GeoSmart Information

Environmental Thinking

FloodSmart Standard

Site address	Land to the rear of 13 Glenmore Road Camden London NW3 4BY
Site coordinates	527279, 185002
Report prepared for	Christina and Andrew Edge 19 Broom Water Teddington TW11 9QJ
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1. Executive summary

The National Planning Policy Framework (2012) and Planning Practice Guidance (2015) requires that flood risk assessments review flooding from all potential sources. A review has been undertaken of national environmental data sets to assess the potential flood risk to the Site. The review is provided within this concise interpretative report written by an experienced GeoSmart flood risk consultant.

GeoSmart have assessed the best available data to determine the potential risk from flooding at the Site, based on professional judgment with recommendations where applicable. An explanation of the various risk categories is provided in the report.

Site analysis

Source of Flood risk	Baseline	After Mitigation
River and coastal	Low	N/A
Surface water pluvial flooding	Negligible	N/A
Groundwater flooding	Negligible	N/A
Other flood risk factors present	No	N/A
Is any other further work recommended?	No	N/A

N/A = mitigation not required

Proposals for the Site comprise an extension to the existing subterranean development to include two bedrooms, a bathroom, a living room and a utility room. According to the SFRA, the Site is located within a Critical Drainage Area (CDA) (Group3_005), however the risk of flooding from all sources is low to negligible and therefore mitigation measures are not required.

It should be noted within the London Borough of Camden's Basement and Lightwells guidance note (CPG4) and in line with advice from Thames Water that a positive pumped device is recommended for all basement developments.

Next steps

No further work is required to mitigate flood risk. A Sustainable Drainage strategy may be required by the London Borough of Camden due to the minor extension of the proposed basement development outside the building footprint. Confirmation with the council should therefore be sought.

2. Introduction

Background and purpose

This assessment has been undertaken by firstly compiling information concerning the Site and the surrounding area. The information which is gathered is then used to construct a 'conceptual site model', including an understanding of the appropriateness of the development as defined in the NPPF (2012) and the source(s) of any flood risk present. Finally, a preliminary assessment of the steps that can be taken to manage any flood risk to the development is undertaken.

This report has been prepared with reference to the National Planning Policy Framework (NPPF, 2012).

"*The National Planning Policy Framework set out the Government's planning policies for England and how these are expected to be applied*" (NPPF, 2012).

The National Planning Policy Framework promotes a sequential, risk based approach to the location of development.

"This general approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. The aim should be to keep development out of medium and high risk flood areas (Flood Zones 2 and 3) and other areas affected by other sources of flooding where possible" (NPPG, 2014).

The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at the Site.

Report scope

A thorough review of a commercially available flood risk report and Environment Agency supplied data indicating potential sources of flood risk to the Site from rivers and coastal sources, surface run-off (pluvial), groundwater and reservoirs, including historical flood information and modelled flood extent. Appropriate measures are recommended to manage and mitigate the flood risk to the property.

Local rainfall data for the 1 in 100 year rainfall event is used to support site run-off calculations if there is an increase in impermeable area as a result of the development. The effects of climate change are also included in these calculations, using industry standard advice.

Information obtained from the Environment Agency and a review of the London Borough of Camden Strategic Flood Risk Assessment (SFRA) (July 2014) is used to ascertain local flooding issues and, where appropriate, identify information to support a Sequential and/or Exception test required as part of the National Planning Policy Framework (NPPF, 2012).

Using the available data the existing and future flood risks to and from the Site from all flood sources will be assessed in line with current best practice.

An indication of potential flood risk from the Site to downstream receptors is provided where the proposed development increases run-off from the Site.

Report limitations

It is noted that the findings presented in this report are based on a desk study of information supplied by third parties. Whilst we assume that all information is representative of past and present conditions we can offer no guarantee as to its validity and a proportionate program of site investigations would be required to fully verify these findings.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

Datasets

The following table shows the sources of information that have been consulted as part of this report:

Source of flooding	Datasets consulted				
	Commercial Flood Report (Appendix B)	SFRA*	Environment Agency	Thames Water (Appendix C)	OS Data
Historical	X	X	X		
Fluvial/tidal	X	X	X		
Surface water (pluvial)	X	X	X		
Groundwater	X	X			
Sewer		X		X	
Culvert/bridges		X			X
Reservoir		X	X		

* London Borough of Camden Strategic Flood Risk Assessment (SFRA) (July 2014)
* Supporting information on the datasets used is provided in the relevant appendix

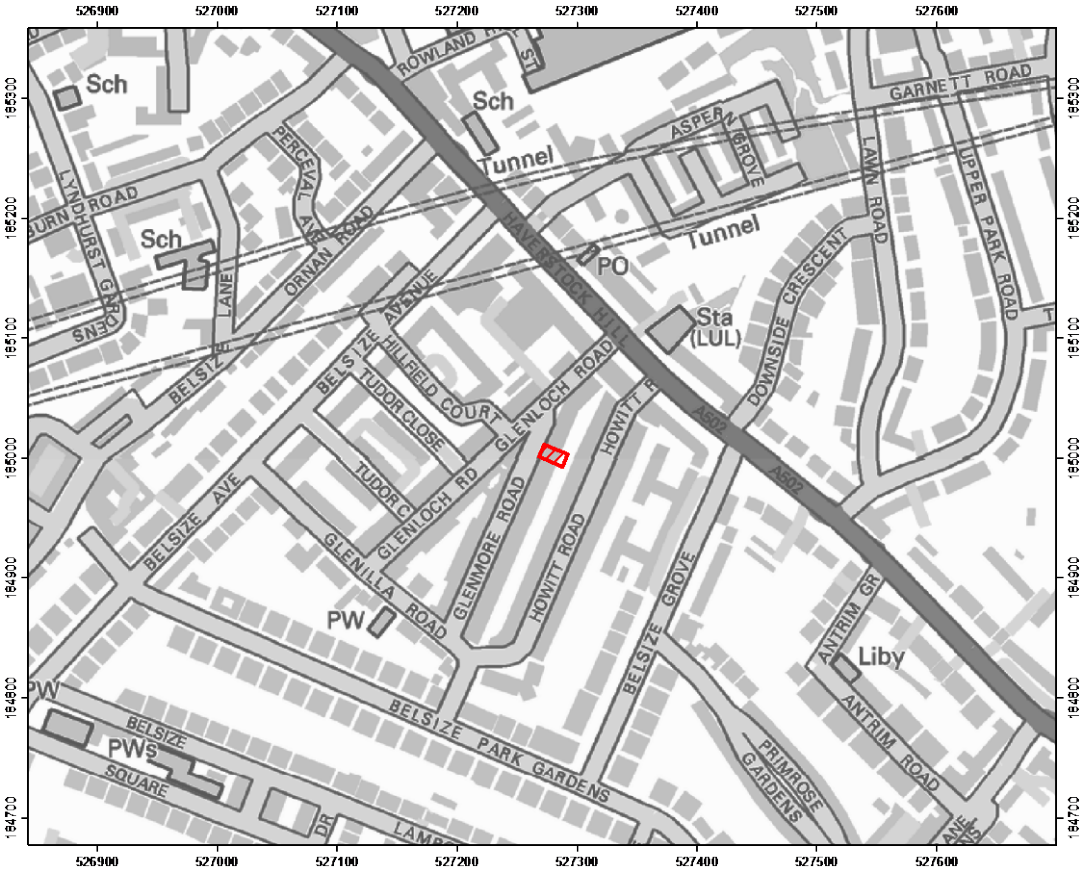
3. Site analysis

Site information

The Site is located in the Belsize Ward of the London Borough of Camden in a setting of predominately residential land use, National Grid Reference TQ 27279 85002 (see Figure 1). According to OS data the immediate area surrounding the Site is on a gentle slope between 65-70 mAOD. Using a 1 km buffer around the Site, it is noted that, to the north land rises to c.75 mAOD. To the west land remains between 65-70 mAOD, to the east land falls to between 35-40 mAOD and to the south falls to between 45-50 mAOD.

Site specific ground elevations in the form of a topographic survey were not provided and could not be obtained for the Site from the Environment Agency, 1 m and 2 m accuracy elevation data (ref: TQ_2785DTM) was not available. Based on Ordnance Survey DTM terrain 50 data, the Site has an elevation of 69.3 mAOD. It is acknowledged that the OS Terrain 50 data has a 50m grid resolution and the data is has been verified to be 4 m RMSE1. Site plans and drawings are provided in Appendix A.

Figure 1 Site Location



Development

The Site is currently used within a residential capacity. The proposed development will comprise an extension to the existing subterranean development to include two bedrooms, a bathroom, a living room and a utility room (see Appendix A). The effect of the overall development will not result in an increase in number of occupants and/or users of the building and will not result in the change of use, nature or times of occupation. The estimated lifespan of the development is 100 years.

Hydrological features

Watercourses/surface water features within 1km of the Site:

Hampstead Ponds are located approximately 830m north of the Site.

Potential overland flow routes to the Site could exist from the north and the north east.

Potential overland flow routes from the Site could exist to the south east.

Proximity to relevant infrastructure:

A culverted watercourse flows south from Hampstead Ponds and is located approximately 60m west of the Site. All main rivers historically located within London Borough of Camden are now culverted and are classed as 'lost rivers' (URS, 2014)

Hydrogeological features

British Geological Survey mapping indicates that there is no record of superficial deposits recorded on the Site (BGS, 2016)

British Geological Survey mapping indicates that the underlying bedrock geology consists of the London Clay Formation (BGS, 2016) and is not classified as an aquifer (EA, 2016).

The Site is not located within a Source Protection Zone.

4. Flood risk to the development

Historical flood events

No historic flood events have been recorded at the Site (Landmark, 2016)(EA, 2016).

Guidance

The purpose of historic flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean that flooding has never occurred on Site or that flooding will never occur at the Site.

Fluvial/coastal flood risk

According to the Environment Agency's Flood Map for Planning Purposes, the Site is located within an Environment Agency Flood Zone 1 and therefore classified as being at low risk of fluvial flooding (Figure 2). According to the SFRA, the Site is located within a Critical Drainage Area (CDA) (Group3_005) but is not located within a Local Flood Risk Zone (URS Ltd, 2014).

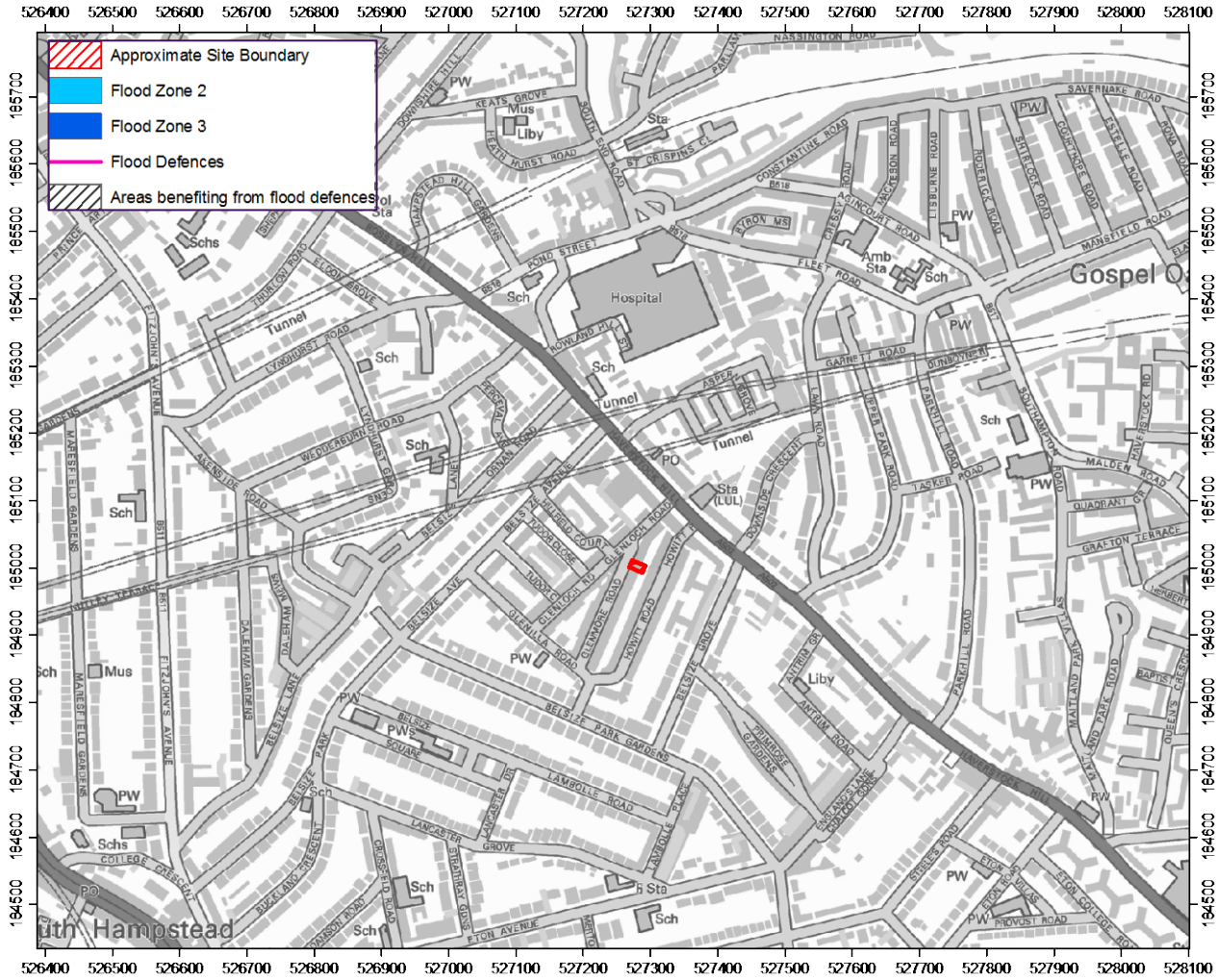
Guidance

As defined in the NPPF (2012):

Ignoring the presence of any defences, land located in a Flood Zone 1 is considered to be at low risk of flooding, with less than a 1 in 1000 annual probability of fluvial or coastal flooding in any one year.

Development of all uses of land is appropriate in this zone (see glossary for terminology).

Figure 2 Environment Agency (EA) Flood Map for Planning Purposes (EA, 2016)



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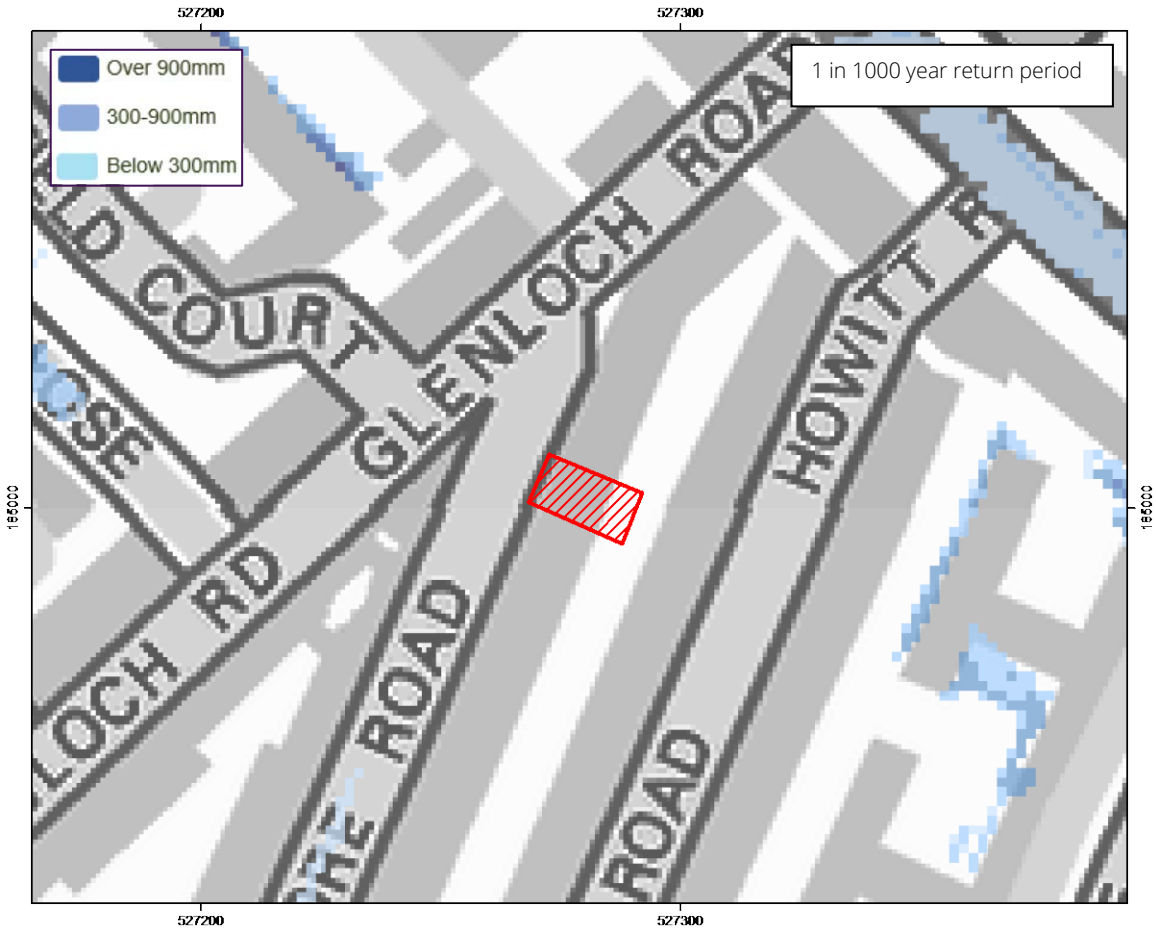
Surface water (pluvial) flooding

The Site is considered to be at very low risk of surface water pluvial flooding (Figure 3). As the 1 in 100 year surface water mapping does not consider climate change, the 1 in 1000 year mapping has been used to assess flood risk from surface water to reflect the potential increase in risk due to climate change. The SFRA does not indicate reported incidents of surface water flooding within 100 m of the Site and also indicated that the Site is at very low risk of surface water flooding and has a low flood hazard (URS Ltd, 2014).

Figure 3 Environment Agency (EA) Surface Water Flood Risk Map (EA, 2016)



Based on inspection of OS data, the Site is not located on a potential overland flow route and does not contain areas of low topography in relation to the surrounding area. Despite the Site's location within a Critical Drainage Area, the flood risk to the Site is very low.

Guidance

According to EA's surface water flood risk map, a site at very low risk has a chance of flooding of less than 1 in 1000 (0.1%)

Groundwater flooding

Based on GeoSmart's Groundwater Flood Risk (GW5) Map (Figure 4) the Site is considered to be at negligible risk of groundwater flooding. The SFRA does not indicate reported incidents of ground water flooding within 100 m of the Site (URS Ltd, 2014).

The risks are higher for basements and below ground structures.

Figure 4 GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2016)

Guidance

According to GeoSmart (2016) there is a negligible risk of groundwater flooding in this area and any groundwater flooding incidence will be less frequent that 1 in 100 years return period.

Negligible Risk - There will be a remote possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

Sewer flooding

Records held by Thames Water indicate that there have been no incidences of flooding related to the surcharging of public sewers at the Site (Thames Water, 2016; Appendix D). The Strategic Flood Risk Assessment (SFRA) also confirms there have been no records of sewer flooding incidences on Site has mapped the Site within an area which has experienced at least 1 incidence of internal sewer flooding and is not within an area which had experienced any instances of external sewer flooding (NW3 4 postcode)(URS Ltd, 2014).

Guidance

Properties classified as "at risk" are those 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 either once or twice in the ten year reference period (Thames Water, 2016). Records held by Thames Water provide information relating to reported incidents, the absence of any records does not mean that the Site is not at risk of flooding.

It is noted within Camden Planning Guidance for Basements and Lightwells, that as sewers are designed to surcharge to just below cover level, basement and other subterranean development is at risk of flooding with sewage. In accordance with advice from Thames Water and to protect against flooding the Council will ensure that all basement and other subterranean development is protected from sewer flooding by the installation of a positive pumped device.

Culverts and bridges

Culverts and bridges have been identified within 1 km of the Site. Historic 'lost rivers' were culverted and incorporated into the local sewer network in the 19th Century. T there is evidence that during the 1975 and 2002 extreme rainfall events surcharging of the local sewer network occurred as its capacity was exceeded (URS Ltd, 2014). Flood risk from these 'lost rivers' and the sewer network they are now connected to is addressed above.

Reservoir flooding

According to the Environment Agency mapping (2016c) the Site is not at risk of flooding from reservoirs.

Guidance

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m^3 of water) and is based on the worst case scenario. Reservoir flooding is extremely unlikely to occur (Environment Agency, 2016c).

5. Flood risk from the development

The proposed development involves an increase of impermeable surfaces at the Site. Therefore, an estimation of run-off is required to permit effective site water management and prevent any increase in flood risk to off-site receptors from the Site.

Drainage and run-off

The proposed development involves an increase of impermeable surfaces at the Site due to the extension of the basement development. Therefore, an estimation of run-off is required to permit effective site water management and prevent any increase in flood risk to off-site receptors from the Site.

Using rainfall data from the Flood Estimation Handbook (FEH) CD-ROM, developed by NERC (2009), the potential surface water run-off generated from the Site during a 1 in 100 year return period has been calculated. Guidance included within the National Planning Policy Framework (NPPF) recommends that the effects of climate change are incorporated into Flood Risk Assessments (Flood Risk Assessments: Climate Change Allowances Guidance, 2016).

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

The results for a 1 in 100 year 6 hour rainfall event at the Site are summarised in the table below.

Catchment	Rainfall (mm)	Rainfall (mm) inc. CC (+40% for Upper End +20% for Central)	Run-off from impermeable surfaces	
			m3/m2	m3/m2 incl. CC (+40% for Upper End +20% for Central)
Upper End	80.9	113.26	0.08	0.11
Central	80.9	97.08	0.08	0.10

A method of investigating the run-off due to the proposed development can be calculated by multiplying the run-off per square metre by the impermeable area within the proposed development plan.

It is recommended that attenuation of run-off is undertaken on site to compensate for proposed increases in impermeable surface areas. Attenuation may comprise the provision of storage within a sustainable drainage system.

A list of SuDS components that could be used to manage surface water run-off from the Site are listed in the following table. Alternative SUDs components may also be considered and more information can be found at http://www.susdrain.org/. Always seek expert advice on the selection and sizing of the SuDS components most suitable for your Site.

Option	Description
Rainwater harvesting	Rain water harvesting can collect run-off from the roofs for use in non-potable situations, using water butts for example.
Permeable paving	Permeable pavements can be used for driveways, footpaths and parking areas to increase the amount of permeable land cover. Suitable aggregate materials (angular gravels with suitable grading as per CIRIA, 2007) will improve water quality due to their filtration capacity. Plastic geocellular systems beneath these surfaces can increase the void space and therefore storage but do not allow filtration unless they are combined with aggregate material and/or permeable geotextiles.
Swales	Shallow, wide and vegetated channels that can store excess run-off whilst removing any pollutants.
Soakaways	An excavation filled with gravel within the Site. Surface water run-off is piped to the soakaway.
Attenuation basins/pond	Dry basin or a permanent pond that is designed to hold excess water during a rainfall event.

GeoSmart would be happy to provide an outline design strategy if required through our SuDSmart Pro report.

It is assumed that any changes to the existing drainage system will be undertaken in accordance with best practice and that care will be taken to ensure the new development does not overload/block any existing drainage or flow pathways to/from the Site. Based on the topography and low surface water flood risk in the vicinity interference with overland flow paths is considered very unlikely.

6. Suitability of the proposed development

The information below outlines the suitability of the proposed development in relation to national and local planning policy.

National

The aims of the national planning policies are achieved through application of the Sequential Test and in some cases the Exception Test.

Guidance

Sequential test: The aim of this test is to steer new development towards areas with the lowest probability of flooding (NPPF, 2012). Reasonably available sites located in Flood Zone 1 should be considered before those in Flood Zone 2 and only when there are no reasonably available sites in Flood Zones 1 and 2 should development in Flood Zone 3 be considered.

Exception test: In some cases this may need to be applied once the sequential test has been considered. For the exception test to be passed it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Suitability of the proposed development, and whether an Exception Test is required, is based on the Flood Zone the Site is located within and the flood risk vulnerability classification of the Site as indicated in the table overleaf. This development is classified as 'more vulnerable' and is located in a Flood Zone 1. Therefore an Exception Test is not required. The Sequential Test can be considered to be passed as the Site is located in a Flood Zone 1.

Table: Flood risk vulnerability and flood zone 'compatibility (taken from NPPF, 2012)

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Zone 1 – low probability	✓	✓	✓	✓	✓
	Zone 2 – medium probability	✓	✓	Exception test required	✓	✓
	Zone 3 – high probability	Exception test required	✓	X	Exception test required	✓
	Zone 3 - – functional flood plain	Exception test required	✓	X	X	X

Local

For this report, the London Borough of Camden SFRA has been consulted. The SFRA was undertaken by URS in July, 2014. Relevant information contained in this report for the Site area is outlined below:

- Historically the sources of the Rivers Fleet, Tyburn, Kilburn and Brent were located in the area of Hampstead Heath. In the present day no main rivers are located in the London Borough of Camden following the incorporation of the reaches into the Thames Water Utilities Ltd (TWUL) sewer network. The borough is located entirely in Flood Zone 1 (URS Ltd, 2014).

- The London Borough of Camden Surface Water Management Plan (SWMP) identified a number of Critical Drainage Areas (CDAs). Specific areas within a CDA are not necessarily at higher risk from surface water than an area outside of a CDA. However the location of an area within a CDA indicates that it is within a catchment area which contributes to a flooding hotspot. Within CDAs, surface water management should be a particular focus of new developments. The majority of the borough is located within a CDA (URS Ltd, 2014).

- Mapping shows that for the model scenarios, the surface water flood extent broadly follows the natural topography of the borough, as expected. Potential flooding also follows man-made features such as roads and rail lines. Historic flood records indicate that LBC, particularly to the north of Euston Road, is prone to surface water flooding (URS Ltd, 2014).

Guidance

Strategic Flood Risk Assessments are carried out by local authorities, in consultation with the Environment Agency, to assess the flood risk to the area from all sources both now and in the future due to climate change. They are used to inform planning decisions to ensure inappropriate development is avoided (NPPF, 2012).

7. Resilience and mitigation

Based on the available information mitigation measures outlined in the following table are likely to help protect the development from flooding.

Emergency evacuation/safe egress routes

As the development is in a Flood Zone 1 a safe access route is not required as the Site is located outside the 1 in 100 year and 1 in 1000 year flood event extents.

Fluvial/coastal mitigation measures

As the Site is located in Flood Zone 1, fluvial mitigation measures are not required.

Surface water mitigation measures

As the Site is not identified as at risk of pluvial flooding, mitigation measures are not required.

A SuDS design should be considered to mitigate any flood risk from the Site.

Groundwater mitigation measures

As the Site is not identified as being at risk of groundwater flooding, mitigation measures are not required.

Other Flood Risk mitigation measures

As the Site is not identified as at risk from other sources, mitigation measures are not required.

It is noted within the London Borough of Camden's Basement and Lightwells guidance note (CPG4, July 2015) and in line with advice from Thames Water, that a positive pumped device is recommended for all basement developments to prevent flooding from overloaded sewers.

8. Conclusions and recommendations

A LOW fluvial flood risk has been identified.

A VERY LOW surface water flood risk has been identified.

A NEGLIGIBLE groundwater flood risk has been identified.

No other sources of flood risk have been identified to impact the Site, based on the data currently available.

In line with the London Borough of Camden's Basement and Lightwells guidance note (CPG4, July 2015) and Thames Water, a positive pumped device is recommended for basement developments to prevent flooding from overloaded sewers.

The table below provides a summary of where the responses to key questions are discussed in this report.

Key sources of flood risks identified	None (see Section 3).
Are standard mitigation measures likely to provide protection from flooding to/from the Site?	N/A, see Section 7.
Is the development likely to satisfy the requirements of the Sequential Test?	N/A, see Section 6.
Is any further work recommended?	We recommend that mitigation measures that have been discussed within this report in section 7 are considered as part of the proposed development where possible and evidence of this is provided to the Local Authority as part of the planning application.

9. Further information and what to do next

The following table includes a list of products by GeoSmart:

Recommendations for next steps		
✓	Additional assessment: SuDSmart Report 	The SuDSmart Report range assesses which drainage options are available for a Site. They build on technical detail starting from simple infiltration screening, and work up to more complex SuDS Assessments detailing alternative options and designs. Please contact info@geosmartinfo.co.uk for further information.
	Additional assessment: FloodSmart Report 	The FloodSmart Report range provides clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at a site. Our consultants assess available data to determine the level of risk based on professional judgement and years of experience. Please contact info@geosmartinfo.co.uk for further information.
	Additional assessment: GroundSmart Report 	Should you require any geotechnical advice to inform your site development please contact info@geosmartinfo.co.uk for further information.
	Additional assessment: EnviroSmart Report 	Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective. Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements. Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions. Please contact info@geosmartinfo.co.uk for further information.

10. References and glossary

British Geological Survey (BGS) (2016). Geology of Britain Viewer. (http://mapapps.bgs.ac.uk/geologyofbritain/home.html), accessed on 14/09/2016.

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Glossary

General terms

BGS	British Geological Survey
EA	Environment Agency
GeoSmart groundwater flood risk model	GeoSmart's national groundwater flood risk model takes advantage of all the available data and provides a preliminary indication of groundwater flood risk on a 50m grid covering England and Wales. The model indicates the risk of the water table coming within 1 m of the ground surface for an indicative 1 in 200 year return period scenario.
Dry-Island	An area considered at low risk of flooding (eg. In a Flood Zone 1) that is entirely surrounded by areas at higher risk of flooding (eg. Flood Zone 2 and 3)
Flood resilience	Flood resilience of wet-proofing accepts that water will enter the building, but through careful design will minimise damage and allow the re-occupancy of the building quickly. Mitigation measures that reduce the damage to a property caused by flooding can include water entry strategies, raising electrical sockets off the floor, hard flooring.
Flood resistance	Flood resistance, or dry-proofing, stops water entering a building. Mitigation measures that prevent or reduce the likelihood of water entering a property can include raising flood levels or installation of sandbags.
Flood Zone 1	This zone has less than a 0.1% annual probability of river flooding
Flood Zone 2	This zone has between 0.1 and 1% annual probability of river flooding and between 0.1% and 0.5 % annual probability sea flooding
Flood Zone 3	This zone has more than a 1% annual probability of river flooding and 0.5% annual probability of sea flooding
Functional Flood Plain	An area of land where water has to flow or be stored in times of flood.
Hydrologic model	A computer model that simulates surface run-off or fluvial flow. The typical accuracy of hydrologic models such as this is ±0.25m for estimating flood levels at particular locations.
OS	Ordnance Survey
Residual Flood Risk	The flood risk remaining after taking mitigating actions.
SFRA	Strategic Flood Risk Assessment. This is a brief flood risk assessment provided by the local council
SuDS	A Sustainable drainage system (SuDS) is designed to replicate, as closely as possible, the natural drainage from the Site (before development) to ensure that the flood risk downstream of the Site does not increase as a result of the land being developed. SuDS also significantly improve the quality of water leaving the Site and can also improve the amenity and biodiversity that a site has to offer. There are a range of SuDS options available to provide effective surface water management that intercept and store excess run-off. Sites over 1 Ha will usually require a sustainable drainage assessment if planning permission is required. The current proposal is that from April 2014 for more than a single dwelling the drainage system will require approval from the SuDs Approval Board (SABs).

Aquifer Types

Principal aquifer	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.
Secondary A aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
Secondary B aquifer	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
Secondary undifferentiated	Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
Unproductive Strata	These are rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow.

NPPF (2012) terms

Exception test	Applied once the sequential test has been passed. For the exception test to be passed it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
Sequential test	Aims to steer new development to areas with the lowest probability of flooding.
Essential infrastructure	Essential infrastructure includes essential transport infrastructure, essential utility infrastructure and wind turbines.
Water compatible	Water compatible land uses include flood control infrastructure, water-based recreation and lifeguard/coastal stations.
Less vulnerable	Less vulnerable land uses include police/ambulance/fire stations which are not required to be operational during flooding and buildings used for shops/financial/professional/other services.
More vulnerable	More vulnerable land uses include hospitals, residential institutions, buildings used for dwelling houses/student halls/drinking establishments/hotels and sites used for holiday or short-let caravans and camping.
Highly vulnerable	Highly vulnerable land uses include police/ambulance/fire stations which are required to be operational during flooding, basement dwellings and caravans/mobile homes/park homes intended for permanent residential use.

Appendices

Disclaimer

This report has been prepared by GeoSmart in its professional capacity as soil and groundwater specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client, and is provided by GeoSmart solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to GeoSmart at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, GeoSmart may, by prior written agreement, agree to such release, provided that it is acknowledged that GeoSmart accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. GeoSmart accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against GeoSmart except as expressly agreed with GeoSmart in writing.

For full T&Cs see http://geosmartinfo.co.uk/terms-conditions

Important consumer protection information

This search has been produced by GeoSmart Information Limited, New Zealand House, 160-162 Abbey Foregate, Shrewsbury, SY2 6FD.

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GeoSmart Information Limited 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 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.

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

Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly.

If you want to make a complaint, we will:

- 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.

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 his final decision.

Complaints should be sent to:

Lisa Davies
Operations Manager

GeoSmart Information Limited
New Zealand House
160 Abbey Foregate
Shrewsbury
SY2 6FD

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