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DRAINAGE STRATEGY

&

FLOOD RISK ASSESSMENT

76 PARK AVENUE
RUISLIP
MIDDLESEX
HA47UJ

AUGUST 2019
36316c/R/00A/CET

APPROVAL SHEET AND FOREWORD

Drainage Strategy & Flood Risk Assessment Report
For
76 Park Avenue HA4 7UJ

Report Status: Revision A	Date of Issue: August 23rd 2019	
	Name	Signature & Date
Author:	Claire Taylor	23/8/19
Checked & Approved:	Daniel Hopkins	23/8/19

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This report shall not be used for engineering or contractual purposes unless signed above by the author and the checker/approver, and unless the report status is "Final".

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Drg No. 36316/C/101 West London SFRA Policy Maps Fluvial / Pluvial
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EXECUTIVE SUMMARY

	Item	Comment
1	Development description	Single residential redevelopment (extension)
2	Location	TQ 09282 88185
3	Site Area (Extension Area)	10m^2
4	Planning Authority	Hillingdon Council
5	Current Land Use	Residential
7	EA Flood Zone Classification	2
8	Site Level	Not known
10	Drainage	Surface water to Public SW Sewer / Rear Garden Drain Foul water to Public FW Sewer

1 INTRODUCTION

Knapp Hicks & Partners Ltd have been appointed to undertake a Drainage Strategy and Flood Risk Assessment for a residential development located at 76 Park Avenue, Ruislip, Middlesex HA4 7UJ.

1.1 REQUIREMENT FOR A DRAINAGE STRATEGY & FLOOD RISK ASSESSMENT

This report has been prepared to assist with a Planning Application for a residential property located on the boundary of a Flood Zone 2 (refer to Flood Risk Plans in Appendix B) and as such requires a Flood Risk Assessment (FRA).

This report is, in accordance with the requirements of BS8533, to:-

- Identify the mechanisms which could cause flooding at the site;
- Assess the flood risk posed to the site from these sources;
- Assess whether there will be an increased flood risk to neighbouring properties as a result of the proposed development;
- Assess the management of surface water on the site.

2 SOURCES OF INFORMATION

This flood risk assessment refers to the following documents:-

2.1 BS8533:2011 ASSESSING & MANAGING FLOOD RISK IN DEVELOPMENT – CODE OF PRACTICE (REF.1)

The British Standard gives recommendations and guidance on the appropriate assessment and management of flood risk where development is proposed in the UK. It is intended to provide practical assistance for dealing with flood risk in and around developments.

2.2 TECHNICAL GUIDANCE TO THE NATIONAL PLANNING POLICY FRAMEWORK (NPPF) (REF.2)

This document was firt published in March 2012 and replaced PPS25. It advises on the flood risk management of proposed developments with regard to sea and river flooding. The revised National Planning Policy Framework was updated on 19 February 2019 and sets out the government's planning policies for England and how these are expected to be applied

2.3 STRATEGIC FLOOD RISK ASSESSMENT (SFRA) (REF.3)

The SFRA was published in 2018 by Scott Wilson on behalf of Hillingdon Borough Council and deals with flooding from all sources as listed in NPPF, although the main emphasis is upon the risk of tidal and fluvial flooding within the Borough.

2.4 WEST LONDON SFRA POLICY MAP

West London Strategic Flood Risk assessment Maps are supplied for the Boroughs of Barnet, Brent, Ealing, Harrow, Hillingdon and Hounslow and the internet mapping information is available for the following:

- Policy Map
- Surface Water Flood Risk
- Fluvial and Tidal Flood Risk

- Groundwater, Sewer and Artificial Flood Risk
- Flood Management Infrastructure

2.5 SITE SPECIFIC DOCUMENTS

The following documents and drawings have also been consulted for the preparation of this flood risk assessment:-

- Proposed Site Plan, Dwg. 4207/01 & 4207/02, dated March 2019, included in Appendix A
- Drainage Plan Proposal Dwg 36316/C/100, dated August 2019
- Groundsure Location intelligence - Flood, included in Appendix A

2.6 FLOOD INVESTIGATION REPORT

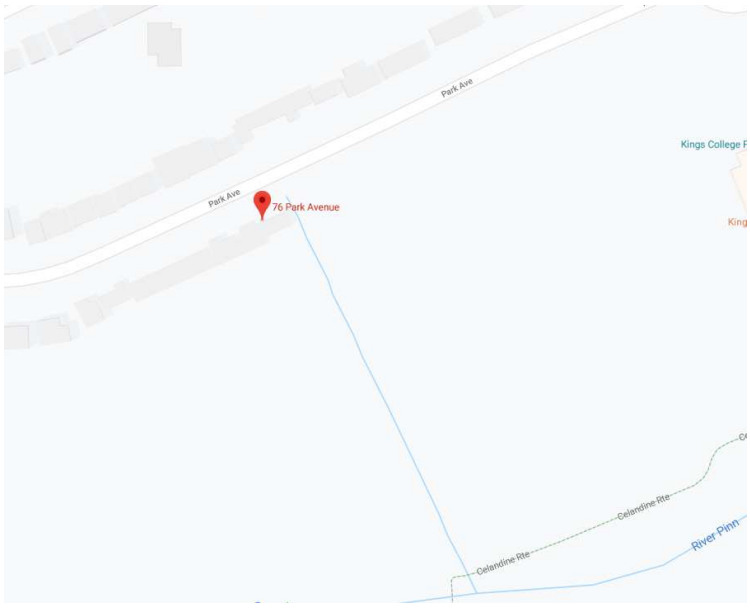
The London Borough of Hillingdon LLFA Flood Investigation Report for floods dated 23rd June 2016, report dated June 2017 contained in the report under Areas affected 3) Broadwood Avenue and Park Avenue, Ruislip HA4 7 and highlights the flooding occurring on the 23rd June 2016 Park Avenue having six reports of flooding internally, four reports of flooding under floor boards and sixteen reports of flooding to gardens and drives / garages.

3 EXISTING SITE DESCRIPTION

3.1 LOCATION

The site is located at NGR TQ 09282 88185 and is an existing property within a residential estate

The planning application is for a rear extension to the existing residential property with the demolition of an existing conservatory and the erection of a 2 storey addition. The existing total ground floor plan covers an area of approximately 100m^2. The extension increases the ground floor plan to 110m^2 an increase of 10m^2. There is also an existing block paved driveway of approximately 68m^2



3.2 TOPOGRAPHY

The site is located within an existing residential development and is adjacent the Kings College playing fields and has an open ditch (ordinary watercourse) separating the properties boundary (no. 78 Park Avenue) and the playing fields, the open ditch discharges into the River Pinn, downstream of the development.

3.3 GEOLOGY

The Geology of Britain Viewer indicates the geology underlying the site to be Lambeth Formation, comprising clay, silt and sand. It is believed that the infiltration rates of the Lambeth Clay would not offer sufficient meaningful infiltration to be able to utilise a traditional soakage solution.

3.4 HYDROLOGY

The OS maps indicates a small ditch (ordinary watercourse) to the east of the development running between the property and the playing fields. This appears to connect directly into the River Pinn (Main River) which is located to the south of the property.

3.5 HYDROGEOLOGY

The underlying soil is classified as a secondary A aquifer on DFRA's Magic map.

3.6 THE SITE ITSELF IS NOT LOCATED WITHIN A SOURCE PROTECTION ZONE (SPZ). EFFECT OF CLIMATE CHANGE

It is now accepted that climate change will increase the risk of flooding as rainfall events become more intense, frequent and prolonged. Government Guidance – Flood risk assessment climate change allowances t*ables: Recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows, offshore wind speeds and wave heights* (ref 2) provides guidance on the enhancement which should be applied to hydrological models. It is predicted that peak rainfall intensity will have substantial increases and are forecasted in the tables to 2115 and therefore surface water designs for residential developments should make allowance for these increases see below for flood risk assessment.

Flood Risk Assessment

Flood Type	Potential pathway	Source	Is there a risk of flooding from this source?	Mitigation	Residual Risk
Coastal or estuarine	Flooding that can occur from the sea due to a particularly high tide or surge, or a combination of both	None	No	NA	NA
Streams and rivers	Flows that are not contained within the channel due to high levels of rainfall in the catchment	River Pinn	Yes	This is an existing developed area with many similar developments. The Flood Investigation Report for floods dated 23rd June 2016 has flooding reports in the area however none recorded at the property suggesting the site has had detrimental flooding in the past.	Low

Flood Type	Potential pathway	Source	Is there a risk of flooding from this source?	Mitigation	Residual Risk
Overland flow	Surface water runoff which has not infiltrated into the ground or entered into a drainage system	Surrounding ground is enclosed gardens or hard landscaped sloping towards the carriageways. Environment Agency maps indicate surface water flooding as low.	Yes	NA	Low
Groundwater	Where the water table rises to such a level that flooding occurs e.g. in low lying areas underlain by permeable ground, usually due to extended periods of wet weather	There are no records of this having been an issue in the direct locality.	No	NA	Low
Drainage Infrastructure	System surcharge due to overload or blockage	Surface water and foul drains serving the site	Yes	Drainage systems to be designed in accordance with the Building Regulations. Regular management and maintenance of drainage systems to prevent accumulation of silt and/or other blockages	High
		Surcharge of highway	Yes	Ground levels at site boundary should be high enough to deflect flood water along carriageway channel lines and thus bypass the site	Low

Flood Type	Potential pathway	Source	Is there a risk of flooding from this source?	Mitigation	Residual Risk
Other/artificial	Pipe burst	Water mains	Yes	Surplus water will discharge down external gullies and drain away.	Low

3.7 EXISTING SITE

The current impermeable area of the dwelling is circa 168m^2, made up of block paved hardstanding area (68m^2) to the front and the building roof area (100m^2) for the existing property.

Based on Thames Water site visits the existing discharge of surface water is currently via a Public surface water sewer located in Park Avenue and also to a surface water drain in the rear garden serving approximately 4 private properties. The rear drain discharges to the ordinary watercourse adjacent 78 Park Avenue.

Based on 30 year rainfall event (50mm per hour) the existing surface water from the property discharges at a peak rate of approximately 2.3 l/s. It is unknown what percentage discharges to each surface water system. However Thames Water suggests both discharge to the ordinary watercourse

CCTV Drainage survey is currently being carried out at the time of writing this report to confirm the above information.

The existing site curtilage is within Flood Zone 2 however the small extension as shown on Dwg 36316 / C / 101 sits outside the concerned areas for Fluvial and Pluvial Flood risk.

4 PROPOSED DEVELOPMENT

It has been proposed to extend the existing residential site this will increase the impermeable areas of the dwelling to circa 178m^2 including for both parking areas and roof areas. Net increase of 10m^2

5 SURFACE WATER MANAGEMENT

The site is Brownfield and the proposed development will have an increased impermeable area. Overall the site will generate an increase in both the peak rate and volume of surface water runoff.

Thames Water and the London Plan specify that the proposed surface water outfalls comply with the following order of preference

1 store rainwater for later use

2 use infiltration techniques, such as porous surfaces in non-clay areas

3 attenuate rainwater in ponds or open water features for gradual release

4 attenuate rainwater by storing in tanks or sealed water features for gradual release

5 discharge rainwater direct to a watercourse

6 discharge rainwater to a surface water sewer/drain

7 discharge rainwater to the combined sewer.

Options 1,2,3,4 listed above individually are not suitable for this development and it is highly unlikely that option 2 on its own the soil would provide sufficient meaningful infiltration to be able to utilise a soakage solution and groundwater maps suggest high water table.

There would be an increase in both volume of surface water and discharge rates of surface water for the new development over the rates of current surface water discharged from the existing site.

In line with the Planning Policy 5.15 of the London Plan, surface water flows should be reduced to Greenfield rates or as close as is practicable possible. Therefore, surface water flows from the proposed development will need to be managed to a rate no greater than existing.

It is proposed to collect all surface water from the new extension roof area of approximately $10m^2$ and discharge via a water storage barrel (227 litre capacity) and free drain to the existing drain located in the rear of the property adding an additional 0.2 l/s peak discharge.

To combat the additional flow of 0.2 l/s to the rear drain, the existing block paved area at the front of the property, is to be replaced with a permeable paved area of $68m^2$ peak discharge at 1.4 l/s therefore the design offers a betterment of 1.2 l/s on the original drainage, Dwg 36316/C/100 shows indicative proposals.

It is noted on street level maps neighbouring properties have utilised permeable driveways, without conclusive evidence against these properties flooding the use of permeable paved driveways are part of the viable solution

The proposed surface water drainage solution uses the first two principles of the Suds Heirarchy:

1. store rainwater for later use as per the water storage barrel
2. use infiltration techniques, such as porous surfaces in non-clay areas as per the permeable paving.

As the property is close, but sits outside Fluvial and Pluvial Flood risk areas and the reports of nearby flooding as per The London Borough of Hillingdon LLFA Flood Investigation Report for floods dated 23rd June 2016, report dated June 2017. The detailed design will provide appropriate flood resistant and resilient features. Some of the features that will be taken into account for the whole of the building footprint (existing building and proposed extension) include the following:

- installing flood doors,
- flood barriers,
- air brick covers,
- pointing or waterproofing brickwork,
- installing non-return valves, and
- moving existing electric sockets by at least 300mm above floor level.
- raise whole of existing ground floor level by 75 millimetres.

6 CONCLUSION

The site is Brownfield and the proposed development will have an increased impermeable area. Overall the site would generate an increase in both the peak rate and volume of surface water runoff from the site

The existing surface water discharges into a surface water sewer in the front and a surface drain in the rear of the property to an ordinary watercourse which is in close proximity. This development is highly unlikely to infiltrate via traditional soakaways or crates as that the soil and the groundwater table would prevent sufficient meaningful infiltration to be able to utilise as a soakage solution.

It is proposed to collect all surface water from the new extension roof area of approximately 10m^2 and discharge via a water storage barrel (227 litre capacity) and free drain to the existing drain in the rear of the property. As it is highly unlikely that an underground storage tank will drain into the soil as at depth would not provide sufficient meaningful infiltration to be able to utilise a complete soakage solution and with risk of shallow groundwater.

To combat the additional flow of 0.2 l/s to the rear drain, the existing block paved area at the front is to be replaced with a permeable paved area of 68m^2 peak discharge at 1.4 l/s therefore the drainage solution provides a betterment of 1.2 l/s (an improvement of reducing the existing permeable area by 58m^2 or 580%) on the original.

The drainage solution uses the first two stages of the Thames Water and London Plan SuDs Hierarchy:

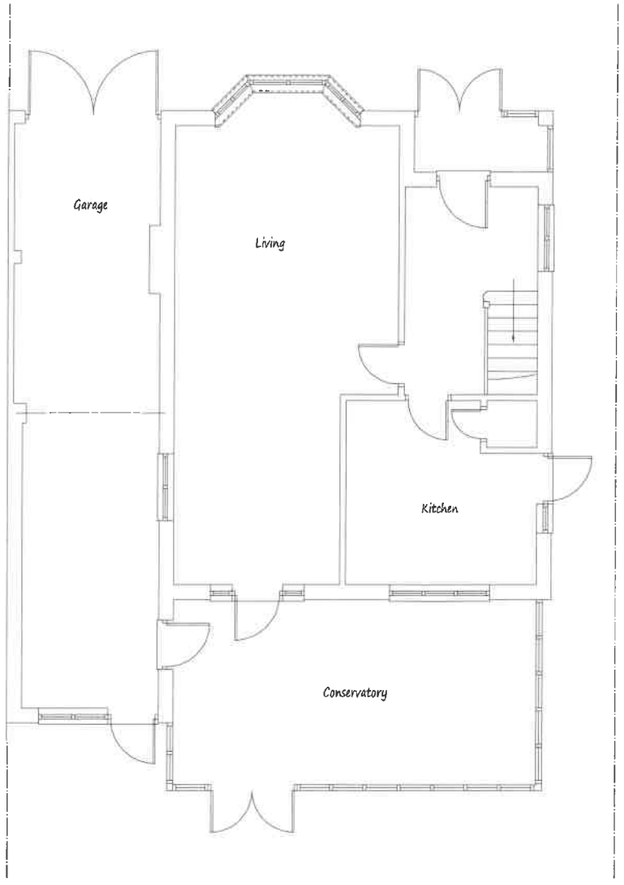
1. store rainwater for later use as per the water storage barrel
2. use infiltration techniques, such as porous surfaces in non-clay areas as per the permeable paving.

The detailed design will provide appropriate flood resistant and resilient features for the whole building.

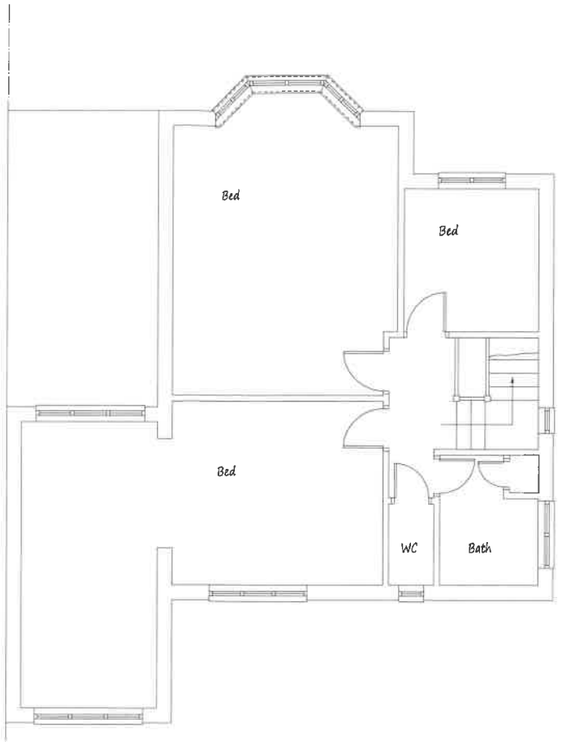
It is recommended that the surface water drainage system is monitored annually and maintained as necessary.

APPENDIX A

DRAWINGS



Existing Ground Floor Plan



Existing First Floor Plan

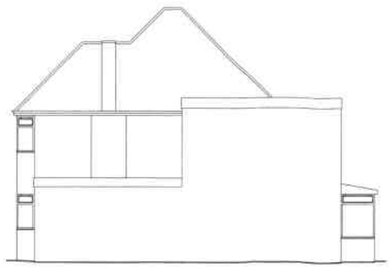
This drawing to be read in conjunction with Drg No 4207/02

Existing Elevations

Front Elevation

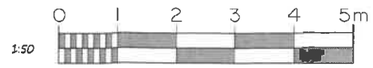
Side Elevation

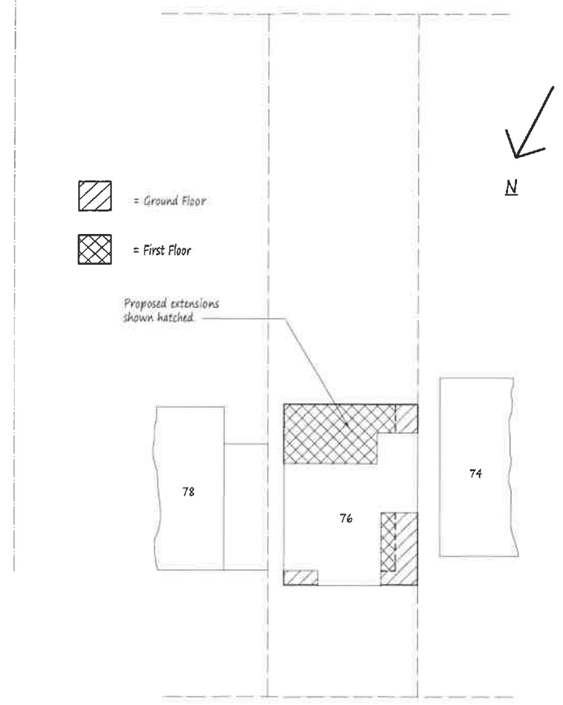
Rear Elevation



Side Elevation

Scale Bar





Site Plan scale 1:200

NOTES:
All dimensions must be checked on site and not scaled from this drawing.

A		
	Date	Revisions

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Client
Mr. S. Morris

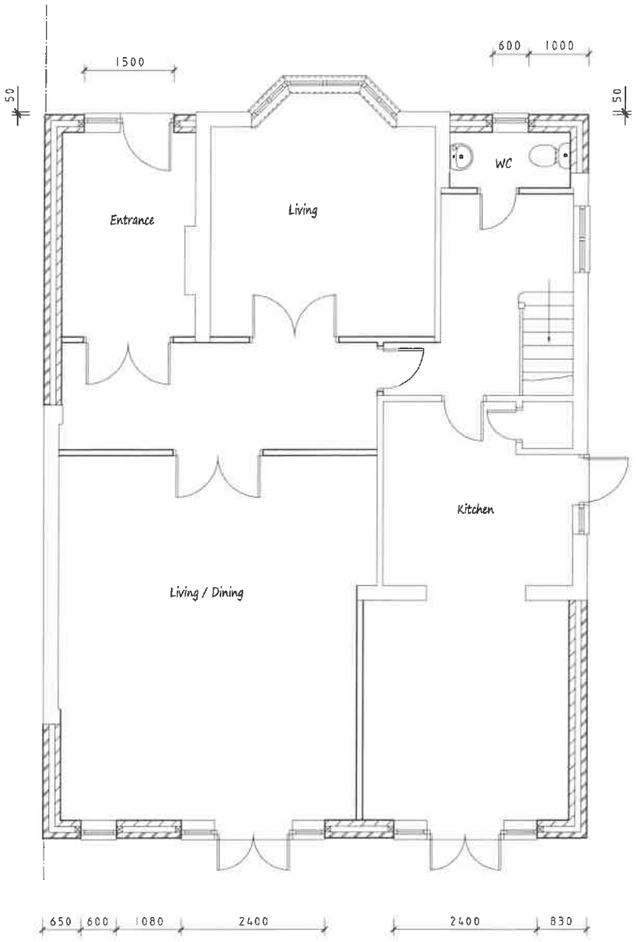
Job Title
76 Park Avenue
Ruislip
Middlesex

Drawing Title
Existing Details and Site Plan.

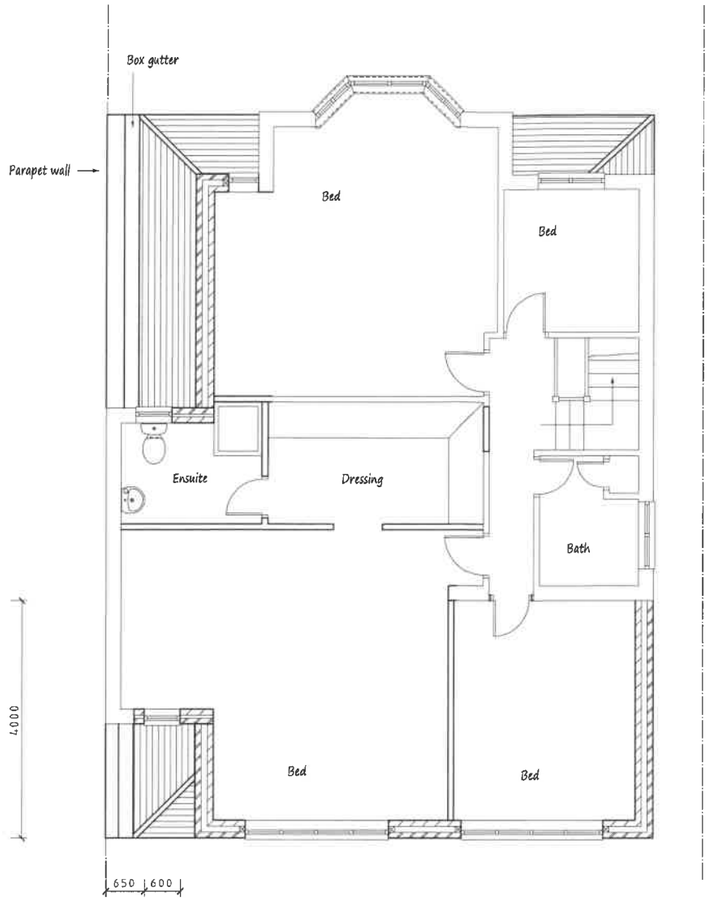
Scale
1:50, 100, 200

Date	Drawn by
March 2019	MDP

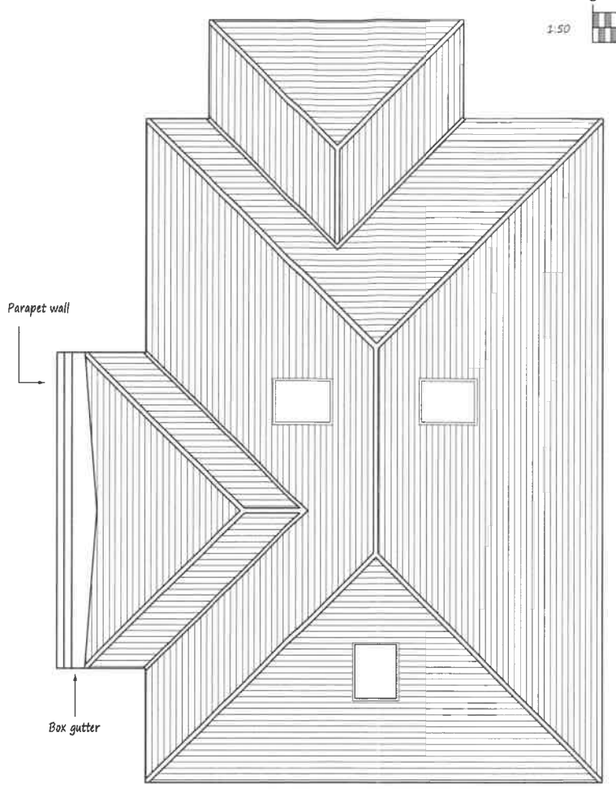
Drg No.
4207/01



Proposed Ground Floor Plan



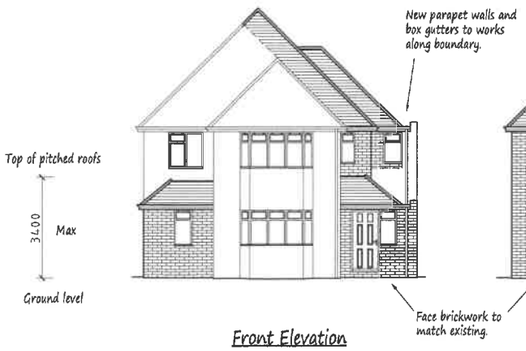
Proposed First Floor Plan



Proposed Roof Plan

This drawing to be read in conjunction with Drg No 4207/01

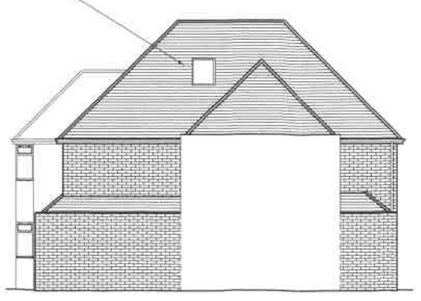
Proposed Elevations - All Materials to Match Existing



Front Elevation

Side Elevation

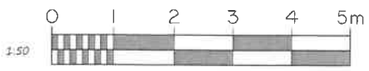
Rear Elevation



Side Elevation

NOTES:
All dimensions must be checked on site and not scaled from this drawing.

Scale Bar



A		
	Date	Revisions

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Client
Mr. S. Morris

Job Title

76 Park Avenue
Ruislip
Middlesex

Drawing Title

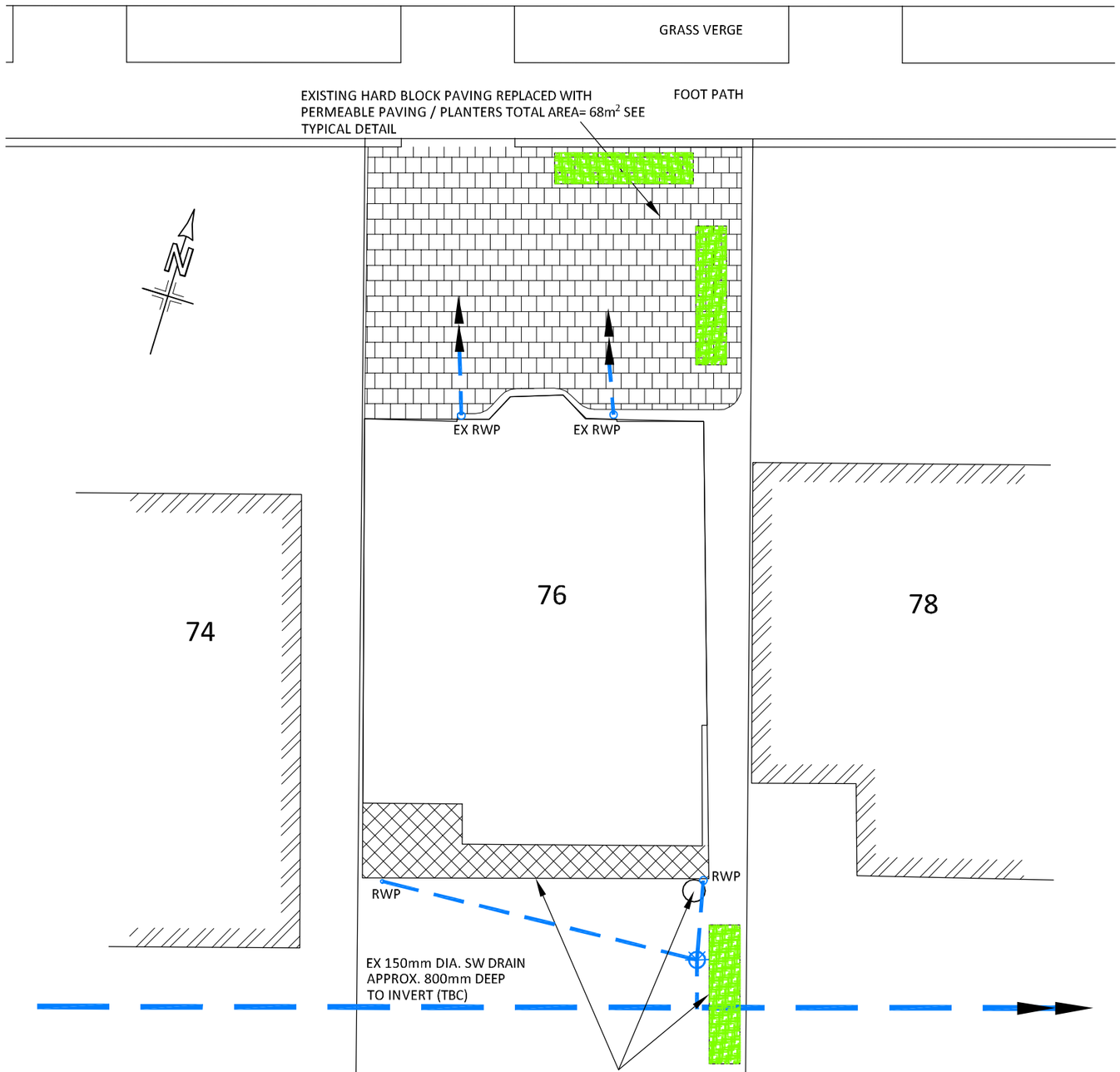
Proposed Single Storey Front / Side Extensions, First Floor Side and Two Storey Rear Extension, Including Alterations to Main Roof.

Scale
1:50. 100

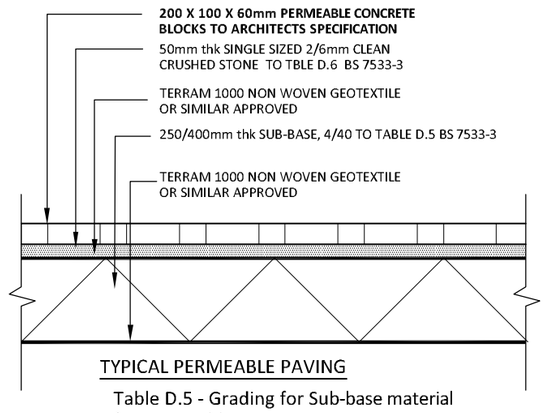
Date	Drawn by
March 2019	MDP

Drg No.
4207/02

PARK AVENUE



PLAN (INDICATIVE ONLY)



TYPICAL PERMEABLE PAVING

Table D.5 - Grading for Sub-base material for permeable pavements.

BS sieve size (mm)	% passing by Mass
	4/40
80	100
63	98-100
40	90-99
31.5	-
20	25-70
10	-
4	0-15
2.8	0-5

SUBJECT TO CCTV DRAINAGE SURVEY / REPORT

CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015

DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION

1. SERVICES TO BE LOCATED
2. MANUAL LIFTING
3. HOT MATERIAL WORKING
4. CUTTING/DUST
5. CONCRETE, HANDING, LIFTING, PLACEMENT
6. DEEP EXCAVATIONS, COLLAPSE/FALLING
7. SERVICE VOIDS/RISERS, FALLING

Use figured dimensions only: Do not scale from drawing.
All levels and dimensions are to be checked on site.
This drawing is to be read in conjunction with all relevant documents

KNAPP HICKS & PARTNERS LTD. (DATE AS TITLE)

NOTES.
-

NOTES

1. Invert levels and positions of existing drains / chambers / sewers where new connections are to be made are to be confirmed prior to construction.
2. Tests to DG 365 2018 Soakage Design to the proposed permeable areas to confirm design prior to construction and to be read in conjunction with surface water / foul drain CCTV Drainage survey report
3. All drainage works shall be carried out in accordance with the requirements of the Local Authority, the Environment Agency and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 6th Edition and any addendums as appropriate.
4. All drainage shall comply with the typical details and the requirements of BS EN 752 and Part H of the Building Regulations.
5. Any part of the existing drainage system to be retained as part of the new scheme shall be cleaned and inspected. Any structural defects shall be repaired using appropriate and approved means.
6. For setting-out dimensions of SVP's, RWP's etc, refer to Architect's or Mechanical Engineer's drawings. Positions shown are indicative and subject to final design.
7. All surface water drainage shall be 150mm diameter unless otherwise stated.
8. All precast concrete units used in the drainage works shall be manufactured using sulphate resisting cement. Buried concrete to satisfy the requirements of BRE Special Digest 1 = AC-1 & Site Investigation Report.
9. Manhole covers and frames shall be BS EN 124 and shall be Kitemarked. Covers and frames shall be heavy duty D400 in carriageways and vehicular areas and medium duty B125 in footways and soft landscaping. MH covers in paved areas to have cover & frame orientated 'square' with paving to minimise cut slabs or blocks.
10. Refer to structural drawings for details of manholes and sewers constructed within floor slabs and foundations.
11. Cover levels are to be adjusted locally to suit finished ground levels.
12. HEALTH AND SAFETY: The works shall be carried out by specialist competent and experienced contractors who are members of a recognised national organisation.
13. Operatives shall have received full and appropriate training for the operations they are to undertake. All work shall be carried out in accordance with all pertinent Health and Safety Regulations.
14. Existing drainage to be removed to be broken out to bed level and void backfilled with granular material, compacted in layers not exceeding 250mm.
15. Access panels are to be provided to all rainwater downpipes 600mm max. above finished ground level.
16. All Gradients at drainage runs are indicative, runs to be laid soffit to soffit
17. Generally pipes to have granular Bed & Surround in accordance with manufacturers recommendations, ensuring adequate protection with respect to depth and location.
18. All private drainage to be laid to levels shown using flexibly jointed pipes, either uPVC to BS 4660 and BS 5481 or vitrified clayware to BS EN 295.
19. Rodding eyes, etc are to be laid to manufacturers minimum cover and depth to allow adequate fall from adjoining unit.
20. Groundworker to ensure proposed finished ground profile is formed by evenly grading between the spot levels shown.

Rev	Date	Revision	By	Chk
-	23/08/19	INITIAL ISSUE	NK	CET

Client

Mr S.Morris

Project

76 Park Avenue
Ruislip
MIDDLESEX, HA4 7UJ

Drawing Title

DRAINAGE PLAN PROPOSAL

Knapp Hicks
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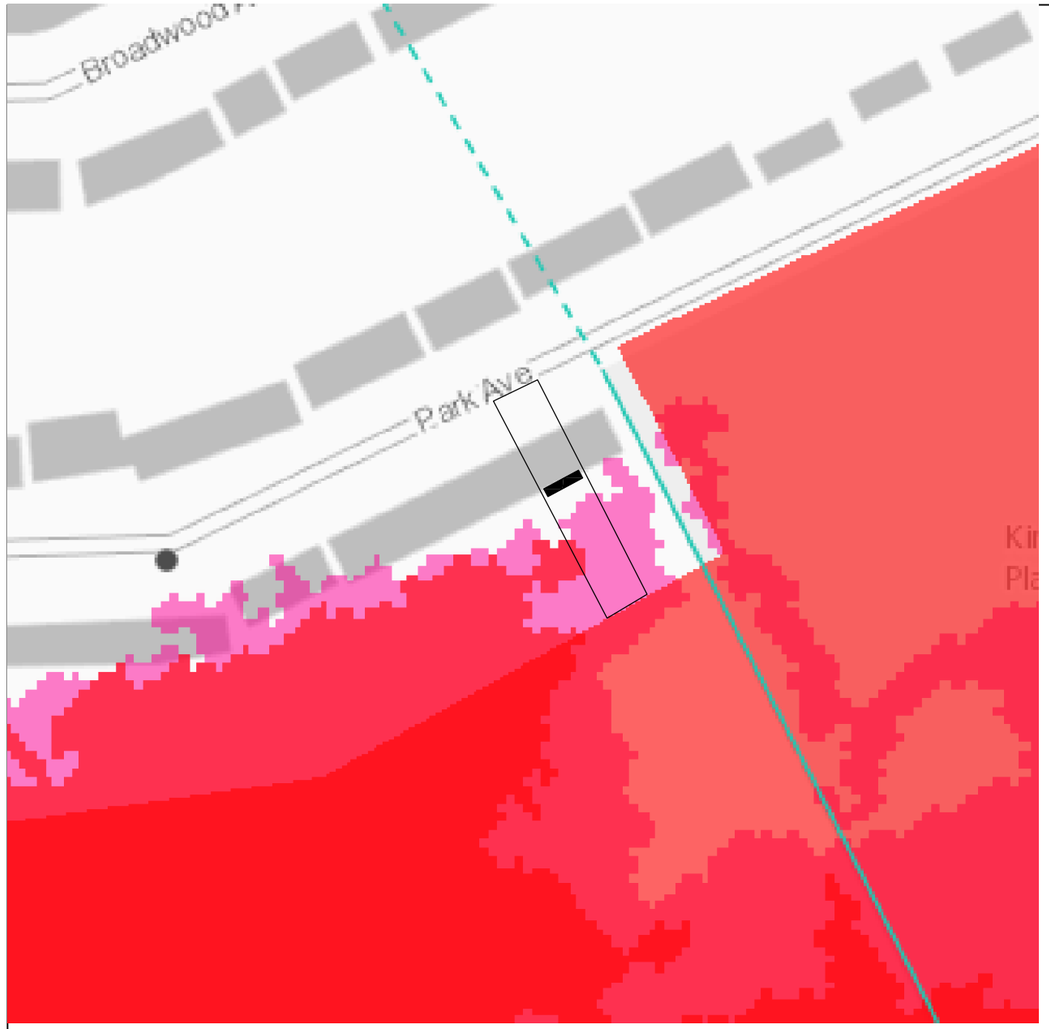
SCALE	NTS	DRAWN	NK	A1
DATE	AUG 19	CHECK	CET	

PRELIMINARY

36316 / C / 100 -

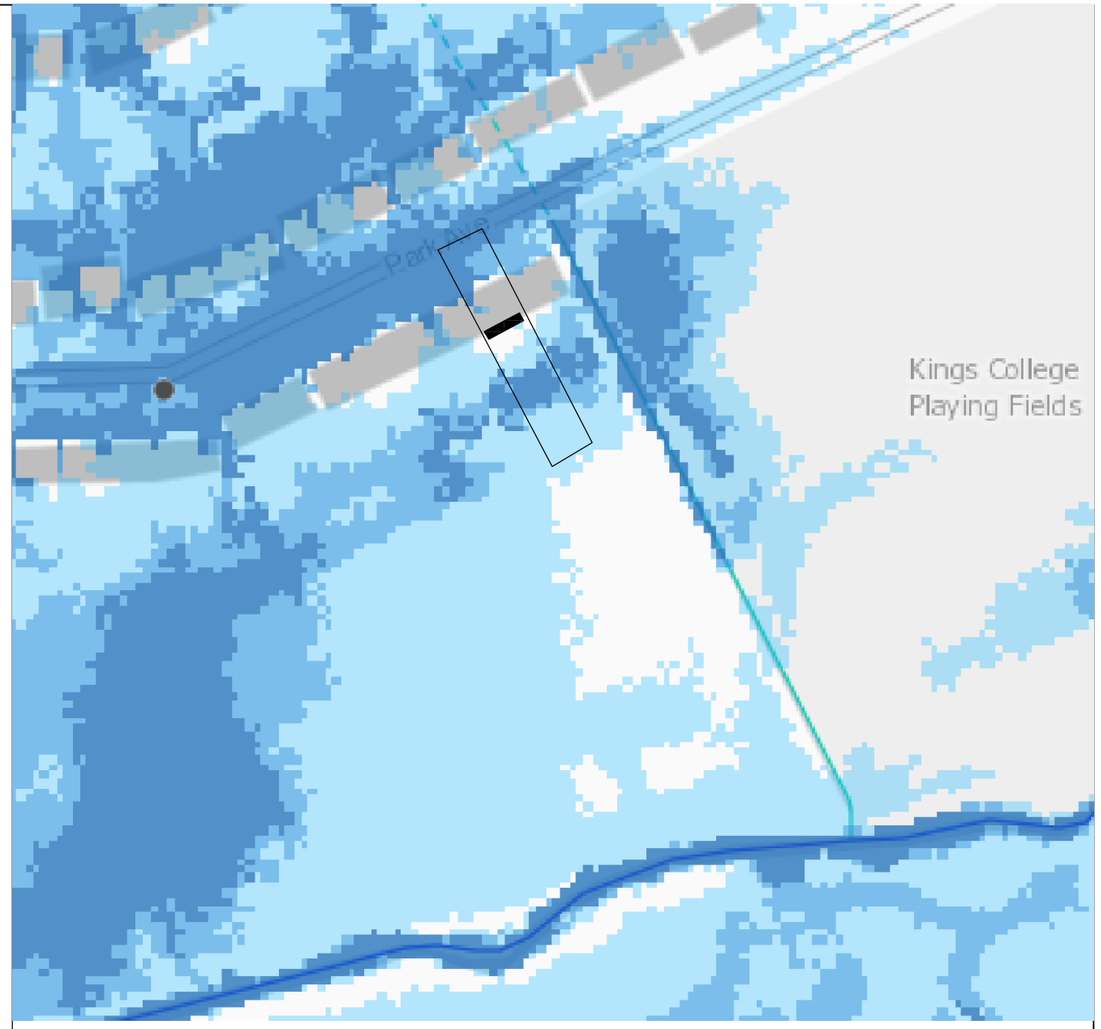


FLUVIAL / TIDAL FLOOD MAP

Flood Zone 3b (Functional floodplain) is defined as:
• Land within EA modelled fluvial and tidal flood risk extents predicted for up to and including 1 in 20 year return period events allowing for the impact of flood defences – Flood Zone 3b (fluvial / tidal)
• Land which is included within the EA's Flood Storage Areas dataset – Flood Zone 3b (fluvial / tidal)

Flood Zone 3a is defined as:
• Land within EA modelled fluvial flood risk extents predicted for up to and including 1 in 100 year return period events – Flood Zone 3a (fluvial / tidal)
• Land within EA modelled tidal flood risk extents predicted for up to and including 1 in 200 year return period events – Flood Zone 3a (fluvial / tidal)
• Land within EA modelled surface water flood risk extents predicted for up to and including 1 in 100 year return period events – Flood Zone 3a (surface water)

Area of Proposed Extension



PLUVIAL SURFACE WATER FLOOD MAP

EA2017 - Risk of flooding from Surface Water Extent: 3.3% annual chance

EA2017 - Risk of flooding from Surface Water Extent: 1% annual chance

EA2017 - Risk of flooding from Surface Water Extent: 0.1% annual chance

Area of Proposed Extension

Use figured dimensions only: Do not scale from drawing.
All levels and dimensions are to be checked on site.
This drawing is to be read in conjunction with all relevant documents

KNAPP HICKS & PARTNERS LTD. (DATE AS TITLE)

NOTES.

Maps taken from West London SFRA Policy Map Directory

Rev	Date	Revision	By	Chk
-	23/08/19	INITIAL ISSUE	NK	CET

Client
Mr S.Morris

Project
76 Park Avenue
Ruislip
MIDDLESEX, HA4 7UJ

Drawing Title
West London SFRA Policy Map
Fluvial / Tidal Flood Map
Pluvial / Surface Water Map

Knapp Hicks
Consulting Structural, Civil & Geotechnical Engineers
Prospect House, 1 Highpoint Business Village
Henwood, Ashford, Kent TN24 8DH
tel: 01233 502255 website: www.knapphicks.co.uk

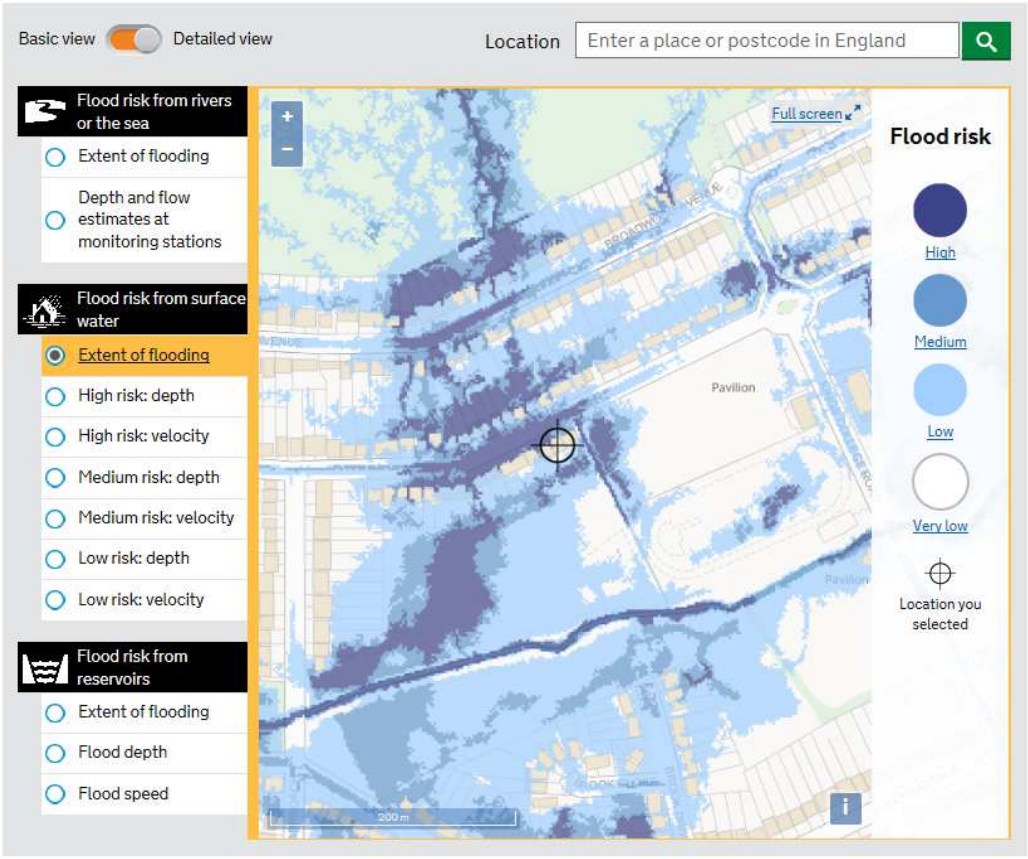
SCALE	NTS	DRAWN	NK	A1
DATE	AUG 19	CHECK	CET	

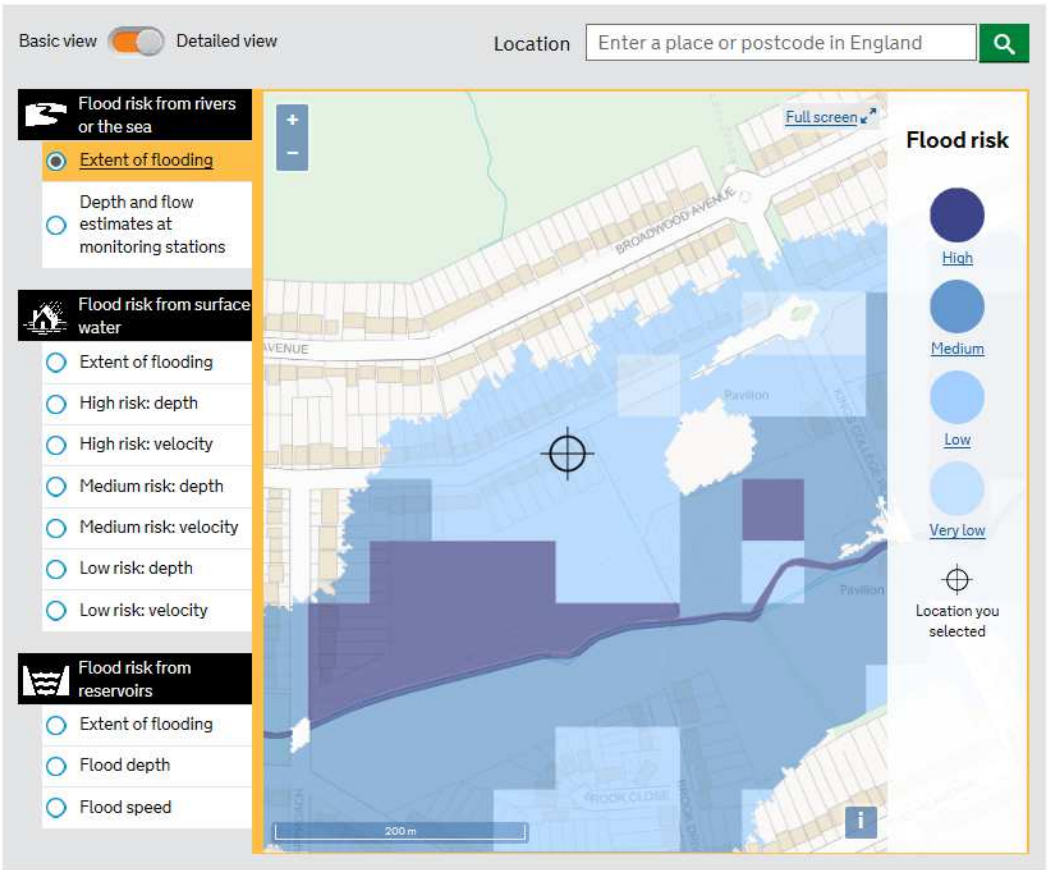
PRELIMINARY

36316/ C /101 -

APPENDIX B

FLOOD RISK PLANS FROM ENVIRONMENT AGENCY GROUNDSURE LOCATION INTELLIGENCE.


Basic view
Detailed view
Location
Enter a place or postcode in England
Flood risk from rivers or the sea
Extent of flooding
Depth and flow estimates at monitoring stations
Flood risk from surface water
Extent of flooding
High risk: depth
High risk: velocity
Medium risk: depth
Medium risk: velocity
Low risk: depth
Low risk: velocity
Flood risk from reservoirs
Extent of flooding
Flood depth
Flood speed
Full screen
Flood risk
High
Medium
Low
Very low
Location you selected
Pavilion
200 m


Basic view
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Enter a place or postcode in England
Flood risk from rivers or the sea
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Flood risk from reservoirs
Extent of flooding
Flood depth
Flood speed
Full screen
Flood risk
High
Medium
Low
Very low
Location you selected
Pavilion
200 m

Groundsure
LOCATION INTELLIGENCE

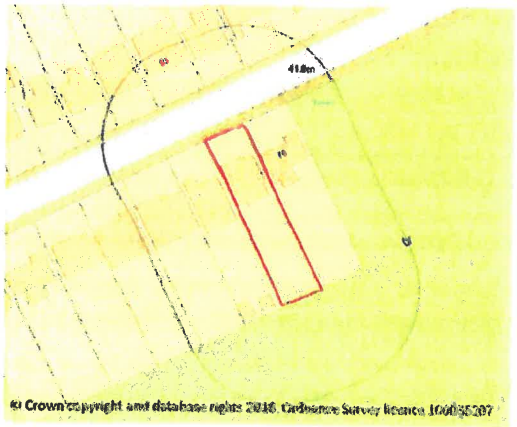
Flood

76 Park Avenue RUISLIP, HA4 7UJ

Overall Flood risk

HIGH

Groundsure Flood complies with relevant Law Society practice notes on flood risk in property transactions.



It is important to be fully informed of all risks associated with a property before completing your purchase. Please read all the information in this report carefully.

Flood considerations

Rivers and the Sea	Low	page 3
Surface Water	High	page 5
Groundwater	Negligible	
Historic Flood	Identified	page 4
Flood Defences	Present	page 4

JBA floodability index

Floodability	Black 1	page 6

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SEARCH FLOW

You can contact SearchFlow on:
helpdesk@SearchFlow.co.uk
0870 787 7625

Full assessments for other environmental risks are available in additional Groundsure searches including the Groundsure Avista 7 in 1 report. Contact Groundsure or your search provider for further details.

Key recommended next steps

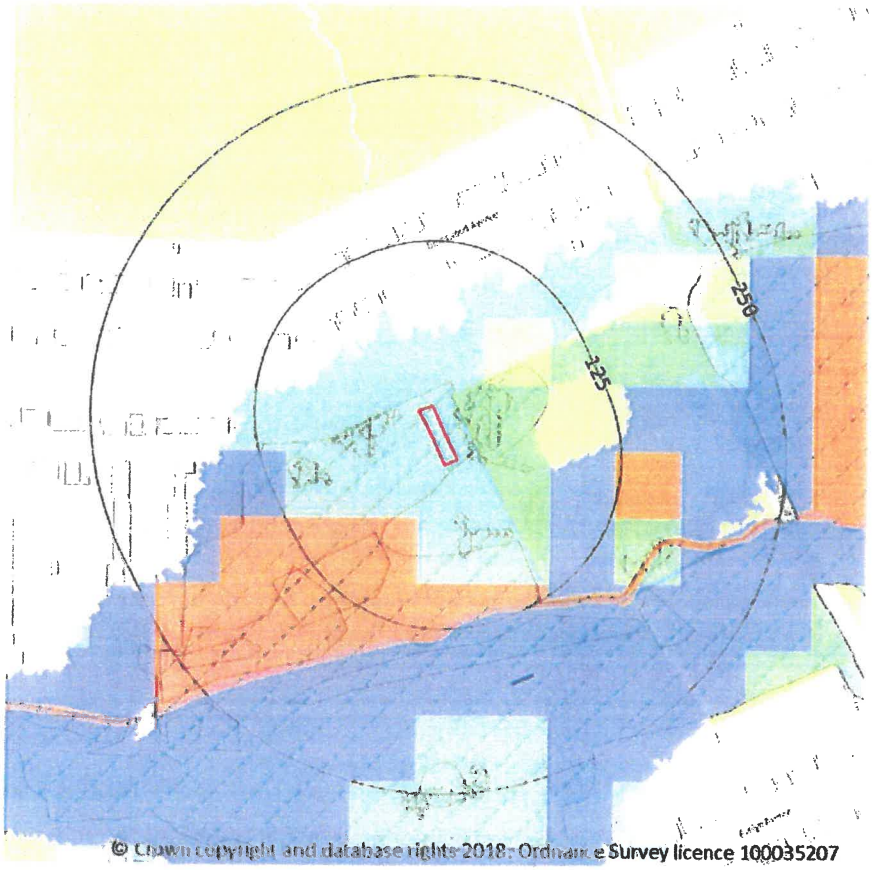
These relate to an environmental risk that may affect health, insurance premiums and/or a lender's willingness to lend.

Flood risk
The property is assessed to have a flood risk rating of moderate or higher. Key recommended next steps:

- consider flood prevention measures that may be useful in the property, such as flood gates and barriers or modified airbricks
- investigate the insurance on offer for the property to ensure any implications on premiums are fully understood before completion
- check to see if the property is eligible for the Flood Re scheme, which enables many properties at risk of flooding to be insured at reasonable rates: http://www.floodre.co.uk/homeowner/about-us/

Flood

Risk of flooding from rivers and the sea



X Site Centre — Site Outline

-125-
-250- Search buffers in metres (m)

Environment Agency river and coastal flooding:

- High
- Medium
- Low
- Very Low

- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Proposed Flood Defence Scheme
- Flood Defences

Risk of flooding from rivers and the sea

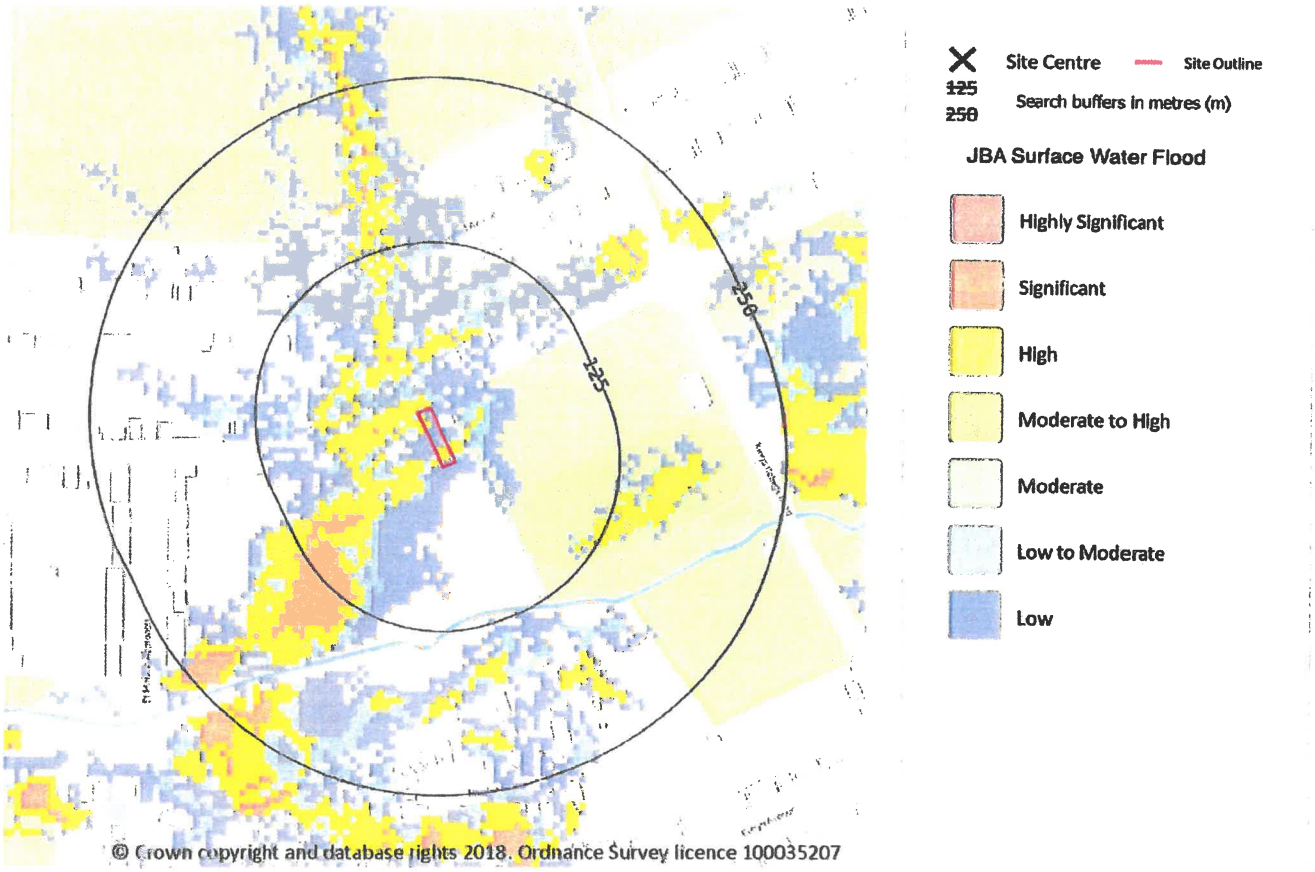
The property has a Low chance of flooding in any given year, according to Risk of Flooding from Rivers and Sea (RoFRaS) data. This could cause problems with insuring the property against flood risk. However, if built before 2009, it may be eligible for insurance assistance from the Flood Re scheme: http://www.floodre.co.uk/

RoFRaS assesses flood risk from rivers and the sea in England and Wales, using local data and expertise. It shows the chance of flooding from rivers or the sea, taking account of flood defences and the condition those defences are in. The RoFRaS model uses local water level and flood defence data to model flood risk. See below for explanation of the RoFRaS levels of flood risk.

Please see the Recommended next steps on **page 2** for further advice.

Environment Agency RoFRaS risk ratings

Surface water flood risk



Surface water flood risk

The property is likely to be prone to flooding following extreme rainfall, which could cause problems with insuring the property against flood risk. However, if built before 2009, it may be eligible for insurance assistance from the Flood Re scheme: http://www.floodre.co.uk/

The area in which the property is located has been assessed to be at a High risk of surface water flooding. This area is considered to have a 1 in 75 probability of surface water flooding due to rainfall in a given year to a depth of between 0.1m to 0.3m. However, as is the case with probability statistics and predictions, this information should be used as a guideline only. The area may flood several years in a row, or not at all for many years.

These risk calculations are based on JBA Risk Management maps.

Very Low	Low	Medium	High
The chance of flooding from rivers or the sea is considered to be less than 1 in 1000 (0.1%) in any given year.	The chance of flooding from rivers or the sea is considered to be less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) in any given year.	The chance of flooding from rivers or the sea is considered to be less than 1 in 30 (3.3%) but greater than 1 in 100 (1%) in any given year.	The chance of flooding from rivers or the sea is considered to be greater than or equal to 1 in 30 (3.3%) in any given year.

Historical flood areas

Large scale flooding has been recorded in the area where the property is located in the past.

A record of a flood in previous years does not mean that an area will flood again, especially as this information does not take account of flood management schemes and improved flood defences. Equally, absence of a historic flood event for an area does not mean that the area has never flooded, but only that it doesn't appear in Environment Agency national data.

As flood risks may or may not have changed, this requires further investigation.

Distance	Direction	Date of Flood	Flood Source	Flood Cause	Type of Flood
0	on site	01-01-1977 12-12-1977	Main river	Channel capacity exceeded (no raised defences)	Fluvial

This information is collated from a database showing the individual footprint of every historic flood recorded by Environment Agency. Please note this doesn't include records held by individual local offices.

Flood Defences

Flood defences

There are flood defences built in the vicinity of the property. Flood defences seek to reduce the risk of flooding and to safeguard life, protect property, sustain economic activity and the natural environment. Flood defences are designed to protect against flood events of a particular magnitude, expressed as risk in any one year.

Please see the Recommended next steps on **page 2** for further advice.

Datasets searched but no features were found at this location

In addition to the results detailed in the maps and tables in this report, all of these datasets were also queried but did not reveal any results relevant to the site or surrounding area.

Flood Risk
Flood storage areas: part of floodplain
Areas benefiting from flood defences
Proposed flood defences
Groundwater flooding

Flood information

The Flood Risk Assessment section is based on datasets covering a variety of different flooding types. No inspection of the property or of the surrounding area has been undertaken by Groundsure or the data providers. The modelling of flood hazards is extremely complex and in creating a national dataset certain assumptions have been made and all such datasets will have limitations. These datasets should be used to give an indication of relative flood risk rather than a definitive answer. Local actions and minor variations, such as blocked drains or streams etc. can greatly alter the effect of flooding. A low or negligible modelled flood risk does not guarantee that flooding will not occur. Nor will a high risk mean that flooding definitely will occur. Groundsure's overall flood risk assessment takes account of the cumulative risk of river, coastal, surface water (pluvial), and groundwater flooding and historic flood events.

Risk of flooding from rivers and the sea
This is an assessment of flood risk for England and Wales produced using local data and expertise, provided by Environment Agency. It shows the chance of flooding from rivers or the sea presented in categories taking account of flood defences and the condition those defences are in. The model uses local water level and flood defence data to model flood risk.

Historic flood events
Over 86,000 events are recorded within this database. This data is used to understand where flooding has occurred in the past and provides details as available. Absence of a historic flood event for an area does not mean that the area has never flooded, but only that Environment Agency/Natural Resources Wales do not currently have records of flooding within the area. Equally, a record of a flood footprint in previous years does not mean that an area will flood again, and this information does not take account of flood management schemes and improved flood defences.

Surface water flooding
JBA Risk Management surface water flood map identifies areas likely to flood following extreme rainfall events, i.e. land naturally vulnerable to surface water or "pluvial" flooding. This data set was produced by simulating 1 in 75 year, 1 in 200 year and 1 in 1000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though older ones may even flood in a 1 in 5 year rainstorm event.

Proposed flood defences
The data includes all Environment Agency/Natural Resources Wales's projects over £100K that will change or sustain the standards of flood defence in England and Wales over the next 5 years. It also includes the

equivalent schemes for all Local Authority and Internal Drainage Boards.

Flood storage areas

Flood Storage Areas may also act as flood defences. A flood storage area may also be referred to as a balancing reservoir, storage basin or balancing pond. Its purpose is to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel. It may also delay the timing of a flood peak so that its volume is discharged over a longer time interval. These areas are also referred to as Zone 3b or 'the functional floodplain' and has a 5% or greater chance of flooding in any given year, or is designed to flood in the event of an extreme (0.1%) flood or another probability which may be agreed between the Local Planning Authority and Environment Agency/Natural Resources Wales, including water conveyance routes. Development within Flood Storage Areas is severely restricted.

Groundwater flooding

Groundwater flooding is flooding caused by unusually high groundwater levels. It occurs as excess water emerging at the ground surface or within underground structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, in some cases lasting for weeks or months, and it can result in significant damage to property. This risk assessment is based on a 5m Digital Terrain Model (DTM) and a 1 in 100 year return period.

JBA Floodability

The property has been rated as **Black 1**. Please see the Recommended next steps on **page 2** for further advice.

Flood Re is a joint initiative between the Government and insurers. It was set up to help UK residents who are at risk of flooding to obtain flood cover as part of their household insurance. There are several exemptions from the Flood Re scheme including new properties built after 1 January 2009, commercial property, buy to let properties and blocks of flats with four or more units. A full list of exemptions is available on the Flood Re website (https://www.floodre.co.uk/can-flood-re-help-me/eligibility-criteria/).

JBA's Floodability rating provides an indication of the likelihood of a property being ceded into the Flood Re scheme from river, coastal and surface water flood only. It does not consider the many other factors needed for ceding into the Flood Re scheme, nor does it consider the other requirements for obtaining insurance.

The JBA Floodability Index is categorised on a fivefold scale:

Green indicates a level of flood hazard such that insurance covering flood risk may be obtainable relatively easily as part of a standard household insurance contract. There is a very low possibility of insurance companies ceding the property into the Flood Re scheme unless the property has flooded in the past.

Amber indicates a level of flood hazard such that insurance covering flood risk may be available but may be subject to increased premiums and non-standard and/or additional terms. There is a low possibility of insurance companies ceding the property into the Flood Re scheme unless the property has flooded in the past.

Red indicates a level of flood hazard such that standard priced insurance covering flood risk is likely to be subject to increased premiums and non-standard and/or additional terms. There is a moderate possibility of insurance companies ceding the property into the Flood Re scheme particularly if the property has flooded in the past.

Black 1 indicates a level of flood hazard such that standard priced insurance covering flood risk is likely to be subject to increased premiums and non-standard and/or additional terms. There is a high possibility of insurance companies ceding the property into the Flood Re scheme, especially if the property has flooded in the past.

Black 2 indicates a level of flood hazard such that standard priced insurance covering flood risk is likely to be subject to increased premiums and non-standard and/or additional terms. There is a very high possibility of insurance companies ceding the property into the Flood Re scheme, especially if the property has flooded in the past.

Search Code and Groundsure terms and conditions

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- 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 practice 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.

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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 Web: https://www.tpos.co.uk/

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- acknowledge it within 5 working days of receipt
- normally deal with it fully and provide a final response, in writing, within 20 working days of receipt
- keep you informed by letter, telephone or e-mail, as you prefer, if we need more time
- provide a final response, in writing, at the latest within 40 working days of receipt
- liaise, at your request, with anyone acting formally on your behalf

Complaints should be sent to:
Operations Director, Groundsure Ltd, Sovereign House, Church Street, Brighton, BN1 1UJ. Tel: 08444 159 000. Email: info@groundsure.com If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: admin@tpos.co.uk We will co-operate fully with the Ombudsman during an investigation and comply with their final decision.

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Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information in your Flood report. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

APPENDIX C

Correspondence from Hillingdon Borough Council

Thank you Charlotte, I will forward onto our client to address.
With kind regards
Gary

On Monday, 19 August 2019, 08:47:44 BST, Charlotte Spencer <cspencer2@hillingdon.gov.uk> wrote:

Hi Gary,

I received the response last week when I was on leave. The updated comments are as follows:

The information is not currently in line with national, regional and local planning policy. The application should be refused, or the following changes made to the submission and aspects secured by way of condition. The FRA makes reference to multiple documents that are now superseded and does not refer to new key reports and legislation, including the National Planning Policy Framework (2019), West London Strategic Flood Risk Assessment (2018), Planning Practice Guidance (originally published 2014). These should be amended in the FRA to ensure compliance with national, regional and local planning policies. The FRA has failed to address concerns previously raised regarding the risk of flooding from surface water and from the ordinary watercourse that runs adjacent to the next door property. Extensive flooding occurred in June 2016 in the vicinity of the property as covered in the Flood Investigation Report available on the Council website. The FRA states that the risk of surface water flooding is low, whereas the Environment Agency mapping shows that from the carriageway of Park Avenue up to the front elevation is at high risk of surface water flooding, with depths potentially increasing above 300mm in the medium event when climate change is taken into account. The front entrance to the property will move from an area at lower risk of flooding to an area at higher risk (to the west). The FRA has not recommended any flood protection measures. To reduce the potential of internal property flooding, the new front door to the property should be flood proof and flood proofing measures put in place (such as external flood proofing). The FRA has addressed the need to attenuate collected surface water from the property as a result of the increase extent of impermeable surfaces; however, the chosen method is not considered to be appropriate for the location of the site. Due to the ordinary watercourse from Park Wood and the proximity to the River Pinn, the surface water drainage network is known to surcharge in this location. While it is acknowledged that traditional soakaways are unlikely to drain due to the potential for shallow groundwater and the alluvium deposits, the use of permeable paving, rainwater harvesting and rain gardens/planters would be a more appropriate and sustainable method of draining the site as they will reduce the connectivity to the constrained surface water sewer network and provide water quality, water resources and biodiversity benefits.

Many Thanks
Charlotte

On Thu, 15 Aug 2019 at 13:03, Gary Pottle <gepottle@yahoo.co.uk> wrote:
Hi Charlotte
Is there any update from Flood Risk Officer yet please.
With kind regards
Gary

On Thursday, 25 July 2019, 09:49:52 BST, Charlotte Spencer <cspencer2@hillingdon.gov.uk> wrote:

Hi Gary,

Not yet, I have chased this morning.

Thanks
Charlotte