Part of the STRI Group

epg

The Environmental Protection Group Ltd

Flood Risk Assessment

Maple & Poplar

Hayes

London

28.02.18

Prepared by Rod Green/John Roberts

Amended by George Hudman

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Reference EPG-8798-FRA-01 **Revision** 1.1 **Issue Date** November 2022

Revision	Purpose	Date
V1.0	Preliminary Issue	28/02/2018
V1.1	New proposed layout incorporated	07/11/2022

CONTENTS

Appendices

SUMMARY

Site Location	Maple and Poplar. OS: TQ 11745 82522
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**
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 Maple and Poplar, Hayes, UB4 9NG. The FRA has been requested by the London Borough of Hillingdon to accompany the planning submission.

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:

- The London Plan, March 2021.
- 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

The 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, the 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.

The 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, the 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 the 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

The 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 for the London Management Catchment

3.3% Annual Exceedance Rainfall Event		
Epoch	**Central allowance**	**Upper end allowance**
2050s	20%	35%
2070s	20%	35%
1% Annual Exceedance Rainfall Event		
Epoch	**Central allowance**	**Upper end allowance**
2050s	20%	40%
2070s	25%	40%

*Use '2050s' for development with a lifetime up to 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

2. THE SITE AND DEVELOPMENT

2.1 Existing Site

The area on which the proposed development is to be sited consists brownfield land with access from Maple Road. The boundary covers approximately 0.420 hectares and comprises a small area of grassed land surrounding two existing day centre buildings and a tarmacadam access and car park area to the northeast of the development. The site is bounded by residential properties to the northwest and the A312 Parkway dual carriageway to the northeast. Trees predominantly line the perimeter of the site which appears to be relatively level within the red line boundary. Surrounding land use is predominately residential in nature.

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, (Langley silt member) overlying clayey soils (London clay). An adjacent borehole log report from the BGS website indicates approx. 0.3m of made ground over 4.2m of stiff brown silty clay to a depth of 4.5m, standing water was recorded at 2.8 and water was struck at 4.2m. This is supported by the London Borough of Hillingdon Geological Map South, Figure 12.2. Refer to Appendix C.

2.3 Drainage Infrastructure

An existing 225mm surface water drain extends south along Maple Road from an existing manhole located adjacent to the site access road. An existing 150mm foul water drain also extends south along Maple Road from the same location. Refer to The Thames Water asset information identified in Appendix D.

It is assumed that the existing buildings and hard areas adjacent to the site entrance discharge into the external drainage network within Maple Road.

The London Borough of Hillingdon summary map of past flooding incidents, figure A-4.2 indicates that there have been 1-5 sewer flood records within the UB4 9 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 Maple Road. Refer to Appendix G.

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 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 to the south of the proposed development.

2.5 Proposals

The Bough of Hillingdon proposal is to build two 3/4 storey blocks consisting of 17 two bedroom flats:

- 15 No Type A two bed
- 2 No Type B two bed disabled access flats

The total impermeable area has been calculated to be approx. 0.1660 ha.

The proposed site layout can be found in Appendix E.

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 NPPF, 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. Correspondence with the Environment Agency (Appendix F) states that there has been no historic flooding on the development site. Therefore, the risk is 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, Figure 4.2 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 to the north of the site and does not affect the proposed development. The driveway into the site indicates a Medium and High flood risk (i.e. greater than 1 in 30 year probability of occurrence). As the area is outside the red line boundary and the flooding does not extend into the site it will not affect the proposed development.

Figures 3.1, 3.2 & 2.3 in Appendix F show the Low risk scenario flooded depths, Medium risk scenario flooded depth & the high risk flooded depth respectively. Generally, the flood depth will be minor and below 300mm in the High risk scenario and between 300mm and 900mm in during the Low and Medium risk scenarios.

The proposed drainage strategy (see Section 5.3 and 8798-EPG-XX-00-DR-Y-0001) offers a robust approach to deal with runoff throughout the developed site with the full catchment considered. The highway access drive shall intercept and convey overland flows to an appropriate attenuation device. The drainage system shall incorporate a reservoir sub base, permeable access drive and car parking areas and geocellular attenuation tank, to treat and store runoff prior to discharge to the adjacent Thames Water Surface Water Sewer for all events up to and including the 1in100+40% storm.

Flood risk from Pluvial sources is considered a low to medium risk, with the mitigation measures suggested the risk is considered low and acceptable.

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 does not designate the land below the development, see Appendix F Figure 5.0 Ground Water map. The London Borough of Hillingdon historic flood map (June 2014 SFRA) indicates that there have been no historic flooding events on the proposed site (Appendix H). 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 sewer network located within Maple Road adjacent to the development. The London Borough of Hillingdon historic flood map (June 2014) indicates that there are only a small number of recorded incidents within the area, however, it does not indicate the actual highways affected. (Appendix H). The highway is situated lower than the top of the access driveways and any flooding would be contained without affecting the proposed development. 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, however, incorporating a Sustainable Urban Drainage System (SuDS) utilising permeable hardstanding area and a subterranean attenuation tank discharging via flow control chambers into the local stormwater drainage network as indicated on the EPG drainage proposal layout (Appendix J) will mitigate any flooding from the proposed development.

An allowance for 40% additional flow for Climate Change has been added to the design calculations (Appendix K) and discharge is to be restricted to Greenfield rates. Therefore, the risk of flooding from the development is low and acceptable.

4. MITIGATION SUMMARY

4.1 Pluvial Flooding

The existing car parking area off Maple Road and adjacent to the proposed site is inclined to flooding, however it is outside the site boundary and the site boundary will be protected with a linear channel. The existing car park area shall be maintained and any road gullies cleared in order to mitigate future flooding issues. The onsite low level flooding shall be decreased with the incorporation of the proposed SUDS (see Section 5.3 and 8798-EPG-XX-00-DR-Y-0001) which shall provide interception and capture of any overland flows. Likewise, the proposed site layout shall enable overland flows in other areas to be captured by the proposed drainage system

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

Development Considerations

In accordance with the 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

The NPPF states that the development must provide safe access and egress during a flood event. During fluvial and pluvial events, the site is shown to be unaffected. This indicates that the access point from Maple Road is not impeded 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), the 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

The nearest watercourse to the site is the Yeading Brook to the south of the development. Discharge to the brook would be problematic and would involve crossing third party land, therefore discharge is impracticable and not feasible.

Discharge to the pipe network

There is an existing stormwater pipe network adjacent to the development and it is suggested that the proposed development connects to this system via a cascade source control arrangement.

The existing impermeable catchment where proposed works are sited is measured as 01660.ha. The existing discharge rate from the existing impermeable catchment where works are proposed has been calculated to be 23.1 l/s.

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 design utilises all possible SUDS features to allow the capture and attenuation of rainwater along with the removal of pollutants prior to discharge.

The proposed drainage layout 8798-EPG-XX-00-DR-Y-0001 and standard details 8798-EPG-XX-00-DR-Y-0100 are shown in Appendix J.

Rainwater from the front of the roof areas of the proposed new residential blocks will be collected and conveyed into a subterranean attenuation tank via the permeable subbase located below the permeable

access drive. The rainwater will pass via a filter protected back inlet gully to remove silts prior to discharge via a filtered rainwater diffuser to the subbase reservoir.

The permeable surface will drain into a porous subbase (Min. 30% porosity) via a dimpled geotextile comprising of a proprietary blend of polyester fibres that incorporates hydrophilic and hydrophobic properties to achieve effective oil retention. Trapped hydrocarbons are biodegraded by naturally occurring microorganisms providing a self-cleansing mechanism.

Treated stormwater with filter into a 400mm deep geocellular attenuation tank incorporating a treatment geotextile before discharging via a flow control chamber into the external drainage system.

The location of all access and inspection chambers shall be coordinated with the architectural layouts to ensure they provide sufficient access for maintenance and are aesthetically acceptable.

The existing discharge rate from the 1in1 year event has been analysed using the modified rational method and the existing catchment where the proposed building is to be sited.

Qex = 2.78 x A x i (A = area in ha, i = rainfall intensity mm/hr)

Qex = 2.78 x 50 x 0.1660 = 23.1 l/s

50% betterment should be applied to the existing 1in1 year event to calculate the proposed 1in100+40% flow rate. This would require a max restricted flow of 11.5 l/s during the 1in100+40% event.

The proposed surface water discharge will be restricted to 6.4l/s during the 1in100+40% climate change event. This is less than the 50% betterment figure calculated below and allows for a maintainable SuDS system.

Total site area:	=	0. 4200ha (approx.)
Existing Impermeable area	=	0.1660ha (approx.)
Existing surface water flow (2.78x50x0.1660)	=	23.1 l/s
Existing flow less 50% betterment =		11.5 l/s
Proposed impermeable area	=	0.2860ha (approx.)
Assumed 1in100+ 40% CC storm flow:	=	6.4 l/s (design flow)
Surface water storage requirements (100yr + 40% CC)	=	180.45m^3

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 drain at the junction of the site access road and Maple Road.

A peak load of 6.34l/s is anticipated (see Appendix L).

The location of all access and demarcation chambers shall be coordinated with the architectural layouts to ensure they provide sufficient access for maintenance and are aesthetically acceptable.

5.4 Maintaining Flow Paths

There are no surface water flood flow paths which cross the development site according to surface water mapping published by the Environment Agency in Appendix F. Therefore, no flow paths shall need maintaining.

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, however, it is deemed to be a low to medium risk and does not directly affect the proposed development.

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.

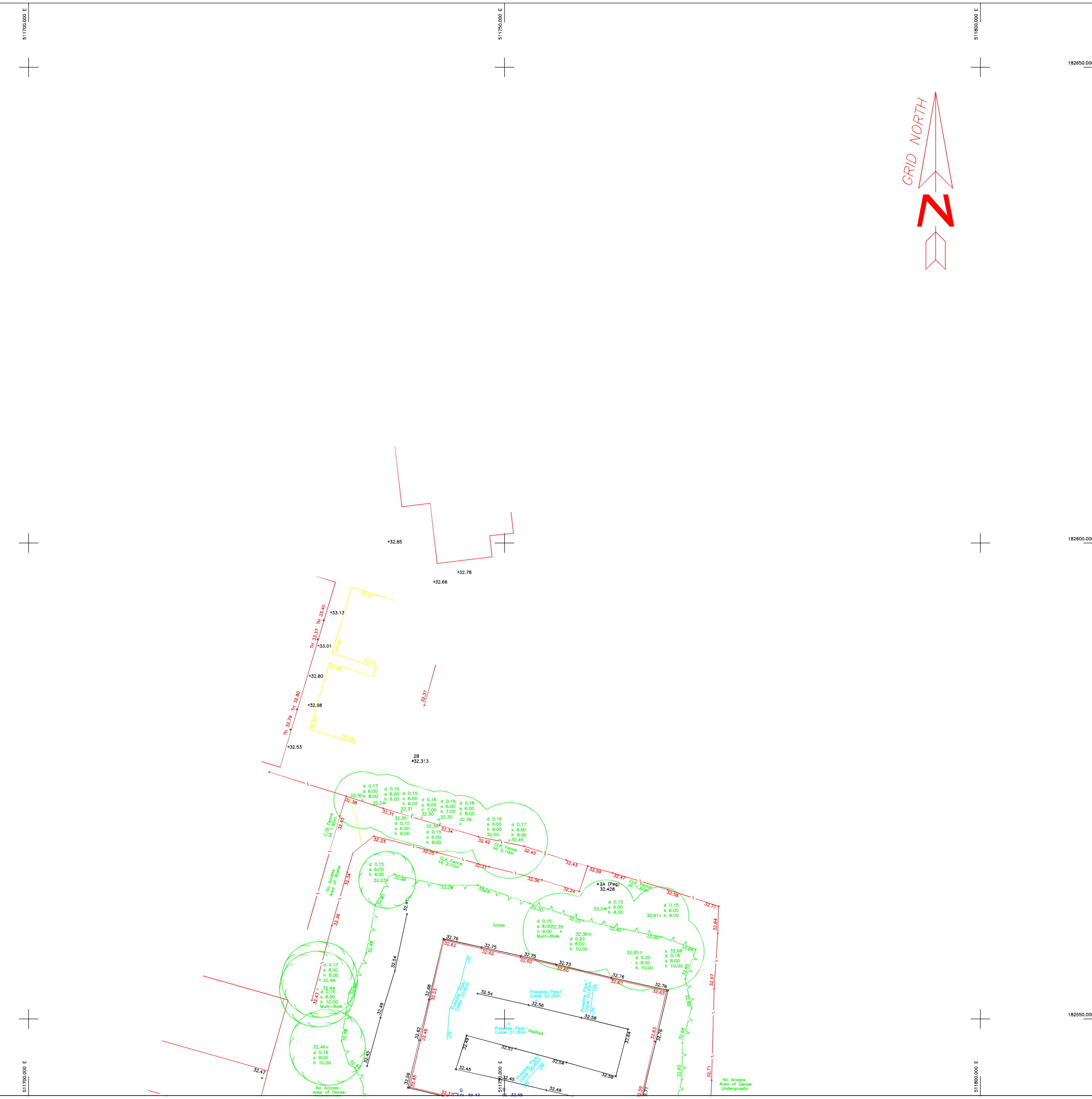
Overall, this report demonstrates that the flood risk to the site is low, reasonable and acceptable.

The proposed drainage strategy presented in Appendix J shows that the run-off can be managed and restricted to below the 50% betterment runoff rate with an allowance for climate change.

Appendix A – Site Location Plan

Site Location Plan

Appendix B – Topographical Survey



LASER SURVEYS

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DATUM NOTES

GRID IS BASED UPON SURVEY CONTROL STATION 2, FIXED TO THE ORDNANCE SURVEY NATIONAL GRID BY GPS SATELLITE ACTIVE NETWORK.

LEVELS ARE RELATED TO :– ORDNANCE SURVEY GPS ACTIVE NETWORK, AND TRANSFORMED USING THE OSGM15 & OSTN15 MODEL.

DATUM USED IS LOCATED AT :–
SURVEY CONTROL STATION 2, SURVEY NAIL IN ROAD OPPOSITE BUILDING

VALUE GIVEN AS 32.256m (NEWLYN DATUM)
511740.552 E 182522.549 N

SURVEY CONTROL STATIONS SHOWN △

ABBREVIATIONS (where applicable)

AV	Air Valve	MH	Manhole Cover
BK	Brick	MK	Marker
BL	Bollard	MS	Milestone
BS	Bus Stop	MT	Meter
BT	British Telecom	MY	Mercury
C/B	Close Boarded	OH	Overhead
CL	Cover Level	PAV	Paving
CLK	Chainlink	PB	Post Box
CO	Column	PE	Pipe
Conc	Concrete	PM	Parking Meter
CP	Catch Pit	P/R	Post and Rail
CPS	Concrete Paving Slabs	PT	Post
CTV	Cable Television	P/W	Post and Wire
DC	Drainage Channel	RE	Rodding Eye
DP	Drain Pipe	RET	Retaining
EP	Electricity Pole	RS	Road Sign
ER	Earthing Rod	RSJ	Rolled Steel Joist
FB	Flower Bed	SC	Stop Cock
FE	Fence	SK	Soakaway
FH	Fire Hydrant	SPT	Septic Tank
FL	Floor Level	ST	Silt Trap
FP	Flag Pole	SV	Stop Valve
GP	Gate Post	SVC	Security Video Camera
GV	Gas Valve	TCB	Telephone Call Box
GY, G	Gully	TL	Traffic Light
HT	Height	TK	Tank
IC	Inspection Cover	TP	Telegraph Pole
IL	Invert Level	UG	Underground
IN	Interceptor	UTF	Unable To Trace Further
I/R	Iron Railings	UTL	Unable To Lift
JB	Junction Box	VP	Vent Pipe
KO	Kerb Outlet	WL	Water Level
LB	Litter Bin	WM	Water Meter
LP	Lamp Post	WO	Wash Out

NOTES

* Drainage pipe sizes (where shown) have been gauged from the surface for safety reasons and should be regarded as approximate only.
* Tree species (where shown) should be treated with caution and expert indentification is advised.
* Although this is a digital survey the accuracy and amount of detail shown is only commensurate with the graphical scale of mapping as specified. Care should be exercised when working to larger scales.
* Visible features in the vicinity of the boundaries as shown above, may not represent the extent of legally conveyed ownership.
* Whilst every effort has been made to achieve accuracy on this plan, CRUCIAL clearance dimensions, levels and invert levels should be checked prior to design and construction.
* Kerb levels have been taken in the bottom of the channel.
* Areas of dense undergrowth cannot be surveyed in detail, these areas will be shown in outline only and marked as "dense undergrowth" on the plan.

SHEET LAYOUT
NOT TO SCALE

MAPLE ROAD
UXBRIDGE
UB4 9NQ

TOPOGRAPHICAL SURVEY, UNDERGROUND SERVICES TRACE & GPR SURVEY

SURVEYED FOR: LONDON BOROUGH OF HILLINGDON, CORPORATE PAYMENTS 1S/04, CIVIC CENTRE, UXBRIDGE, MIDDLESEX, UB8 1UW

SURVEYOR: AC
DATE: OCTOBER 2017

DATE	REVISION

DRAWING NO	L 8331/T	REV 0
SCALE	1 : 200	
SEE ALSO DWG NOS	L 8331/E	
SHEET	1 of 3	
REF NO	L 8331	

UNDERGROUND SERVICES

1) Although every effort has been made to trace underground services using radiodetection no guarantee can be given that all have been found. Due to their non-conductivity it may not been possible to trace certain types of plastic service pipes. eg. Gas & Water. Service trial holes must be dug prior to excavation.

2) In the absence of evidence to the contrary the routes of confirmed manhole connections are assumed to be direct and straight.

3) This survey has been carried out in accordance with the RICS specification for tracing underground utilities at scales of 1:500 & larger.

4) Underground service information should be read in conjunction with latest statutory drawings.

5) Please note that it is illegal to lift telecommunications covers in public areas. Their routes can be ascertained by contacting the relevant statutory authorities. Broken or damaged manholes were not lifted by Laser Surveys Limited. It is not possible to trace plastic pipes by radiodetection e.g. Gas/Water or fibre optic cables or pipes of less than 100mm in diameter. The electronic detection of pipework will apply to live metallic pipes/cables that we can induce a signal to. As an alternative GPR techniques can be employed at additional cost in attempt to locate services not detectable by radiodetection. All tracing is subject to retrieval of clear signals.

6) The different services are denoted as follows:–

- D0.50m — Underground Cable/TV (depth in metres)
- d100 — Underground Combined Drainage (diameter in millimetres)
- D0.50m — Underground Electric (depth in metres)
- d100 — Underground Foul Drainage (diameter in millimetres)
- D0.50m — Underground Gas (depth in metres)
- D0.50m — Underground Fibre Optic (depth in metres)
- d100 — Underground Storm Drainage (diameter in millimetres)
- D0.50m — Underground Telecom (depth in metres)
- D0.50m — Underground Traffic Signals (depth in metres)
- D0.50m — Underground Water (depth in metres)
- D0.50m — Underground Unidentified (depth in metres)
- D0.50m — Mixed Cables (depth in metres)

7) Abbreviations:–

CL	Cover Level	MH	Manhole
d	Diameter (mm)	NPV	No pipes visible
D	Depth (m)	NOPV	No Other pipes visible
FW	Foul Water	SW	Storm Water
HL	High Level pipe	UTF	Unable to trace further
IC	Inspection Cover	UTT	Unable to trace
IL	Invert Level	WL	Water Level

GPR Reflections

GROUND RADAR

The material surrounding and particularly above buried services can effect whether the services can be resolved using GPR. Reinforced concrete, buried metallic objects, the presence of moisture or clay and changes in the material construction can lead to poor data resolution.

As we have no information with respect to the material overlaying any services the GPR method can only give a guaranteed accuracy of 50%.

Depth results using GPR are typically accurate to within 10% with a horizontal accuracy of ± 150mm. These figures will vary as the velocity of the ground is assumed.

The results of the GPR survey should be treated with caution as there is no guarantee that any service shown actually exists, only a possibilty that something can seen on the records.

GPR Reflection

UNDERGROUND SERVICES

1) Although every effort has been made to trace underground services using radiodetection no guarantee can be given that all have been found. Due to their non-conductivity it may not been possible to trace certain types of plastic service pipes. eg. Gas & Water. Service trial holes must be dug prior to excavation.

2) In the absence of evidence to the contrary the routes of confirmed manhole connections are assumed to be direct and straight.

3) This survey has been carried out in accordance with the RICS specification for tracing underground utilities at scales of 1:500 & larger.

4) Underground service information should be read in conjunction with latest statutory drawings.

5) Please note that it is illegal to lift telecommunications covers in public areas. Their routes can be ascertained by contacting the relevant statutory authorities. Broken or damaged manholes were not lifted by Laser Surveys Limited. It is not possible to trace plastic pipes by radiodetection e.g. Gas/Water or fibre optic cables or pipes of less than 100mm in diameter. The electronic detection of pipework will apply to live metallic pipes/cables that we can induce a signal to. As an alternative GPR techniques can be employed at additional cost in attempt to locate services not detectable by radiodetection. All tracing is subject to retrieval of clear signals.

6) The different services are denoted as follows:-

- D0.50m — Underground Cable/TV (depth in metres)
- d100 — Underground Combined Drainage (diameter in millimetres)
- D0.50m — Underground Electric (depth in metres)
- d100 — Underground Foul Drainage (diameter in millimetres)
- D0.50m — Underground Gas (depth in metres)
- D0.50m — Underground Fibre Optic (depth in metres)
- d100 — Underground Storm Drainage (diameter in millimetres)
- D0.50m — Underground Telecom (depth in metres)
- D0.50m — Underground Traffic Signals (depth in metres)
- D0.50m — Underground Water (depth in metres)
- D0.50m — Underground Unidentified (depth in metres)
- D0.50m — Mixed Cables (depth in metres)

7) Abbreviations:-

CL	Cover Level	MH	Manhole
d	Diameter (mm)	NPV	No pipes visible
D	Depth (m)	NOPV	No Other pipes visible
FW	Foul Water	SW	Storm Water
HL	High Level pipe	UTF	Unable to trace further
IC	Inspection Cover	UTT	Unable to trace
IL	Invert Level	WL	Water Level

GPR Reflections

GROUND RADAR

The material surrounding and particularly above buried services can effect whether the services can be resolved using GPR. Reinforced concrete , buried metallic objects, the presence of moisture or clay and changes in the material construction can lead to poor data resolution.

As we have no information with respect to the material overlaying any services the GPR method can only give a guaranteed accuracy of 50%.

Depth results using GPR are typically accurate to within 10% with a horizontal accuracy of ± 150mm. These figures will vary as the velocity of the ground is assumed.

The results of the GPR survey should be treated with caution as there is no guarantee that any service shown actually exists, only a possibilty that something can seen on the records.

GPR Reflection

LASER SURVEYS

LAND AND BUILDING SURVEYS, UNDERGROUND SERVICES LOCATION, CCTV DRAINAGE SURVEYS.
Established 1975. Member of The Survey Association.

OPEN SPACE, UPPER INTERFIELDS, LEIGH SINTON ROAD, MALVERN, WORCESTERSHIRE, WR14 1UT
TEL 01886 833173 email: worcester@lasersurveys.com

142-144 HILLVIEW AVENUE, HORNCHURCH, ESSEX. RM11 2DL
TEL 01708 438408 FAX 01708 438405. email: london@lasersurveys.com

DATUM NOTES

GRID IS BASED UPON SURVEY CONTROL STATION 2, FIXED TO THE ORDNANCE SURVEY NATIONAL GRID BY GPS SATELLITE ACTIVE NETWORK.

LEVELS ARE RELATED TO :- ORDNANCE SURVEY GPS ACTIVE NETWORK, AND TRANSFORMED USING THE OSGM15 & OSTN15 MODEL.

DATUM USED IS LOCATED AT :-
SURVEY CONTROL STATION 2, SURVEY NAIL IN ROAD OPPOSITE BUILDING

VALUE GIVEN AS 32.256m (NEWLYN DATUM)
511740.552 E 182522.549 N

SURVEY CONTROL STATIONS SHOWN

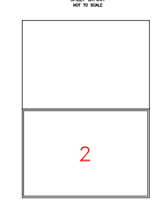
ABBREVIATIONS (where applicable)

AV	Air Valve	MH	Manhole Cover
BK	Brick	MK	Marker
BL	Bollard	MS	Milestone
BS	Bus Stop	MT	Meter
BT	British Telecom	MY	Mercury
C/B	Close Boarded	OH	Overhead
CL	Cover Level	PAV	Paving
CLK	Chainlink	PB	Post Box
CO	Column	PE	Pipe
Conc	Concrete	PM	Parking Meter
CP	Catch Pit	P/R	Post and Rail
CPS	Concrete Paving Slabs	PT	Post
CTV	Cable Television	P/W	Post and Wire
DC	Drainage Channel	RE	Rodding Eye
DP	Drain Pipe	RET	Retaining
EP	Electricity Pole	RS	Road Sign
ER	Earthing Rod	RSJ	Rolled Steel Joist
FB	Flower Bed	SC	Stop Cock
FE	Fence	SK	Soakaway
FH	Fire Hydrant	SPT	Septic Tank
FL	Floor Level	ST	Silt Trap
FP	Flag Pole	SV	Stop Valve
GP	Gate Post	SVC	Security Video Camera
GV	Gas Valve	TCB	Telephone Call Box
GY,G	Gully	TL	Traffic Light
HT	Height	TK	Tank
IC	Inspection Cover	TP	Telegraph Pole
IL	Invert Level	UG	Underground
IN	Interceptor	UTF	Unable To Trace Further
I/R	Iron Railings	UTL	Unable To Lift
JB	Junction Box	VP	Vent Pipe
KO	Kerb Outlet	WL	Water Level
LB	Litter Bin	WM	Water Meter
LP	Lamp Post	WO	Wash Out

NOTES

- Drainage pipe sizes (where shown) have been gauged from the surface for safety reasons and should be regarded as approximate only.
- Tree species (where shown) should be treated with caution and expert indentification is advised.
- Although this is a digital survey the accuracy and amount of detail shown is only commensurate with the graphical scale of mapping as specified. Care should be exercised when working to larger scales.
- Visible features in the vicinity of the boundaries as shown above, may not represent the extent of legally conveyed ownership.
- Whilst every effort has been made to achieve accuracy on this plan, CRUCIAL clearance dimensions, levels and invert levels should be checked prior to design and construction.
- Kerb levels have been taken in the bottom of the channel.
- Areas of dense undergrowth cannot be surveyed in detail, these areas will be shown in outline only and marked as "dense undergrowth" on the plan.

SHEET LAYOUT
NOT TO SCALE



MAPLE ROAD UXBRIDGE UB4 9NQ

TOPOGRAPHICAL SURVEY, UNDERGROUND SERVICES TRACE & GPR SURVEY

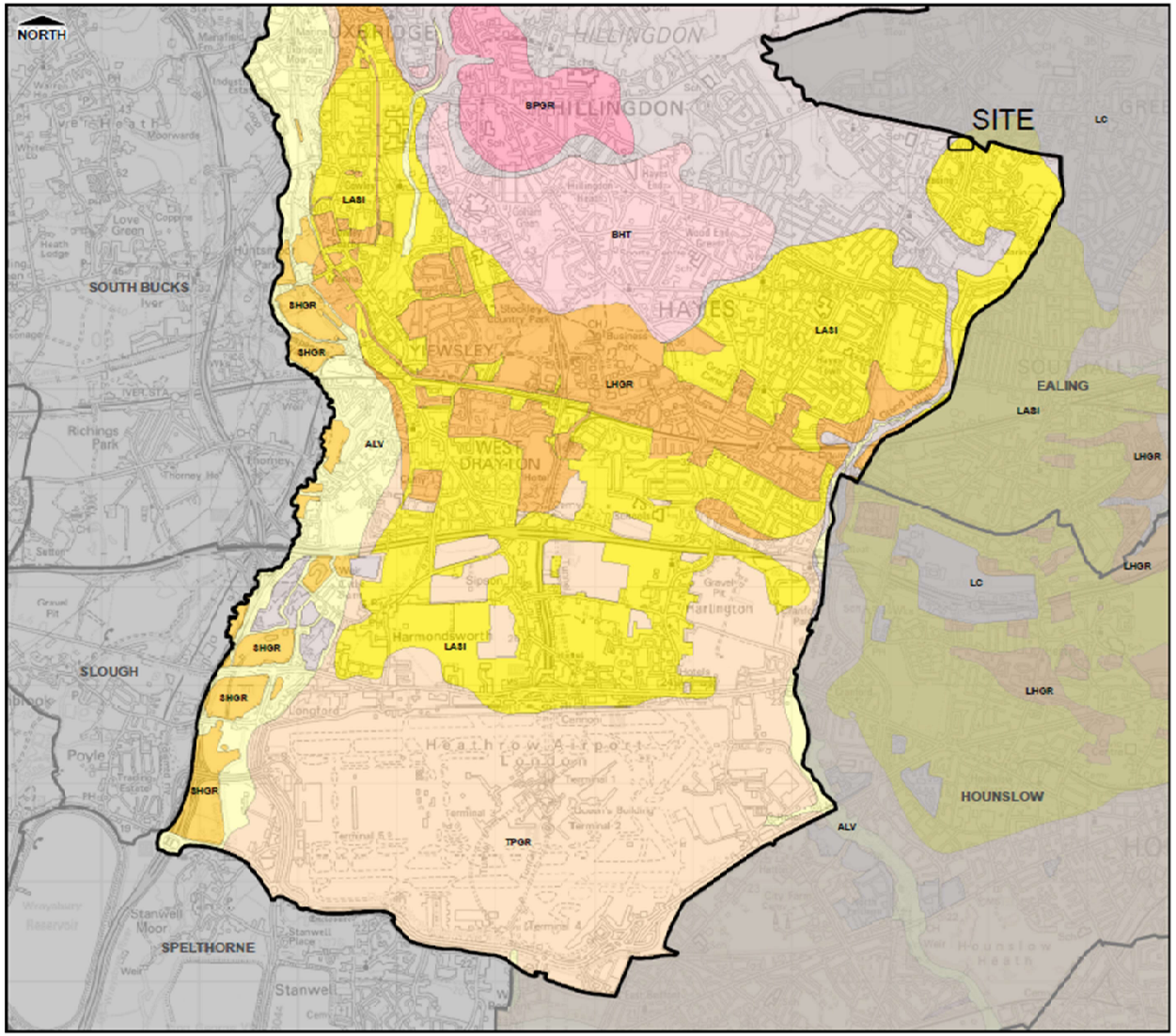
SURVEYED FOR: LONDON BOROUGH OF HILLINGDON, CORPORATE PAYMENTS 1S/04, CIVIC CENTRE, UXBRIDGE, MIDDLESEX, UB8 1UW

SURVEYOR: AC
DATE: OCTOBER 2017

DATE	REVISION

DRAWING NO	L 8331/T	REV 0
SCALE	1 : 200	
SEE ALSO DWG NOS	L 8331/E	
SHEET	2 of 3	
REF NO	L 8331	

Appendix C – London Borough of Hillingdon Geological Map South



THIS DRAWING 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 (LHGR)
- Sand And Gravel of Uncertain Age And Origin (SGAO)
- Shepperton Gravel Member (SHGR)
- Stanmore Gravel Formation (STGR)
- Taplow Gravel Formation (TPGR)
- Winter Hill Gravel (WIHG)

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

HILLINGDON

Surface Water Management Plan

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

Geological Map

Consultants

CAPITA SYMONDS Flood Risk Management

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

Drain London Programme Board Members

Environment Agency · Thames Water · LONDON COUNCILS · GREATERLONDONAUTHORITY

FIGURE 12.2

Appendix D – Thames Water Asset Location Sewer Map

CommercialDW
Drainage And Water Enquiry

London Borough of Hillingdon Legal Services (Searc
DX45101 UXBRIDGE

Search address supplied	Poplar Farm Day Centre & Postive Bheaviour Team 151a And 151b Andcar park adj Maple Road HAYES UB4 9NQ
Your reference	3E04 AT/10008/295/MAPLE
Our reference	CDWS/CDWS Standard/2012_2308332
Received date	**4 September 2012**
Search date	**11 September 2012**

Please Note:

From 1st October 2011 ownership of private sewers and lateral drains have changed in accordance with the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011.

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0845 070 9148
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

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

CommercialDW

Drainage And Water Enquiry

Order Summary

	Question	Answer
Maps		
1	Where relevant, please include a copy of an extract from the public sewer map.	Map Provided
2	Where relevant, please include a copy of an extract from the map of waterworks.	Map Provided
Drainage		
3	Does foul water from the property drain to a public sewer?	See Details
4	Does surface water from the property drain to a public sewer?	See Details
5	Is a surface water drainage charge payable?	See Details
6	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundary of the property?	No
7	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	See Details
8	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
9	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
10	Is any building which is or forms part of the property, at risk of internal flooding due to overloaded public sewers?	See Details
11	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	See Details
Water		
12	Is the property connected to mains water supply?	See Details
13	Are there any water mains, resource mains or discharge pipes within the boundary of the property?	No
14	Is there 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
15	Is the property at risk of receiving low water pressure or flow?	Not Connected
16	Please include details of a water quality analysis made by the water undertaker for the water supply zone in respect of the most recent calendar year.	See Details

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Drainage And Water Enquiry

17	Please include details of any departures, authorised by the Secretary of State or by the National Assembly for Wales under Part 6 of the 2000 Regulations from the provisions of Part 3 of those Regulations.	Passed

Charging

18	Please include details of the location of any water meter serving the property.	See Details
19	Who is the sewerage and water undertakers for the area?	See Details
20	Who bills the property for sewerage services?	Not Billed
21	Who bills the property for water services?	Not Billed
22	What is the current basis for charging for sewerage and / or water services at the property?	No Charge

Optional Additional Information

23	Are there any trade effluent consents relating to this site/property for disposal of chemically enhanced waste?	No
24	Is there a wayleave agreement giving Thames Water the right of access to pass through private land in order to reach the Company's assets?	No
25	Is there an easement agreement giving the Company the right of access to Assets located in private land which prevent the landowner from restricting the Company's access?	No
26	Details of any manhole cover and invert levels applicable to this site are enclosed.	See Details

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CommercialDW
Drainage And Water Enquiry

Search address supplied: Poplar Farm Day Centre & Postive Bheaviour Team, 151a And 151b Andcar park adj, Maple Road, HAYES, UB4 9NQ

Any new owner or occupier will need to contact Thames Water on 0845 9200 888 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.

Maps

Q1 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.

Q2 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.

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CommercialDW

Drainage And Water Enquiry

Drainage

Q3 Does foul water from the property drain to a public sewer?

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

Q4 Does surface water from the property drain to a public sewer?

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

Q5 Is a surface water drainage charge payable?

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

Q6 Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundary of the property?

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

Q7 Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?

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

Q8 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 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.

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Q9 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.

Q10 Is any 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.

Q11 Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.

The nearest sewage treatment works is 7.676 kilometeres to the west of the property. The name of the nearest sewage treatment works is IVER (NORTH) STW.

Water

Q12 Is the property connected to mains water supply?

This enquiry relates to a plot of land or a recently built property. It is recommended that the water supply proposals are checked with the developer.

Q13 Are there any water mains, resource mains or discharge pipes within the boundary of the property?

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

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CommercialDW

Drainage And Water Enquiry

Q14 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.

Q15 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.

Q16 Please include details of a water quality analysis made by the water undertaker for the water supply zone in respect of the most recent calendar year.

The analysis records confirmed that tests failed to meet the standards of the 2000 Regulations or the 2001 Regulations in relation to another substance or substances, and these are: 1 out of the 192 tests failed to meet the standard for Coliform Bacteria. A single coliform bacterium, although not a risk to public health, was detected in one sample taken from a customer's property in November in Betam Road, Hayes. Following a detailed investigation the quality of the water supply to the area was shown to be satisfactory, however the cause of the failure is not known.

Q17 Please include details of any departures, authorised by the Secretary of State or by the National Assembly for Wales under Part 6 of the 2000 Regulations from the provisions of Part 3 of those Regulations.

There are no such authorised departures for the water supply zone.

Charging

Q18 Please include details of the location of any water meter serving the property.

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

Q19 Who is the sewerage and water undertakers for the area?

Thames Water Utilities Limited, Clearwater Court, Reading, RG1 8DB is the sewerage undertaker for the area and Veolia Water, Tamblin Way, Hatfield, AL10 9EZ, is the water undertaker for the area.

Thames Water Utilities Ltd

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Q20 Who bills the property for sewerage services?

The property is not billed for sewerage services.

Q21 Who bills the property for water services?

The property is not billed for water services.

Q22 What is the current basis for charging for sewerage and / or water services at the property?

Records indicate that this enquiry relates to a plot of land or a recently built property.

Optional Additional Information

Q23 Trade Effluent Consent

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

No.

Q24 Wayleaves

Is there a wayleave agreement giving Thames Water (from here on known as "the Company") the right of access to pass through private land in order to reach the Company's assets?

No.

Q25 Easement

Is there an easement agreement giving the Company the right of access to assets located in private land which prevent the landowner from restricting the Company's access?

No.

Q26 Manhole Cover and Invert Levels

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

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CommercialDW

Drainage And Water Enquiry

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.

Thames Water Utilities Ltd

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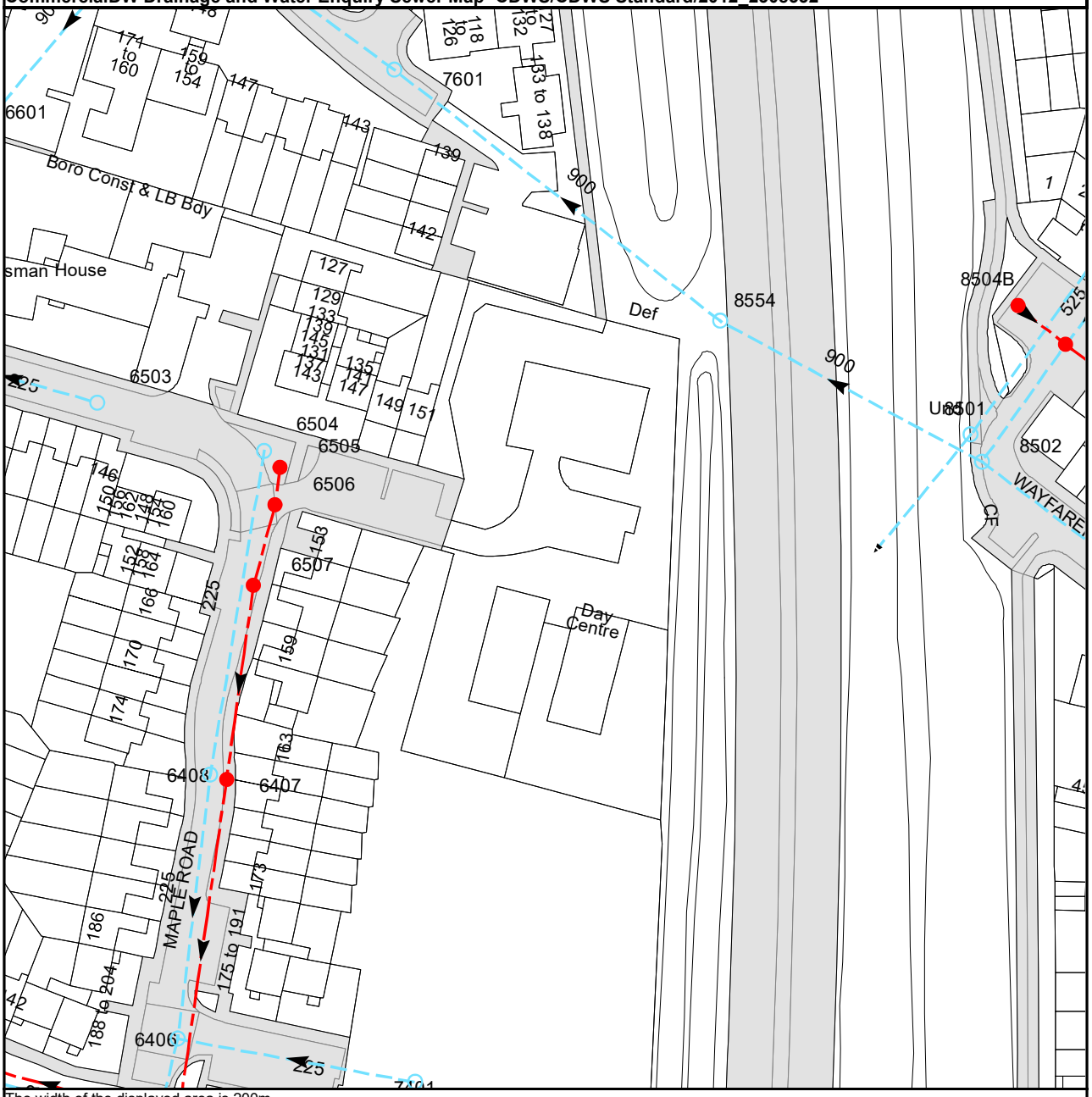
CommercialDW Drainage and Water Enquiry Sewer Map- CDWS/CDWS Standard/2012_2308332



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
7401	n/a	n/a
7601	33.16	29.01
6504	n/a	n/a
6506	n/a	n/a
6505	n/a	n/a
8502	31.76	29.12
8503B	31.84	30.24
6503	n/a	n/a
6406	n/a	n/a
6407	n/a	n/a
6408	n/a	n/a
6507	n/a	n/a
8501	32.71	31.52
8554	n/a	28.92
8504B	32.04	30.54

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

Sewer Fittings

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

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

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

Control Valve

Drop Pipe

Ancillary

Weir

End Items

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

Outfall

Undefined End

Inlet

Other Symbols

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

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

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

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

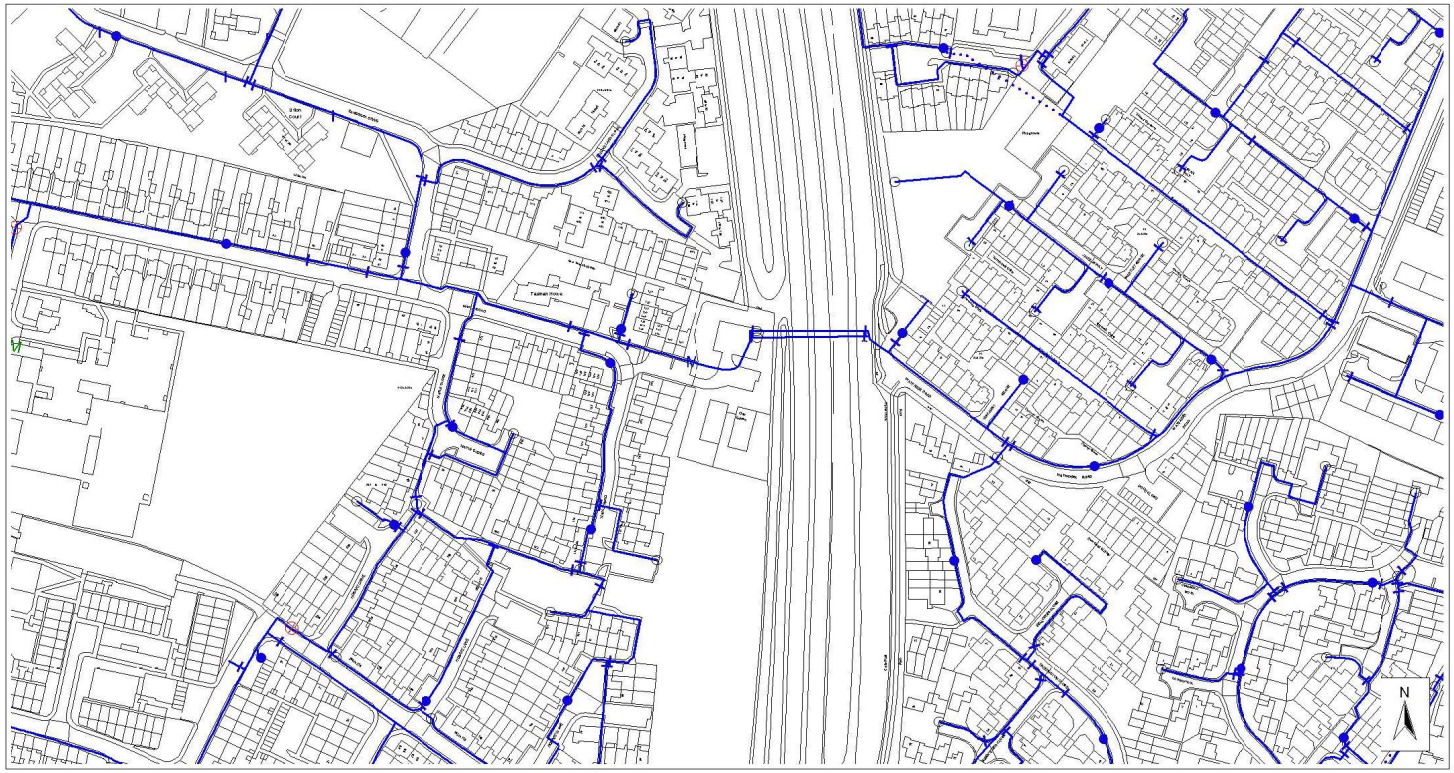
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

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

Reference No: 2012_2308332

11/09/2012



This plan is based upon the Ordnance Survey map by Veolia Water Central Limited with the sanction of the controller of HM Stationery Office (c) Crown Copyright Reserved

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 Veolia Water on 0345 7823333 or at the address below.

Veolia Water, Tamblin Way, Hatfield, Hertfordshire, AL10 9EZ
www.veoliawater.co.uk/central

This map is centred upon Ordnance Survey map tile TQ1182NE 1:2000

Water Main
Abandoned Main
Other Main (Potentially unreliable data)
Easement strip
Valves, Hydrants and Fittings

Enquiries and Response

The records relating to this search were checked by Renee Truter of Thames Water Utilities and Ben Hawes of Veolia Water Company who has no, nor is likely to have, any personal or business relationship with any person involved in the sale of the property.

This search report was prepared by Renee Truter of Thames Water Utilities who has no, nor is likely to have, any personal or business relationship with any person involved in the sale of the property.

For your guidance:

- Thames Water Property Searches's Complaints Procedure:
  - Thames Water Property Searches offers a robust complaints procedure. Formal complaints can be made by telephone, in writing or by email at searches@thameswater.co.uk.
  - Whilst we will endeavour to resolve complaints by telephone, there may be the need to investigate the complaint further to identify the error and in some cases third party consultation will be required. For this reason, we will log all complaints on our system and a response will be provided to the customer within 24 hours. If no error has occurred a full explanation will be provided.
  - If the query cannot be resolved within 24 hours, the customer will be provided with an update within 48 hours. Where necessary the search will be recompiled free of charge and an amended copy will be dispatched to the customer as soon as possible.
  - For queries relating to an expedited search that has exceeded its Service Level Agreement (SLA), the fees will be adjusted accordingly. If a refund or compensation has been agreed, this will be sent to the customer within approximately 6 weeks.
  - If the customer is not satisfied with the resolution to their query, a Senior Manager will review the matter and respond within 5 working days.

Question 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 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 3

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 4

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: 0845 9200 888, 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 5

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: 0845 9200 888 or refer to the website www.thameswater.co.uk.

Question 6

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.
- 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 7

For your guidance:

- This is because there are no buildings from which to measure the distance to any public sewers.
- The presence of a public sewer within 30.48 metres (100 feet) of the building(s) within the property can result in the local authority requiring a property to be connected to the public sewer.
- The measurement is estimated from the Ordnance Survey record, between the building(s) within the boundary of the property and the nearest public sewer.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Question 8

For your guidance:

- 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 9

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 10

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: 0845 9200 800 or website www.thameswater.co.uk

Question 11

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 13

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 14

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 15

For your guidance:

- As this enquiry appears to relate to a plot of land or recently built property, this information is therefore not relevant to this propery.
- 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 the 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 DG2 (Low Pressure Register) 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 under DG2 (Low Pressure Register) 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 from DG2 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 DG2 figures.
- Please contact your water company mentioned in Question 19 if you require further information.

Question 16

For your guidance:

- Please note that this property is not currently connected to the public clean network - and that this information is therefore not relevant to this enquiry.
- Thames Water investigates all infringements of drinking water quality standards and takes appropriate corrective actions to resolve any problems. If there were any risk to public health from the quality of drinking water supplied, the Company would have informed customers immediately and advised not to drink the water until the issue had been resolved.
- Water companies have a duty to provide wholesome water that meets the standards of the Water Supply (Water Quality) Regulations 2000. However, the property owner is responsible for any deterioration in water quality that is a result of the distribution system (the supply pipe and the plumbing within the property) that results in the standards not being met.
- In England and Wales these regulations implement the requirements of the European Drinking Directive 98/83/EC. The 2000 regulations impose standards for a range of parameters, which are either health based to ensure the water is safe to drink or to ensure the water is aesthetically acceptable. They also require that drinking water should not contain any element, organism or substance (whether or not a parameter) at a concentration or value, which would be detrimental to public health.
- Water quality is normally tested at the tap used for domestic consumption, normally the kitchen. However, the householder is responsible for any of deterioration in water quality that is a result of the domestic distribution system (the supply pipe and the plumbing within the property) that results in the standards not being met.
- If there are concerns that lead pipes within the property may be causing high levels of lead in your drinking water please contact your water company mentioned in Question 14 for further advice.
- The Water Company undertakes a monitoring programme to establish water quality that includes random sampling from properties. It will notify the consumers of any failures to meet the water quality standards that are due to the condition or maintenance of the distribution system.
- The data collected by the Company is subject to external review by the Drinking Water Inspectorate (DWI) and by local and health authorities. In addition to reviewing quality data the DWI also carry out audits during which any area of the company's operation can be examined. Further information may be found at www.dwi.gov.uk
- If you require further advice regarding these failures, please contact your Water Company mentioned in Question 19.

Question 17

For your guidance:

- Authorised departures are not permitted if the extent of the departure from the standard is likely to constitute a potential danger to human health.
- Please contact your water company mentioned in Question 19 if you require further information.

Question 22

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 23

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.

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

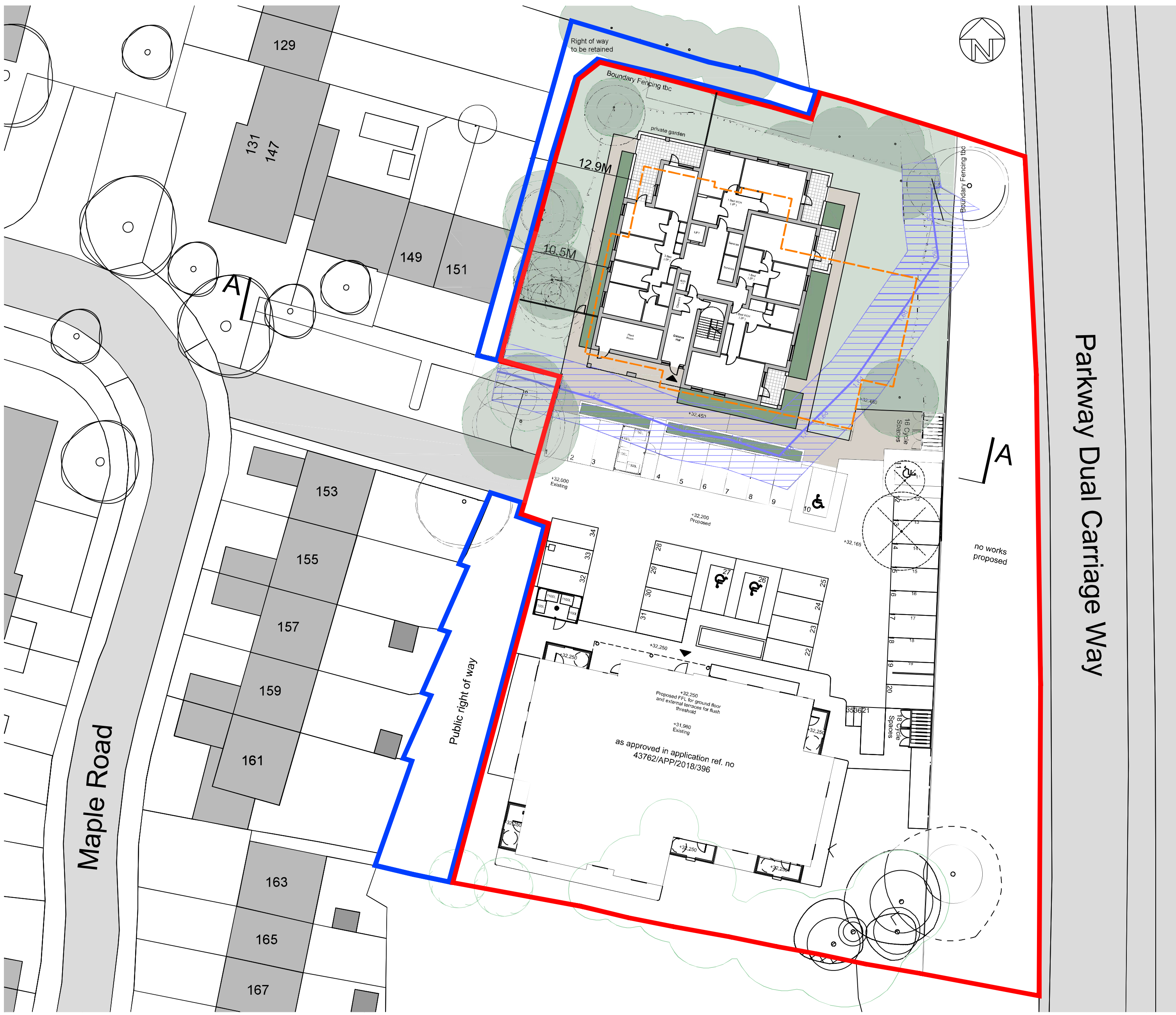
The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

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

A1



Proposed Schedule of Accommodation for North Block
3/4 storey block

Flat		1 BED	2 BED	3 BED	No.	Area	Hr	THr
	Ground Floor							
1 - 4	1BED/2P Flat	1			1	53.3m²	2	2
	1BED/2P Flat (Wheelchair unit)	1			1	63.9m²	2	2
	1BED/2P Flat (Wheelchair unit)	1			1	66.6m²	2	2
	3BED/5P Flat			1	1	91.4m²	4	4
	First Floor							
5 - 9	1BED/2P Flat	1			1	53.2m²	2	2
	2BED/3P Flat		3		3	64-68m²	3	9
	2BED/4P Flat		1		1	75.3m²	3	3
	Second Floor							
10 - 14	1BED/2P Flat	1			1	53.2m²	2	2
	2BED/3P Flat		3		3	64-68m²	3	9
	2BED/4P Flat		1		1	75.3m²	3	3
	Third Floor							
15 - 17	1BED/2P Flat	1			1	55.5m²	2	2
	2BED/3P Flat		2		2	64-68m²	2	4
	TOTALS	6	10	1	17			44

Car Parking Notes

Proposed Parking for Block North and South : 36 spaces including 4no. disabled car parking spaces and 2no. motorcycle spaces

Private Amenity Space for North Block (400m² min required)
1b2p=20m² / 2b4p=25m² / 3b5p=30m²
Proposed Amenity space - 774m²

- Boundary of the Site
- Right of way
- Position of the North Block as per approved planning application 43762/APP/2018/396
- Affinity Water Main with 6m Easement as shown. Location of the existing water main based on received drawing in pdf format.
- Trees to be removed

0 10m 20m
1:200

Maple and Poplar_North Block
Proposed Site Plan

CLIENT NAME	PROJECT.
Hillingdon Council	Maple and Poplar_North Block
PROJECT ADDRESS: Maple and Poplar, Hayes, UB4 9NQ	TITLE. Proposed Site Plan
	SUITABILITY CODE: D6

SCALE.	DRAWN	CHECKED	APPROVED	DATE
1:200	KS	MM	MM	21/07/2022

PROJ NO	AUTHOR	VOLUME	LEVEL	DOCTYP	ROLE	DRW NO	REV STAT	REV NO
34111	BGL	A1	00	DR	A	1100	P	04

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t. 020 8294 1000
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Appendix F – The Environment Agency Flood Maps

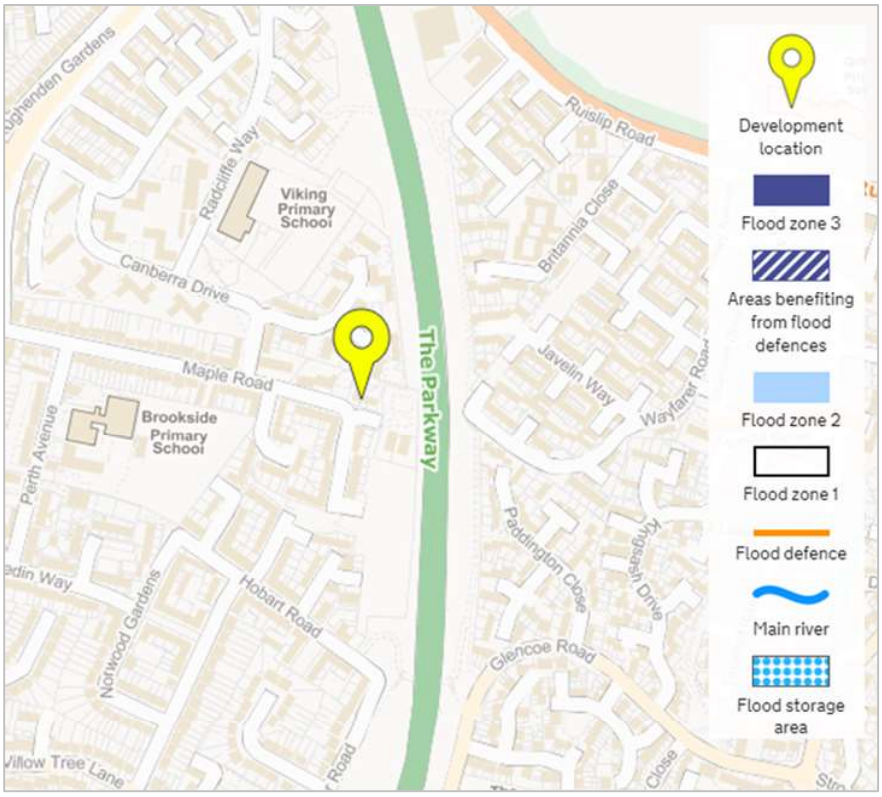


Figure 1.0 EA Flood map for Planning

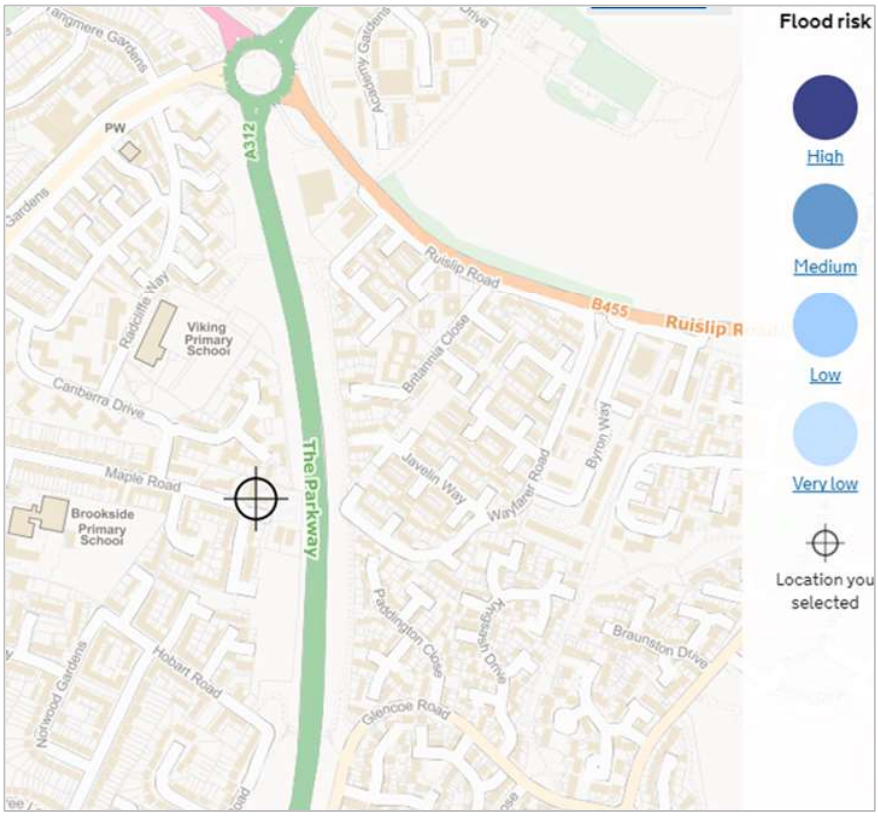


Figure 2.0 Long term flood risk from fluvial or tidal flooding map

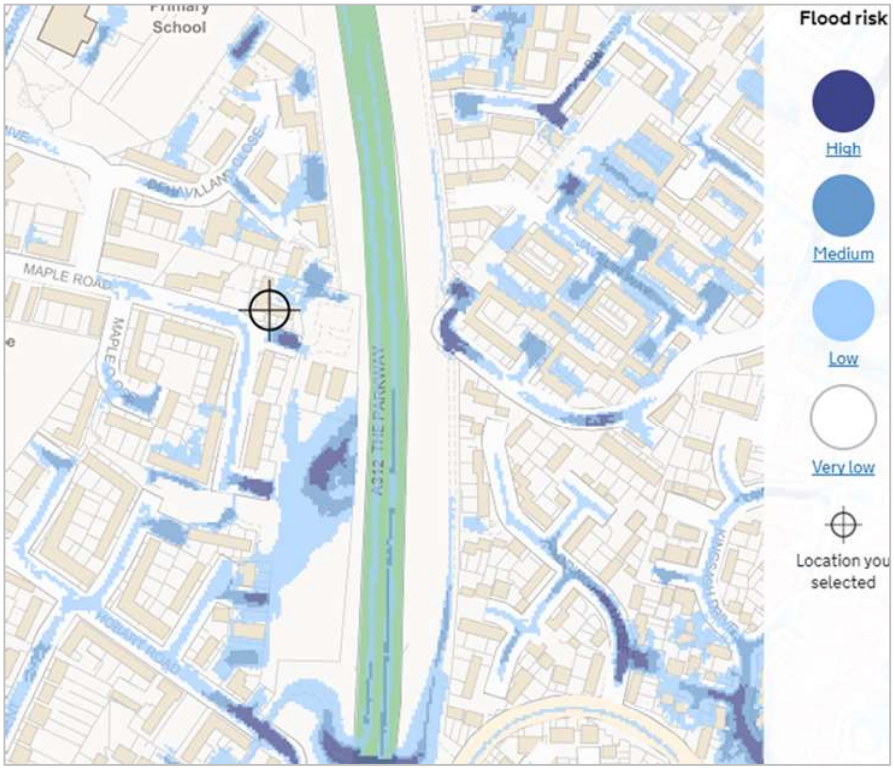


Figure 3.0 Long term flood risk from pluvial flooding map

Figure 3.1 Low risk scenario flood pluvial flooding map

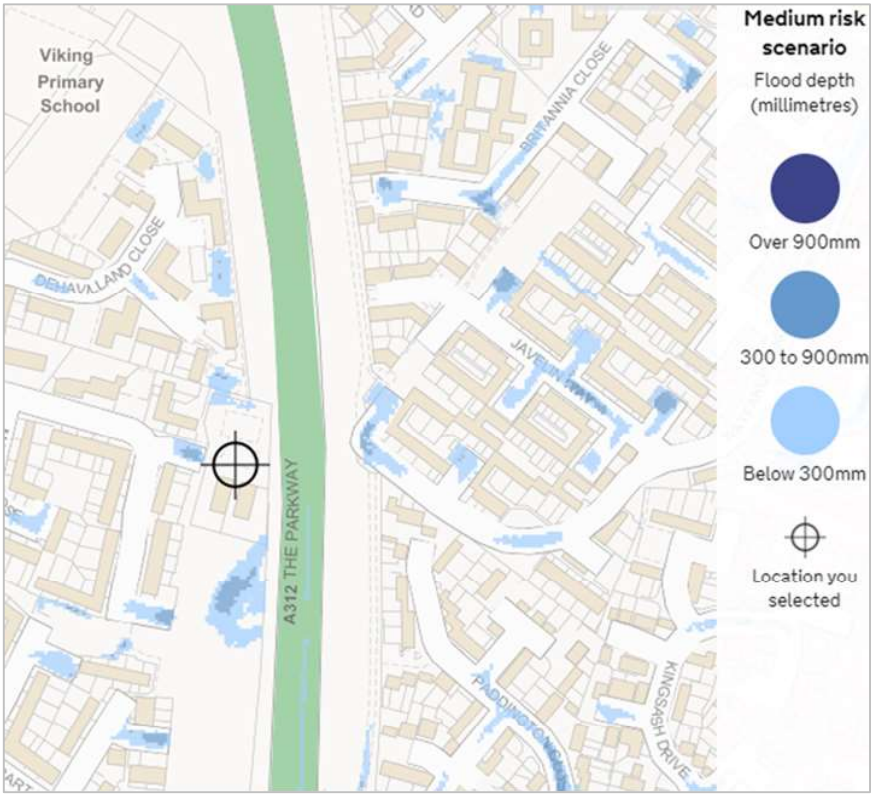


Figure 3.2 Medium risk scenario flood pluvial flooding map

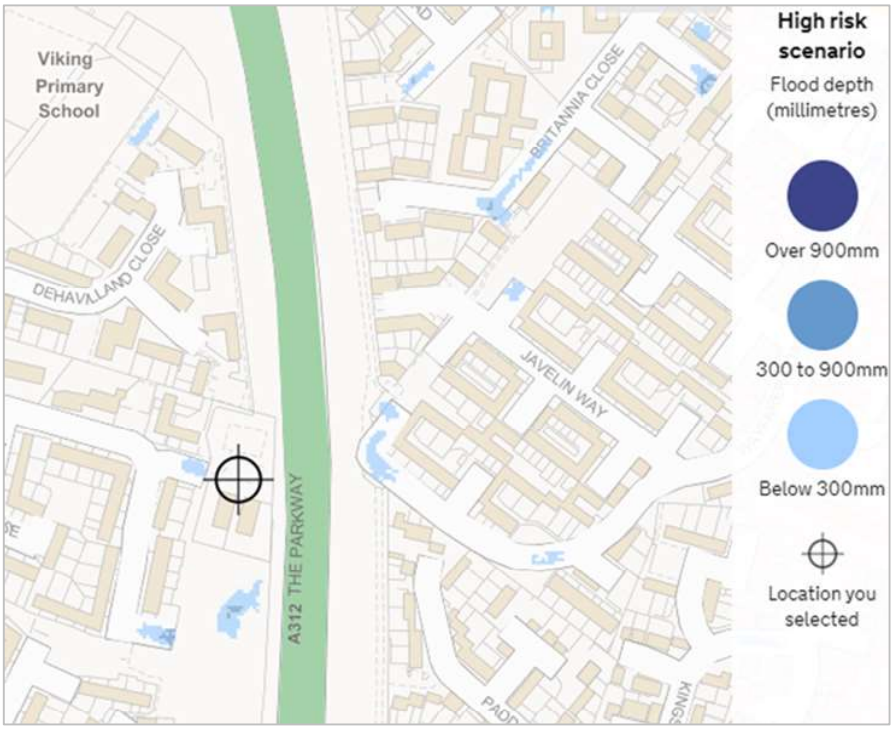


Figure 3.3 High risk scenario flood pluvial flooding map

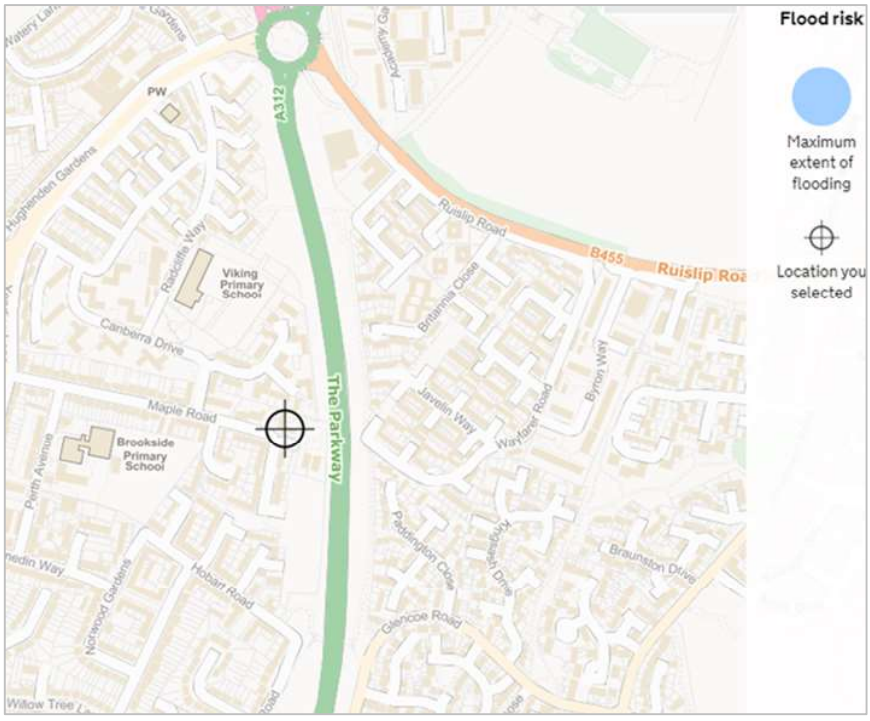


Figure 4.0 Long term flood risk from reservoirs map

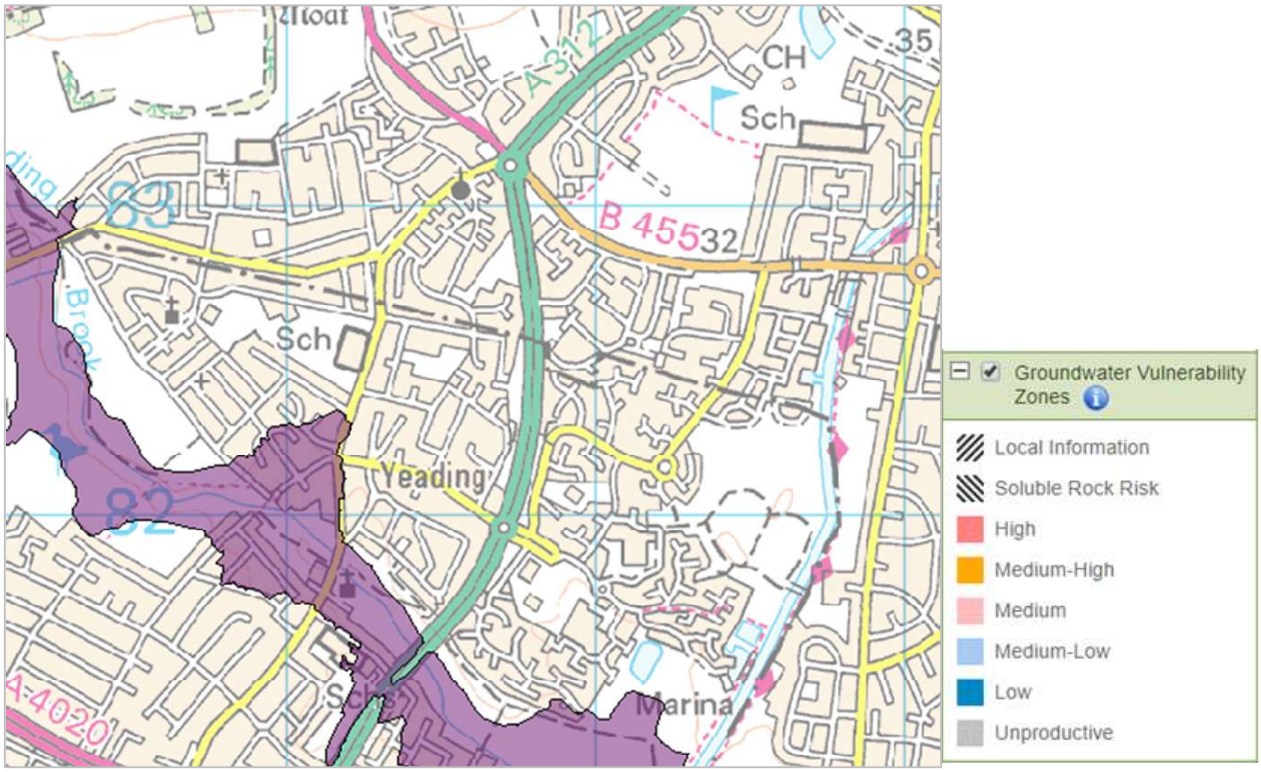
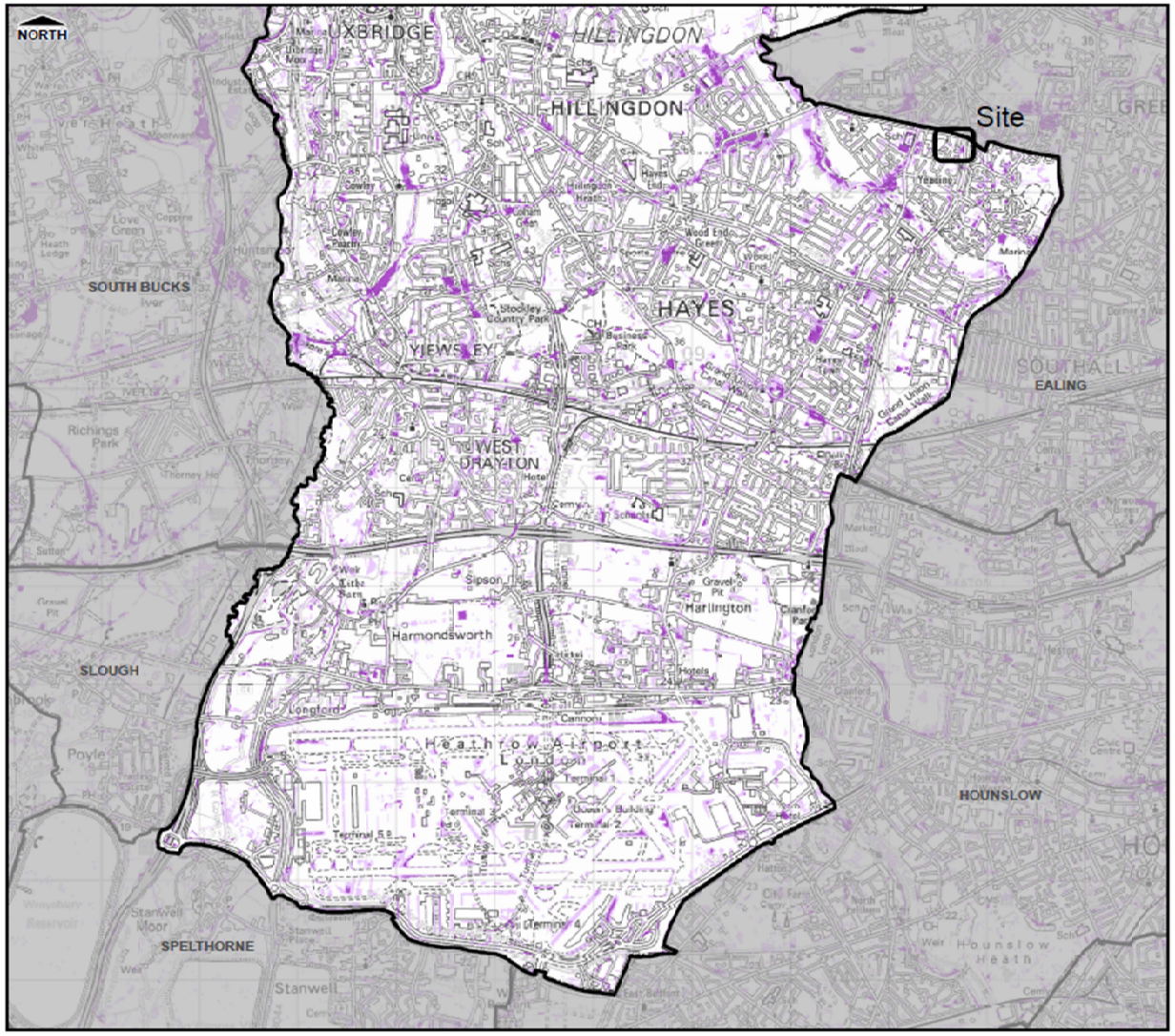


Figure 5.0 EA Ground water vulnerability map (Local Information)

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



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

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

Notes

London Borough of Hillingdon

HILLINGDON LONDON

Surface Water Management Plan

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

Environment Agency Flood Map for Surface Water

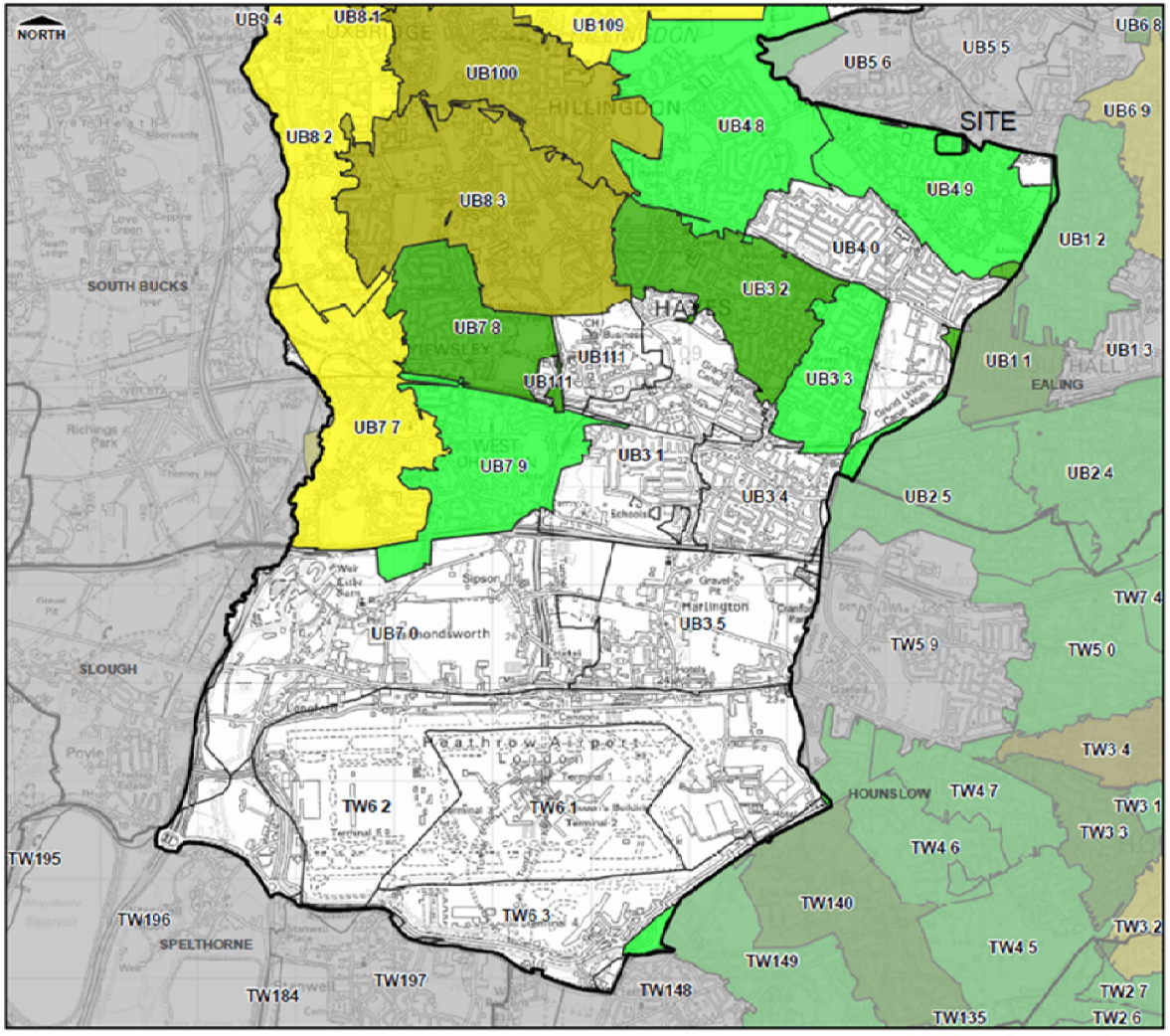
Consultants
CAPITA SYMONDS
Flood Risk Management
Capita Symonds
Level Seven,
52 Grosvenor Gardens,
Belgravia,
London
SW1W 0AU

Drain London Programme Board Members

Environment Agency · Thames Water · LONDON COUNCILS · GREATERLONDONAUTHORITY

FIGURE 4.2

Appendix H – London Borough of Hillingdon Summary Map of past sewer incidents.



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

- Borough Administrative Boundary
- Sewer Flooding Incidents
- Sewer Flood Outline

No. of Sewer Flood Records

- None
- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 50
- 51 - 100
- 101+

Notes

1. Sewer flood records relate to internal and external flooding of properties
2. Data supplied by Thames Water Ltd and is correct as at June 2010

London Borough of Hillingdon

Preliminary Flood Risk Assessment

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

Summary Map of Past Floods - Sewer Incidents

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

Drain London Programme Board Members

Environment Agency · Thames Water · LONDON COUNCILS · GREATERLONDONAUTHORITY

FIGURE A-4.2

Appendix J – Proposed Drainage Layout

Legend.

- Existing Public Surface Water Sewer Network
- Existing Public Foul or Combined Sewer Network
- Surface Water Drainage Pipework 150mm dia U.N.O
- Surface Water Drainage Pipework 150mm dia U.N.O
- Rainwater downpipe (position & size by others)
- 300mm dia Back Inlet Gully with filter screen
- 900mm dia catchpit inspection chamber
- 500mm dia catchpit inspection chamber
- PFC — Permafilter Flow Control unit in inspection chamber
- 750mm dia catchpit inspection chamber
- Medium duty Permavoid Treatment Attenuation Conduit 400mm thick
- Reservoir Pavement with 350mm thick SudsAgg Porous Sub-Base
- Permavoid Diffuser unit 150mm thick
- Permachannel Combined Collection & Treatment Channel, with adjacent 708 wide x 150mm thick Permavoid Diffuser Conduit

Notes.

1. This drawing is to be read in conjunction with all relevant architects, engineers and specialist drawings.
2. Rainwater Management System design and construction to Engineers Specification.
3. All work is to be carried out in accordance with the latest edition of Building Regulations, BSI Codes of Practice and Local Authority requirements.
4. Stormwater attenuation/retention system shall be Permavoid (or similar approved) pre-formed modular geocellular system with minimum 95% volumetric void ratio and minimum 52% effective perforated surface area.
5. Designs shall be based on sound structural calculations supported with clear laboratory test results and shall consider both collapse and unit deflection. Consideration shall also be given to the effect of unit deflection on the overlaying surface materials. Permanent dead loads (including lateral loads) from overlying surfacing or structural elements shall be based upon the construction drawings. Live loadings from vehicles and activities at the surface including maintenance shall be considered. Modular geo-cellular systems must be designed as structural components, using structural design theory in accordance with CIRIA Report C680.
6. Geocellular units to be encapsulated with geotextile in accordance with the Engineers specification. Units are to be installed in accordance with the manufacturer's recommendations.
7. The geocellular system shall be encapsulated with a geotextile suitable to provide separation and filtration between the geocellular layer and the overlying landscape finishes and shall also be compatible with and protect the underlying waterproof membrane system. The geotextile shall be laid with 300mm overlaps, and be applied to external surfaces of the geocellular units as detailed on the Engineering drawing(s). Geotextile to be installed in accordance with the manufacturer's recommendations.
8. Waterproof geomembrane to be single layer cold applied robust welded flexible membrane suitable for waterproofing to structures and for water containment. Membrane to be nominal 1mm thick laid with minimum 120mm laps and welded seams. All welded seams shall be tested using appropriate non-destructive techniques such as air pressure testing of twin-wedge welded seams, air lance testing or similar. Geomembrane to be installed in accordance with the manufacturer's recommendations. The whole are of the installed membrane shall be visually inspected and tested using appropriate techniques such as dialectric testing or similar.
9. Geocellular units shall generally be laid with zero falls unless notes otherwise and laid on a prepared even formation that shall be free from undulations, sharp steps or protrusions. The formation shall achieve a maximum deflection of 5mm in 3.0m in any direction. The formation shall be inspected by the Engineer and installing contractor to ensue acceptability for the construction of the geocellular tank.
10. The installer shall ensure that all expected temporary construction loads have been considered as part of the structural design. Any load additional/unplanned to that considered as part of the structural design shall be immediately brought to the attention of the Engineer. All necessary precautions shall be taken to prevent the overloading of the geocellular structure.
11. Proprietary flow control outlets shall be provided to suit. Flow control outlets shall be sized to suit the required attenuation/retention application and be located where indicated in the Engineering drawings.
12. All dimensions are in millimetres unless otherwise stated.
13. Do not scale from this drawing. If in doubt ask.
14. Should there be any conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed PRIOR to to works proceeding on site.
15. **Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings are PRELIMINARY and NOT OR CONSTRUCTION.**
16. At all times the works are to be executed in accordance with the requirements of the Health and Safety at Work Act 1974 and current CDM Regulations.
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STATUS	REV	DATE	REVISION HISTORY	DSG | DRW | CHK | APP
S3	P02	07.11.22	Design amended due to updated proposed plans	RG | GH | SW | PW
S3	P01	28.02.18	Issued for comment and discussion	RG | JHR | RG | PC

ALL REVISIONS

CLIENT

HILLINGDON

KEY PLAN

ORIGINATOR

Part of the STBI Group
epg
The Environmental Protection Group Ltd
Warrington Business Park
Long Lane
Warrington
T: 01925 652 980
F: 01925 652 983
W: www.epg-ltd.co.uk
E: consultants@epg-ltd.co.uk

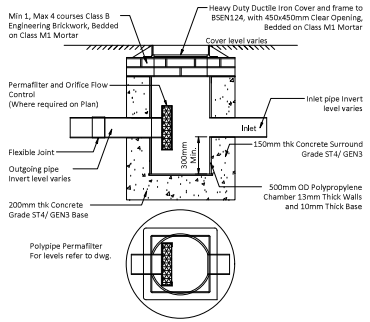
DRAWING TITLE

Maple & Poplar
Hayes, London
Surface Water Management
Alternative Sustainable Drainage Layout

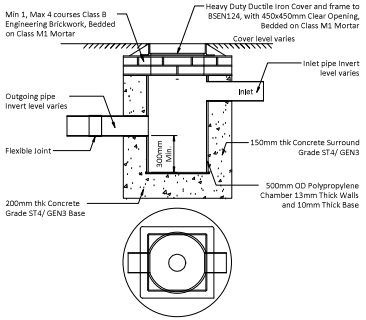
	Name	Signature	Date
Designed by	RG		28/02/2018
Drawn by	JHR		28/02/2018
Checked	RG		28/02/2018
Approved	PC		28/02/2018

EPG REF	SCALE @ A1	BIM FILE NAME - REVISION
8798	1:200	-
	S3 - Suitable for Internal Review & Comment	

PROJECT	ISSUER	VOLUME	LEVEL	TYPE	ROLE	NUMBER	REV
8798	EPG	XX	00	DR	Y	0001	P02



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



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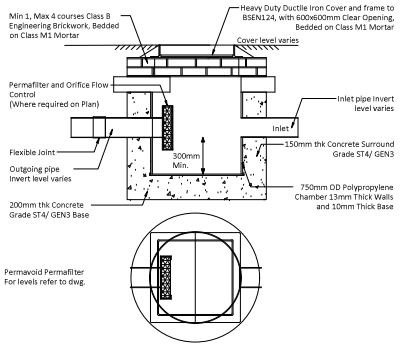
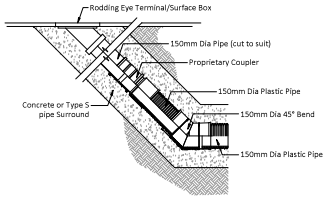


750Ø PERMAVOID CATCHPIT INSPECTION CHAMBER INCORPORATING FLOW CONTROL AND DEBRIS DEVICE (900Ø Similar)



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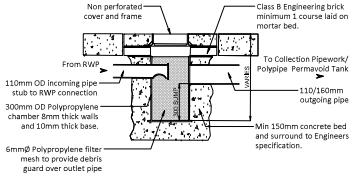
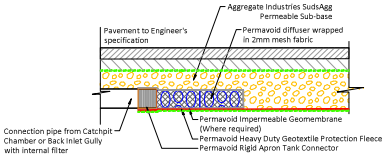
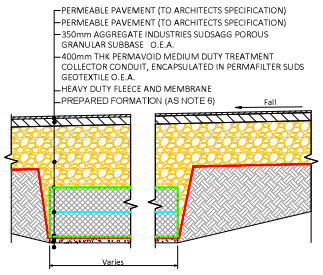


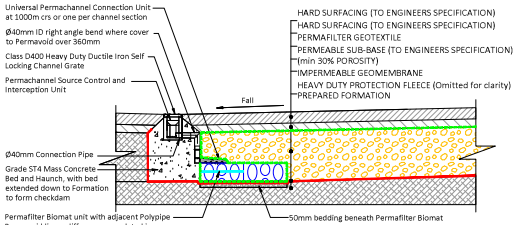
TYPICAL 300mmØ FILTER CHAMBER



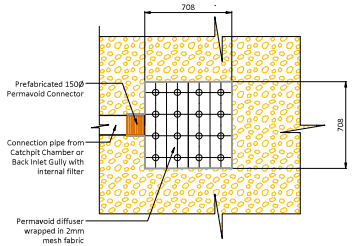
TYPICAL SECTION THROUGH A PERMAVOID DIFFUSER



TYPICAL SECTION THROUGH PERMEABLE PAVEMENT AND PERMAVOID MEDIUM DUTY TREATMENT COLLECTOR CONDUIT



TYPICAL SECTION THROUGH PERMACHANNEL WITH PERMAVOID DIFFUSER CONDUIT AND PERMEABLE SUB-BASE ATTENUATION



TYPICAL PLAN THROUGH A PERMAVOID DIFFUSER

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ALL REVISIONS

CLIENT

HILLINGDON

KEY PLAN

ORIGINATOR

Part of the STBI Group
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The Environmental Protection Group Ltd
Warrington Business Park
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T: 01925 652 980
F: 01925 652 983
W: www.epg-ltd.co.uk
E: consultantsupport@epg-ltd.co.uk

DRAWING TITLE

Maple & Poplar
Hayes, London
Surface Water Management
Alternative Sustainable Drainage Details

	Name	Signature	Date
Designed by	RG		28/02/2018
Drawn by	JHR		28/02/2018
Checked	RG		28/02/2018
Approved	PC		28/02/2018

EPG REF	SCALE @ A1	BIM FILE NAME - REVISION
8798	1:20	-
	S3 - Suitable for Internal Review & Comment	

PROJECT	ISSUER	VOLUME	LEVEL	TYPE	ROLE	NUMBER	REV
8798	EPG	XX	00	DR	Y	0100	P02

Appendix K – Proposed Hydraulic Calculations

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

Half Drain Time : 287 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	0.601	0.351	0.0	4.3	4.3	79.9	O K
30 min Summer	0.697	0.447	0.0	4.9	4.9	103.4	O K
60 min Summer	0.780	0.530	0.0	5.3	5.3	124.5	Flood Risk
120 min Summer	0.869	0.619	0.0	5.8	5.8	147.2	Flood Risk
180 min Summer	0.900	0.650	0.0	5.9	5.9	155.0	Flood Risk
240 min Summer	0.908	0.658	0.0	6.0	6.0	157.1	Flood Risk
360 min Summer	0.905	0.655	0.0	5.9	5.9	156.3	Flood Risk
480 min Summer	0.889	0.639	0.0	5.9	5.9	152.2	Flood Risk
600 min Summer	0.868	0.618	0.0	5.8	5.8	146.9	Flood Risk
720 min Summer	0.846	0.596	0.0	5.7	5.7	141.2	Flood Risk
960 min Summer	0.802	0.552	0.0	5.4	5.4	130.0	Flood Risk
1440 min Summer	0.726	0.476	0.0	5.0	5.0	110.6	Flood Risk
2160 min Summer	0.639	0.389	0.0	4.5	4.5	88.6	O K
2880 min Summer	0.571	0.321	0.0	4.1	4.1	73.2	O K
4320 min Summer	0.484	0.234	0.0	3.4	3.4	53.4	O K
5760 min Summer	0.432	0.182	0.0	2.9	2.9	41.5	O K
7200 min Summer	0.399	0.149	0.0	2.6	2.6	34.1	O K
8640 min Summer	0.378	0.128	0.0	2.3	2.3	29.1	O K
10080 min Summer	0.362	0.112	0.0	2.1	2.1	25.5	O K
15 min Winter	0.646	0.396	0.0	4.5	4.5	90.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	162.222	0.0	80.7	20
30 min Summer	105.593	0.0	106.8	35
60 min Summer	65.421	0.0	135.1	64
120 min Summer	41.128	0.0	171.0	122
180 min Summer	30.780	0.0	192.5	180
240 min Summer	24.805	0.0	207.1	208
360 min Summer	17.998	0.0	225.7	268
480 min Summer	14.171	0.0	237.0	334
600 min Summer	11.718	0.0	244.9	404
720 min Summer	10.007	0.0	250.8	470
960 min Summer	7.771	0.0	259.4	608
1440 min Summer	5.431	0.0	271.1	868
2160 min Summer	3.782	0.0	283.4	1256
2880 min Summer	2.927	0.0	291.3	1616
4320 min Summer	2.046	0.0	302.8	2336
5760 min Summer	1.596	0.0	313.9	3056
7200 min Summer	1.328	0.0	324.4	3752
8640 min Summer	1.150	0.0	334.9	4496
10080 min Summer	1.023	0.0	345.4	5240
15 min Winter	162.222	0.0	91.1	20

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	0.750	0.500	0.0	5.2	5.2	116.7	Flood Risk
60 min Winter	0.844	0.594	0.0	5.6	5.6	140.7	Flood Risk
120 min Winter	0.947	0.697	0.0	6.1	6.1	167.1	Flood Risk
180 min Winter	0.986	0.736	0.0	6.3	6.3	176.9	Flood Risk
240 min Winter	0.996	0.746	0.0	6.4	6.4	179.4	Flood Risk
360 min Winter	0.985	0.735	0.0	6.3	6.3	176.8	Flood Risk
480 min Winter	0.962	0.712	0.0	6.2	6.2	170.9	Flood Risk
600 min Winter	0.933	0.683	0.0	6.1	6.1	163.4	Flood Risk
720 min Winter	0.902	0.652	0.0	5.9	5.9	155.5	Flood Risk
960 min Winter	0.840	0.590	0.0	5.6	5.6	139.8	Flood Risk
1440 min Winter	0.737	0.487	0.0	5.1	5.1	113.4	Flood Risk
2160 min Winter	0.622	0.372	0.0	4.4	4.4	84.9	O K
2880 min Winter	0.539	0.289	0.0	3.8	3.8	65.9	O K
4320 min Winter	0.441	0.191	0.0	3.0	3.0	43.5	O K
5760 min Winter	0.389	0.139	0.0	2.5	2.5	31.7	O K
7200 min Winter	0.360	0.110	0.0	2.1	2.1	25.0	O K
8640 min Winter	0.342	0.092	0.0	1.9	1.9	20.9	O K
10080 min Winter	0.333	0.083	0.0	1.7	1.7	18.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	105.593	0.0	120.2	34
60 min Winter	65.421	0.0	151.9	62
120 min Winter	41.128	0.0	192.2	120
180 min Winter	30.780	0.0	216.3	176
240 min Winter	24.805	0.0	232.6	228
360 min Winter	17.998	0.0	253.4	284
480 min Winter	14.171	0.0	266.1	360
600 min Winter	11.718	0.0	275.0	436
720 min Winter	10.007	0.0	281.7	510
960 min Winter	7.771	0.0	291.4	654
1440 min Winter	5.431	0.0	304.6	926
2160 min Winter	3.782	0.0	318.5	1320
2880 min Winter	2.927	0.0	327.5	1696
4320 min Winter	2.046	0.0	340.8	2420
5760 min Winter	1.596	0.0	353.3	3112
7200 min Winter	1.328	0.0	365.4	3816
8640 min Winter	1.150	0.0	377.6	4496
10080 min Winter	1.023	0.0	389.8	5144

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 508789 181402 TQ 08789 81402
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.286

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	2	0.095	2	4	0.095	4	6	0.096

Time Area Diagram

Total Area (ha) 0.000

Time From:	(mins) To:	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 1.000

Complex Structure

Cellular Storage

Invert Level (m) 0.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	240.0	240.0	0.401	0.0	270.4
0.400	240.0	270.4			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	85.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	236.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	0.650	Cap Volume Depth (m)	0.350

Orifice Outflow Control

Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 0.250

Appendix L – Proposed Foul Water Calculations

The Environmental Protection Group Ltd											Project : Maple and Poplar			Client:
Title: Above Ground Sanitation Calculation Sheet											8798			Sheet 1of 1
Prepared by: RG		Date: 26.02.18												Rev:
Reference data utilised: EN 12056-2:2000 Gravity Drainage Systems Inside Buildings														Dwg Refs:
Table 2 - Discharge Units (DU) and Table 3 Typical Frequency Factors (K)											K = 0.5			
Table 12 - Hydraulic Capacity (Qmax) swept enteries 50Ø = 0.9l/s, 100Ø = 7.3l/s, 150Ø = 18.3l/s and 200Ø= 27.3l/s														
6.3 Calculation of Flowrate Qww = K√∑Du														
Equip Des	WC	Bidet	WHB	Bath	Shw	Sink	D/Wash	W/Mac			Total Du's	Flow l/s	Stack Ø	Comments
Du Load	1.7	0.3	0.3	0.5	0.4	0.5	0.5	1.0						
Stack Ref														
											0	0.00	0	
Type A	30		30	30		30	30	30			135	5.81	100	
											0	0.00	0	
Type B	8		8	4		4	4	4			26	2.55	100	
											0	0.00	0	
											0	0.00	0	
Total											161	6.34	100	Peak flow
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	
											0	0.00	0	