVICE



TYPICAL 300mmØ RWP BACK INLET GULLY



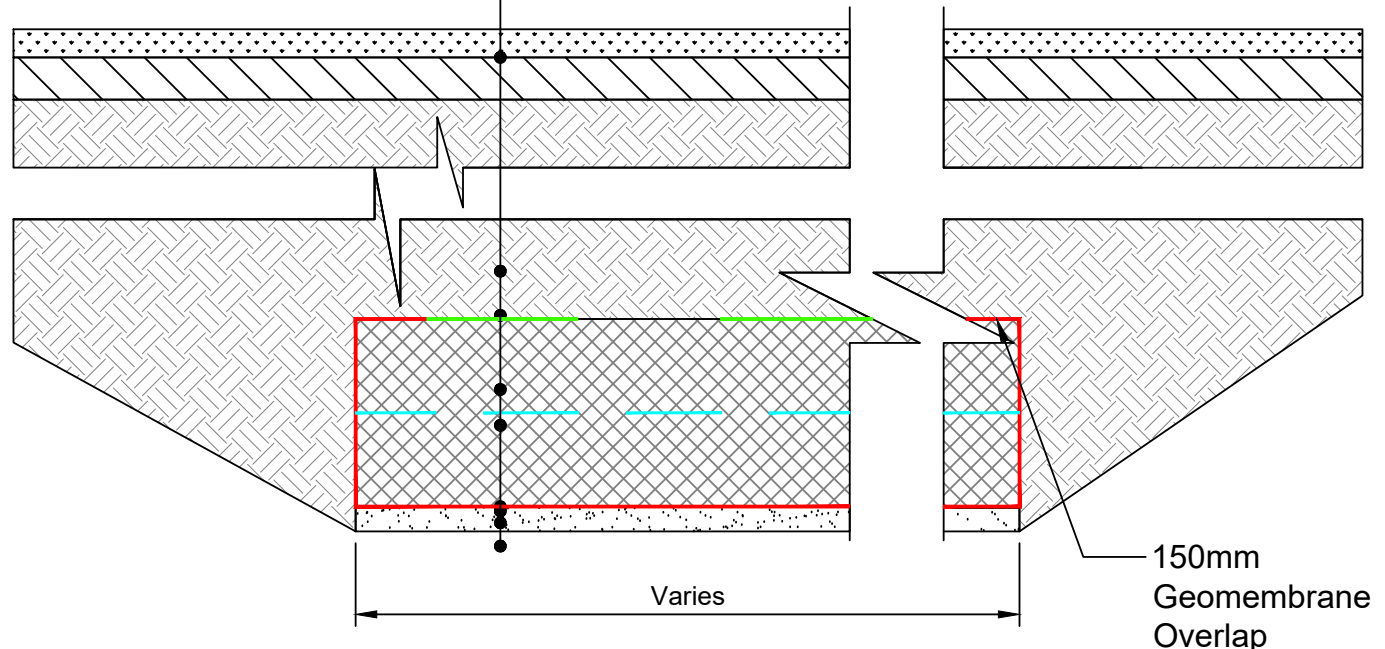
TYPICAL RODDING EYE DETAIL

Legend.

- Existing Public Surface Water Sewer Network
- Surface Water Drainage Pipework 150mm dia U.N.O
- 300mm dia Back Inlet Gully with filter screen
- Rodding eye
- 750mm dia catchpit inspection chamber
- 500mm dia catchpit inspection chamber
- Permafilter Flow Control unit in inspection chamber
- Pervious Paving System with 400mm thick Modified Open Graded Pervious Sub-base (min 30% porosity)
- Polystorm PSM1a Modular Attenuation Tank 400mm thick
- Polystorm PSM1a Modular Attenuation Tank 800mm thick
- Permavoid Surface Water Attenuation Conduit 150mm thick
- Permavoid Surface Water Attenuation Conduit 150mm thick
- Permavoid High Performance Diffuser Conduit 300mm thick
- Fleece Protected Impermeable Membrane Checkdam with Permavoid or Permaform Checkgate flow controls
- Outlet Headwall

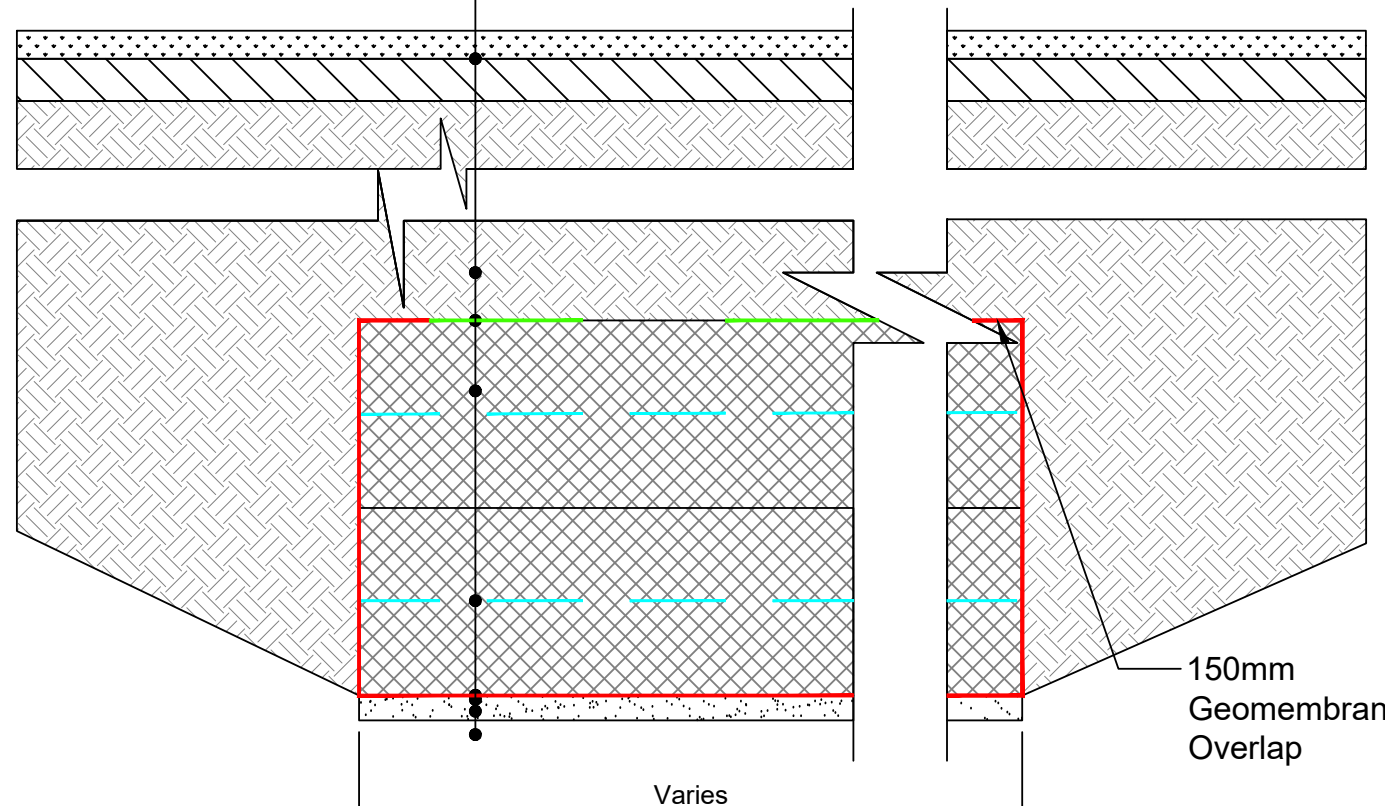
- Notes
- Roadway and footpath surfacing design and construction to Engineer's Specification (by others).
 - Heavy duty geotextile fleece to be non-woven needle-punched polypropylene as per Specification. Geotextile to be laid with minimum 300mm overlaps and to be applied to all external surfaces of Polypropylene Permavoid drainage units. To be installed in accordance with the manufacturer's recommendations.
 - Waterproof geomembrane to be single layer cold applied robust welded flexible membrane as per Specification suitable for waterproofing to structures and for water containment. Membrane to be nominal 1mm thick laid with minimum 120mm laps and welded seams. To be installed in accordance with the manufacturer's recommendations and under approved CDA protocol that includes testing of the welds.
 - Stormwater attenuation/infiltration system shall be Polypropylene Permavoid pre-formed modular geocellular sub-base replacement with minimum 95% volumetric void ratio and minimum 52% effective perforated surface area. Units shall be manufactured with integral interlocking ties (Polypropylene Permavoid) to maintain rigidity and minimise deflection. Geocellular units to be fully encapsulated with Heavy duty geotextile fleece (as Note 2) and impermeable membrane (as Note 3). Geocellular layer to be in accordance with the Specification and BS7533:2009 Pt1.3. All to be installed in accordance with the manufacturer's recommendations.
 - Multi-layered Polypropylene Permavoid tank configurations shall be fixed with proprietary shear connectors between each vertical layer to maintain rigidity and minimise lateral displacement in accordance with BS7533:2009 Pt1.3. Shear connectors shall be fixed in accordance with the manufacturer's recommendations.
 - Polypropylene Permavoid units to be laid on a prepared even formation that shall be free from undulations, sharp steps or protruding stones/clumps. The formation shall be graded to achieve a maximum deviation of 5mm in 3.0m in any direction. The formation shall have an equilibrium CBR value greater than 5%. Where the Polypropylene Permavoid discharge via infiltration to the ground the formation shall be granular and the equilibrium CBR value shall be greater than 10%. A 50mm thick bedding layer of crushed clean rock is in accordance with the specification may be used to achieve a suitable bedding surface. The crushed clean rock shall be 2/5 aggregate in accordance with BS 2442:2002 and BS7533:2009 Pt1.3. The bedding layer shall be placed to give a smooth, even and firm formation. The formation and bedding shall be inspected by the Engineer and Contractor to ensure that they are acceptable for the construction of Polypropylene Permavoid.
 - Where appropriate, the constructed tanks, associated pipe work and connectors shall be air and water tested in line with manufacturer's instructions to demonstrate air and watertightness of the impermeable membrane, where attenuation tanks are specified.
 - Polypropylene Permavoid units shall generally be laid with zero falls unless noted otherwise.
 - Where the design permits Polypropylene Permavoid tanks may be backfilled with selected soil materials. This material shall not contain pieces of rock, gravel, clay lumps, etc greater than 25mm in diameter, nor should it contain any other sharp materials such as metals that could pierce the units or membranes or cause uneven loading. The selected backfill material shall be compacted to 90% maximum dry density using plate mechanical compaction equipment. The materials and method of compaction shall be approved by the Engineer and Contractor.
 - Polypropylene Permachannel units are nominal 1000mm long. All continuous lengths of Polypropylene Permachannel shall have an outlet at 1000mm centres. All 'He and Miss' lengths of Polypropylene Permachannel shall have one outlet per 3000mm channel unit.
 - All dimensions are in millimetres unless otherwise stated.
 - Pre-cast concrete products shall comply with the relevant provisions of BS 5911 and be 'Kite Marked'.
 - All pipes and pipe fittings shall be HDPE swinwall and have current British Board of Agreement Certification.
 - Manhole covers and frames, grids and frames shall comply with the relevant provisions of BS EN 124.
 - Do not scale from this drawing. If in doubt ask.
 - This drawing to be read in conjunction with all relevant EPG Architects & Engineers drawings.
 - Should there be any conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed PRIOR to construction on site.
 - Unit technical approval has been obtained from the relevant Authority. It should be understood that all drawings are PRELIMINARY and NOT FOR CONSTRUCTION.
 - At all times the works are to be executed in accordance with the requirements of the Health and Safety at Work Act 1974 and CDM Regulations 2015.

- LANDSCAPING TO ENGINEERS SPECIFICATION
- BACK FILL/SUBBASE TO ENGINEERS SPECIFICATION
 - POLYPIPE HEAVY DUTY GEOTEXTILE PROTECTION FLEECE
 - 400mm THK POLYPIPE PSM1a GEOCELLULAR STORAGE LAYER
 - POLYPIPE HEAVY DUTY IMPERMEABLE GEOMEMBRANE
 - POLYPIPE HEAVY DUTY GEOTEXTILE PROTECTION FLEECE (omitted for clarity)
 - BLINDING LAYER 50mm THK
 - PREPARED FORMATION



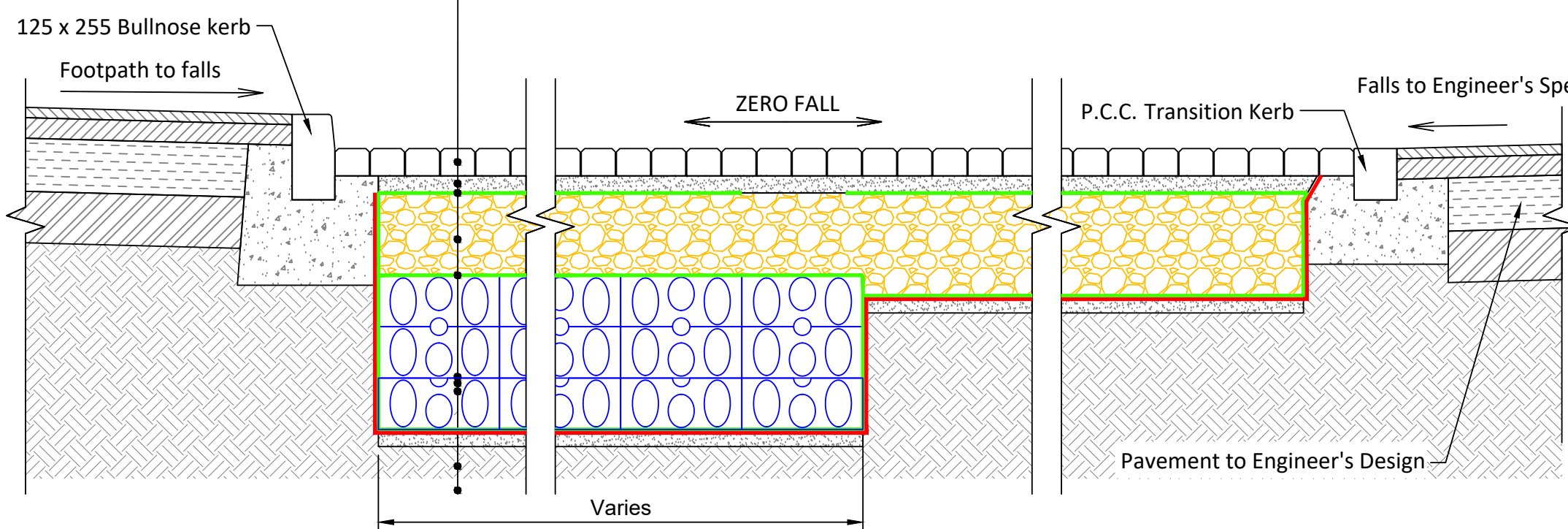
TYPICAL SECTION THROUGH 400mm THK POLYPIPE POLYSTORM ATTENUATION TANK

- LANDSCAPING TO ENGINEERS SPECIFICATION
- BACK FILL/SUBBASE TO ENGINEERS SPECIFICATION
 - POLYPIPE HEAVY DUTY GEOTEXTILE PROTECTION FLEECE
 - 800mm THK POLYPIPE PSM1a GEOCELLULAR STORAGE LAYER
 - POLYPIPE HEAVY DUTY IMPERMEABLE GEOMEMBRANE
 - POLYPIPE HEAVY DUTY GEOTEXTILE PROTECTION FLEECE (omitted for clarity)
 - BLINDING LAYER 50mm THK
 - PREPARED FORMATION

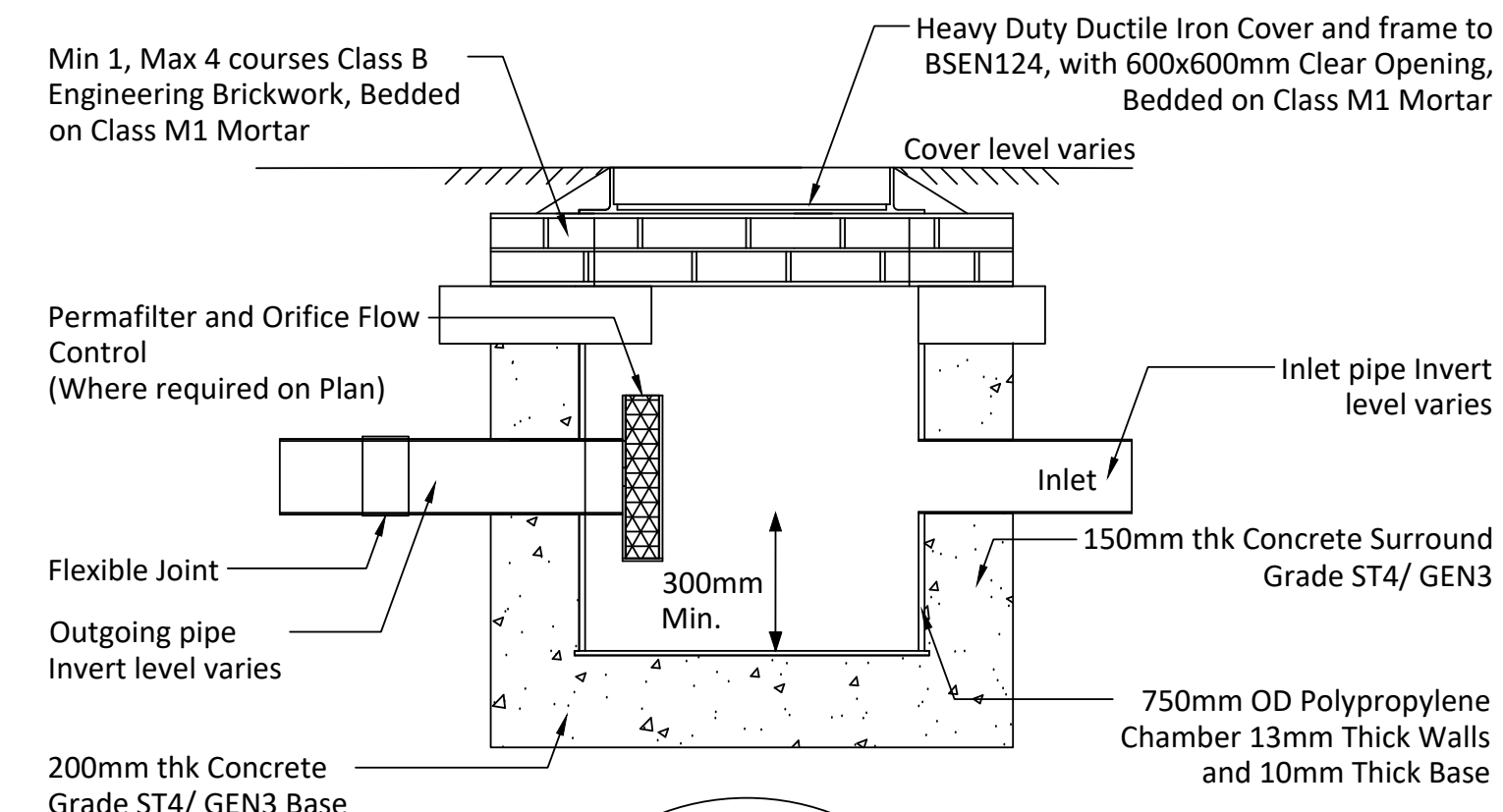


TYPICAL SECTION THROUGH 800 THK POLYPIPE POLYSTORM ATTENUATION TANK

- PERVIOUS BLOCK PAVING SYSTEM 80mm THK
- BEDDING LAYER - TYPE 2/6.3 TO BS EN 13242:2002 50mm THK
- PERMAVOID PERMAFILTER SUDS TEXTILE
- MIN 400mm MODIFIED OPEN GRADED PERVIOUS SUB-BASE (Min 30% POROSITY)
- PERMAVOID PERMAFILTER SUDS TEXTILE
- 450mm THK PERMAVOID MODULAR SUB-BASE REPLACEMENT CONDUIT
- PERMAVOID HEAVY DUTY GEOTEXTILE
- PERMAVOID IMPERMEABLE GEOMEMBRANE
- 50mm THK GRANULAR BEDDING LAYER
- PREPARED FORMATION
- CAPPING (IF REQUIRED) TO ENGINEERS SPECIFICATION (Thickness to suit CBR)



TYPICAL SECTION THROUGH PERVIOUS PAVING INCORPORATING MODIFIED OPEN GRADED POROUS SUB-BASE AND 450mm PERMAVOID ATTENUATION TANK



750Ø PERMAVOID CATCHPIT INSPECTION CHAMBER INCORPORATING FLOW CONTROL AND DEBRIS DEVICE (900Ø Similar)

REV	DESCRIPTION	DATE

epg
The Environmental Protection Group
Warrington Business Park
Long Lane
Warrington
Cheshire WA1 1LJ
T: 01925 622 885
F: 01925 622 881
W: www.epg.co.uk
E: consultants@epg.net
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BELMORE ALLOTMENTS

LONDON BOROUGH OF HILLINGDON

DATE	07/03/2018
SCALE	1:250
DESIGNED BY	PRW
CHECKED BY	PDC
DATE	
FOR COMMENT	
REVISION	P02

Appendix N – Proposed Hydraulic Calculations

The Environmental Protection Group Ltd		Page 1
Warrington Business Park Long Lane Warrington WA2 8TX		
Date 08/03/2018 10:04 File	Designed by jroberts Checked by	
XP Solutions Source Control 2017.1.2		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	1.310	Urban	0.000
SAAR (mm)	600	Region Number	Region 6

Results l/s

QBAR Rural	2.0
QBAR Urban	2.0
Q100 years	6.4
Q1 year	1.7
Q30 years	4.5
Q100 years	6.4

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The Environmental Protection Group Ltd		Page 1
Warrington Business Park Long Lane Warrington WA2 8TX	Belmore Allotments LB Hillingdon 1in100+40%	
Date 08/03/2018 09:51 File EPG-MD-8800- Hydraulic ...	Designed by JHR Checked by PW	
XP Solutions	Source Control 2017.1.2	

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

Half Drain Time : 1221 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	8.508	0.108	0.0	2.8	2.8	236.6	0 K
30 min Summer	8.539	0.139	0.0	3.3	3.3	304.2	0 K
60 min Summer	8.569	0.169	0.0	3.7	3.7	370.5	0 K
120 min Summer	8.598	0.198	0.0	4.1	4.1	432.5	0 K
180 min Summer	8.612	0.212	0.0	4.3	4.3	464.4	0 K
240 min Summer	8.621	0.221	0.0	4.4	4.4	483.6	0 K
360 min Summer	8.632	0.232	0.0	4.5	4.5	506.8	0 K
480 min Summer	8.637	0.237	0.0	4.6	4.6	519.2	0 K
600 min Summer	8.640	0.240	0.0	4.6	4.6	525.1	0 K
720 min Summer	8.641	0.241	0.0	4.6	4.6	526.8	0 K
960 min Summer	8.640	0.240	0.0	4.6	4.6	525.9	0 K
1440 min Summer	8.638	0.238	0.0	4.6	4.6	522.0	0 K
2160 min Summer	8.633	0.233	0.0	4.6	4.6	510.9	0 K
2880 min Summer	8.627	0.227	0.0	4.5	4.5	495.8	0 K
4320 min Summer	8.611	0.211	0.0	4.3	4.3	461.8	0 K
5760 min Summer	8.596	0.196	0.0	4.1	4.1	428.3	0 K
7200 min Summer	8.582	0.182	0.0	3.9	3.9	397.7	0 K
8640 min Summer	8.569	0.169	0.0	3.7	3.7	370.3	0 K
10080 min Summer	8.558	0.158	0.0	3.6	3.6	346.1	0 K
15 min Winter	8.521	0.121	0.0	3.0	3.0	265.0	0 K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	148.852	0.0	136.4	27
30 min Summer	96.133	0.0	184.2	41
60 min Summer	59.033	0.0	303.3	70
120 min Summer	35.012	0.0	363.5	130
180 min Summer	25.462	0.0	396.9	188
240 min Summer	20.200	0.0	419.2	248
360 min Summer	14.557	0.0	450.9	366
480 min Summer	11.534	0.0	473.1	484
600 min Summer	9.622	0.0	489.4	602
720 min Summer	8.294	0.0	501.6	720
960 min Summer	6.557	0.0	517.2	830
1440 min Summer	4.702	0.0	524.2	1072
2160 min Summer	3.368	0.0	713.4	1472
2880 min Summer	2.655	0.0	742.6	1880
4320 min Summer	1.897	0.0	765.0	2688
5760 min Summer	1.493	0.0	888.9	3472
7200 min Summer	1.240	0.0	918.1	4256
8640 min Summer	1.064	0.0	938.4	5016
10080 min Summer	0.936	0.0	948.5	5752
15 min Winter	148.852	0.0	156.5	26

The Environmental Protection Group Ltd		Page 2
Warrington Business Park Long Lane Warrington WA2 8TX	Belmore Allotments LB Hillingdon 1in100+40%	
Date 08/03/2018 09:51 File EPG-MD-8800- Hydraulic ...	Designed by JHR Checked by PW	
XP Solutions		Source Control 2017.1.2

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
30 min Winter	8.556	0.156	0.0	3.6	3.6	340.9	0 K
60 min Winter	8.590	0.190	0.0	4.0	4.0	415.4	0 K
120 min Winter	8.622	0.222	0.0	4.4	4.4	485.3	0 K
180 min Winter	8.638	0.238	0.0	4.6	4.6	521.5	0 K
240 min Winter	8.648	0.248	0.0	4.7	4.7	543.5	0 K
360 min Winter	8.661	0.261	0.0	4.9	4.9	570.6	0 K
480 min Winter	8.668	0.268	0.0	4.9	4.9	585.5	0 K
600 min Winter	8.671	0.271	0.0	5.0	5.0	593.5	0 K
720 min Winter	8.673	0.273	0.0	5.0	5.0	596.9	0 K
960 min Winter	8.672	0.272	0.0	5.0	5.0	595.7	0 K
1440 min Winter	8.667	0.267	0.0	4.9	4.9	585.2	0 K
2160 min Winter	8.658	0.258	0.0	4.8	4.8	565.2	0 K
2880 min Winter	8.647	0.247	0.0	4.7	4.7	539.8	0 K
4320 min Winter	8.622	0.222	0.0	4.4	4.4	487.0	0 K
5760 min Winter	8.600	0.200	0.0	4.2	4.2	438.0	0 K
7200 min Winter	8.581	0.181	0.0	3.9	3.9	395.3	0 K
8640 min Winter	8.564	0.164	0.0	3.7	3.7	358.7	0 K
10080 min Winter	8.550	0.150	0.0	3.5	3.5	327.3	0 K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
30 min Winter	96.133	0.0	208.6	41
60 min Winter	59.033	0.0	343.0	70
120 min Winter	35.012	0.0	409.2	128
180 min Winter	25.462	0.0	446.0	186
240 min Winter	20.200	0.0	470.6	242
360 min Winter	14.557	0.0	505.2	358
480 min Winter	11.534	0.0	529.2	474
600 min Winter	9.622	0.0	546.2	586
720 min Winter	8.294	0.0	558.6	696
960 min Winter	6.557	0.0	573.4	908
1440 min Winter	4.702	0.0	575.2	1128
2160 min Winter	3.368	0.0	801.8	1584
2880 min Winter	2.655	0.0	833.7	2028
4320 min Winter	1.897	0.0	856.4	2900
5760 min Winter	1.493	0.0	998.2	3704
7200 min Winter	1.240	0.0	1031.5	4536
8640 min Winter	1.064	0.0	1055.2	5280
10080 min Winter	0.936	0.0	1067.7	6048

The Environmental Protection Group Ltd		Page 3
Warrington Business Park Long Lane Warrington WA2 8TX	Belmore Allotments LB Hillingdon 1in100+40%	
Date 08/03/2018 09:51 File EPG-MD-8800- Hydraulic ...	Designed by JHR Checked by PW	
XP Solutions	Source Control 2017.1.2	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.855

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:
0	4	0.285	4	8	0.285
				8	12
					0.285

The Environmental Protection Group Ltd		Page 4
Warrington Business Park Long Lane Warrington WA2 8TX	Belmore Allotments LB Hillingdon 1in100+40%	
Date 08/03/2018 09:51	Designed by JHR	
File EPG-MD-8800- Hydraulic ...	Checked by PW	
XP Solutions	Source Control 2017.1.2	

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	2304.0	2304.0	0.400	0.0	2361.6
0.300	2304.0	2361.6			

Orifice Outflow Control

Diameter (m) 0.070 Discharge Coefficient 0.600 Invert Level (m) 8.400

Project Number: 8800
Project Name: Belmore Allotments
Element: SW Design



Storage Volumes Provided

Catchment Description	Run-off Area	Run off	Run-off Area	Required Storage	Actual Storage	Tank Ref.	Tank/Conduit Dimensions					Slope Factor	Outflow Per Catchment (l/s)
	Gross (sq.m)	co-efficient %	Net (sq.m)	Per Sub-Catchment (cu.m)	Per Sub-Catchment (cu.m)		Length (m)	Width (m)	Depth (m)	Void Raito %			
	(Items in Italics = Areas)												
Block A 1/2 Block B	568	95%	540	43.93	7.60	T1	20.000	1.000	0.400	95%	1.000	0.37	
		90%			21.66	T2	57.000	1.000	0.400	95%	1.000		
					21.66		57.000	1.000	0.400	95%	1.000		
Block C Block D	566	95%	538	43.78	97.28		64.000	2.000	0.800	95%	1.000	0.37	
	566	95%	538	43.78								0.37	
Block E	1323	95%	1257	102.33	23.94		18.000	3.500	0.400	95%	1.000	0.86	
					1.71		9.000	0.500	0.400	95%	1.000		
					3.61		19.000	0.500	0.400	95%	1.000		
					37.62		33.000	1.500	0.800	95%	1.000		
					1.90		10.000	0.500	0.400	95%	1.000		
					45.60		40.000	1.500	0.800	95%	1.000		
Road 1	277	90%	249	20.30	21.33		237.000	1.000	0.400	30%	0.750	0.17	
					0.21		4.248	0.354	0.150	95%	1.000		
Road 2	829	90%	746	60.75	50.85		565.000	1.000	0.400	30%	0.750	0.51	
					16.07		35.400	1.062	0.450	95%	1.000		
					1.61		3.540	1.062	0.450	95%	1.000		
Road 3 1/8 Block B	399	90%	359	29.24	23.13		257.000	1.000	0.400	30%	0.750	0.25	
	156.4	95%	149	12.10	22.29		18.408	2.832	0.450	95%	1.000	0.10	
Road 4 1/8 Block B	387	90%	348	28.36	26.82		298.000	1.000	0.400	30%	0.750	0.24	
	156.4	95%	149	12.10	19.50		18.408	2.478	0.450	95%	1.000	0.10	
Road 5 1/8 Block B	383	90%	345	28.07	26.19		291.000	1.000	0.400	30%	0.750	0.24	
	156.4	95%	149	12.10	19.50		18.408	2.478	0.450	95%	1.000	0.10	
Road 6 1/8 Block B	1135	90%	1022	83.17	67.68		752.000	1.000	0.400	30%	0.750	0.70	
	156.4	95%	149	12.10	11.14		18.408	1.416	0.450	95%	1.000	0.10	
					25.29		41.772	1.416	0.450	95%	1.000		
Road 7 Flooding	872	90%	785	63.90	73.89		821.000	1.000	0.400	30%	0.750	0.54	
	750			67.50	30.00		24.780	2.832	0.450	95%	1.000		
					30.00		28.320	2.478	0.450	95%	1.000		
Totals	8680.6		7320	596.00	728.08							5.00	