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STAGE 1 & 2 BASEMENT IMPACT ASSESSMENT SCREENING & SCOPING REPORT

5a Harrow View,
Uxbridge,
UB10 0QG

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APPENDICES

EXECUTIVE SUMMARY

Gaurav Sheel ("The Client") has commissioned Jomas Associates Ltd ('Jomas'), to prepare a Stage 1 & 2 Basement Impact Assessment (Screening and Scoping) report for a site referred to as 5a Harrow View, Uxbridge, UB10 0QG.

It should be noted that the table below is an executive summary of the findings of this report and is for briefing purposes only. Reference should be made to the main report for detailed information and analysis.

Desk Study	
Current Site Use	The site is currently not occupied and consists of a partially demolished single storey residential building with associated driveway, parking, garage and garden.
Proposed Site Use	The proposed development for this site is understood to comprise the demolition of the existing single storey building and construction of a new building with basement and associated garage, outbuilding and garden.
Site History	On the earliest available map (1865), the site is shown as vacant, undeveloped land. The site remains devoid of features until maps dated 1935-38, when a single building is developed on site with associated garden and driveway. The building footprint then appears to change shape during the 1960's (though this may represent a new building/demolition of the former). No observational changes then occur to the site until the present day. Historically, the surrounding area comprised mainly of open undeveloped land with occasional residential houses and roadways. During the 1930's maps indicate extensive residential development to have taken place north, west and south of the site. Residential style development continues throughout the 1900's to present day. Land immediately adjacent to the east of the site remains undeveloped.
Site Setting	The British Geological Survey indicates that the site is directly underlain by superficial deposits of Black Park Gravel Member. These deposits are underlain by solid deposits of the London Clay Formation. The underlying Black Park Gravel Member is identified as a Secondary (A) aquifer with the London Clay Formation identified as Unproductive. The site is within an EA Flood Zone 1. There are no detailed river entries or surface water features reported within 250m of the site. The site is not within an area with a RoFRaS rating. The site is not within an area benefiting from Flood Defences. Groundsure states the risk of surface water flooding on site as "negligible". Groundsure states the site is within an area at "low" risk of groundwater flooding
Potential Geological Hazards	Shrink swell clays are reported as a low risk at the site with ground conditions predominantly medium plasticity for the Black Park Gravel Member. However, the London Clay Formation is well-established as being of high-volume change potential. Therefore, the shrink/swell potential of underlying soils requires further assessment via a ground investigation.

Desk Study	
	The presence of Made Ground and London Clay Formation may be a source of elevated sulphate. If such levels are noted, then sulphate resistant concrete may be required. The groundwater table is anticipated to be present at or above the interface of the Black Park Gravel Member and London Clay Formation. It is recommended that a geotechnical ground investigation is undertaken to inform foundation design.

Screening and Scoping (Basement Impact Assessment)	
Subterranean (Groundwater) Flow	A ground investigation is recommended to confirm the ground conditions and groundwater levels (if any) beneath the site. This can then confirm the relative depths of the basement to the groundwater levels. The ground investigation should also confirm whether soil infiltration drainage is likely to be feasible, and to inform the drainage strategy.
Land Stability	The site, as with the surrounding area, is generally flat. The Groundsure report has noted that there is a “very low” risk of land instability issues for the site. The investigation should also determine the possibility of encountering groundwater and the possibility of Made Ground and/or clay. Atterberg Limits of the underlying clay should be determined by the ground investigation to establish shrink/swell potential.
Surface Flow and Flooding	Construction of the proposed larger footprint building with basement and new garage and outbuilding will likely increase impermeable areas onsite. SUDS will be required by NPPF, PPG and LLFA policy requirements. This should be provided by infiltration if possible, depending on the results of ground investigation. If infiltration SUDS is unfeasible, surface and above ground attenuation before releasing to the existing sewer network could be adopted. Implementation of SUDS will ensure that the increase hardstanding area/building footprint as part of the proposed development, will not increase the potential risk of surface water flooding.

Preliminary Basement Impact Assessment	
Preliminary Basement Impact Assessment	The overall assessment of the site is that the creation of a basement for the existing development will not adversely impact the site or its immediate environs, providing measures are taken to protect surrounding land and properties during construction. The proposed basement excavation will not be within 5m of a public pavement. It is also not within 5m of neighbouring properties. Unavoidable lateral ground movements associated with the basement excavations must be controlled during temporary and permanent works so as not to impact adversely on the stability of the surrounding ground and any associated services. During the construction phase careful and regular monitoring will need to be undertaken to ensure that the property above is not adversely affected. This may mean that the property needs to be suitably propped and supported. From the studies that have been undertaken so far, and subject to the findings of an intrusive investigation, it is concluded that the construction of the building will not present a problem for groundwater. The proposed development is not expected to cause significant problems to the subterranean drainage. However, this should be confirmed by a ground investigation and a subsequently updated Basement Impact Assessment.

Recommended Further Work	
Recommended Further Works	An intrusive ground investigation is recommended to confirm the ground conditions and groundwater levels (if any) beneath the site, as well as to inform foundation design. A preliminary investigation could comprise a cable percussive borehole drilled to at least 5m below the proposed depth of the basement. A standpipe should also be installed to facilitate groundwater monitoring. A SUDS/ Drainage Strategy will also likely be required for planning. Therefore, infiltration testing should be undertaken as part of the ground investigation. In the first instance, this could comprise falling head testing undertaken in the borehole to indicate suitability of full-scale BRE365 testing. If feasible, testing in accordance with BRE365 may then be required to aid design of soakaways/permeable paving etc.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Gaurav Sheel ("The Client") has commissioned Jomas Associates Ltd ('Jomas'), to prepare a Stage 1 & 2 Basement Impact Assessment (Screening & Scoping) at a site referred to as 5a Harrow View, Uxbridge, UB10 0QG.

1.1.2 Jomas' work has been undertaken in accordance with email proposal dated 23rd June 2023.

1.2 Proposed Development

1.2.1 The proposed development for this site is understood to comprise the demolition of the existing single storey building and construction of a new building with basement and associated garage, outbuilding and garden.

1.2.2 Plans of the proposed development are included in Appendix 1.

1.2.3 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997 Part 1.

1.3 Objectives

1.3.1 The objectives of Jomas' investigation was as follows:

- To present a description of the present site status, based upon the published geology, hydrogeology and hydrology of the site and surrounding area;
- To review readily available historical information (i.e., Ordnance Survey maps and database search information) for the site and surrounding areas;
- To assess the potential impacts that the proposal may have on ground stability, the hydrogeology and hydrology on the site and its environs.

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- A walkover survey of the site;
- A desk study, which included the review of a database search report (GeoInsight Report, attached in Appendix 2) and historical Ordnance Survey maps (attached in Appendix 3);
- A Basement Impact Assessment (BIA);
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Scope of Basement Impact Assessment

1.5.1 The site lies within the remit of the London Borough of Hillingdon. The council has published a document "Local Plan Part 2 Development Management Policies" (16 January 2020). This gives a lot of detail on the issues relevant to basements within London borough of Hillingdon but does not go into detail as to how these issues should be assessed. The guidance on requirements broadly mirrors the more detailed guidance published by the London Borough of Camden in their document "Camden Planning Guidance Basements" (CPGB) (January 2021), which does provide guidance as to how to undertake a BIA.

1.5.2 Consequently, Jomas has based the methodology of the BIA on the guidance given in CPGB. This document has been used as it is generally accepted that this gives the best available guidance on the practicalities regarding how to the undertake a BIA.

1.5.3 Jomas' BIA covers most items required under CPGB, with the exception of;

- Drainage assessment.
- Construction Sequence Methodology.
- Programme for enabling works, construction and restoration.
- Plans and sections to show foundation details of adjacent structures.
- Evidence of consultation with neighbours.
- Ground Movement Assessment (GMA), to include assessment of significant adverse impacts and specific mitigation measures required, as well as confirmatory and reasoned statement identifying likely damage to nearby properties according to the Burland Scale.
- Proposals for monitoring during construction.

1.5.4 This Jomas BIA also takes into account the Campbell Reith pro forma BIA produced on behalf of and published by the London Borough of Camden as guidance for applicants to ensure that all of the required information is provided.

1.5.5 A number of the requirements set out in the London Borough of Camden document CPGB will need to be addressed in a construction management plan, this stage is not within the scope of work that Jomas Associates have been commissioned.

1.6 Supplied Documentation

1.6.1 Jomas Associates have not been supplied with any previously produced reports at the time of writing this report.

1.7 Limitations

1.7.1 Jomas Associates Ltd has prepared this report for the sole use of Gaurav Sheel in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This

report may not be relied upon by any other party without the explicit written agreement of Jomas. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

1.7.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas has actual knowledge to the contrary, information obtained from public sources or provided to Jomas by site personnel and other information sources, have been assumed to be correct. Jomas does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.

1.7.3 Whilst every effort has been made to ensure the accuracy of the data supplied, and any analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.

1.7.4 ***This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.***

2 SITE SETTING & HISTORICAL INFORMATION

2.1 Site Information

2.1.1 The site location plan is appended to this report in Appendix 1.

Table 2.1: Site Information

Name of Site	-
Address of Site	5a Harrow View, Uxbridge, UB10 0QG
Approx. National Grid Ref.	508184, 182709
Site Area (Approx)	0.07 hectares
Site Occupation	Disused – formerly residential
Local Authority	London Borough of Hillingdon
Proposed Site Use	Single storey residential house with a basement level. A detached outbuilding and garage are also proposed.

2.2 Walkover Survey

2.2.1 The site was visited by a Jomas Engineer on 29th June 2023. The following information was noted while on site.

Table 2.2: Site Description

Area	Item	Details
On-site:	**Current Uses:**	The site is currently not occupied and consists of the remnants of a single storey residential building with associated driveway, parking, garage and garden. The building has been mostly demolished, leaving only the southern and western walls.
	Evidence of historic uses:	No evidence of historic uses other than residential were observed on site.
	Surfaces:	The site is mostly soft cover by soil. Small areas of hardstanding include paved concrete slabs and the remnant concrete slab in the footprint of the demolished building. A small concrete pad was also noted in the north west of the site.
	Vegetation:	Occasional weeds/grass present onsite. The site is surrounded by small trees and shrubbery/hedging on the eastern and western edges approximately 3-5m tall. A few taller trees west of the site are noted, approximately 5-10m tall.

Area	Item	Details
	Topography / Slope Stability:	The site is observed to be flat and level.
	Drainage:	The site appears to be connected to normal drainage facilities with no issues noted.
	Services:	The site appears to be connected to water, electricity and communication services. A gas connection was not observed.
	Controlled waters:	No controlled waters were observed on site.
	Tanks:	No tanks were observed on site.
Neighbouring land:	**North:**	Residential housing with associated gardens.
	East:	Undeveloped land as grass fields. 'McDonald business park' (>500m and abandoned).
	South:	Residential housing with associated gardens.
	West:	Residential housing with associated gardens.

2.2.2 Photos taken during the site walkover are provided in Appendix 1.

2.3 Historical Mapping Information

2.3.1 The historical development of the site and its surrounding areas was evaluated following the review of a number of Ordnance Survey historic maps, procured from GroundSure, and these are provided in Appendix 3 of this report.

2.3.2 A summary produced from the review of the historical map is given in Table 2.3 below. Distances are taken from the site boundary.

Table 2.3: Historical Development

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1865-68 1:2,500/1:10,560	The site is undeveloped and devoid of features.	The surrounding area mostly comprises undeveloped land possibly used as agricultural fields with occasional roadways. There is a collection of residential houses with associated gardens approximately 120m south west. There are a number of small ponds located nearby, 130m and 200m north, 150m to the south east, and 160m to the south.
1881 1:10,560	No significant changes.	No significant changes.

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1894-1900 1:2,500/1:10,560	No significant changes.	There has been residential development approximately 500m to the south. Several wells are shown 125-250m to the south and south west.
1913-20 1:10,560	No significant changes.	No significant changes.
1932 1:10,560	No significant changes.	No significant changes.
1935-38 1:2,500/1:10,560	The site is now occupied by a residential building in the south with associated garden.	There has been extensive residential development to the north, south and west of the site. The small ponds 160m south and 200m north are no longer present and have been potentially infilled.
1960-66 1:1,250/1:2,500/ 1:10,560	The building footprint appears to have changed shape (and may represent a new building/demolition of the former structure). An additional outbuilding is also present.	There has been some further residential development adjacent to the site, including new residences to the south and a new road (Harrow View). The small pond 130m to the north is no longer present and has been potentially infilled.
1970-75 1:10,000 /1:10,560	No significant changes.	No significant changes.
1975-80 1:1,250	No significant changes.	The small pond 150m to the south east is no longer present and has been potentially infilled.
1989-92 1:2,500/1:10,000	No significant changes.	No significant changes.
2001-03 1:1,250/1:10,000	No significant changes.	No significant changes.
2010 1:10,000	No significant changes.	No significant changes.
2023 1:10,000	No significant changes.	No significant changes.

2.3.4 Aerial photographs supplied as part of the GroundSure Enviro+GeoInsight report range from 1999 to 2021. These show the site in its present-day configuration with no significant changes occurring to the site or surrounding area.

2.4 Previous Site Investigations

2.4.1 No previous site investigation reports were provided at the time of writing.

2.5 Planning Information

2.5.1 A review of the local authority's planning portal was undertaken on 05/07/2023 at https://planning.hillingdon.gov.uk/OcellaWeb/planningSearch.

2.5.2 A number of applications were found to have been made at the study site regarding extensions to previously existing residential building. No documents pertaining to ground investigation or basement impact assessments could be found.

2.6 Sensitive Land Uses

2.6.1 The London Hillingdon green belt lies 2m east of the site.

2.6.2 No other sensitive land uses were identified within 1km of the site.

2.7 Radon

2.7.1 The site is reported not to lie within a Radon affected area, as less than 1% of properties are above the action level. Consequently, no radon protective measures are necessary in the construction of new dwellings or extensions as described in publication BR211 (BRE, 2015).

2.7.2 It should be noted however that a growing number of London Boroughs are adopting Public Health England guidance as outlined in their 'UK National Radon Action Plan' (PHE, 2018), which states that Radon measurements should be made in regularly occupied basements of properties irrespective of their geographical location. Therefore, such an assessment, or radon protection measures may be required by the London Borough of Hillingdon.

3 GEOLOGICAL SETTING & HAZARD REVIEW

3.1.1 The following section summarises the principal geological resources of the site and its surroundings. The data discussed herein is generally based on the information given within the Groundsure Report (in Appendix 2).

3.2 Solid and Drift Geology

3.2.1 Information provided by the British Geological Survey (BGS) indicates that the site is directly underlain by superficial deposits of the Black Park Gravel Member over solid deposits of the London Clay Formation.

3.2.2 The Black Park Gravel Member is reported to as being 1-6m thick and is described by BGS as consisting of:

> *"Sand and gravel, with possible lenses of silt, clay or peat. Horizontally stratified, matrix-supported gravel with thin tabular cross-bedded sand channels. Gravel assemblage is characterised by abundant angular flint (75-89%), sparse rounded flint (3-9%), sparse vein quartz (4-10%) and sparse quartzite (1-6%)."*

3.2.3 The London Clay Formation is described by BGS as consisting of:

> *"…bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite."*

3.2.4 No Made Ground is reported on site but given the identified history, a depth of Made Ground should be expected.

3.3 British Geological Survey (BGS) Borehole Data

3.3.1 No BGS borehole records were available within 250m of the site.

3.4 Geological Hazards

3.4.1 The following are brief findings extracted from the GroundSure GeoInsight Report, that relate to factors that may have a potential impact upon the engineering of the proposed development.

Table 3.1: Geological Hazards

Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
Shrink swell clays	Low	Ground conditions predominantly medium plasticity.	No
Running sands	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.	No
Compressible deposits	Negligible	Compressible strata are not thought to occur	No

Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
Collapsible Deposits	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.	No
Landslides	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.	No
Ground dissolution soluble rocks	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.	No
Coal mining	None	The study site is not located within the specified search distance of an identified coal mining area.	No
Non-coal mining	None	The study site is not located within the specified search distance of an identified non-coal mining area.	No

3.4.2 In addition, the GeoInsight report notes the following:

- No historical surface ground working features are reported within 250m of the site.
- No historical underground working features are reported within 1km of the site.
- No other features relating to mining, ground workings, natural cavities or sinkholes are reported within 250m of the site.

3.4.3 The clearance of the site, including removal of foundations and services is likely to increase the depth of Made Ground on the site.

3.4.4 Foundations should not be formed within Made Ground or organic rich materials (i.e. Topsoil and potentially may include the Black Park Gravel Member) due to the unacceptable risk of total and differential settlement.

3.4.5 The presence of Made Ground derived from demolition material may be a source of elevated sulphate results associated with plaster from the previous structures.

3.4.6 The BGS notes disseminated pyrite within the London Clay Formation and as such may be a source of elevated sulphate. If such levels are noted then sulphate resistant concrete may be required.

3.4.7 The groundwater table is anticipated to be present at or above the interface of the Black Park Gravel Member and London Clay Formation. Based on the geological conditions described in Section 3.2, this could be around 1-6m bgl. The potential impacts of shallow groundwater should be considered during foundation design. The effects that this may have include (but are not limited to):

- Permanent excavations – i.e. for items such as basements and drainage. This is likely to need waterproofing / tanking and may have flotation issues.

- Temporary excavations – likely to affect side stability especially where the excavations are formed in granular materials.
- Soakaways – likely to affect the permeability and therefore the effective use of soak-away drainage.
- Concrete classification on the site (in accordance with BRE SD-1) due to the potential for a mobile groundwater table.
- May require dewatering or groundwater exclusion techniques to be used.
- Foundation design – likely to reduce the allowable bearing capacity that could be achieved in the superficial deposits.

3.4.8 Although a "*low*" risk has been identified for shrink swell clays, this is based on the surface geology only (Black Park Gravel Member) and does not consider the thickness of this stratum or underlying soils. The London Clay Formation is well-established as being of high-volume change potential, and and therefore the shrink/swell potential of the soils underlying the site requires further assessment.

3.4.9 It is recommended that a geotechnical ground investigation is undertaken to inform design.

4 HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

4.1 Hydrogeology & Hydrology

4.1.1 General information about the hydrogeology of the site was obtained from the MAGIC website and Groundsure report.

Groundwater Vulnerability

4.1.2 Since 1 April 2010, the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. This comprises;

- **Secondary A** - 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** - 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.
- **Principal Aquifer** – this is a formation with a high primary permeability, supplying large quantities of water for public supply abstraction.
- **Unproductive Strata** - These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Hydrogeology

4.1.3 The baseline hydrogeology of the site is based on available hydrogeological mapping, including the BGS online mapping, and generic information obtained from the Groundsure Report.

4.1.4 The available data indicates that the geology of the area consists of the Black Park Gravel Member underlain by the London Clay Formation. It would be expected that a groundwater table would be encountered above or at the interface between the two strata.

Hydrology

4.1.5 The hydrology of the site and the area covers water abstractions, rivers, streams, other water bodies and flooding.

4.1.6 The Environment Agency defines a floodplain as the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

4.1.7 There are two different kinds of area shown on the Flood Map for Planning. They can be described as follows:

Areas that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year;
- or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.

(For planning and development purposes, this is the same as Flood Zone 3, in England only.)

- The additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year.

(For planning and development purposes, this is the same as Flood Zone 2, in England only.)

4.1.8 These two areas show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.

4.1.9 Outside of these areas flooding from rivers and the sea is very unlikely. There is less than a 0.1 per cent (1 in 1000) chance of flooding occurring each year. The majority of England and Wales falls within this area. (For planning and development purposes, this is the same as Flood Zone 1, in England only.)

4.1.10 Some areas benefit from flood defences and these are detailed on Environment Agency mapping.

4.1.11 Flood defences do not completely remove the chance of flooding, however, and can be overtopped or fail in extreme weather conditions.

Table 4.1: Summary of Hydrogeological & Hydrology

Feature		On Site	Off Site
Aquifer	**Superficial:**	Secondary (A) Aquifer (Black Park Gravel Member)	Secondary (A) Aquifer 395m S (Boyn Hill Gravel Member)
	Solid:	Unproductive (London Clay Formation)	None reported within 500m.

Feature		On Site	Off Site
Surface Water Features		None	No surface water features within 250m of site. No detailed river networks within 500m of site.
Flood Risk	**EA Flood Zone 2**	None	None within 50m of site.
	EA Flood Zone 3	None	None within 50m of site.
	RoFRaS	None	None within 50m of site.
	Historical Flood Events	None reported within 250m of site.	
	Flood Defences	There are no areas benefiting from Flood Defences within 250m of the study site	
	Surface Water Flooding	Negligible	Highest risk within 50m is *negligible*.
	Groundwater Flooding	Low	Highest risk within 50m is *low*.

4.2 Flood Risk Review

4.2.1 In accordance with the NPPF Guidance, below is a review of flood risks posed to and from the development and recommendations for appropriate design mitigation where necessary. Specific areas considered are based on the requirements laid out in the "Camden Guidance for Subterranean Development" as this document is generally considered to be the most comprehensive Local Authority Guidance in the London area.

Table 4.2: Flood Risk Review

Flood Sources	Site Status	Comment on flood risk posed to / from the development
Fluvial / Tidal	Site is not within 250m of an Environment Agency Zone 2 or zone 3 floodplain. Risk of flooding from rivers and the sea (RoFRaS) is not reported within 50m of the site.	Low Risk
Groundwater	The Groundsure report indicates the highest risk for groundwater flooding onsite and within 50m of the site as low.	As SUDS will be required by NPPF, PPG and LLFA policy requirements, this is likely to be provided by surface and above ground attenuation before releasing to the existing sewer network. This will ensure that the proposed development will not increase the potential risk of groundwater flooding. Basement will be fully waterproofed as appropriate to industry standard. Low Risk
Artificial Sources	No surface water features within 250m of site.	Low Risk

Surface Water / Sewer Flooding	No surface water features within 250m of site. Condition, depth and location of surrounding infrastructure uncertain.	As SUDS will be required by NPPF, PPG and LLFA policy requirements, these are likely to include attenuation before releasing to the existing sewer network. If permeable paving is used this would likely reduce the risk of surface water flooding. Combined, these are likely to reduce the risk of both surface and sewer flooding to both the site and surrounding properties. Basement will be fully waterproofed as appropriate to industry standard. Low Risk
Climate Change	Included in the flood modelling extents. Site not within climate change flood extent area	Development will not significantly increase the peak flow and volume of discharge from the site. Low risk posed to and from the development

4.2.2 Information about the risk to the study site from flooding has been obtained from the following documents produced for London Borough of Hillingdon: Surface Water Management Plan (Capita Symonds, 2013); and West London Strategic Flood Risk Assessment (Metis, 2018). Potential impacts to the site are discussed below.

Flooding from Fluvial/Tidal Sources

4.2.3 The West London SFRA shows the nearest main river is located approximately 1632m north east of site identified as Yeading Brook/River Crane. The nearest ordinary watercourse is located approximately 1250m south west of site (a tributary of the River Pinn).

4.2.4 The site is >1km away from the largest modelled flood extent of these watercourses. In addition, no EA recorded flood outlines or EA historic flooding events are shown within 1km of site.

Groundwater Flooding

4.2.5 The West London SFRA shows the site within an area of ≥25% to <50% susceptibility to groundwater flooding.

4.2.6 According to the SWMP, there are 6No. records of groundwater water flooding in Hillingdon, the nearest of which was located on Hoppner Road, approximately 480m north east of site. It should be noted that this location is reportedly directly underlain by deposits of London Clay Formation (i.e., unlike Harrow View which is expected to have superficial deposits overlying London Clay Formation).

Surface Water Flooding

4.2.7 According to the West London SFRA, the site does not lie in an area with a risk of surface water flooding. The nearest area at risk from 0.1% annual chance of surface water flooding is approximately 10m north of the site.

4.2.8 According to the SWMP, there are 6No. records of surface water flooding in Hillingdon, none of which were within 1km of the site.

4.2.9 In addition to this, the site lies within an EA Flood Zone 1. Based on EA mapping, the site and highways surrounding the site are not within an area identified as a high risk for surface water flooding potential; the site itself not likely to be inundated.

Sewer/Artificial Flooding

4.2.10 The LB Hillingdon SWMP shows the number of sewer flooding events for the postcode "UB10 0--". This indicates that 13No. properties were impacted by sewer flooding prior to 2010. This is broadly average for the Hillingdon borough. This is shown in Figure 9.2 of the SWMP.

4.2.11 The West London SFRA shows the site is ~950m from the maximum extent of risk of flooding from reservoirs.

Critical Drainage Areas (CDAs)

4.2.12 A critical drainage area is defined in the LB Hillingdon SWMP as "*a discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer and/or river) often cause flooding in a Flood Risk Area during severe weather thereby affecting people, property or local infrastructure*".

4.2.13 17No. Critical Drainage Areas (CDA) are located within (or crossing over) the LB Hillingdon administrative boundaries. The site is not located within a CDA.

Sustainable Drainage Systems (SuDS)

4.2.14 In accordance with the NPPF, PPG and LLFA policy requirements, sustainable drainage systems (SUDS) should be incorporated wherever possible to reduce positive surface water run-off and flood risk to other areas.

4.2.15 Given the expected underlying ground and hydrogeological conditions it is considered that infiltration drainage may be suitable, though this should be confirmed by a ground investigation.

4.2.16 SUDS may include the replacement of hard cover with permeable hardstanding and surface / above-ground attenuation prior to discharge to storm sewers.

Conclusion

4.2.17 Based on the available data, the site is considered to be at low risk from identified potential sources of flooding. The basement can be constructed and operated safely in flood risk terms without increasing flood risk elsewhere and is therefore considered NPPF compliant.

4.2.18 Extracts from the West London SFRA and Hillingdon SWMP are included in Appendix 4.

4.3 Sequential and Exception Tests

4.3.1 The Sequential Test aims to ensure that development does not take place in areas at high risk of flooding when appropriate areas of lower risk are reasonably available.

Sequential Test: within FZ1 and no additional dwelling hence pass by default.

4.3.2 Paragraph 19 of PPS25 recognizes the fact that wider sustainable development criteria may require the development of some land that cannot be delivered through the sequential test. In these circumstances, the Exception Test can be applied to some developments depending on their vulnerability classification (Table D.2 of PPS25). The Exception Test provides a method of managing flood risk while still allowing necessary development to occur.

Exception Test: FZ1 hence pass by default and low risk posed to and from other sources.

4.4 Flood Resilience

4.4.1 In accordance with general basement flood policy and basement design, the proposed development will utilize the flood resilient techniques recommended in the NPPF Technical Guidance where appropriate and also the recommendations that have previously been issued by various councils.

4.4.2 These include:

- Basement to be fully waterproofed (tanked) and waterproofing to be tied in to the ground floor slab as appropriate: to reduce the turnaround time for returning the property to full operation after a flood event.
- Plasterboards will be installed in horizontal sheets rather than conventional vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event.
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property.
- Any wood fixings on basement / ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event.

- The basement waterproofing where feasible will be extended to an appropriate level above existing ground levels.
- The concrete sub floor as standard will likely be laid to fall to drains or gullies which will remove any build-up of ground water to a sump pump where it will be pumped into the mains sewer. This pump will be fitted with a non-return valve to prevent water backing up into the property should the mains sewer become full.
- Insulation to the external walls will be specified as rigid board which has impermeable foil facings that are resistant to the passage of water vapour and double the thermal resistance of the cavity.

5 SCREENING AND SCOPING ASSESSMENT

5.1 Screening Assessment

5.1.1 Screening is the process of determining whether or not there are areas of concern which require a BIA for a particular project. This was undertaken in previous sections by the site characterisation. Scoping is the process of producing a statement which defines further matters of concern identified in the screening stage. This defining is in terms of ground processes in order that a site specific BIA can be designed and executed by deciding what aspects identified in the screening stage require further investigation by desk research or intrusive drilling and monitoring or other work.

5.1.2 The scoping stage highlights areas of concern where further investigation, intrusive soil and water testing and groundwater monitoring may be required.

5.1.3 This Jomas BIA also takes into account the Campbell Reith pro forma BIA produced on behalf of and published by the London Borough of Camden as guidance for applicants to ensure that all of the required information is provided. Within the pro forma a series of tables have been used to identify what issues are relevant to the site.

5.1.4 Each question posed in the tables is completed by answering “Yes”, “No” or “Unknown”. Any question answered with “Yes” or “Unknown” is then subsequently carried forward to the scoping phase of the assessment.

5.1.5 The results of the screening process for the site are provided in Table 5.1 below. Where further discussion is required the items have been carried forward to scoping.

5.1.6 The numbering within the questions refers the reader to the appropriate question / section in the London Borough of Camden BIA pro forma.

5.1.7 It should also be noted that the London Borough of Hillingdon may not place the same importance on the issues identified in the London Borough of Camden’s guidance documents. It should be noted that the pro forma is mainly concerned with the pond chain on Hampstead Heath, if other ponds / waterbodies may similarly affect the development Jomas will indicate this.

5.1.8 A ground investigation is undertaken where necessary to establish base conditions and the impact assessment determines the impact of the proposed basement on the baseline conditions, taking into account any mitigating measures proposed.

Table 5.1: Screening Assessment

Query	Y / N	Comment
Subterranean (Groundwater) Flow (see London Borough of Camden BIA Pro Forma Section 4.1.1)		
1a) Is the site located directly above an aquifer?	Yes	The site is directly underlain by the Black Park Gravel Member, a Secondary (A) aquifer.
1b) Will the proposed basement extend below the surface of the water table?	Unknown	The basement may potentially extend below a water table within the superficial deposits. This should be confirmed by a ground investigation.
2) Is the site within 100m of a watercourse, well (disused or used) or a potential spring line?	No	No surface water features within 250m of site. No detailed river networks within 500m of site.
3) Is the site within the catchment of any surface water features?	Yes	The site is within the catchment of the river, Yeading Brook which is 1632m to the north east.
4) Will the proposed basement development result in a change in the proportion of hard surfaced/paved areas?	Yes	The proportion of hardstanding/building footprint will be greater in the post development scenario.
5) As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	Unknown	The amount of hardstanding/building footprint will increase. A SUDS/drainage strategy is yet to be produced.
6) Is the lowest point of the proposed excavation (allowing of any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond (not just the pond chains on Hampstead Heath or spring line?	No	No surface water features within 250m of site.
Slope Stability ((see London Borough of Camden BIA Pro Forma Section 4.2)		
1) Does the existing site include slopes, natural or manmade, greater than 7 degrees? (approximately 1 in 8)	No	The site is flat and level with the main road.
2) Will the proposed re-profiling of landscaping change slopes at the property to more than 7 degrees? (approximately 1 in 8)	No	Re-profiling of change of slopes is not anticipated.
3) Does the developments' neighbouring land include railway cuttings and the like, with a slope greater than 7 degrees? (approximately 1 in 8)	No	There are no reported railway lines within 250m of the site. Land uses neighbouring site are residential.
4) Is the site within a wider hillside setting in which the general slope is greater than 7 degrees? (approximately 1 in 8)	No	Surrounding area is generally flat.
5) Is the London Clay the shallowest strata at the site?	No	The site is reported to be directly underlain by superficial deposits of the Black Park Gravel

Query	Y / N	Comment
		Member, these deposits are underlain by the London Clay Formation.
6) Will any trees be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?	Unknown	No trees were noted onsite during the walkover. A tree survey of the boundary areas should be undertaken to establish whether there are any root protection zones.
7) Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	Unknown	The site is reported to be in area at low risk from shrink-swell clays (Black Park Gravel Member). The London Clay Formation is well established as commonly having a high-volume change potential No evidence of structural distress caused by seasonal shrink / swell was noted during the external walkover.
8) Is the site within 100m of a watercourse or a spring line?	No	No surface water features within 250m of site. No detailed river networks within 500m of site.
9) Is the site within an area of previously worked ground?	No	Site has only had the current development in place.
10) Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	Unknown	The site is directly underlain by Secondary (A) aquifer of the Black Park Gravel Member, underlain by unproductive London Clay Formation. Groundwater is anticipated to be present at or above the interface of these strata but this should be confirmed by a ground investigation.
11) Is the site within 50m of the Hampstead Heath ponds (or other waterbody)?	No	No surface water features within 250m of site. No detailed river networks within 500m of site.
12) Is the site within 5m of a highway or pedestrian 'right of way'?	Yes	The site driveway/access leads onto a road with pavements to the south. However, the proposed excavation will be >30m from this.
13) Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Unknown	Neighbouring foundations are unknown.
14) Is the site over (or within the exclusion of) any tunnels e.g. railway lines?	No	There are no reported railway lines within 250m of the site.
Surface Flow and Flooding (see London Borough of Camden BIA Pro Forma Section 4.3)		
1) Is the site within the catchment of the pond chains on Hampstead Heath?	No	No surface water features within 250m of site. No detailed river networks within 500m of site.
2) As part of the site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially different from the existing route?	Yes	The proposed development looks to expand the current building footprint and areas of hardstanding; surface water flow routes are likely to change.

Query	Y / N	Comment
		Replacement of existing hardstanding outside of the building footprint with permeable paving as part of the likely required SUDs would increase the amount of water that would be discharged to the ground.
3) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	Yes	The proportion of hardstanding/building footprint will be greater in the post development scenario. Installation of permeable paving as part of the likely required SUDs could reduce the amount of impermeable areas.
4) Will the proposed basement result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	Yes	SUDS should be implemented and a focus on collecting surface water/rainfall to be disposed of via a soakaway providing conditions are suitable.
5) Will the proposed basement result in changes to the quality of surface waters being received by adjacent properties or downstream watercourses?	No	-
6) Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?	No	No nearby surface water features and not within an EA flood zone.

5.2 Scoping

5.2.1 Scoping is the activity of defining in further detail the matters to be investigated as part of the BIA process. Scoping comprises of the definition of the required investigation needed in order to determine in detail the nature and significance of the potential impacts identified during screening.

5.2.2 The potential impacts for each of the matters highlighted in Table 5.1 above are discussed in further detail below together with the requirements for further investigations. Detailed assessment of the potential impacts and recommendations are provided where possible.

Subterranean (Groundwater) Flow

5.2.3 A ground investigation is recommended to confirm the ground conditions and groundwater levels (if any) beneath the site. This can then be used to confirm the relative depths of the basement to the groundwater levels.

5.2.4 The ground investigation should also confirm whether soil infiltration drainage is likely to be feasible, and to inform the drainage strategy.

Land Stability

5.2.5 The site, as with the surrounding area, is generally flat. The Groundsure report has noted that there is a "very low" risk of land instability issues for the site.

5.2.6 The recommended ground investigation should also determine the possibility of encountering groundwater and the possibility of Made Ground and/or clay. Atterberg Limits of the underlying clay should be determined by the ground investigation to assess shrink/swell potential of the soils.

5.2.7 It is noted that the London Borough of Camden's guidance documents requires a Ground Movement Assessment (GMA) to be undertaken as part of the Basement Impact Assessment. Such an assessment uses a ground model based on a zone of influence equivalent of four times the proposed depth of excavation. The only buildings in proximity to the excavation are small outbuildings (e.g., sheds), therefore a GMA is unlikely to be required as part of the BIA application.

Surface Flow and Flooding

5.2.8 There will be an increase in hardstanding area/building footprint on site and as such this may cause an increase in surface water run-off.

5.2.9 SUDS will be required by NPPF, PPG and LLFA policy requirements. This should be provided by infiltration if possible, depending on the results of ground investigation. If infiltration SUDS is unfeasible, surface and above ground attenuation before releasing to the existing sewer network could be adopted.

5.2.10 Implementation of SUDS will ensure that the increased hardstanding area/building footprint as part of the proposed development, will not increase the potential risk of surface water flooding.

6 PRELIMINARY BASEMENT IMPACT ASSESSMENT

6.1 Proposed Changes to Areas of External Hardstanding

6.1.1 The proposed development will comprise demolition of existing buildings and construction of a larger building with basement, construction of a new larger garage and new outbuilding. As a result, there will be an increase in area of hardstanding/building footprint.

6.1.2 As SUDS will be required by NPPF, PPG and LLFA policy requirements, where practicable, the remaining hard surfaces will likely be replaced with permeable paving.

6.1.3 A ground investigation should establish the feasibility of infiltration SUDS.

6.2 Past Flooding

6.2.1 The National Planning Policy Framework sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow.

6.2.2 When assessing the site-specific flood risk and the potential for historic flooding to reoccur the above guidance recommends that, historic flooding records and any other relevant and available information including flood datasets (e.g. flood levels, depths and/or velocities) and any other relevant data which can be acquired are assessed.

6.2.3 The West London SFRA shows that no EA recorded flood outlines or EA historic flooding events are shown within 1km of site

6.2.4 According to the SWMP, there are 6No. records of groundwater water flooding in Hillingdon, the nearest of which was located on Hoppner Road, approximately 480m north east of site.

6.2.5 According to the SWMP, there are 6No. records of surface water flooding in Hillingdon, none of which were within 1km of the site.

6.2.6 The LB Hillingdon SWMP shows the number of sewer flooding events for the postcode “UB10 0--”. This indicates that 13No. properties were impacted by sewer flooding prior to 2010. This is broadly average for the Hillingdon borough. This is shown in Figure 9.2 of the SWMP.

6.2.7 The site is therefore considered to be at low risk of flooding based on historic flooding.

6.3 Geological Impact

6.3.1 The published geological maps indicate that the site is directly underlain by superficial deposits of the Black Park Gravel Member. These superficial deposits are underlain by solid deposits of the London Clay Formation. This should be confirmed by an intrusive investigation.

6.3.2 At the depths that the basement would be constructed at the London Clay Formation is unlikely to be prone to seasonal shrinkage and swelling that arises due to changing water content in the soil. This is due to a lack of significant vegetation capable of removing water within the zone of influence; the extensive hard cover minimising the amount of water entering the ground and the likely groundwater at the interface of the Black Park Gravels and the London Clay Formation.

6.3.3 However, ground conditions, including the shrink/swell potential of soil should be confirmed by a ground investigation.

6.3.4 The groundwater table is considered likely to be at or above the interface of the two strata due to the overlying granular materials likely to have a relatively high permeability compared to the very low permeability London Clay Formation.

6.4 Hydrology and Hydrogeology Impact

6.4.1 Based on the information available at the time of writing, the risk of flooding from groundwater is considered to be low. The proposed basement is unlikely to have a detectable impact on the local groundwater regime.

6.4.2 Appropriate water proofing measures should be included within the whole of the proposed basement wall/floor design as a precaution.

6.4.3 The proposed development will lie outside of flood risk zones and is therefore assessed as being at a low probability of fluvial flooding.

6.4.4 There are no surface water features or water networks within 250m of the site. It is therefore not anticipated that the site will have an impact upon the hydrology of the area.

6.4.5 17No. Critical Drainage Areas (CDA) are located within the Hillingdon Surface Water Management Plan. This site is not located within a CDA. As these are related to man-made drainage (i.e. sewers), the installation of SUDS to reduce the rate of peak flow into the sewers would reduce the chance of sewer flooding to occur.

6.4.6 The information available suggests that the site lies in an area that is at low risk of surface water flooding.

6.4.7 The proposed basement construction will increase impermeable areas in the post development scenario due to the increase in size in building footprint.

6.4.8 No risk of flooding to the site from artificial sources has been identified.

6.5 Impacts of Basement on Adjacent Properties and Pavement

6.5.1 The proposed basement excavation will not be within 5m of a public pavement. It is also not within 5m of neighbouring properties.

6.5.2 Unavoidable lateral ground movements associated with the basement excavations must be controlled during temporary and permanent works so as not to impact adversely on the stability of the surrounding ground, any associated services and structures.

6.5.3 It is recommended that the site is supported by suitably designed temporary support with a basement box construction. This will ensure that the adjacent land is adequately supported in the temporary and permanent construction. Alternatively, the excavation should proceed in a manner that maintains the integrity of the ground on all sides.

6.5.4 Careful and regular monitoring of the structure will need to be undertaken during the construction phase to ensure that vertical movements do not adversely affect neighbouring structures. If necessary, the works may have to be carried out in stages with the above structure suitably propped and supported.

6.5.5 It will be necessary to ensure that the basements are designed in accordance with the NHBC Standards and take due cognisance of the potential impacts highlighted above. This may be achieved by ensuring best practice engineering and design of the proposed scheme by competent persons and in full accordance with the Construction (Design and Management) Regulations. This will include:

- Establishment of the likely ground movements arising from the temporary and permanent works and the mitigation of excessive movements;
- Assessment of the impact on any adjacent structures (including adjacent properties and the adjacent pavement with potential services);
- Determination of the most appropriate methods of construction of the proposed basements;
- Undertake pre-condition surveys of adjacent structures;
- Monitor any movements and pre-existing cracks during construction;
- Establishment of contingencies to deal with adverse performance;
- Ensuring quality of workmanship by competent persons.

6.5.6 Full details of the suitable engineering design of the scheme in addition to an appropriate construction method statement should be submitted by the Developer to the London Borough of Hillingdon.

7 REFERENCES

BRE Report BR211; Radon: Protective measures for new dwellings, 2015

British Standards Institution (2015) BS 5930:2015 *Code of practice for ground investigations*. Milton Keynes: BSI

Campbell Reith (March 2018) *"Pro Forma Basement Impact Assessment*", London Borough of Camden

Capita Symonds (2013) "*Surface Water Management Plan*"

CIRIA C580, Embedded retaining walls – guidance for economic design

Groundsure EnviroInsight Report Ref JOMAS-TF4-VZJ-O3L-ZO3 June 2023

London Borough of Camden (January 2021) *"Camden Planning Guidance Basements"*

Metis Consultants Ltd (2023) "*West London Strategic Flood Risk Assessment*"

Ministry of Housing, Communities & Local Government: *National Planning Policy Framework*. February 2019

APPENDICES

APPENDIX 1 – FIGURES

APPENDIX 2 – GROUNDSURE REPORTS

APPENDIX 3 – OS HISTORICAL MAPS

APPENDIX 4 – EXTRACTS FROM WEST LONDON SFRA AND LB HILLINGDON SWMP

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