



Bridge House, Uxbridge

Flood Risk Assessment

June 2017

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Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

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Comments	Preliminary
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Comments	Preliminary
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We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

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Executive Summary

Waterman was commissioned by Legal & General Assurance (Pensions Management) Limited to investigate the potential flood risk to Bridge House, Uxbridge, located in the London Borough of Hillingdon. The Site is located adjacent to the River Colne and the Grand Union Canal.

The development proposals comprise the change of use of the existing buildings from offices to residential, altering only the internal layout under permitted development rights.

The Site is located within Flood Zone 1, and is therefore considered to be at low risk of tidal and fluvial flooding.

The risk of flooding from pluvial, groundwater and artificial sources has also been assessed and found to be low.

As a permitted development proposal, this development only alters the internal use of the existing building, and does not change the impermeable footprint of the Site or external ground levels. As a result there would be no alteration to the existing surface water drainage network (which would continue to discharge to the adjacent waterways), and no impact as a result of the proposals.

The existing and proposed foul flows have been calculated at 3.2 l/s and 1.3 l/s based on the accommodation schedule. As there is an anticipated reduction in flows there would be no impact on the local infrastructure, and the development would continue to drain as existing.

This report demonstrates that the proposed development has a low probability of flooding. It also confirms that there would be no increase in surface water runoff or foul water discharge and that there would be no increase in flood risk due to this development on-site or within its surroundings. It is considered that the development should be granted prior approval with respect to flood risk.

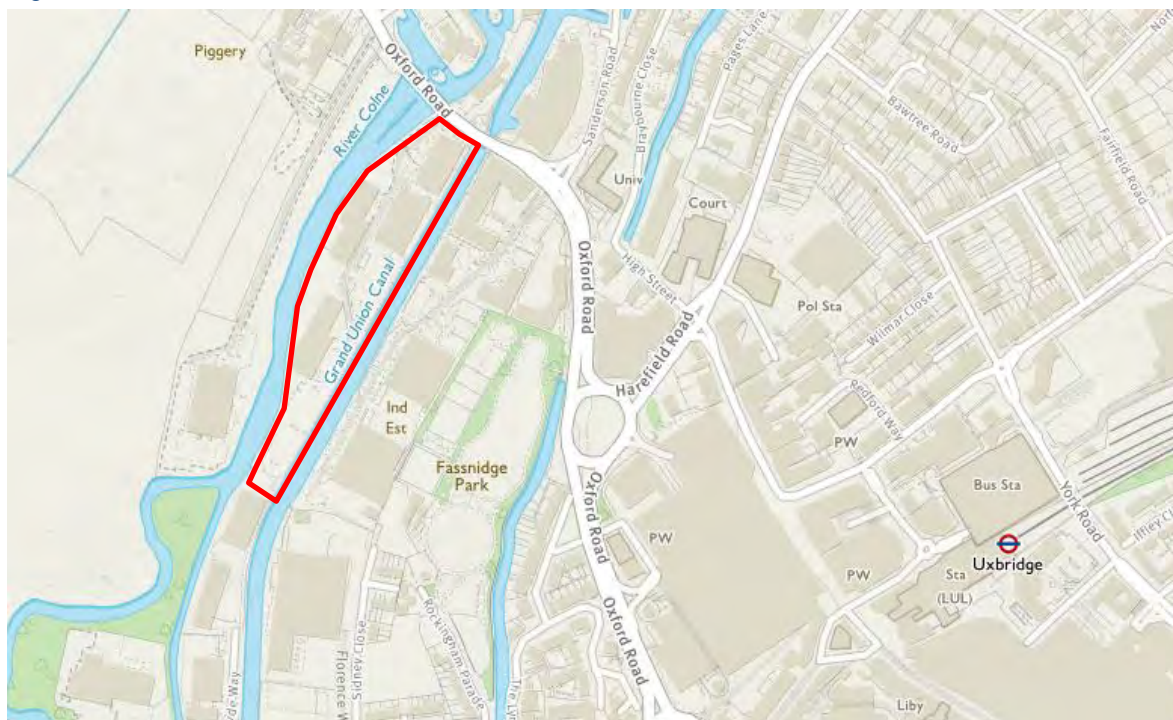
1. Introduction

- 1.1. Waterman was commissioned by Legal & General Assurance (Pensions Management) Limited to provide a Flood Risk Assessment (FRA) in relation to the proposed development of Bridge House, Uxbridge, located in the London Borough of Hillingdon.
- 1.2. The Development proposals comprise a change of use from office to residential use under permitted development rights, but requiring prior approval. The overriding aim of this report is to demonstrate that the proposals would not have a detrimental effect on the flood risk or drainage regime of the Site or its surroundings.

Site Description

- 1.3. The existing Site currently comprises an office development with external car parking and multi-storey car park. The Site is located at post code UB8 1HS as shown in Figure 1. The Site is 2.3ha and is bounded by the River Colne to the west, the Grand Union Canal to the east, existing buildings to the south and Oxford Road to the north.

Figure 1: Site Location Plan



Key



Site Location

Source: OS maps

Development Proposals

- 1.4. The development proposals for the Site (Appendix A) consist of the change of use of Bridge House, Waterside and Riverview from offices (Class B1) to residential (Class C3) under the Town and Country Planning (General Permitted Development) Order 2015 (as amended).
- 1.5. The Site is split into three areas (see Appendix A), Bridge House, Waterside and River View. Each area will be submitted for planning separately, however this document covers all three areas.

Planning Policy and Guidance

National Planning Policy Framework and Planning Practice Guidance

- 1.6. The National Planning Policy Frameworkⁱ (NPPF) states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk. Where development is necessary, it must be made safe without increasing flood risk elsewhere.
- 1.7. The NPPF states that Local Plans should be supported by Strategic Flood Risk Assessments (SFRA) and policies developed in order to manage flood risk from all sources. They should take into account advice from the Environment Agency (EA) and other relevant flood risk management bodies, such as lead local flood authorities and internal drainage boards. It advises that Local Plans should apply a sequential, risk-based approach to the location of development to avoid, where possible, flood risk to people and property. In addition, they should manage any residual risk, taking account of the effects of climate change, by:
 - Applying the Sequential Test and if necessary, the Exception Test;
 - Safeguarding land from development that is required for current and future flood management;
 - Using opportunities offered by new development to reduce the causes and effects of flooding; and
 - Where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations.
- 1.8. The NPPF clarifies that the aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. In addition, development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. If, following application of the Sequential Test, it is not possible (consistent with wider sustainability objectives) for the development to be located in zones with a lower probability of flooding, the Exception Test can be applied if appropriate. For the Exception Test to be passed:
 - A site-specific FRA must demonstrate that the development would be safe for its lifetime, taking account of the vulnerability of its users without increasing flood risk elsewhere, and, where possible, would reduce flood risk overall; and
 - It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared.

- 1.9. The NPPF states that when determining planning applications, Local Planning Authorities (LPA) should ensure that flood risk is not increased elsewhere, and only consider development in areas at risk of flooding where it can be demonstrated that:
- Within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location; and
 - Development is appropriately flood resilient and resistant, includes safe access and escape routes where required, any residual risk can be safely managed (including emergency planning), and priority is given to the use of Sustainable Drainage Systems (SuDS).
- 1.10. The Planning Practice Guidance (PPG)ⁱⁱ provides additional guidance to LPAs to ensure effective implementation of the planning policies set out within the NPPF regarding development in areas at risk of flooding. The guidance retains key elements of superseded NPPF Technical Guidanceⁱⁱⁱ and Planning Policy Statement 25 Development and Flood Risk Practice Guide^{iv} (PPS25) and is accessed via a web-based portal.
- 1.11. The PPG sets out that SuDS should be considered on a site-specific basis and should be provided unless it is demonstrated that they would be inappropriate. It goes on to set out that the local planning authority should be satisfied that the proposed minimum standards of operation are appropriate and that arrangements for ongoing maintenance are clear. This should be commensurate with the nature and scale of the proposed development.
- 1.12. The PPG states that developers and LPAs should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of SuDS. Referencing information provided by the EA, the PPG provides advice on taking climate change into account, setting out recommended contingency allowances for net sea level rise and peak rainfall intensities, which should be increased by between 5% and 40% from now until the year 2115. It also advises on flood resilience and resistance measures when dealing with the residual risks remaining after applying the sequential approach and mitigating actions.
- 1.13. The PPG also includes advice on flood risk vulnerability and flood zone compatibility. The following flood zones refer to the probability of river and sea flooding, without the presence of defences:
- Zone 1 - low probability: less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year;
 - Zone 2 - medium probability: between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% to 0.1%), or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% to 0.1%) in any year;
 - Zone 3a - high probability: 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability flooding from the sea (>0.5%) in any year; and
 - Zone 3b - the functional floodplain: where water has to flow or be stored in times of flood; identification should take account of local circumstances but would typically flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme 1 in 1000 (0.1%) flood.
- 1.14. Flood risk vulnerability is split into five classifications in Table 2 of the PPG, as follows, and the compatibility of these within each Flood Zone is set out in Table 3 of the PPG:

- Essential Infrastructure, e.g. essential transport and utility infrastructure, wind turbines;
- Highly Vulnerable, e.g. emergency services (those required to be operational during flooding), basement dwellings;
- More Vulnerable, e.g. residential dwellings, hospitals, schools, hotels, drinking establishments;
- Less Vulnerable, e.g. retail, offices, storage and distribution, leisure, restaurants; and
- Water-Compatible Development, e.g. docks, marinas, wharves.

Non-statutory Technical Standards for Sustainable Drainage Systems

- 1.15. The Non-statutory Technical Standards for Sustainable Drainage Systems^v was published in March 2015 and is the current guidance for the design, maintenance and operation of SuDS.
- 1.16. The standards set out that the peak runoff rates should be as close as is reasonably practicable to the greenfield rate, but should never exceed the pre-development runoff rate.
- 1.17. The standards also set out that the drainage system should be designed so that flooding does not occur on any part of the Site for a 1 in 30 year rainfall event, and that no flooding of a building (including basement) would occur during a 1 in 100 year rainfall event.
- 1.18. It is also noted within the standards that pumping should only be used when it is not reasonably practicable to discharge by gravity.

The London Plan 2016

- 1.19. The London Plan^{vi} published in 2016 represents the Mayor's policies for development in London.
- 1.20. New developments are required to meet the highest standards of sustainable design and construction under Policy 5.3, and include measures to conserve water and reduce the effects of flooding. Policy 5.12 regarding flood risk management states that developments must comply with the requirements set out in the NPPF and the associated flood risk technical guidance over the lifetime of the development, whilst taking into account the Thames Estuary 2100^{vii} proposals.
- 1.21. The London Plan states that the frequency and consequence of fluvial, surface water and sewer flooding are likely to increase as a result of climate change and identifies SuDS as one of the key ways of ensuring that long-term flood risk is managed. Policy 5.13 promotes the use of SuDS to reduce the contribution of climate change to flooding, and seeks to ensure that surface water runoff is managed as close to its source as possible. Policy 5.11 specifically promotes the inclusion of roof, wall and site planting, where feasible.
- 1.22. The London Plan Supplementary Planning Guidance^{viii} (SPG) entitled 'Sustainable Design and Construction', published in April 2014, provides further information on how to achieve the objectives of the London Plan. Regarding the control of surface water runoff, the SPG states:
 - Developers should aim to achieve 100% attenuation of the site's undeveloped surface water runoff rate i.e. achieve greenfield runoff rates; and

- Where greenfield rates cannot be achieved, a minimum of 50% attenuation of the undeveloped sites surface water runoff is expected.

1.23. The SPG also states the SuDS should be utilised for all developments, wherever practical, and should aim to provide additional benefits to a scheme as well as reduce flood risk.

London Borough of Hillingdon Preliminary Flood Risk Assessment

- 1.24. The London Borough of Hillingdon's Preliminary Flood Risk Assessment^{ix} (PFRA) was published in May 2011 to provide a high-level summary of flood risk in the Borough of Hillingdon, based on readily available information.
- 1.25. It describes the probability and subsequent consequences of past and future flooding, and considers flooding from surface water runoff, groundwater, and ordinary watercourses across the borough, and any interactions they have with main rivers and the sea.

London Borough of Hillingdon Surface Water Management Plan

- 1.26. The London Borough of Hillingdon's Surface Water Management Plan^x (SWMP) was published in January 2013 to outline the preferred surface water management strategy for the borough.
- 1.27. This document considers flooding from sewers, groundwater, overland surface water runoff, ordinary watercourses and ditches. It also acts as a starting point for the long-term management of surface water for the borough, and will be used in the future to inform land use planning and capital investment.
- 1.28. Information from the SWMP regarding the above sources of flooding is included within Chapter 2 of this report.

London Borough of Hillingdon Strategic Flood Risk Assessment

- 1.29. The London Borough of Hillingdon's Strategic Flood Risk Assessment (SFRA) was published in November 2008 as part of the required Sustainability Appraisal, which ensures Planning Authorities are permitting developments within the principles of sustainability.
- 1.30. The SFRA outlines the flood risks in the London Borough of Hillingdon, and gives guidance on the application of the sequential and exception tests. It also discusses SuDS, the requirement for FRAs and emergency planning.
- 1.31. Information from the SFRA is discussed within chapter 2 of this report.

London Borough of Hillingdon Local Plan

- 1.32. The Local Plan^{xi} was adopted in November 2012 and outlines the borough's policies on development linking with the London Plan and the NPPF.
- 1.33. Policy EM6 outlines the borough's methods of managing and monitoring flood risk. It supports the NPPF guidelines and the requirement for SuDS to be included where viable. Paragraph 8.91 of Hillingdon's Local Plan states that SuDS should seek to reduce flood risk, reduce pollution and provide landscape and wildlife benefits.

- 1.34. Paragraph 8.129 regarding Water Resources states that all developments should aim to keep water consumption to 105 litres or less per person per day, to include recycling and storing grey water, and utilising rainwater runoff.

Developers' Guide for Surface Water Management

- 1.35. LBS planning application submission requirements for drainage strategies are set out within their Developers' Guide for Surface Water Management^{xii}. Their requirements include the following:
- Description of the existing and proposed drainage arrangements for the site;
 - Calculation of the existing and proposed surface water runoff for the site. Taking account of the existing and proposed permeable/impermeable areas;
 - Assessment of the suitability for SuDS, including recommendations and indicative sizing for the chosen measures;
 - Site drainage layout to include a site plan showing locations of SuDS measures, pipelines and flow control devices.
 - Confirmation of who will maintain the site drainage system, including SuDS measures.
 - Evidence that the site has an agreed point of discharge, or that initial discussions have been undertaken with Thames Water.
 - Any required phasing arrangements that must be considered.

Water Industry Act

- 1.36. Thames Water is the local Sewerage Undertaker and provides sewerage services under the guidance of the Water Industry Act 1991.
- 1.37. Under Section 106 of the Water Industry Act, the developer currently maintains the automatic right to 'communicate' with the public foul and surface water sewer system.

Scope of Report

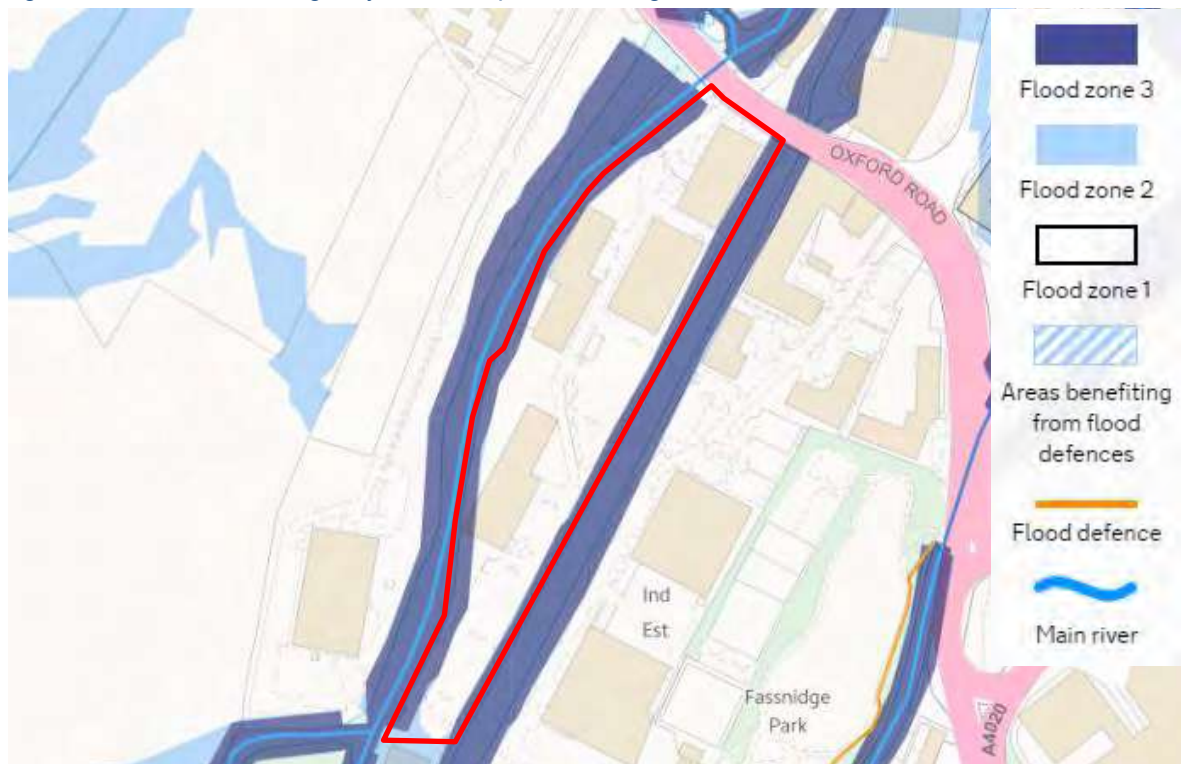
- 1.38. This report assesses the potential effects of tidal, fluvial, pluvial, groundwater and artificial sources of flooding upon the development, in line with national and local planning policy. In addition, the management of foul and surface water runoff is also assessed, so as not to have a detrimental effect on the Site or its surroundings.

2. Sources of Potential Flooding

Tidal and Fluvial

- 2.1. According to the Environment Agency's (EA) Flood Map for Planning (Figure 2), the Site is located within Flood Zone 1, which denotes a low probability of tidal and fluvial flooding (less than a 1 in 1000 annual probability).

Figure 2: Environment Agency Flood Map for Planning



Key



Source: <http://maps.environment-agency.gov.uk>

- 2.2. However, the River Colne and Grand Union Canal border the Site to the northwest and southeast respectively. As a result areas of Flood Zones 2 and 3 (medium and high probability of tidal and fluvial flooding) border the Site.
- 2.3. The EA have confirmed (Appendix B) that the 1 in 1000 year modelled flood levels for the River Colne and the Grand Union Canal are 31.57m (node C001D) and 31.93m AOD (node I002) respectively.
- 2.4. The topographic survey (Appendix C) shows that the existing levels at the boundary of the Site are a minimum of 32.01m AOD adjacent to the River Colne, which is 440mm above the 1 in 1000 year

flood level (31.57m AOD). The existing boundary levels adjacent to the Grand Union Canal are a minimum of 32.13m AOD, 200mm above the 1 in 1000 year flood level (31.93m AOD). This confirms that the Site is located within Flood Zone 1 and is at a low probability of flooding from tidal and fluvial sources.

- 2.5. As seen in the development proposals (Appendix A), there are no amendments to the existing levels (internally or externally), and therefore the Site would remain at a low risk of flooding from tidal and fluvial sources.

Groundwater

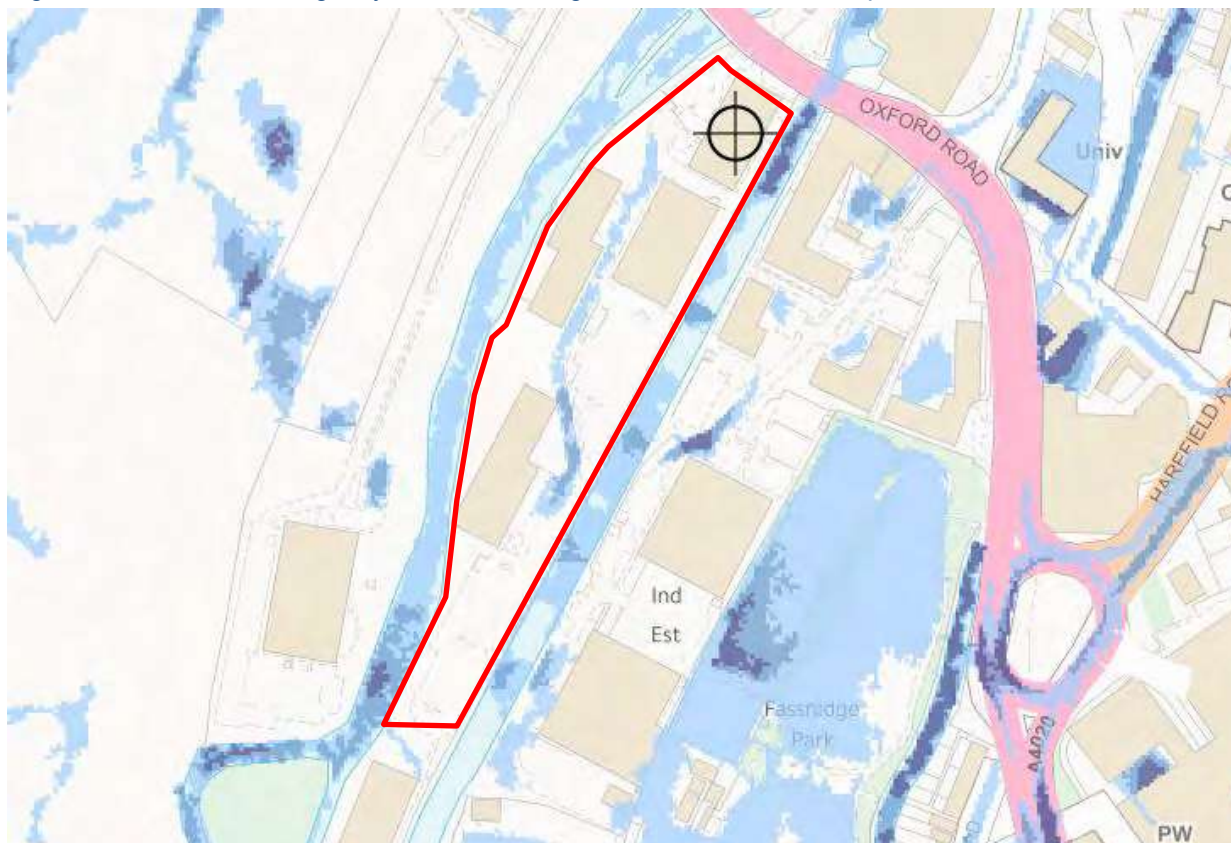
- 2.6. There are no British Geological Survey (BGS) borehole records or intrusive investigation results available at the Site.
- 2.7. Figure 9 of the Level 1 SFRA (Appendix D) indicates that the underlying superficial geology is Alluvium, and the underlying bedrock geology is Lambeth Group.
- 2.8. Figure 10.1 of the SWMP (Appendix E) indicates that the Site lies in an area where there is an increased potential for groundwater flooding. However, no incidents of groundwater flooding have been recorded, and the closest recorded incident is approximately 1.2km to the northeast of the Site.
- 2.9. The EA have confirmed (Appendix B) that they hold no records of groundwater flooding in the vicinity of the Site.
- 2.10. The proposals only comprise internal change of use, and therefore no excavations would be undertaken due to the proposals. As a result there would be no structures to alter the existing groundwater regime beneath the Site. The risk of groundwater flooding to the Development is therefore considered low, as is the impact of the Development on groundwater flooding elsewhere.

Pluvial

- 2.11. Pluvial flooding (also known as surface water and sewer flooding) occurs when natural and engineered systems have insufficient capacity to deal with the volume of rainfall. Pluvial flooding can sometimes occur in urban areas during extreme, high intensity, low duration summer rainfall events which overwhelm the local surface water drainage systems, or in rural areas during medium intensity, long duration events where saturated ground conditions prevent infiltration into the subsoil. This flood water would then be conveyed via overland flow routes dictated by the local topography.
- 2.12. The SWMP surface water flood depth mapping shown in Figures 13.1, 15.1, 17.1 and 21.1 (Appendix E) indicate that the majority of the Site is located outside the area shown to be at risk of surface water flooding. A small area on the west of the Site is indicated as being at risk of flooding between the 1 in 30 to 1 in 1000 year flood events, where flood depths up to 0.25m could occur. Section 3.3.17 of the SWMP states that this broad scale mapping provides an initial guide to areas that may be at risk and that there are a number of limitations to using the information, therefore this mapping should not be relied upon on a site specific basis.
- 2.13. Interrogation of the EA's Flood Map for Surface Water (Figure 3) indicates that the majority of the Site is at 'very low' risk of surface water flooding. A small area in the centre of the Site is indicated to be at 'low' risk of surface water flooding from a 1 in 1000 year event, up to a depth of 300mm.

However, it should be noted that the EA have confirmed that this map only shows indicative areas of risk and should not be relied upon on a Site-specific basis.

Figure 3: Environment Agency Risk of Flooding from Surface Water Map



Key

	Site Location	
	High Risk	(1 in 30 year or greater)
	Medium Risk	(between 1 in 30 and 1 in 100)
	Low Risk	(between 1 in 100 and 1 in 1000)
	Very Low Risk	(1 in 1000 year or less)

Source: <http://watermaps.environment-agency.gov.uk>

- 2.14. It is noted in Appendix C that the topography generally falls in a south westerly direction within the Site. Land to the southwest of the Site is approximately 1.3m lower than the Site itself and therefore would not create an overland flow route onto the Site.
- 2.15. The northern limit of the Site is delineated by Oxford Road. Oxford Road lies at about 33.5m AOD at the entrance to the Site and falls to the west. As the Site is lower than the road there is potential for a flow route onto the Site from the north. However, as there is no identified surface water ponding within this highway, it is not anticipated that this would be of concern.
- 2.16. There are no alternations to external ground levels or building finished floor levels as a result of the proposals. Therefore, it is likely that the buildings would continue to be at a 'very low' risk of surface water flooding.
- 2.17. Figure 1.1 of the SWMP (Appendix E) shows that the Site is not located within a critical drainage area.
- 2.18. Figure 9.1 of the SWMP (Appendix E) shows that the Site is located within an area where between 21 and 50 properties have been reported as being affected by sewer flooding. However, it is noted that this information is not site-specific and Figure 3.1 of the PFRA (Appendix F) confirms that there has been no sewer flooding at the Site.
- 2.19. Correspondence received from Thames Water (Appendix G) has confirmed that they have no issues with their drainage assets in the vicinity, and have no records of historic sewer flooding within the postcode of the Site.
- 2.20. It is therefore considered that there is a low risk of pluvial flooding to the Site.

Artificial Sources

- 2.21. Mapping shown on the EA website indicates the largest area that may be affected by flooding if a reservoir were to fail. The EA note that this is a worst case prediction, and any flood event is unlikely to be this large. This mapping (Figure 4) shows that the Site would not be subject to flooding due to failure of the reservoirs in the area, with water contained within the adjacent channels.
- 2.22. The Grand Union Canal is operated and maintained by the Canal and Rivers Trust, who have confirmed (Appendix H) that they have no flooding records due to overtopping or breach of this section of waterway.
- 2.23. It is therefore considered that the risk of flooding from artificial sources is low.

Figure 4: Environment Agency Risk of Flooding from Reservoirs Map



Key



Site Location



Maximum extent of reservoir flooding

Source: <http://watermaps.environment-agency.gov.uk>

3. Drainage Strategy

- 3.1. It is also important to assess the potential for the proposed Development to increase flood risk to others through increasing foul or surface water runoff from the Site.

Surface Water Drainage

- 3.2. Thames Water sewer records (Appendix G) indicate that there are no surface water or combined sewers on-Site. A subsequent CCTV survey identified private surface water sewers adjacent to Bridge House and Waterside which drain into the River Colne. No surface water sewers have been identified underneath the Riverview area.
- 3.3. The proposals do not alter any of the external fabric of the existing buildings, and surface water runoff from the Site would continue to drain through the existing downpipes and connections into the adjacent watercourses, as per the existing situation. As there will be no change in the impermeable area across the Site, the rate and volume of discharge will remain as existing.

Foul Drainage

- 3.4. A CCTV survey identified foul sewers from all buildings in the Bridge House area, all running into the combined sewer to the northeast. CCTV surveys have not been completed for the Waterside and Riverview sections. The Thames Water asset search (Appendix G) returned no records of sewers in the Riverview and Waterside areas.
- 3.5. The existing and proposed foul flows have been calculated based on the accommodation schedule (Appendix A). The calculations (Appendix I) show that the existing and proposed peak discharge rates from the Site would be 3.2 l/s and 1.3 l/s respectively, thereby providing a reduction.

Summary

- 3.6. As set out above, the proposed change of use will not have a detrimental effect on the foul or surface water runoff from the Site.

4. Conclusions

- 4.1. The development proposals comprise the change of use of the existing buildings from offices to residential, altering only the internal layout under permitted development rights.
- 4.2. The Site is located within Flood Zone 1, and is therefore considered to be at low risk of tidal and fluvial flooding.
- 4.3. The risk of flooding from pluvial, groundwater and artificial sources has also been assessed and found to be low.
- 4.4. As a permitted development proposal, this development only alters the internal use of the existing building, and does not change the impermeable footprint of the Site or external ground levels. As a result there would be no alteration to the existing surface water drainage network (which would continue to discharge to the adjacent waterways), and no impact as a result of the proposals.
- 4.5. The existing and proposed foul flows have been calculated at 3.2 l/s and 1.3 l/s based on the accommodation schedule. As there is an anticipated reduction in flows there would be no impact on the local infrastructure, and the development would continue to drain as existing.
- 4.6. This report demonstrates that the proposed development has a low probability of flooding. It also confirms that there would be no increase in surface water runoff or foul water discharge and that there would be no increase in flood risk due to this development on-site or within its surroundings. It is considered that the development should be granted prior approval with respect to flood risk.

5. References

- ⁱ Department for Communities and Local Government, March 2012. *National Planning Policy Framework*
- ⁱⁱ Department for Communities and Local Government, March 2014. *Planning Practice Guidance*
- ⁱⁱⁱ Department for Communities and Local Government, March 2012. *National Planning Policy Framework Technical Guidance*
- ^{iv} Communities and Local Government, 2009. *Planning Policy Statement 25: Development and Flood Risk Practice Guide*
- ^v Department for Environment, Food and Rural Affairs, March 2015. *Non-statutory technical standards for sustainable drainage systems*
- ^{vi} Greater London Authority, March 2016. *The London Plan: Spatial Development Strategy for Greater London consolidated with Alterations since 2011*
- ^{vii} Environment Agency, April 2009. *TE2100 Plan Consultation Document*
- ^{viii} Mayor of London, April 2014. *Supplementary Planning Guidance: Sustainable Design and Construction*
- ^{ix} London Borough of Hillingdon, 2011. *Preliminary Flood Risk Assessment, London Borough of Hillingdon*
- ^x London Borough of Hillingdon, 2011. *Surface Water Management Plan, London Borough of Hillingdon*
- ^{xi} London Borough of Hillingdon, 2011. *Local Plan*
- ^{xii} London Borough of Hillingdon, No Date. *Developers' Guide to Surface Water Management*



APPENDICES

A. Development Proposals

Appendices

Bridge House, Uxbridge

Document Reference: WIC15644-102-R-3-2-1-Flood_Drainage

WIC15644



B. Environment Agency Correspondence

Appendices

Bridge House, Uxbridge

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WIC15644

C. Donal O'Donovan
Waterman Transport & Development Ltd
Via email
donal.odonovan@watermangroup.com

Our ref: NET040883 BC

Date: 18 March 2014

Dear C. Donal O'Donovan

Enquiry regarding Bridge House, Uxbridge - Flood Risk Enquiry.

Thank you for your enquiry. Please find attached a flood map of the area. Using the red line border on your attached map as the site, parts of the site are in floodzones 2 & 3. Please find attached Product 4 data from our Partnerships & Strategic Overview Team.

Please find attached maps of watercourses in the vicinity. Our Sustainable Places Team have advised contacting the local authority, London Borough of Hillingdon, regarding development restrictions.

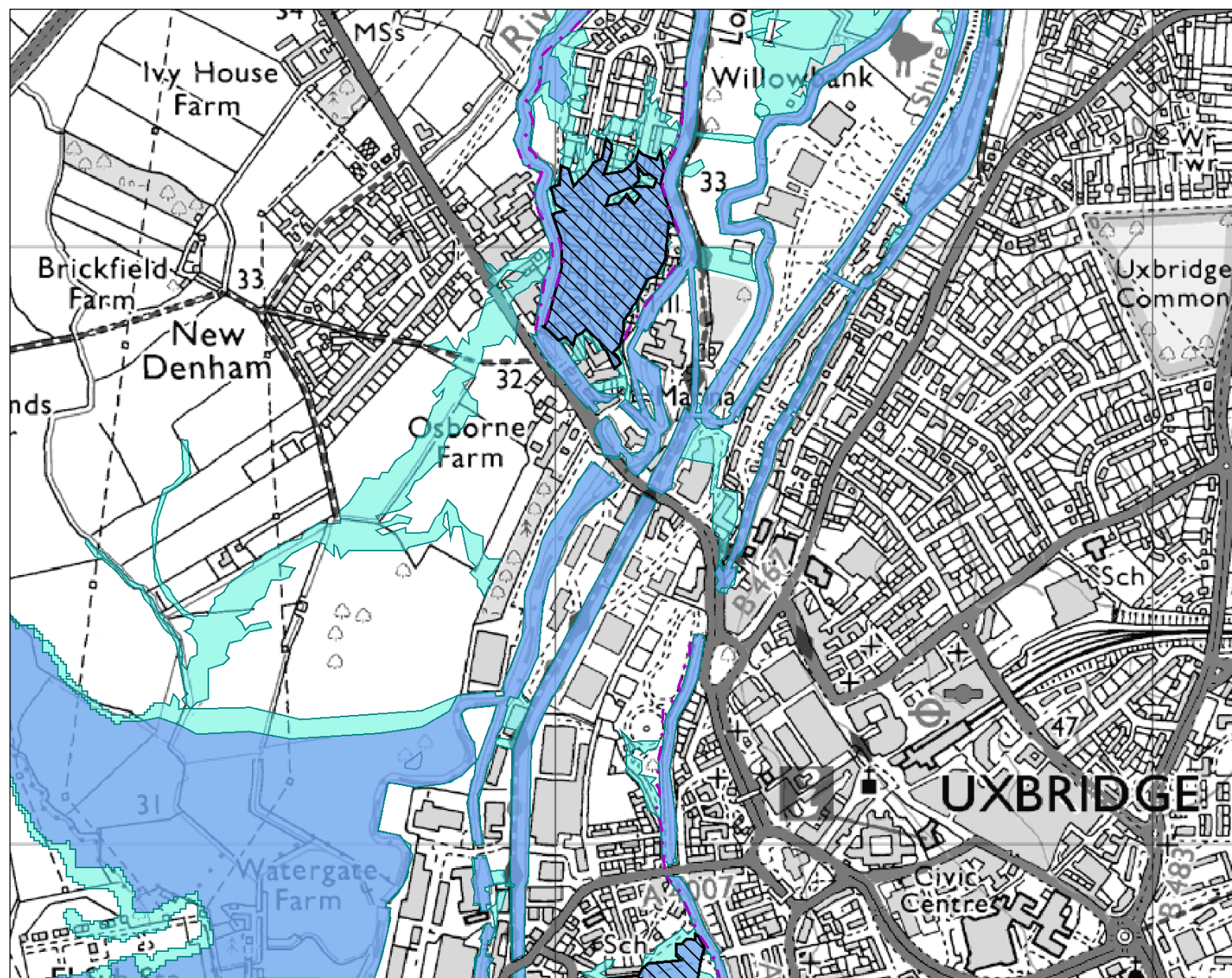
We have no records of groundwater flooding at the site. You may wish to contact the local authority, London Borough of Hillingdon, to see what records they hold. Surface water maps – Please find attached surface water maps for the area. Please be aware the surface water maps can only give an indication of areas at risk from surface water flooding from a national assessment. They cannot provide detail on individual properties. Therefore the information above should not be interpreted as stating that the location you are interested in will or won't actually flood, but simply that it is in or not in an area shown at risk on the maps. You should contact your Lead Local Flood Authority, London borough of Hillingdon, so they can provide you with their view of the information that best represents surface water flood risk in your location as it's vital that local knowledge and information is used to interpret the maps. **The Lead Local Flood Authorities take the lead on surface water flood risk issues.** We advise you to contact the local water company regarding previous or potential flooding from sewers. You may also wish to contact the local authority regarding flooding from any non-main rivers or surface water runoff.

If I can be of any further help, please contact me.

Yours sincerely

Becki Clark
Customers & Engagement Officer
Direct dial 01707 632302
Direct fax 01707 632610
Direct email NETenquiries@environment-agency.gov.uk

Flood map centred on Bridge House, Uxbridge, UB8 1HS - created 11/03/2014 - NET40883BC



Scale 1:10,001



Flood Map for Planning (Rivers and Sea)

- Flood Map - Defences
- Areas Benefiting from Flood Defences
- Flood Map - Flood Storage Areas
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

Flood Map for Planning (Rivers and Sea) (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

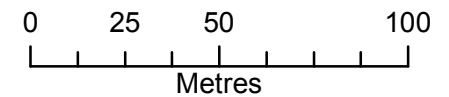
Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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Detailed FRA centred on Bridge House, Uxbridge, UB8 1HS - created 11/03/2014 - NET40883BC



Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX



Legend

— Main Rivers

Defended Flood Outlines

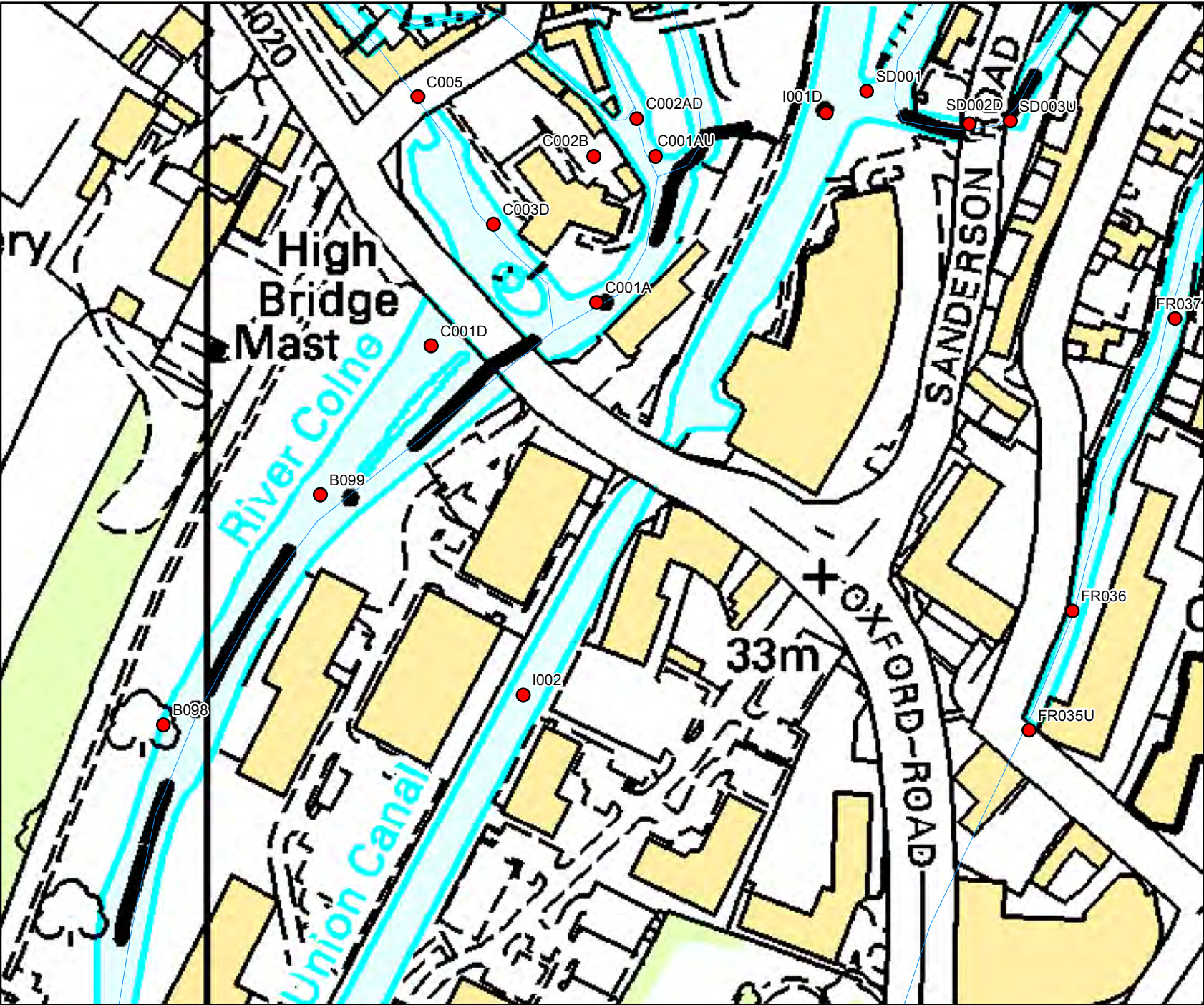
- 1 in 5 (20%) Defended
- 1 in 20 (5%) Defended
- 1 in 100 (1%) Defended
- 1 in 100+20% (*CC) Defended
- 1 in 1000 (0.1%) Defended

The data in this map has been extracted from the Lower Colne Modelling and Mapping Study (Mott MacDonald 2012).

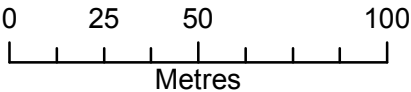
This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

Produced by:
Partnerships & Strategic Overview
North East Thames

Detailed FRA centred on Bridge House, Uxbridge, UB8 1HS - created 11/03/2014 - NET40883BC



Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX



Legend

— Main Rivers

1D Node Results

● Node Results

The data in this map has been extracted from the Lower Colne Modelling and Mapping Study (Mott MacDonald 2012).

This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

Produced by:
Partnerships & Strategic Overview
North East Thames

Environment Agency ref: [NET40883BC](#)

The data in this map has been extracted from the Lower Colne Modelling and Mapping Study (Mott MacDonald 2012).

All flood levels are given in metres Above Ordnance Datum (mAOD)

All flows are given in cubic metres per second (cumecs)

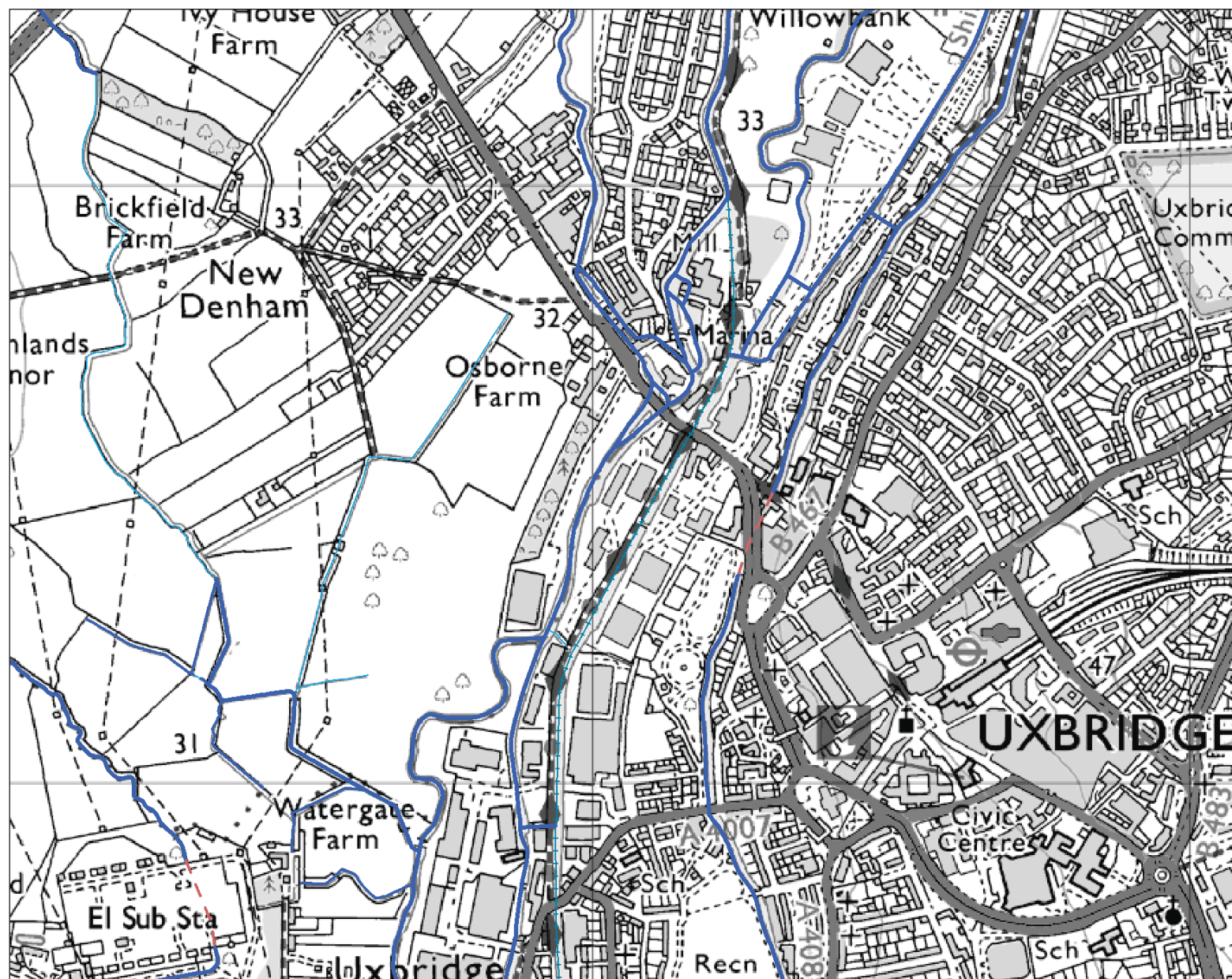
MODELLED FLOOD LEVEL

			Return Period							
Node Label	Easting	Northing	2 yr	5 yr	10 yr	20 yr	50 yr	100 yr	100 yr + 20%	1000 yr
B098	504984	184485	30.65	30.77	30.84	30.92	31.02	31.10	31.23	31.36
B099	505042	184570	30.79	30.90	30.98	31.05	31.15	31.22	31.36	31.48
C001A	505144	184641	30.94	31.03	31.10	31.16	31.25	31.32	31.45	31.57
C001AU	505166	184695	31.07	31.17	31.23	31.29	31.38	31.45	31.57	31.69
C001D	505083	184625	30.94	31.03	31.09	31.16	31.25	31.32	31.45	31.57
C002AD	505159	184709	31.09	31.18	31.24	31.30	31.39	31.46	31.58	31.70
C002B	505143	184695	31.13	31.21	31.27	31.32	31.40	31.47	31.59	31.70
C003D	505106	184670	30.94	31.03	31.10	31.16	31.25	31.32	31.45	31.57
C005	505078	184717	31.10	31.19	31.26	31.32	31.41	31.47	31.59	31.70
FR035U	505304	184483	33.05	33.11	33.20	33.42	33.54	33.62	33.76	33.92
FR036	505320	184527	33.05	33.11	33.20	33.40	33.52	33.58	33.76	33.92
FR037	505358	184635	33.06	33.12	33.21	33.39	33.55	33.63	33.77	33.94
I001D	505229	184711	31.53	31.64	31.68	31.72	31.76	31.78	31.84	31.95
I002	505117	184496	31.53	31.63	31.68	31.72	31.75	31.78	31.83	31.93
SD001	505244	184719	31.53	31.64	31.68	31.72	31.76	31.78	31.84	31.95
SD002D	505282	184707	31.53	31.63	31.67	31.71	31.75	31.78	31.83	31.94
SD003U	505297	184708	31.57	31.68	31.73	31.78	31.82	31.84	31.90	31.99

MODELLED FLOWS

			Return Period							
Node Label	Easting	Northing	2 yr	5 yr	10 yr	20 yr	50 yr	100 yr	100 yr + 20%	1000 yr
B098	504984	184485	6.99	9.07	10.53	12.04	14.22	15.94	19.24	22.39
B099	505042	184570	7.00	9.07	10.53	12.04	14.21	15.94	19.24	22.39
C001A	505144	184641	4.97	6.28	7.20	8.15	9.51	10.60	12.65	14.70
C001AU	505166	184695	1.47	1.74	1.93	2.12	2.39	2.60	3.00	3.39
C001D	505083	184625	7.00	9.07	10.53	12.04	14.22	15.94	19.25	22.39
C002AD	505159	184709	1.47	1.74	1.93	2.12	2.39	2.60	3.00	3.39
C002B	505143	184695	1.47	1.74	1.93	2.12	2.39	2.60	3.00	3.39
C003D	505106	184670	2.03	2.79	3.33	3.89	4.71	5.34	6.59	7.70
C005	505078	184717	2.03	2.79	3.33	3.89	4.71	5.34	6.59	7.70
FR035U	505304	184483	0.48	0.56	0.71	1.66	2.68	3.37	2.52	3.45
FR036	505320	184527	0.48	0.56	0.71	1.77	3.10	4.23	2.52	3.45
FR037	505358	184635	0.48	0.56	0.71	2.02	3.23	4.53	2.52	3.45
I001D	505229	184711	3.02	3.97	4.53	5.01	5.49	5.88	6.74	8.77
I002	505117	184496	3.02	3.98	4.52	5.00	5.48	5.86	6.73	8.77
SD001	505244	184719	2.95	3.87	4.30	4.63	4.90	5.09	5.33	5.33
SD002D	505282	184707	2.95	3.87	4.30	4.61	4.90	5.07	5.33	5.33
SD003U	505297	184708	2.95	3.87	4.30	4.63	4.89	5.08	5.33	5.33

Map of watercourses in the vicinity created 18 March 2014 [Ref:NET040883BC]



Scale 1:10,001



Likelihood of Flooding from Rivers and the Sea

Detailed River Network

- Primary River
- Secondary River
- Tertiary River
- Lake / Reservoir
- Canal
- Culvert
- Canal Tunnel
- Underground River (inferred)
- Underground River (local knowledge)
- Underground River (Potential Sewer)

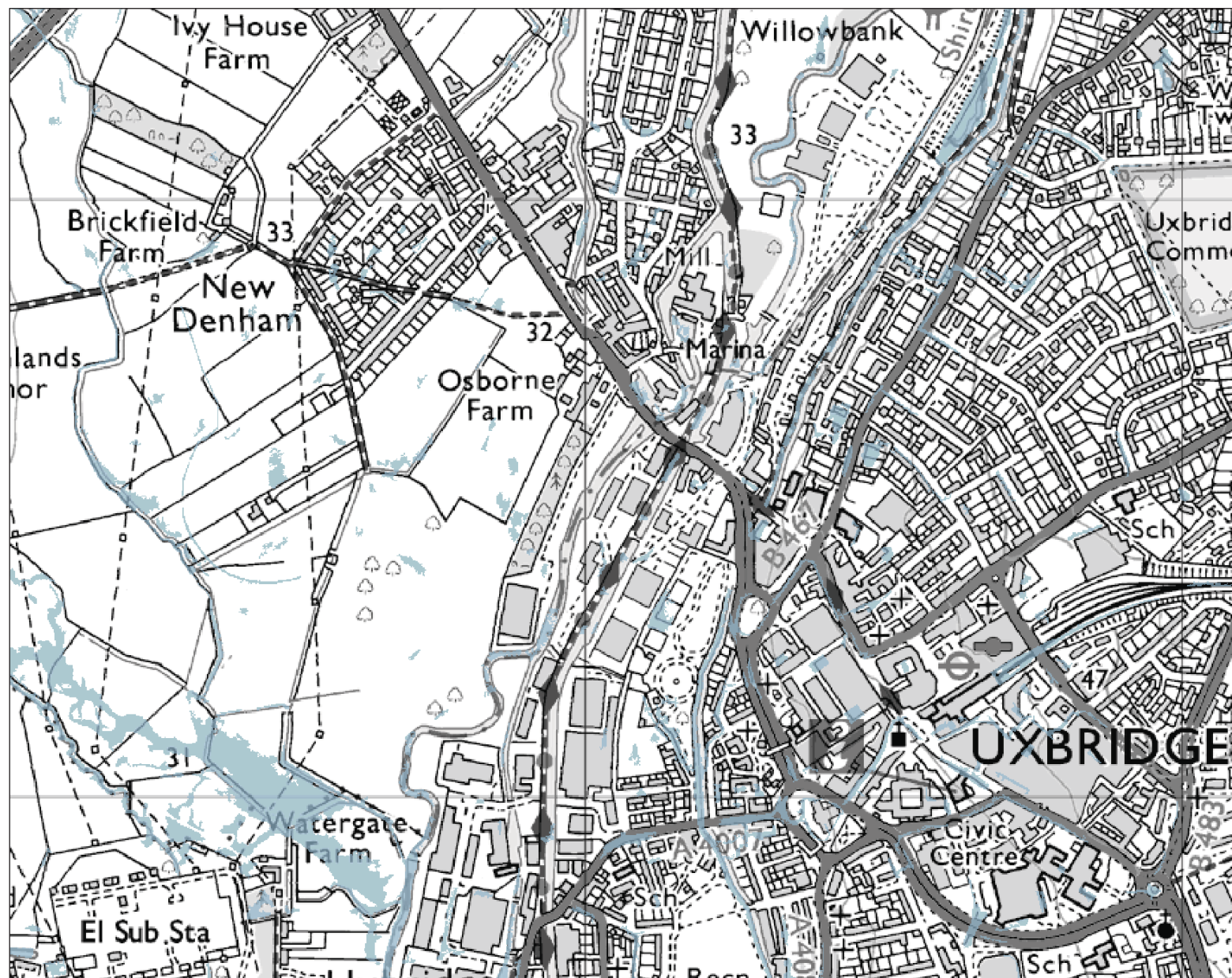
Likelihood of Flooding from Rivers and the Sea (taking into account defences)

- High:** Greater than or equal to 1 in 30 (3.3%) chance in any given year
- Medium:** Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year.
- Low:** Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
- Very Low:** Less than 1 in 1,000 (0.1%) chance in any given year

This information is shown on the Risk of Flooding from Rivers & the Sea map on our website.

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updated Flood Map for Surface Water (2013) - 1 in 100 chance rain [Ref:NET040883BC]



Scale 1:10,001



Likelihood of Flooding from Rivers and the Sea

uFMFSW (2013) - 1 in 100 chance rain

Likelihood of Flooding from Rivers and the Sea (taking into account defences)

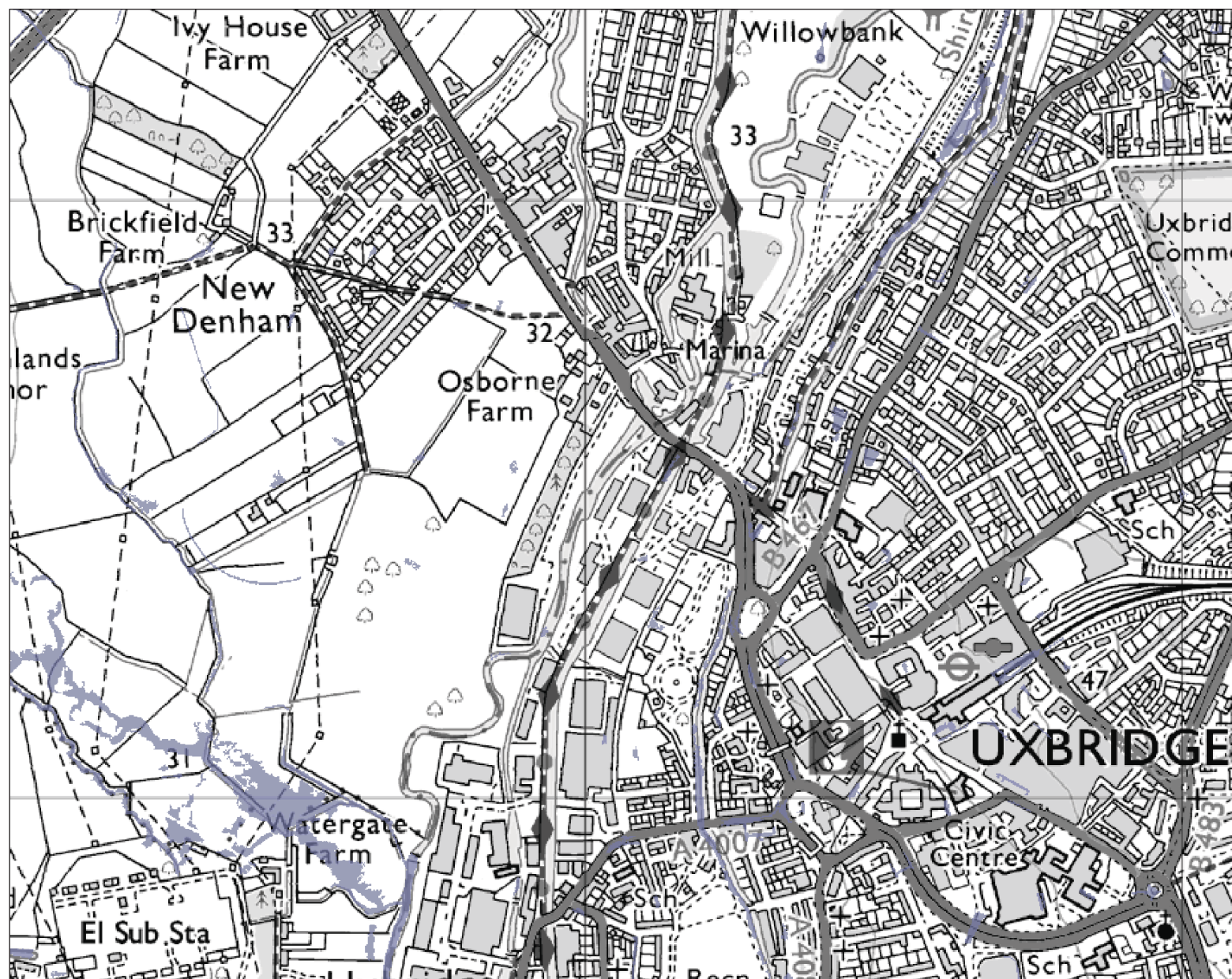
- High: Greater than or equal to 1 in 30 (3.3%) chance in any given year
- Medium: Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year.
- Low: Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
- Very Low: Less than 1 in 1,000 (0.1%) chance in any given year

This information is shown on the Risk of Flooding from Rivers & the Sea map on our website.

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updated Flood Map for Surface Water (2013) - 1 in 30 chance rain [Ref:NET040883BC]



Scale 1:10,001



Likelihood of Flooding from Rivers and the Sea

■ uFMFSW (2013) – 1 in 30 chance rain

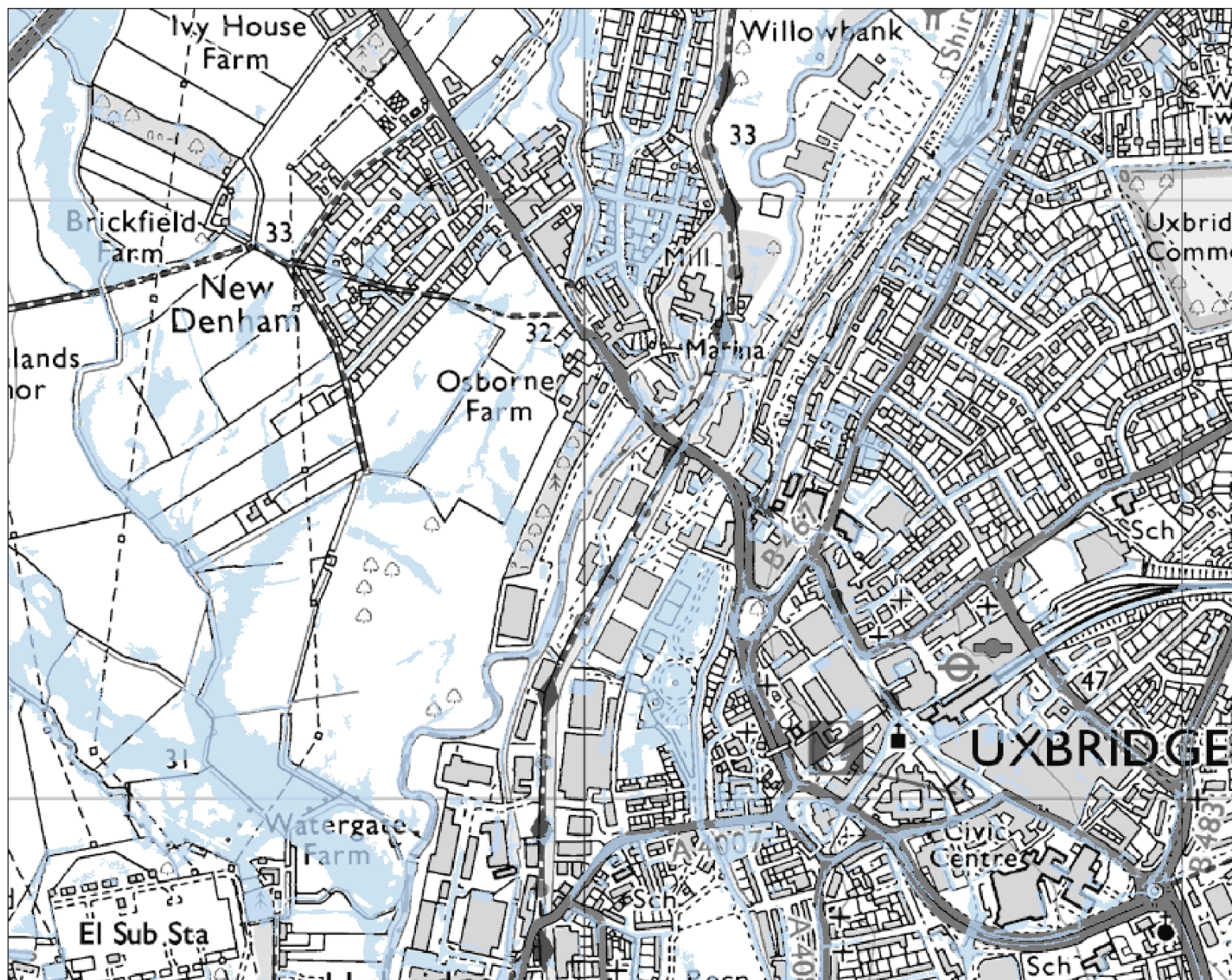
Likelihood of Flooding from Rivers and the Sea (taking into account defences)

- High: Greater than or equal to 1 in 30 (3.3%) chance in any given year
- Medium: Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year.
- Low: Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
- Very Low: Less than 1 in 1,000 (0.1%) chance in any given year

This information is shown on the Risk of Flooding from Rivers & the Sea map on our website.

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updated Flood Map for Surface Water (2013) - 1 in 1000 chance rain [Ref:NET040883BC]



Scale 1:10,001



Likelihood of Flooding from Rivers and the Sea

uFMSW (2013) - 1 in 1000 chance rain

Likelihood of Flooding from Rivers and the Sea (taking into account defences)

- High: Greater than or equal to 1 in 30 (3.3%) chance in any given year
- Medium: Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year.
- Low: Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
- Very Low: Less than 1 in 1,000 (0.1%) chance in any given year

This information is shown on the Risk of Flooding from Rivers & the Sea map on our website.

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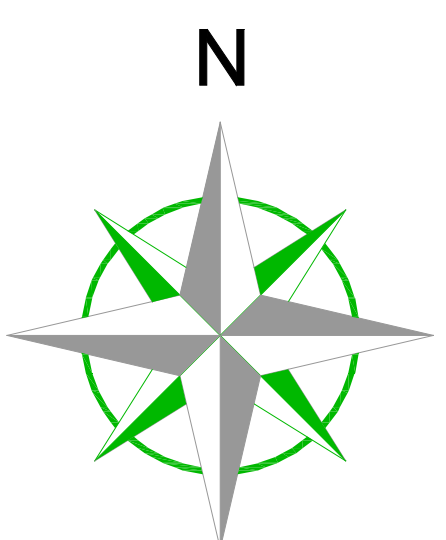
C. Topographic Survey

Appendices

Bridge House, Uxbridge

Document Reference: WIC15644-102-R-3-2-1-Flood_Drainage

WIC15644



Station	Easting (m)	Northing (m)	Level (m)
GH1	505131.677	184610.397	33.351
GH2	505086.262	184577.937	32.672
GH3	505073.178	184547.331	32.545
GH4	505052.786	184483.835	32.716
GH5	505057.865	184431.564	32.749
GH6	505037.335	184382.886	32.507
GH7	505004.223	184320.764	32.655
GH8	504966.442	184251.334	32.747
GH30	505117.218	184523.196	32.625

Surveyed Buildings

The survey has been oriented to the Ordnance Survey (O.S.) National Grid (OSGB36) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN02 & OSGM02 transformation models.

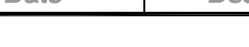
The survey has been correlated to this point and a further one or more OSGB36 points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

[illegible]

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Rev	Date	Description	Drawn	Q. Ref.
				

- Topographical Surveys
- Site Engineering
- Utility / CCTV Surveys
- Measured Building Surveys
- 3D Laser Scanning
- Revit & BIM Models

Rowan House
Duffield Road
Little Eaton
Derby
DE21 5DR

Tel (01332) 830044 Fax (01332) 830055
admin@greenhatch-group.co.uk
www.greenhatch-group.co.uk

St Albans Unit B, The Courtyard Alban Park St Albans Hertfordshire AL4 0LA t. (01727) 854481	Newcastle 24 Riverside Studios Ametyst Road Newcastle Bus. Park Newcastle-U-Tyne NE4 7YL t. (01912) 736391	Poland ul. Panewnicka 91 40-761 Katowice Poland t. 0048 32 202 2292
--	--	---

CLIENT

Mace Group

PROJECT

**Xerox
Bridge House
Uxbridge**

Topographical Survey

SCALE A0@ 1: 200	DATE 20.07.2014
----------------------------	---------------------------

<i>DRAWN</i> SO	<i>QUALITY REF</i> E916
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Level datum	See OS Note
Grid orientation	See OS Note

Job number	20608
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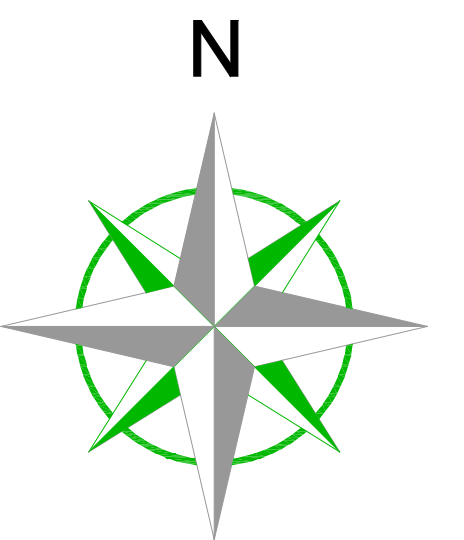
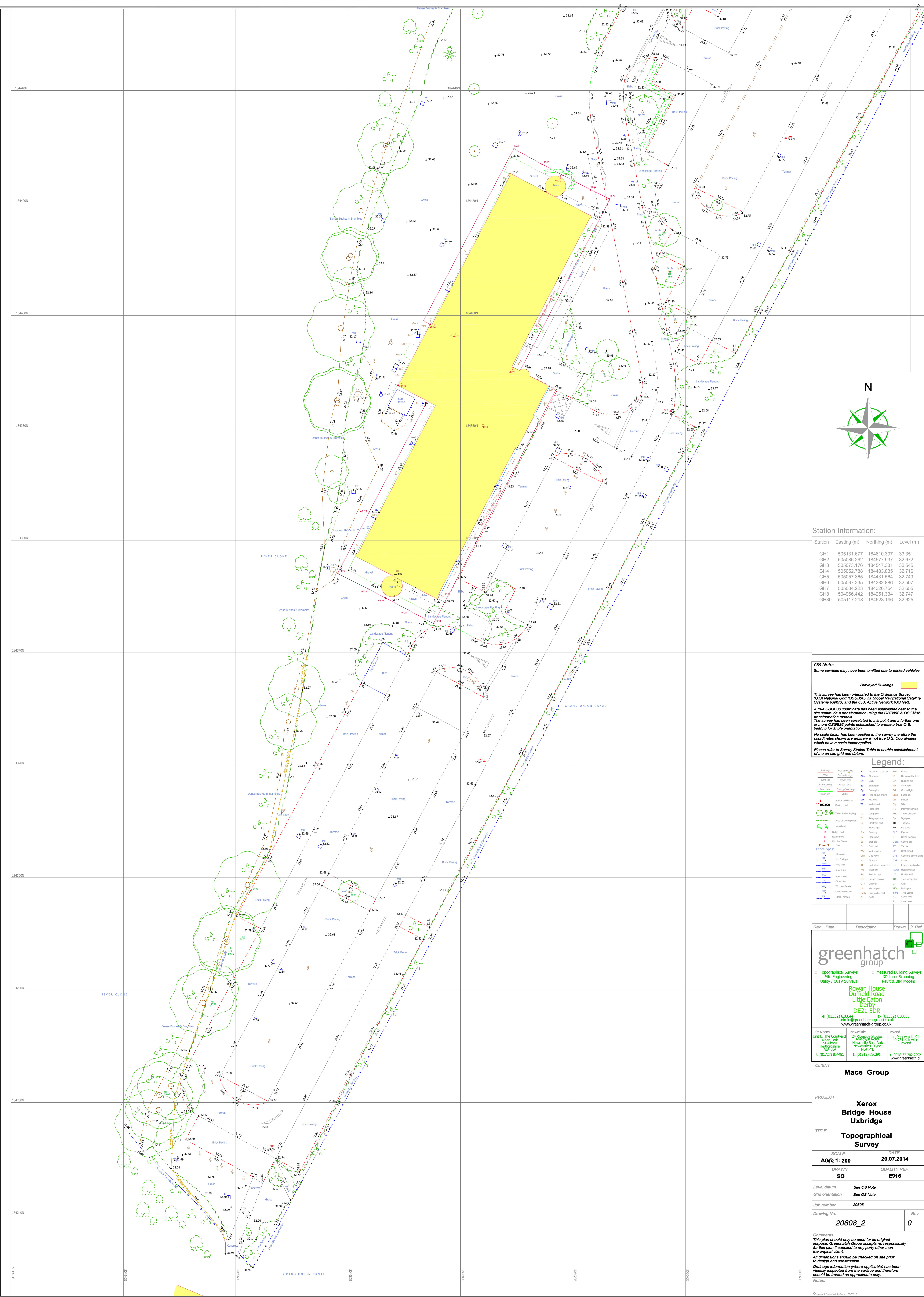
Drawing No.	Rev.
20608_1	0

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility

All dimensions should be checked on site prior to design and construction.

Drainage Information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:



Station Information:

Station	Easting (m)	Northing (m)	Level (m)
GH1	505131.677	184610.397	33.351
GH2	505086.262	184577.937	32.672
GH3	505073.176	184547.331	32.545
GH4	505052.788	184483.835	32.716
GH5	505057.865	184431.564	32.749
GH6	505037.335	184382.886	32.507
GH7	505004.223	184320.764	32.655
GH8	504966.442	184251.334	32.747
GH30	505117.218	184523.196	32.625

OS Note:

Some services may have been omitted due to parked vehicles.

Surveyed Buildings

This survey has been orientated to the Ordnance Survey (O.S.) National Grid (OSGB36) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

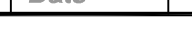
A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN02 & OSGM02 transformation models.

The survey has been correlated to this point and a further one or more OSGB36 points established to create a true O.S. bearing for angle orientation.

Legend:

	Overhead Crane	IC	Implosion chamber	BD	Bed
	Steel plate	FW	Fire water	BS	Barrel (barrel)
	Pipe	QW	Quench water	BL	Blank
	Dryer	QY	Quench	BLK	Black
	Grinding wheel	QZ	Quench zone	BLK	Black
	Drop test	DP	Down pipe	GL	Ground line
	Camp/Overhaul	DP	Down pipe	GL	Ground line
	Water level	DP	Down pipe	GL	Ground line
	100,000	DP	Down pipe	GL	Ground line
	Steel level	WL	Water level	SL	Side
	Time (hour / loading)	TL	Through light	ISL	Interior back wall
	Area of Longshore	TL	Through light	ISL	Interior back wall
	Ridge Level	BU	Buck	ISL	Interior back wall
	E Level	BU	Buck	ISL	Interior back wall
	Flat Roof/Flat	BU	Buck	ISL	Interior back wall
	Fence Types	BU	Buck	ISL	Interior back wall
	Iron Rollings	BU	Buck	ISL	Interior back wall
	Weld	BU	Buck	ISL	Interior back wall
	Fire Risk	BU	Buck	ISL	Interior back wall
	Welding Process	BU	Buck	ISL	Interior back wall
	Welding Process	BU	Buck	ISL	Interior back wall
	Concrete Panels	BU	Buck	ISL	Interior back wall
	Steel Plate	BU	Buck	ISL	Interior back wall

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Rev	Date	Description	Drawn	Q. Ref.
				

☐ Topographical Surveys ☐ Site Engineering ☐ Utility / CCTV Surveys	☐ Measured Building Surveys ☐ 3D Laser Scanning ☐ Revit & BIM Models
Rowan House Duffield Road Little Eaton Derby DE21 5DR Tel (01332) 830044 Fax (01332) 830055 admin@greenhatch-group.co.uk www.greenhatch-group.co.uk	

St Albans Unit B, The Courtyard Alban Park St Albans Hertfordshire AL4 0LA t. (01727) 854481	Newcastle 24 Riverside Studios Armetyst Road Newcastle Bus Park Newcastle-U-Tyne NE4 7YL t. (01912) 736391	Poland ul. Panewnicka 91 40-761 Katowice Poland t. 0048 32 202 2292 www.greenhatch.pl
--	--	--

CLIENT **Mace Group**

[illegible]

**Xerox
Bridge House
Uxbridge**

TITLE **Topographical
Survey**

SCALE A0@ 1: 200	DATE 20.07.2014

DRAWN SO		QUALITY REF E916	
1. 111		2. 222	

Level datum	See OS Note
Grid orientation	See OS Note
Index numbers	20608

Job number	20608
Drawing No.	Rev.
20608 2	0

20000_2	0
---------	---

Comments
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All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

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D. London Borough of Hillingdon Strategic Flood Risk Assessment

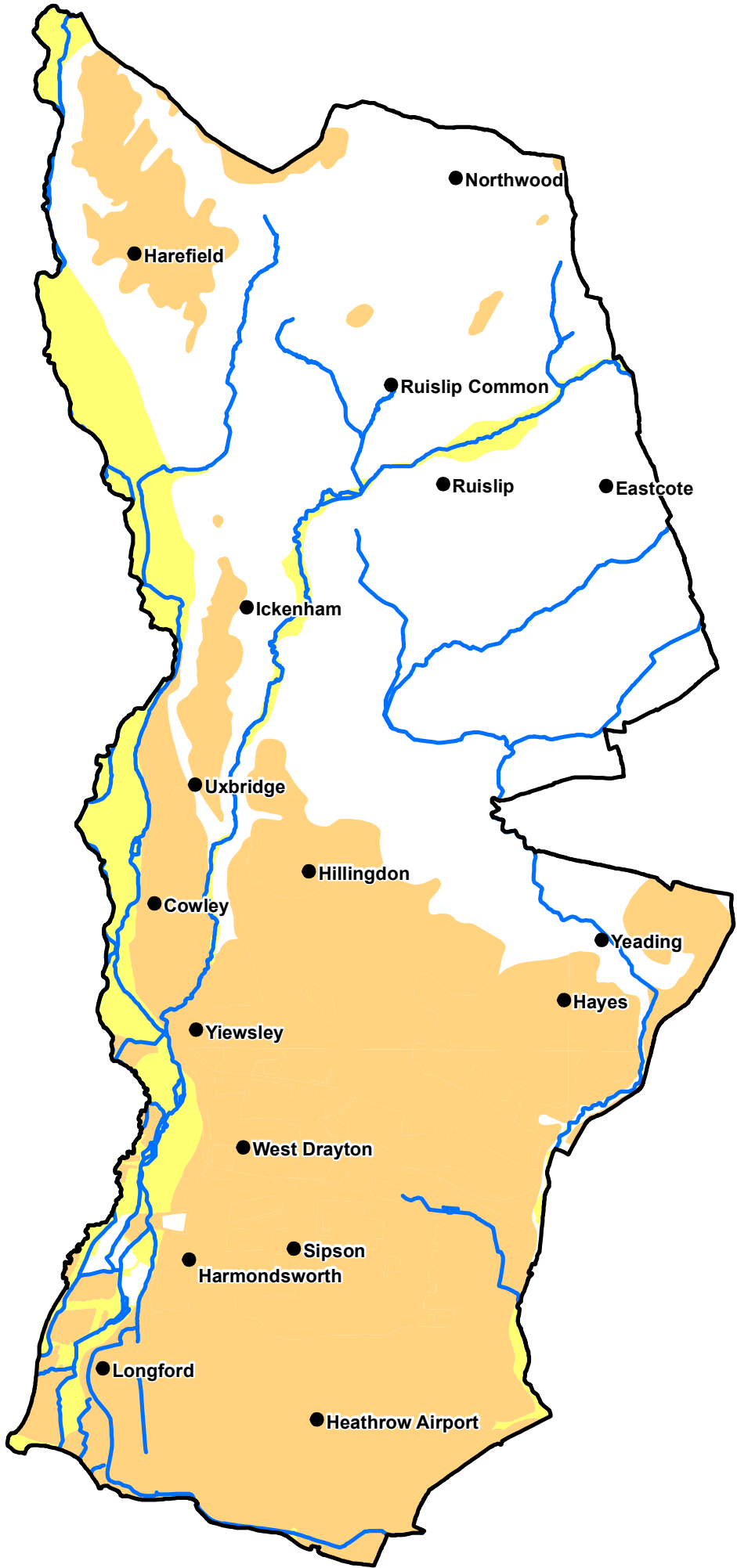
Appendices

Bridge House, Uxbridge

Document Reference: WIC15644-102-R-3-2-1-Flood_Drainage

WIC15644

Plot Date: 15th November 2007
Filepath: K:\D_Hillingdon_SFRA\ArcGIS\MapDocs\Figures\Figure 9 Drift Geology.mxd



THIS DRAWING MAY BE USED ONLY FOR
THE PURPOSE INTENDED AND ONLY
WRITTEN DIMENSIONS SHALL BE USED

NOTES

-  London Borough of Hillingdon
-  Towns
-  Main Watercourses
- Drift Geology**
 -  Alluvium
 -  River Terrace Deposits
(includes various silt, sand
and gravel deposits)

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civil proceedings.

Scott Wilson GD0100031673 2006

Revision Details	By	Date	Suffix
	Check		

Drawing Status
FINAL

Job Title
**LONDON BOROUGH OF
HILLINGDON SFRA**

Drawing Title
DRIFT GEOLOGY

Scale at A3
1:75,000

Drawn	TD	Approved	HR
Stage 1 check	Stage 2 check	Originated	Date

Scott Wilson
Scott House
Basing View, Basingstoke
Hampshire, RG21 4JG
Telephone (01256) 310200
Fax (01256) 310201
www.scottwilson.com



Drawing Number
FIGURE 9
Rev

E. London Borough of Hillingdon Surface Water Management Plan

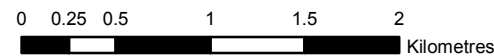
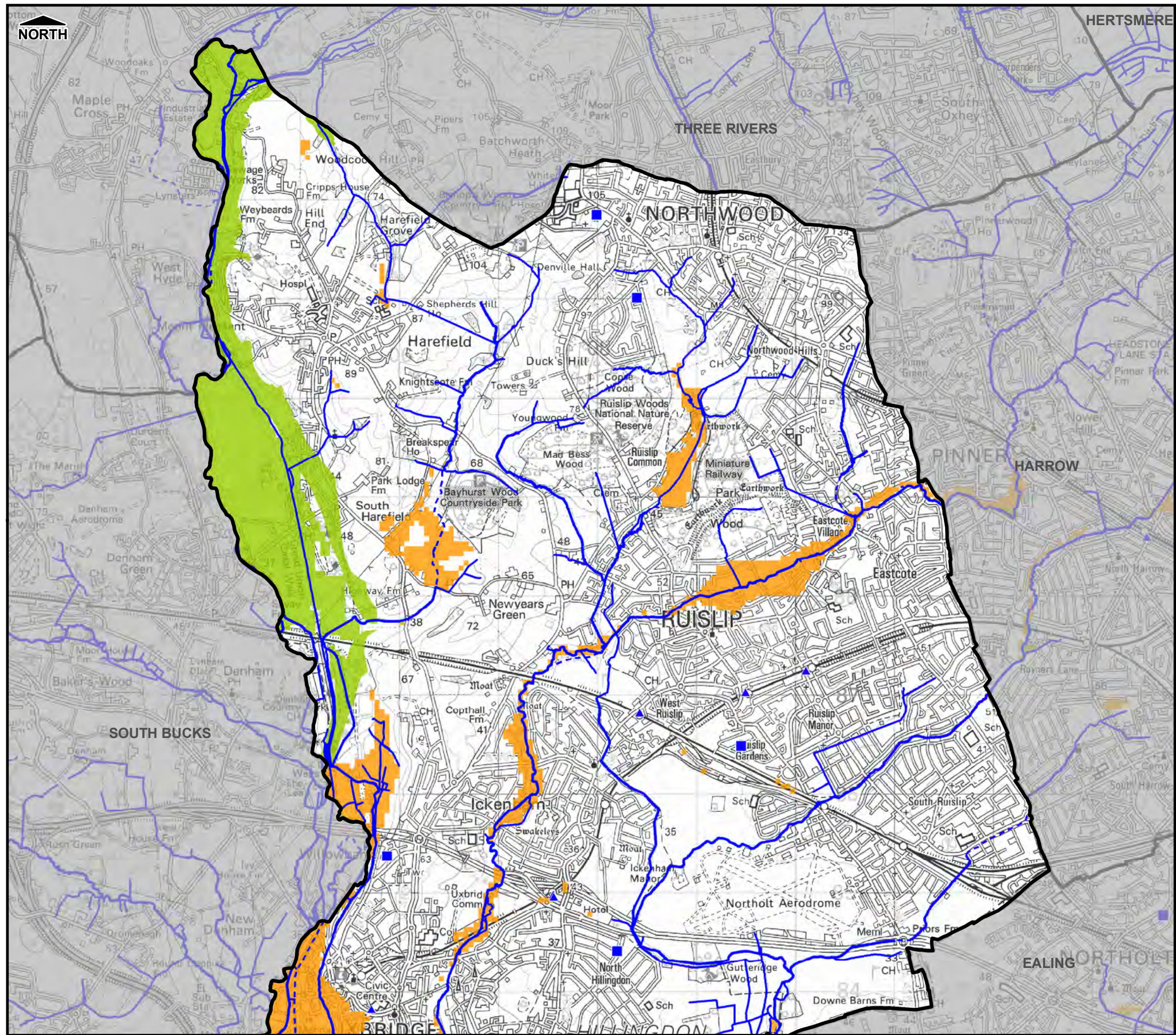
Appendices

Bridge House, Uxbridge

Document Reference: WIC15644-102-R-3-2-1-Flood_Drainage

WIC15644

Filepath: L:\Environment\zwet\CS046913_DrainLondon_Tier2\Group1\ARC\mxd\GP1_Hillingdon_Fig10.1_PotentialElevatedGWMap.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

	Borough Administrative Boundary
	Main River
	Ordinary Watercourse
	Groundwater Flood Incident (EA Records)
	Groundwater Flood Incident (Other Records)
	Permeable Superficial Deposits
	Consolidated Aquifers
	Culverted Watercourse (Main River)

- 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 be within 2 m of the ground surface. Such groundwater rise could lead to the following consequences:
 - 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 Benn Associates Limited 2008 - 2011, partially derived from data supplied by the Environment Agency

London Borough of Hillingdon

Surface Water Management Plan

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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 1:40,000	Date 05/04/2011	Drawn by R.MOORE	Approved by P.HLINOVSKY
--------------------------------	---------------------------	----------------------------	-----------------------------------

Increased Potential for Elevated Groundwater Map

Consultants

Capita Symonds
Level Seven,
52 Grosvenor Gardens,
Belgravia,
London
SW1W 0AU

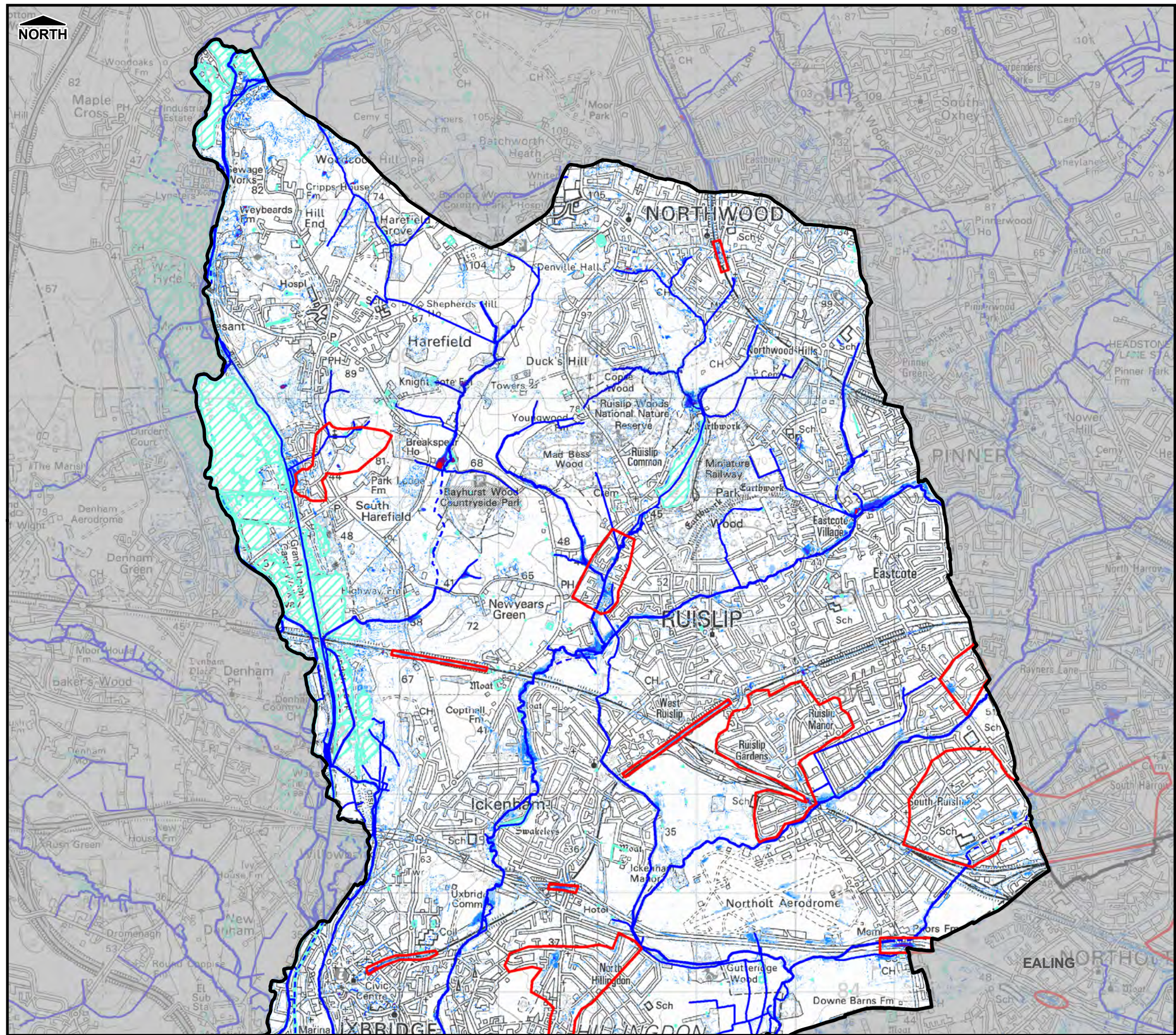
Flood Risk Management

Drain London Programme Board Members

GREATERLONDONAUTHORITY

FIGURE 10.1

Filepath: L:\Environment\zwet\CS046913_Drain\London_Tier2\Group1\ARC\mxd\GP1_Hillingdon_Fig13.1_Depth_30.mxd



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

Notes

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

Surface Water Depth (m)
1 in 30 Chance of rainfall event occurring
in any given year (3.33% AEP)

Consultants

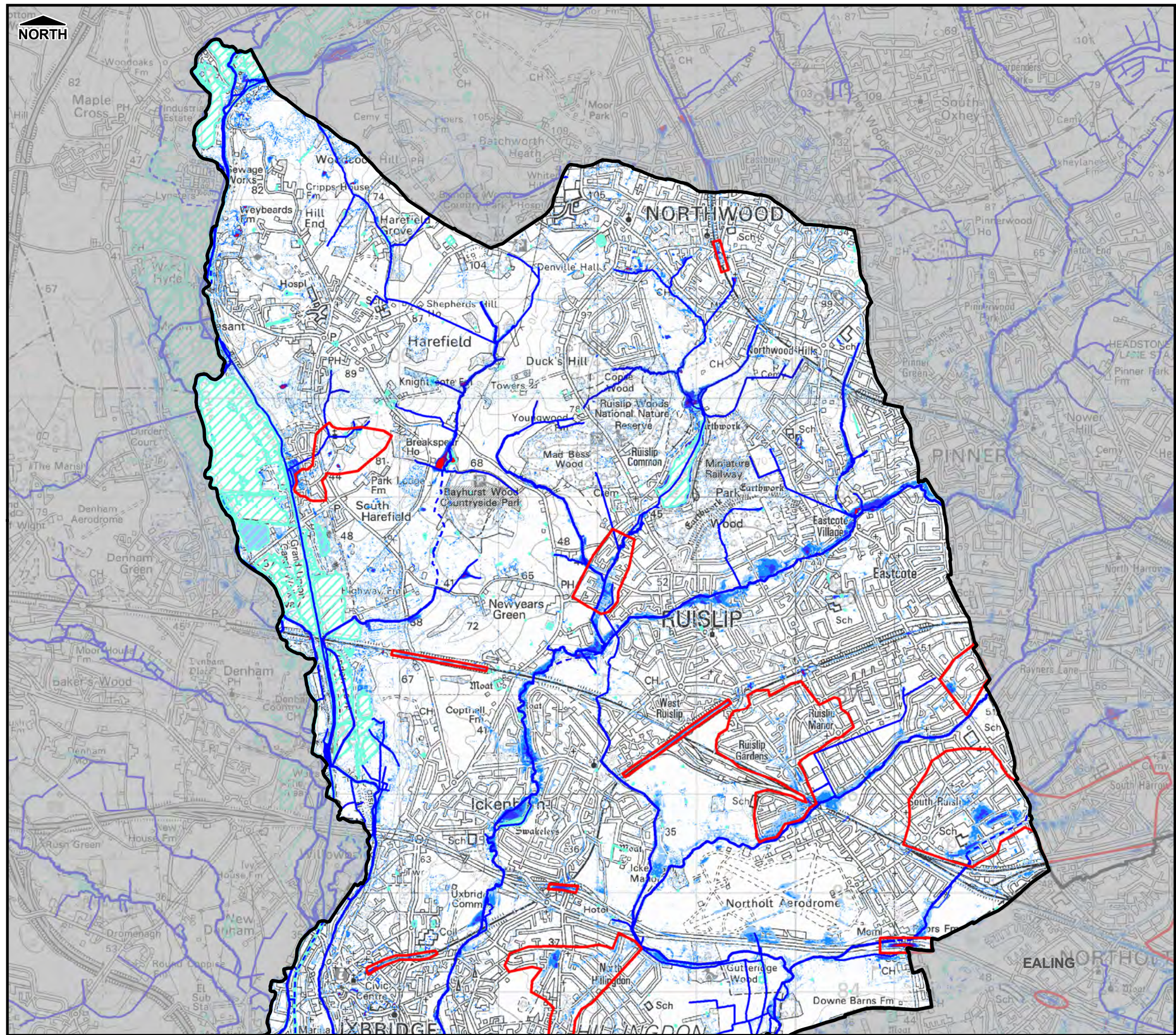
CAPITA SYMONDS Capita Symonds
Level Seven,
52 Grosvenor Gardens,
Belgravia,
London
SW1W 0AU

Drain London Programme Board Members



FIGURE 13.1

Filepath: L:\Environment\zwet\CS046913_Drain\London_Tier2\Group1\ARC\mxd\GP1_Hillingdon_Fig15.1_Depth_75.mxd



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

Notes

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

Surface Water Depth (m)
1 in 75 Chance of rainfall event occurring
in any given year (1.33% AEP)

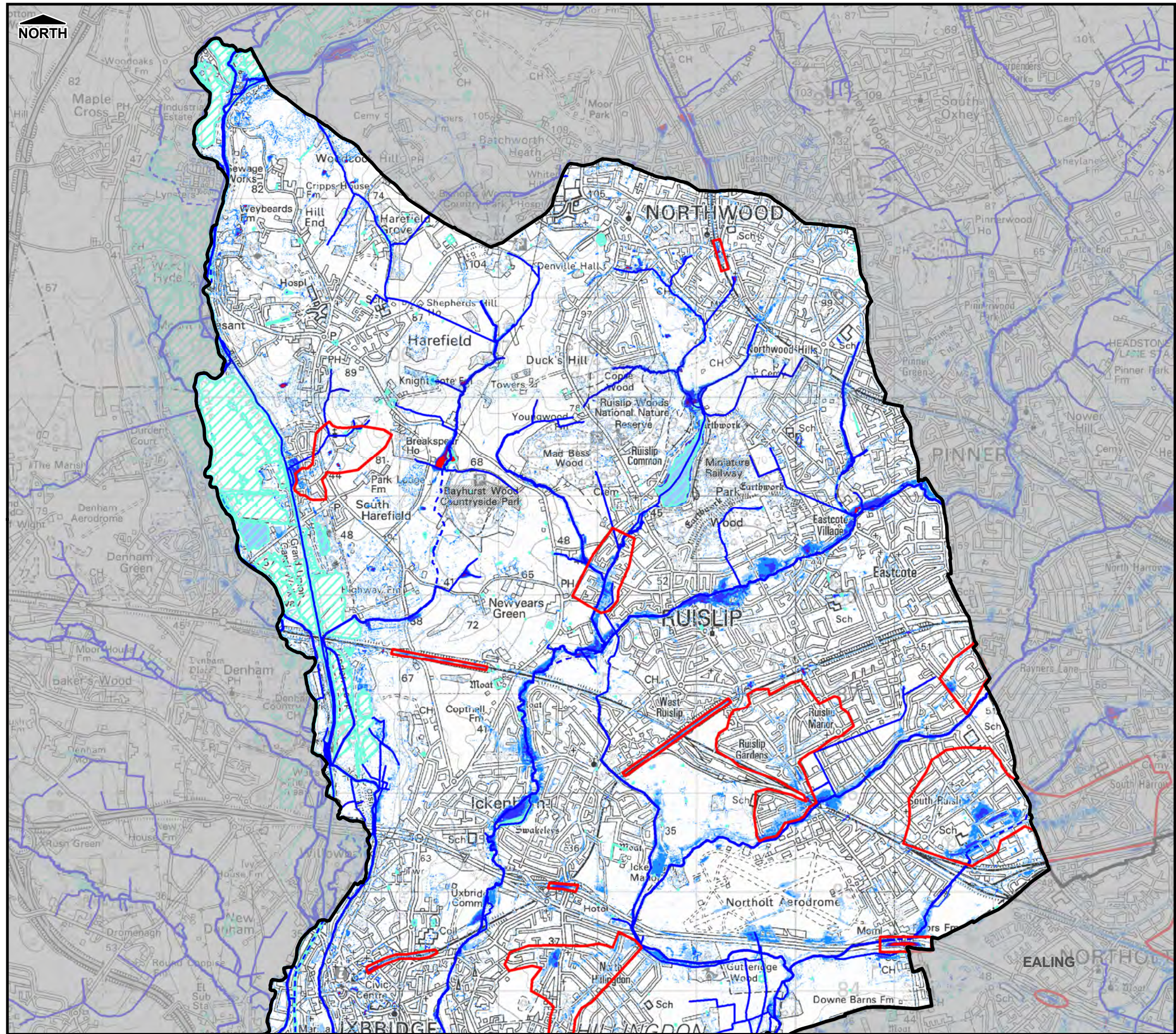
Consultants
CAPITA SYMONDS Capita Symonds
Level Seven,
52 Grosvenor Gardens,
Belgravia,
London
SW1W 0AU

Drain London Programme Board Members



FIGURE 15.1

Filepath: L:\Environment\zwet\CS046913_Drain\London_Tier2\Group1\ARC\mxd\GP1_Hillingdon_Fig17.1_Depth_100.mxd



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 | 0.5m - 1.0m |
| 0.1m - 0.25m | 1.0m - 1.5m |
| 0.25m - 0.5m | > 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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Scale at A3	Date	Drawn by	Approved by
1:40,000	11/04/2011	R.MOORE	P.HLINOVSKY

Surface Water Depth (m)
1 in 100 Chance of rainfall event occurring
in any given year (1% AEP)

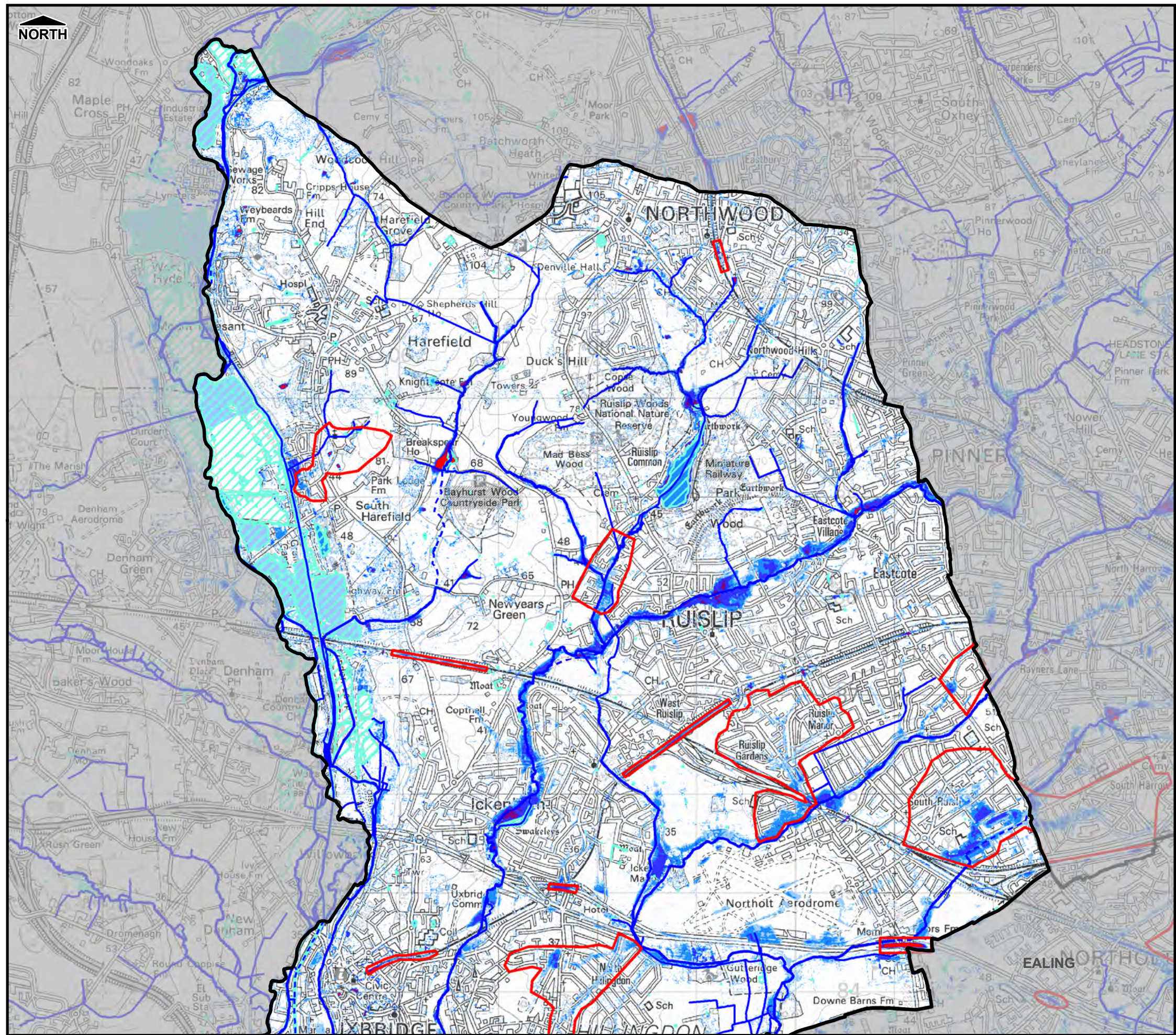
Consultants
CAPITA SYMONDS Capita Symonds
Level Seven,
52 Grosvenor Gardens,
Belgravia,
London
SW1W 0AU

Drain London Programme Board Members



FIGURE 17.1

Filepath: L:\Environment\zwet\CS046913_Drain\London_Tier2\Group1\ARC\mxd\GP1_Hillingdon_Fig21.1_Depth_200.mxd



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

Notes

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

Surface Water Depth (m)
1 in 200 Chance of rainfall event occurring
in any given year (0.5% AEP)

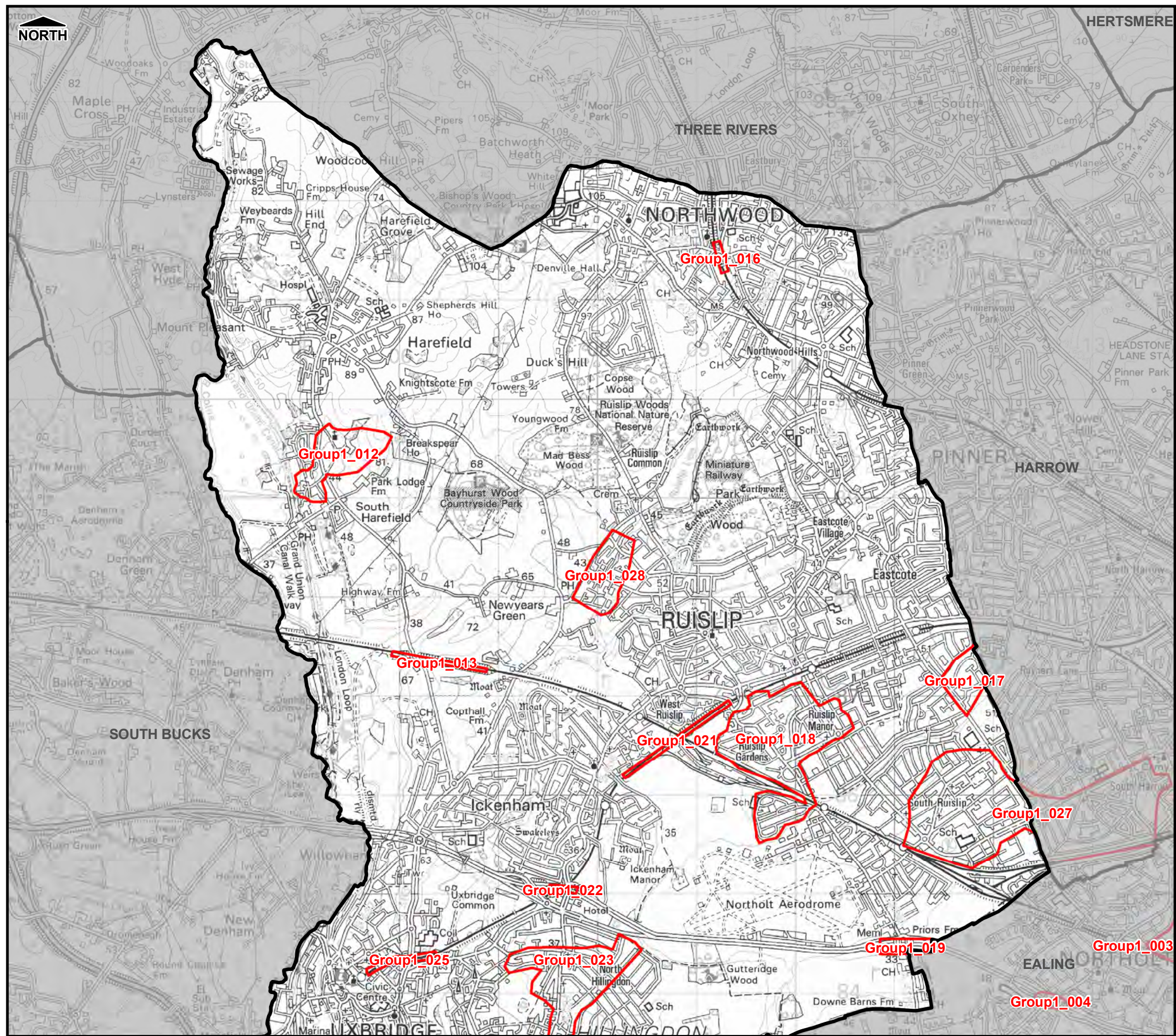
Consultants
CAPITA SYMONDS Capita Symonds
Level Seven,
52 Grosvenor Gardens,
Belgravia,
London
SW1W 0AU

Drain London Programme Board Members



FIGURE 21.1

Filepath: L:\Environment\zwet\CS046913_DrainLondon_Tier2\Group1\ARC\mxd\GP1_Hillingdon_Fig1.1_CDA_Index.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

- Borough Administrative Boundary
- Critical Drainage Area

Notes

London Borough of Hillingdon



Surface Water Management Plan

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Scale at A3	Date	Drawn by	Approved by
1:40,000	15/04/2011	R.MOORE	P.HLINOVSKY

Critical Drainage Area Index Map

Consultants

Capita Symonds
Level Seven,
52 Grosvenor Gardens,
Belgravia,
London
SW1W 0AU

Drain London Programme Board Members



FIGURE 1.1

F. London Borough of Hillingdon Preliminary Flood Risk Assessment

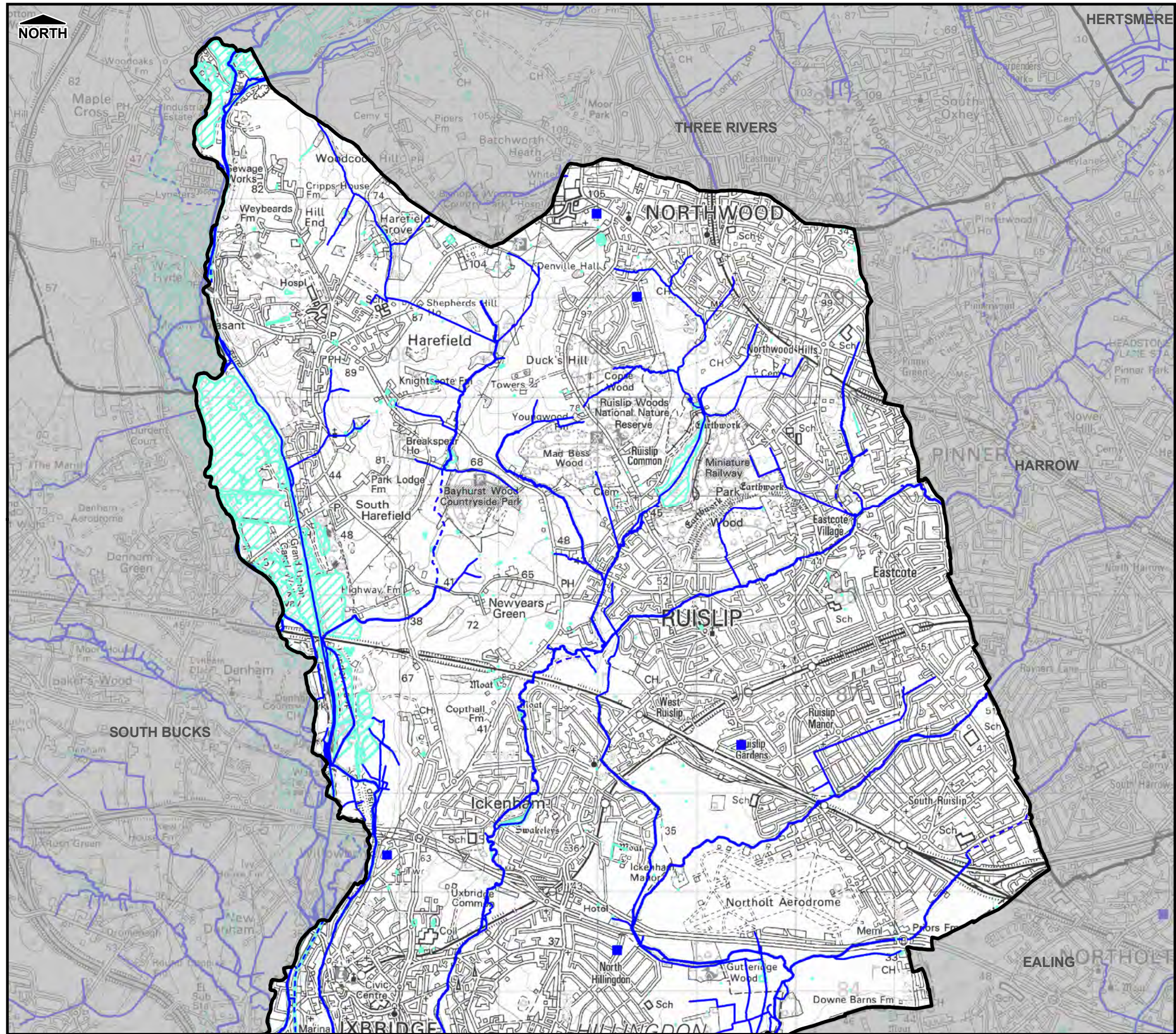
Appendices

Bridge House, Uxbridge

Document Reference: WIC15644-102-R-3-2-1-Flood_Drainage

WIC15644

Filepath: L:\Environment\zwet\CS046913_DrainLondon_Tier2\Group1\ARC\mxd\PFRA\GP1_Hillingdon_FigA-3.1_GWIncidents.mxd



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
- Groundwater Flood Incident (EA Records)
- Ground Water Flood Outline

Notes

London Borough of Hillingdon



Preliminary Flood Risk Assessment

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Scale at A3	Date	Drawn by	Approved by
1:40,000	06/04/2011	R.MOORE	P.HLINSKY

Summary Map of Past Floods - Ground Water Incidents

Consultants	Capita Symonds Flood Risk Management	Scot Wilson Capita Symonds Level Seven, 52 Grosvenor Gardens, Belgravia, London SW1W 0AU
-------------	---	--

Drain London Programme Board Members



FIGURE A-3.1



G. Thames Water Correspondence

Appendices

Bridge House, Uxbridge

Document Reference: WIC15644-102-R-3-2-1-Flood_Drainage

WIC15644

Sewer Flooding

History Enquiry



Waterman Infrastructure & Environment

Search address supplied	Xerox Uk Ltd Bridge House Oxford Road Uxbridge UB8 1HS
Your reference	CIV16015 Bridge House Uxbridge
Our reference	SFH/SFH Standard/2015_2943742
Received date	7 January 2015
Search date	7 January 2015

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Sewer Flooding

History Enquiry



Search address supplied: Xerox Uk Ltd,Bridge House,Oxford
Road,Uxbridge,UB8 1HS

This search is recommended to check for any sewer flooding in a specific address or area

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

- (i) any negligent or incorrect entry in the records searched;
- (ii) any negligent or incorrect interpretation of the records searched;
- (iii) and any negligent or incorrect recording of that interpretation in the search report
- (iv) compensation payments

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Sewer Flooding

History Enquiry



History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- 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

Thames Water Utilities Ltd

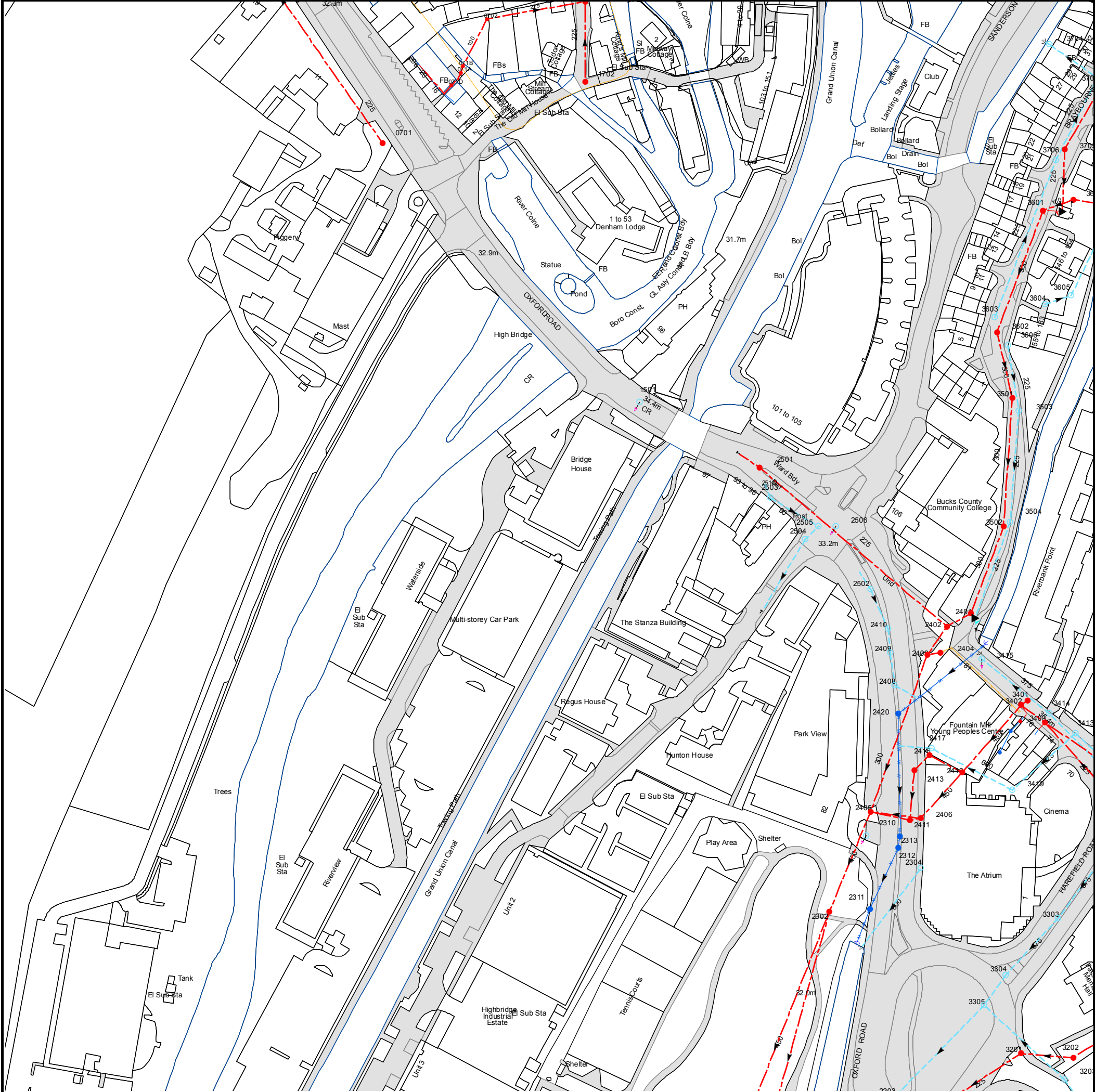
Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Asset Location Search Sewer Map - ALS/ALS Standard/2015_3033114	
---	--



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 505104,184530

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

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3601	35.13	33.73
3620	n/a	n/a
3706	34.33	32.66
3702	34.32	31.89
3704	n/a	n/a
3503	34.55	33.15
3501	34.54	32.64
3606	34.72	33.31
3602	34.68	32.83
3603	33.64	33.19
3604	n/a	n/a
3605	n/a	n/a
3419	n/a	n/a
341A	n/a	n/a
3413	36.63	32.38
341B	n/a	n/a
3403	35.94	34.39
341C	n/a	n/a
3414	n/a	n/a
3402	n/a	n/a
3401	35.62	32.27
3415	n/a	n/a
3502	34.25	32.38
3504	34.35	32.98
0702	n/a	n/a
1701	32.69	31.22
1702	33.02	31.34
1501	n/a	n/a
2501	33.89	32.19
251A	n/a	n/a
2503	n/a	n/a
2504	n/a	n/a
2505	n/a	n/a
2506	n/a	n/a
2502	33.79	32.16
2410	33.79	32.2
2409	n/a	n/a
2403	33.83	31.5
2404	33.91	31.56
2402	33.73	31.63
2401	n/a	n/a
3305	34.48	31.42
3304	35.99	33.37
3201	n/a	n/a
3303	36.98	34.24
3203	n/a	n/a
3202	n/a	n/a
2302	n/a	n/a
2311	n/a	n/a
2304	34.72	31.91
2312	n/a	n/a
2313	n/a	n/a
2310	34.18	32.46
2411	34.66	30.74
2406	34.52	33.2
2405	34	30.64
2412	n/a	n/a
2413	n/a	n/a
2416	n/a	n/a
2417	n/a	n/a
2420	n/a	n/a
2408	34.05	31.82
0701	32.34	n/a
071D	n/a	n/a
071A	n/a	n/a
071B	n/a	n/a
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

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

Notes:

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

Sewer Fittings

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

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

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

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

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

	Outfall
	Undefined End
	Inlet

Other Symbols

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

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

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

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

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

- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

H. Canals and Rivers Trust Correspondence

Appendices

Bridge House, Uxbridge

Document Reference: WIC15644-102-R-3-2-1-Flood_Drainage

WIC15644



Canal &
River Trust

Keeping people, nature & history connected

16th January 2015

Michael Piotrowski
Flood Risk Engineer
Waterman Infrastructure & Environment
Pickfords Wharf
Clink Street
London
SE1 9DG

Our Ref GU-202 / MW 16/1/15
Your Ref CIV15644 150108 MPCRT

Dear Mr Piotrowski

RE: FLOOD RISK ASSESSMENTS - GU-202 - BRIDGE HOUSE UXBRIDGE

Further to your e-mail dated 8th January, I have checked our records and spoken to the Supervisor responsible for this stretch of waterway and I can confirm the following:

- The canal to the east of this site is the Grand Union Canal and is owned, operated and maintained by the Canal & River Trust (CRT). The Trust is the Navigation Authority. The section of canal adjacent to this site is bounded by the Uxbridge Lock to the north (**NGR 505239, 184817**) and the Cowley Lock to the south (**NGR 505141, 182204**). Also the River Fray's inflows into this section of canal (**NGR 505248, 184717**). The River Fray's is designated Main River and is owned by the Environment Agency.
- The Canal & River Trust is not aware of any records of overtopping from, or breaches of this section of the waterway.
- The Canal & River Trust is not aware of any records of flooding caused by ground water, overland flow, or lack of sewer capacity.
- The Canal & River Trust inspects all of its assets every 4 weeks. Monthly, annual and principal inspections are carried out on its major assets. There are no major works currently planned for this section of canal.

For further advice on flood risk assessments I have included some generic guidance (see appendix A).

London Waterways

Canal & River Trust Docklands 420 Manchester Road London E14 9ST

T 0303 040 4040 **E** enquiries.london@canalrivertrust.org.uk www.canalrivertrust.org.uk

Patron: H.R.H. The Prince of Wales. Canal & River Trust, a charitable company limited by guarantee registered in England and Wales with company number 7807276 and registered charity number 1146792, registered office address First Floor North, Station House, 500 Elder Gate, Milton Keynes MK9 1BB

Please note that the Canal & River Trust is unable to comment on the flood risk to individual properties or developments and interpretation of the information provided in this letter is your responsibility.

I trust this is satisfactory, however if you do require any further information please do not hesitate to contact me.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Michael Wheeler', enclosed within a thin black rectangular border.

Mr Michael Wheeler B.Eng(Hons) I.Eng ACIWEM

Water Engineer (South)

Appendix A - Guidance Note for Flood Risk Assessments

The main incidents of uncontrolled loss of water from our waterways are overtopping and breaching as a result of inundation from adjacent water courses, vandalism or structural failure.

Canal & River Trust maintains water levels using reservoirs, feeders and boreholes, and thereafter manages the water by transferring it within the canal system. The level of the water in canals is normally determined predominantly by the level and size of weirs. Water levels in river navigations are affected by the flow in the river and will fluctuate more widely than canals.

When surface water enters our waterways, the level of the water rises. Eventually the water level will reach a point where it discharges from our waterways through control structures. Where the capacity of these control structures is exceeded, overtopping may result.

Breaches which may lead to flooding can occur on our waterways. There can be a number of causes for these including: culvert collapse, animal burrowing and overtopping. Canal & River Trust operates a comprehensive asset management system which enables us to manage the risks of such events occurring.

Breaches occur on average at a rate of three per year over the whole of the Canal & River Trust owned canal network (that's over 2,000 miles of canal).



I. Foul Drainage Calculations

Appendices

Bridge House, Uxbridge

Document Reference: WIC15644-102-R-3-2-1-Flood_Drainage

WIC15644



Project Title: Bridge House
Calculations Title: Existing Foul Flow Estimate

Sheet No: 1 of 2
By: L.Warman
Checked: S.McCabe
Project No: WIC15644
Date: 12/06/2017
Date: 12/06/2017

		Dry Weather Flow Rate (per day)	Source	Number of	Factor	Profile (hours)	Peak Flow Rate (litres/second)
Residential					2.12	24	
Existing property =	160 litres/person/day	432.0 litres per unit	Thames Water Guidelines (2016)	0 existing units			0.0
New property =	125 litres/person/day	337.5 litres per unit	Thames Water Guidelines (2016)	0 proposed units			0.0
Occupancy =	2.7 persons						
Hotel		500.0 litres per room	British Water (2013)	0 rooms	3	24	0.0
Student Accommodation		200.0 litres per bed	Thames Water Guidelines (2016)	0 beds	3	24	0.0
Offices		750.0 litres per 100m ²	Jones (1992)	0 m ²	3	10	0.0
Retail		400.0 litres per 100m ²	Jones (1992)	10607 m ²	3	12	2.9
Cinema		10.0 litres per seat	Jones (1992)	0 seats*	3	8	0.0
Health Club/Sports Centre		50.0 litres per customer	British Water (2013)	0 customers**	3	16	0.0
Day School		90.0 litres per pupil	British Water (2013)	0 pupils	3	10	0.0
Boarding School		175.0 litres per pupil	British Water (2013)	0 pupils	3	24	0.0
Hospital		625.0 litres per bed	Jones (1992)	0 beds	3	24	0.0
Nursing Home		350.0 litres per bed	British Water (2013)	0 beds	3	24	0.0
Restaurant		30.0 litres per cover	British Water (2013)	0 covers	3	8	0.0
Pub/Club		15.0 litres per customer	Butler and Davies (2004)	0 customers***	3	12	0.0
Warehouse		150.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
Manufacturing		550.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
Commercial		300.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
SUB TOTAL							2.9
Infiltration percentage	10%						0.3
TOTAL							3.2

* Foul flow rate needs to be calculated based on number of seats. An allowance of 4m² has been made for each seat.

Floor area = 0 m² 4 m² per person

** Foul flow rate needs to be calculated based on number of customers. An allowance of 4m² has been made for each customer.

Floor area = 0 m² 4 m² per person

*** Foul flow rate needs to be calculated based on number of customers. An allowance of 4m² has been made for each customer.

Floor area = 0 m² 4 m² per person



Project Title: Bridge House
Calculations Title: Proposed Foul Flow Estimate

Sheet No: 2 of 2
By: L.Warman
Checked: S.McCabe
Project No: WIC15644
Date: 12/06/2017
Date: 12/06/2017

	Dry Weather Flow Rate (per day)	Source	Number of	Factor	Profile (hours)	Peak Flow Rate (litres/second)
Residential				2.12	24	
Existing property = 160 litres/person/day	432.0 litres per unit	Thames Water Guidelines (2016)	0 existing units			0.0
New property = 125 litres/person/day	337.5 litres per unit	Thames Water Guidelines (2016)	141 proposed units			1.2
Occupancy = 2.7 persons						
Hotel	500.0 litres per room	British Water (2013)	0 rooms	3	24	0.0
Student Accommodation	200.0 litres per bed	Thames Water Guidelines (2016)	0 beds	3	24	0.0
Offices	750.0 litres per 100m ²	Jones (1992)	0 m ²	3	10	0.0
Retail	400.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
Cinema	10.0 litres per seat	Jones (1992)	0 seats*	3	8	0.0
Health Club/Sports Centre	50.0 litres per customer	British Water (2013)	0 customers**	3	16	0.0
Day School	90.0 litres per pupil	British Water (2013)	0 pupils	3	10	0.0
Boarding School	175.0 litres per pupil	British Water (2013)	0 pupils	3	24	0.0
Hospital	625.0 litres per bed	Jones (1992)	0 beds	3	24	0.0
Nursing Home	350.0 litres per bed	British Water (2013)	0 beds	3	24	0.0
Restaurant	30.0 litres per cover	British Water (2013)	0 covers	3	8	0.0
Pub/Club	15.0 litres per customer	Butler and Davies (2004)	0 customers***	3	12	0.0
Warehouse	150.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
Manufacturing	550.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
Commercial	300.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
SUB TOTAL						1.2
Infiltration percentage 10%						0.1
TOTAL						1.3

* Foul flow rate needs to be calculated based on number of seats. An allowance of 4m² has been made for each seat.

Floor area = 0 m² 4 m² per person

** Foul flow rate needs to be calculated based on number of customers. An allowance of 4m² has been made for each customer.

Floor area = 0 m² 4 m² per person

*** Foul flow rate needs to be calculated based on number of customers. An allowance of 4m² has been made for each customer.

Floor area = 0 m² 4 m² per person

UK and Ireland Office Locations

