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STAGE 1 & 2
BASEMENT IMPACT ASSESSMENT
(SCREENING & SCOPING)
REPORT

37 HEATH DRIVE,
LONDON,
NW3 7SD

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EXECUTIVE SUMMARY

Taishi Limited ("The Client") has commissioned Jomas Associates Ltd ('Jomas'), to prepare a Basement Impact Assessment for a site referred to as 37 Heath Drive, London, NW3 7SD.

The aim of this report is to assess whether the ground conditions within the local area represent an impediment to the proposed development.

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 currently comprises of a detached, residential building fronting onto Heath Drive, with an associated hardstanding driveway and rear patio area. There is also an existing basement level comprising a self-contained apartment. In addition, there is a large private garden in the southeast of site, comprising entirely soft landscaping.
Proposed Site Use	The proposed development is to comprise the demolition of existing structure and construction of a new residential building with 10No dwellings, with an extension to the existing basement. The development will include private gardens to the rear.
Site History	On the earliest available map (1870), the site is shown as vacant, undeveloped land spanning various plots that are likely being used for agricultural purposes. A stream is reported in the east of site, flowing roughly north to south into a larger stream or river to the west of the site, with numerous trees located in close proximity. By the 1915 map, the stream was no longer shown and may have been culverted. The site remains devoid of any developments until the small-scale map dated 1938, which indicates a large building encroaching into the north of site. By the map dated 1951 the large building appears to have been demolished and a large detached, residential property has been constructed in its place. A smaller structure is also present to the southwest of the main building. With the exception of minor redevelopments to this structure, no observational changes then occur to the site until the present day. In the end of the 19th century, the surrounding area comprised mainly agricultural with some minor residential areas including 'New West End' and 'West End'. Extensive residential developments occur in all directions during a period of urbanisation in the first half of the 20th century. In 1870, a partially culverted stream flowing from north to south is present adjacent to the west of site. By the map dated 1915, the waterway is no longer present and has likely been entirely culverted.
Site Setting	The British Geological Survey indicates that the site is directly underlain by solid deposits of the London Clay Formation. The underlying London Clay Formation is identified as an unproductive stratum. There are no water networks or surface water features reported within 250m of the site. According to "The Lost Rivers of London" (Barton 1992), the site is within close proximity to a tributary of the lost river Kilburn (Westbourne). However the Camden SFRA states that this feature was culverted and incorporated into the sewer network. The site is located within an EA Flood Zone 1. The site is not within an area with a RoFRaS rating.

Desk Study	
	The site is not within an area benefiting from flood defences. Groundsure states that the site is at negligible risk of groundwater flooding. The risk of surface water flooding is reported as '1 in 100 year, 0.3m – 1.0m'.
Potential Geological Hazards	The Groundsure data identified a moderate risk of shrink swell clays beneath the site due to the underlying London Clay Formation. The presence of London Clay Formation may be a source of elevated sulphate associated with disseminated pyrite noted by BGS to be within this deposit. If such levels are noted, then sulphate resistant concrete may be required. 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.
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. Atterberg Limits of the underlying London Clay Formation should be determined by the ground investigation to assess shrink/swell potential of the soils. Existing foundations should be established. It is noted that the London Borough of Camden's guidance documents requires a Ground Movement Assessment 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. Consequently, such a study is strongly recommended.
Surface Flow and Flooding	The proposed development will comprise a basement beneath much of the existing hardstanding and existing building footprint. There is anticipated to be a slight increase in impermeable areas to 66%, however, this will be mitigated by the implementation of SuDS. As SUDS will be required by NPPF, PPG and LLFA policy requirements, this will 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.

Preliminary Basement Impact Assessment	
Preliminary 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.

Preliminary Basement Impact Assessment	
	The proposed basement excavation will be within 5m of a public pavement. It is also laterally 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, should be confirmed by a ground investigation and a subsequently updated Basement Impact Assessment. With respect to the front driveway it is likely that the proposed basement will contravene criterion h of Table 6.1. This should be considered in the final design.

Recommended Further Work	
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 Ground Movement Assessment is recommended. It should be noted that the following items are required as part of Camden Planning Guidance Basements (January 2021): • Plans and sections to show foundation details of adjacent structures. • Programme for enabling works, construction and restoration. • Construction Sequence Methodology. • Proposals for monitoring during construction. • Evidence of consultation with neighbours. • Ground Movement Assessment (GMA). • Drainage assessment.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Taishi Limited ("The Client") has commissioned Jomas Associates Ltd ('Jomas'), to prepare a Stage 1 and 2 Basement Impact Assessment (Screening & Scoping) at a site referred to as 37 Heath Drive, London, NW3 7SD.

1.1.2 Jomas' work has been undertaken in accordance with email proposal dated 15th August 2023.

1.2 Proposed Development

1.2.1 The proposed development for this site is understood to comprise the demolition of existing structure and construction of a new residential building with 10No dwellings, with an extension to the additional basement. It is assumed that the development will include private gardens.

1.2.2 A plan of the proposed development is 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.

1.2.4 This will be reviewed at each stage of the project.

1.3 Objectives

1.3.1 The objectives of Jomas' investigation were 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 As the site lies within the purview of the London Borough of Camden, their document "Camden Planning Guidance Basements" (CPGB) (January 2021) has been used to form the methodology utilised in undertaking this BIA.

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

- Plans and sections to show foundation details of adjacent structures – no access to adjacent properties was possible.
- Programme for enabling works, construction and restoration.
- 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.
- Construction Sequence Methodology.
- Proposals for monitoring during construction.
- Drainage assessment.

1.5.3 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.

1.5.4 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 A number of reports previously prepared by third parties were supplied to Jomas Associates at the commencement of this investigation. Table 1.1 details the documents supplied:

Table 1.1: Supplied Reports

Title	Author	Reference	Date
Flood Risk Assessment and Drainage Strategy	Jomas Associates Ltd	P5381J2868	14th September 2023

Title	Author	Reference	Date
Arboricultural Impact Statement and Method Statement	Abbots Arboricultural Advice	SAL/KMA/11656a	2nd November 2023

1.7 Limitations

1.7.1 Jomas Associates Ltd has prepared this report for the sole use of Form Structural Design 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	37 Heath Drive, London, NW3 7SD
Approx. National Grid Ref.	525551 185520
Site Area (Approx)	0.13 hectares
Site Occupation	Residential
Local Authority	London Borough of Camden
Proposed Site Use	Residential with a basement located within the footprint of the building

2.2 Walkover Survey

2.2.1 The site was visited by a Jomas Engineer on 22nd August 2023. The following information was noted while on site.

Table 2.2: Site Description

Area	Item	Details
On-site:	**Current Uses:**	Site consists of 1No modern, detached, residential building fronting on to Heath Drive. The building comprises 2No dwellings; the main house and a separate basement flat. The remainder of the site comprises an associated driveway, a rear patio area, and a rear garden.
	Evidence of historic uses:	No evidence of historic uses observed on site.
	Surfaces:	The site is approximately 50% hardstanding underfoot; made up of the footprint of the building, the front driveway, and a patio area in the rear garden. The rear garden predominantly comprises grassed soft landscaping.
	Vegetation:	The perimeter of the garden is bordered by well-maintained shrubs. Trees approximately 5m-8m tall are also present around the boundaries of the rear garden and driveway areas.
	Topography / Slope Stability:	The site is observed to be level.

Area	Item	Details
	Drainage:	Site appears to be connected to normal drainage facilities with no issues noted.
	Services:	Site appears to be connected to services which are in use.
	Controlled waters:	No controlled waters were observed on site.
	Tanks:	No tanks were observed on site.
Neighbouring land:	**North:**	Residential.
	East:	Residential.
	South:	Residential.
	West:	Residential.

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
1870 – 1874 1:2,500 1:10,560	Site appears to span across multiple plots of vacant, undeveloped, agricultural land. A footpath appears to pass through the middle of the site. A stream flowing approximately north to south, and various trees are present in the east of site.	The surrounding area is predominantly comprised of agricultural land and some minor residential areas. A stream is located adjacent to the west of site, and is an associated branch of the same waterway that is present in the east of site. The waterway appears to be culverted roughly 20m south of site. 2No small ponds are located adjacent to the south of site. Another pond is present roughly 175m northeast. A residential area known as 'New West End' is located approximately 50m west, and an area labelled as 'West End' is located from roughly 200m southwest. A well is located roughly 150m northwest. 2No ponds are present approximately 350m east. A large pond is located roughly 450m south.

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
		The Hampstead residential area is present from approximately 500m northeast of the site.
1894 – 1896 1:1,056 1:2,500 1:10,560	The trees in the east of site appear to have been felled.	A road, labelled as West Hampstead Avenue, is located adjacent to the west of site. The ponds located adjacent to the south of site are no longer present. A covered reservoir is present approximately 400m northwest.
1915 – 1920 1:2,500 1:10,560	No significant changes. The stream in the east of site appears to no longer be present and may have been culverted.	Large-scale developments have occurred and land in the vicinity of site is now predominantly residential. One of the ponds 350m west of the site is not shown. Other ponds noted on previous maps are also no longer present. The stream adjacent to the western boundary of the site is no longer shown.
1938 1:10,560 *Incomplete mapping*	A large building appears to encroach into the northwest of site.	No significant changes.
1951 – 1958 1:1,250 1:2,500 1:10,560	The previous building on site appears to have been demolished. A large, detached, residential building has been constructed in the west of site, with a smaller structure present to the southwest of the main building.	No significant changes.
1966 – 1968 1:1,250 1:10,560	No significant changes.	No significant changes.
1973 – 1982 1:1,250 1:10,000	No significant changes.	No significant changes.
1991 – 1995 1:1,250 1:10,000 *Incomplete small-scale mapping*	No significant changes.	No significant changes.
2003 – 2010 1:1,250	No significant changes.	No significant changes.

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1:10,000		
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 images are consistent with the historical maps, and show a reduction in vegetation at the site since the earliest aerial image.

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 24th August 2023 at https://planningrecords.camden.gov.uk/Northgate/PlanningExplorer/GeneralSearch.

2.5.2 Records pertaining to a Ground Investigation and Basement Impact Assessment undertaken at the adjacent address (38 Heath Road) in 2014 were reviewed. The investigation was carried out by Soiltechnics and comprised 9No. boreholes drilled to depths of between 3.0m and 5.0m bgl, and two Dynamic Probing holes to 7.0m bgl.

2.5.3 The boreholes encountered Made Ground to depths of between 1.5m and 3.8m bgl, the thickest deposits being towards the southwest of the site, underlain by London Clay. It was considered that the deep Made Ground deposits were related to the former ponds on the site that had been infilled.

2.5.4 Groundwater was encountered in three locations, with water encountered near the base of the Made Ground at depths of between 2.05m and 2.40m bgl. The report stated this was perched.

2.6 Sensitive Land Uses

2.6.1 The site is located within a SSSI Impact Risk Zone. As a result of this, all planning applications except householder applications require consultations.

2.6.2 No sensitive land use was identified within 1km of the site.

2.7 Radon

2.7.1 As reported, the site is not within a radon affected area, as less than 1% of properties are above the action level.

2.7.2 Consequently, no radon protective measures are necessary in the construction of new dwellings or extensions as described in publication BR211 (BRE, 2023).

2.7.3 However, a growing number of London Boroughs are adopting Public Health England guidance as outline 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 Camden.

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 solid deposits of the London Clay Formation. An extract of the BGS description is provided below:

> *"…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."*

3.2.2 The Groundsure report indicates that site is adjacent to an area of worked ground that may encroach into the south of site. As a result of this and given the site history, 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	Moderate	Ground conditions predominantly high plasticity.	Yes
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
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

Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
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:

- 2No. historical surface ground working features are reported within 250m of the site. The nearest is reported as a gravel pit 212m southwest from 1873.
- 13No. historical underground working features are reported within 1km of the site. Nearest reported 655m southeast as a tunnel. All features reported are identified as tunnels.
- No BGS Current Ground Working Features are reported within 1km 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) 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 potential for shrink swell clays beneath the proposed footprint may mean that heave precautions would be required.

3.4.8 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.

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.

Source Protection Zones (SPZ)

4.1.3 In terms of aquifer protection, the EA generally adopts a three-fold classification of SPZs for public water supply abstraction wells.

- Zone I - or 'Inner Protection Zone' is located immediately adjacent to the groundwater source and is based on a 50-day travel time. It is designed to protect against the effects of human activity and biological/chemical contaminants that may have an immediate effect on the source.
- Zone II - or 'Outer Protection Zone' is defined by a 400-day travel time to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants.
- Zone III - or 'Total Catchment' is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.

Hydrogeology

4.1.4 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.

4.1.5 The available data indicates that the geology of the area consists of the London Clay Formation. Groundwater is not expected to be present within this unproductive stratum.

Hydrology

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

4.1.7 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.

4.1.8 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.)

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

4.1.10 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.)

4.1.11 Some areas benefit from flood defences and these are detailed on Environment

Agency mapping.

4.1.12 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:**	-	None reported within 500m of site.
	Solid:	Unproductive	Secondary A aquifer reported 122m northeast of site. (Claygate Member)
Surface Water Features		None reported	No water networks or surface water features reported within 250m of site.
Discharge Consents		None reported	1No reported within 500m, reported as 'trade discharges – unspecified' 370m to the west.
Flood Risk	**EA Flood Zone 2**	No	Not reported within 50m of the site.
	EA Flood Zone 3	No	Not reported within 50m of the site.
	RoFRaS	None	Not reported within 50m of the site.
	Historical Flood Events	None reported within 250m of the site	
	Flood Defences	There are no areas benefiting from flood defences reported within 250m of the study site	
	Surface Water Flooding	Highest risk is '1 in 100 year, 0.3m – 1.0m'	Highest risk within 50m is '1 in 30 year, >1.0m'
	Groundwater Flooding	Negligible	Highest risk within 50m is 'negligible'

4.1.13 According to "The Lost Rivers of London" (Barton 1992), the site is within close proximity to a tributary of the lost river Kilburn (Westbourne). The Soiltechnics report for 38 Heath Drive states that this river followed the line of Heath Drive, and that the watercourse crossing the east of the site was a former tributary of the river Westbourne.

4.1.14 The Camden Strategic Flood Risk Assessment (SFRA) (URS, 2014) states that the River Kilburn has been incorporated into the Thames Water sewer network as the Ranelagh Sewer. Further evidence of this was identified on the historic OS maps dated 1870/74 (See Table 2.3); a culverted stream was located on and adjacent to the site. However, Figure 2 of the Camden SFRA does not show this feature and indicates no culverted watercourses within 500m of the site.

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 50m of an Environment Agency Zone 2 or zone 3 floodplain. Risk of flooding from rivers and the sea (RoFRaS) rating none/negligible.	Low risk.
Groundwater	The BGS considers that the site is at negligible risk from groundwater flooding.	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 Camden: Redington Frognal Neighbourhood Forum Summary Report (Arup, 2016); London Borough of Camden Strategic Flood Risk Assessment (SFRA) (URS, July 2014); Preliminary Flood Risk Assessment for London Borough of Camden (Halcrow, 2011); and Surface Water Management Plan for London Borough of Camden (Halcrow, 2011). Potential impacts to the site are discussed below.

Flooding from Fluvial/Tidal Sources

4.2.3 The site is located within EA Flood Zone 1 and no water networks or surface water features have been identified within 250m of the site.

4.2.4 Figure 7 of the Redington Frognal Neighbourhood Forum Summary Report indicates the presence of a watercourse (labelled as Cannon Stream/Kilbourne) and 2No ponds approximately 20m south of site.

4.2.5 The SFRA states that all main rivers historically located within the borough are now culverted and incorporated into the TWUL (Thames Water) sewer network and therefore there is no fluvial flood risk within the borough.

Groundwater Flooding

4.2.6 Figure 4e of the SFRA shows the site is not within an area designated as having an increased susceptibility to elevated groundwater. The nearest EA groundwater flood incident is shown 650m southwest of site and the nearest LBC groundwater flood incident is shown approximately 60m southwest of site, with 7No. properties affected.

4.2.7 The site (and most of the Borough) is underlain by unproductive strata of London Clay Formation. Groundsure reports the site to be at negligible risk of groundwater flooding.

Surface Water Flooding

4.2.8 Figure 3v of the SFRA indicates that risk of flooding from surface water at the site is medium (1 in 100 year). The figure also shows that Finchley Road (~30m south of site) was affected by surface water flooding in 2002. The nearest LBC surface water flooding incident is shown approximately 50m southwest of the site, with 2No properties affected.

4.2.9 Figure 3x shows the flood hazard at site to be <0.75m (low). A flood hazard of 1.25-2.5 (significant) is shown within 50m of the site.

4.2.10 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

4.2.11 Figures 5a and 5b of the SFRA show the number of sewer flooding events for 4-digit postcode prefixes across the borough. For the postcode “NW3 7--” where the site is situated, no properties have been impacted by internal or external sewer flooding.

4.2.12 The London Borough of Camden SWMP states the postcodes at the highest risk of sewer flooding based on historic events; the list does not include “NW3 7--”.

4.2.13 The site is not located within 1km of a reservoir or Hampstead Heath Pond.

Critical Drainage Areas (CDAs)

4.2.14 A CDA is defined in the LBC SWMP as "*A discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding in one or more LFRZ during severe weather thereby affecting people, property or local infrastructure*".

4.2.15 A Local Flood Risk Zone (LFRZ) is defined in the LBC SWMP as "*A discrete area of flooding that does not exceed the national criteria for a Flood Risk Area but affects houses, businesses and/or local infrastructure. The boundary is defined as the actual spatial extent of predicted flooding in a single location"*.

4.2.16 According to Figure 6 (Rev 2) of the SFRA, the site is situated within CDA Group3_010 and is therefore within a catchment area which contributes to a flooding hotspot.

4.2.17 The site is located adjacent to the Cannon Hill LFRZ.

Sustainable Drainage Systems (SuDS)

4.2.18 The proposed basement is defined by the approximate footprint of the existing building and rear patio hardstanding; it is unlikely to significantly change the impermeable areas on site.

4.2.19 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.

4.2.20 However, given the expected underlying ground and hydrogeological conditions it is considered that infiltration drainage would likely be impracticable.

Conclusion

4.2.21 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.

4.2.22 Excerpts of figures from the Camden SFRA 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 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?	No	The site is directly underlain by the London Clay Formation, which is classified as an unproductive stratum.
1b) Will the proposed basement extend below the surface of the water table?	Unknown	Due to the presence of unproductive, practically impermeable London Clay Formation reported to underlie the site, it is unlikely that groundwater will be encountered. This will be confirmed by a ground investigation.

Query	Y / N	Comment
2) Is the site within 100m of a watercourse, well (disused or used) or a potential spring line?	Unknown	No water networks or surface water features within 250m of site. The 1870 OS Map identified a well 150m northwest of the site. In addition, historic watercourses were present on the same historic map on and adjacent to the site, as a tributary of the river Kilburn. However, neither the well nor the watercourse are shown on subsequent editions. Lost Rivers of London (Barton, 1992) notes a tributary of the lost River Kilburn (Westbourne) within close proximity to the site. The Strategic Flood Risk Assessment for Camden states that all watercourses have been incorporated into the TWUL sewer network. A ground investigation will be undertaken to establish the geological and hydrogeological conditions beneath the site.
3) Is the site within the catchment of any surface water features?	No	No water networks or surface water features within 250m of site. Groundsure states the only catchment relates to "Land area part of London Management Catchment draining to the Tidal Thames". Lost Rivers of London (Barton, 1992) notes a tributary of the lost River Kilburn (Westbourne) within close proximity to the site. A ground investigation will be undertaken to establish the geological and hydrogeological conditions beneath the site.
4) Will the proposed basement development result in a change in the proportion of hard surfaced/paved areas?	Yes	As per the Drainage Strategy report, impermeable areas on site will increase from 61% to 66%. Mitigation of this risk in the form of SUDS is detailed within the Drainage Strategy report.
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)?	No	The proposed development will comprise a basement within the existing footprint of the building and rear hardstanding patio area.
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 water networks or surface water features within 250m of site.

Query	Y / N	Comment
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 surrounding land
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 as the proposed development is to take place within the footprint of the main building and rear patio area.
3) Does the developments' neighbouring land include railway cuttings and the like, with a slope greater than 7 degrees? (approximately 1 in 8)	No	Land uses within the surrounding area are primarily 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 level.
5) Is the London Clay the shallowest strata at the site?	Yes	The site is directly underlain by solid deposits of 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?	Yes	The Arboricultural Assessment (November 2023) indicates 8No individual trees will be removed to enable the development. In addition, the calculated root protection area of 5No retained trees extends into the development area. Mitigation measures to protect these trees are outlined within the Arboricultural Assessment report. Shrink/swell soils and heave protection measures to be assessed by ground investigation.
7) Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	Unknown	No obvious evidence of the effects of shrink-swell subsidence was noted on site. However, the site is directly underlain by the London Clay Formation and is reported to be in area at moderate risk from shrink swell clays.
8) Is the site within 100m of a watercourse or a spring line?	No	No water networks or surface water features within 250m of site.
9) Is the site within an area of previously worked ground?	Yes	The Groundsure reports artificial ground described as worked ground (undivided) encroaching onto the south of site. No evidence on mapping to indicate ground working feature in proximity of site. Site has only had the current development in place.

Query	Y / N	Comment
		A ground investigation will be undertaken to confirm underlying ground conditions at the site.
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?	No	The site is directly underlain by unproductive strata of the London Clay Formation.
11) Is the site within 50m of the Hampstead Heath ponds (or other waterbody)?	No	No water networks or surface water features within 250m of site.
12) Is the site within 5m of a highway or pedestrian 'right of way'?	Yes	The site faces onto Heath Drive to the northwest.
13) Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	No	It is understood that the neighbouring/adjoining property has a basement. The formation of a basement on site will not significantly change the differential depth of foundations. A Ground Movement Assessment will be produced to assess the ground movement risk to neighbouring buildings.
14) Is the site over (or within the exclusion of) any tunnels e.g. railway lines?	No	No underground railways are reported 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.
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?	No	The proposed development will comprise a basement within the existing footprint of the building, and therefore surface water flow is unlikely to be affected.
3) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	Yes	As per the Drainage Strategy report, impermeable areas on site will increase from 61% to 66%. Mitigation of this risk in the form of SUDS is detailed within the Drainage Strategy report.
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?	No	No water networks or surface water features within 250m of site. Mitigation of this risk in the form of SUDS is detailed within the Drainage Strategy report.
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	Yes	Although the site is located within an EA Flood Zone 1, it is also located within Critical Drainage

Query	Y / N	Comment
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?		Area (Group 3_010) and adjacent to Cannon Hill Local Flood Risk Zone. Mitigation of this risk in the form of SUDS, which will reduce the overall flood risk post-development is detailed within the Drainage Strategy report.

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 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, including the potential for any evidence relating to a tributary of the lost river Kilburn (Westbourne).

Land Stability

5.2.4 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.

5.2.5 Atterberg Limits of the underlying clay should be determined by the ground investigation to assess shrink/swell potential of the soils.

5.2.6 Existing foundations should be established.

5.2.7 It is noted that the London Borough of Camden’s guidance documents requires a Ground Movement Assessment 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. Consequently, such a study is strongly recommended.

Surface Flow and Flooding

5.2.8 The proposed development will comprise a basement within the existing footprint of the building and rear patio area. Therefore, the proposed development will not cause a significant change in surface water run-off.

5.2.9 As SUDS will be required by NPPF, PPG and LLFA policy requirements, this will 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.

5.2.10 If SUDS can be incorporated into the design, this will further decrease the potential risk of surface water flooding.

5.2.11 A drainage strategy/SUDS report has be produced for the site (Jomas, September 2023) and should be referred to in conjunction with the BIA.

6 PRELIMINARY BASEMENT IMPACT ASSESSMENT

6.1 Proposed Changes to Areas of External Hardstanding

6.1.1 Existing areas of hardstanding comprise approximately 61% of the site, and include the footprint of the existing building, the front driveway area, and the rear patio area.

6.1.2 The proposed development will comprise a basement beneath much of the existing hardstanding and existing building footprint. There is anticipated to be a slight increase in impermeable areas to 66% site coverage, however, overall flood risk will be mitigated by the implementation of SuDS. It is not considered necessary to undertake any further investigations, studies or impact assessment in relation to the proposed changes to areas of external hardstanding.

6.1.3 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 or other form of betterment.

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 nearest EA groundwater flood incident is shown 650m southwest of site and the nearest LBC groundwater flood incident is shown approximately 60m southwest of site, with 7No. properties affected.

6.2.4 Finchley Road (~30m south of site) was affected by surface water flooding in 2002. The nearest LBC surface water flooding incident is shown approximately 50m southwest of the site, with 2No properties affected.

6.2.5 For the postcode “NW3 7--” where the site is situated, no properties have been impacted by internal or external sewer flooding.

6.2.6 There are no historical flood events reported by Groundsure within 250m of the site.

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 With reference to British Geological Survey (BGS) mapping, the geology of the site is anticipated to comprise the London Clay Formation. Given that the site has been

developed previously, a thickness of Made Ground could also be present overlying the natural soils.

6.3.2 The London Clay Formation poses a moderate risk of shrink-swell conditions due to volume change potential, and a ground investigation should be carried out to determine what considerations should be taken into account for basement design in this regard.

6.3.3 Due to the practically impermeable nature of the London Clay Formation, a shallow groundwater table is not anticipated. There is, however, the potential for perched groundwater to be encountered at the interface between the Made Ground and London Clay Formation, though significant volumes of groundwater are not anticipated.

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 water networks or surface water features on or 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 The London Borough of Camden SWMP indicates that overall groundwater flooding across the Borough is considered to be a relatively low risk.

6.4.6 The site is situated within CDA Group3_010 and is therefore within a catchment area which contributes to a flooding hotspot.

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

6.4.8 The proposed basement construction is considered unlikely to create a reduction of impermeable area in the post development scenario.

6.4.9 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 be within 5m of a public pavement. It is also 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.

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 the above property. 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 Camden.

6.6 Cumulative Impacts

6.6.1 The site is reported to be directly underlain by practically impermeable London Clay Formation. Such materials would prevent both the movement of groundwater and the ingress of surface water into the ground.

6.6.2 SUDS will be required at the site; this will likely comprise an above or below ground attenuation tank before release to the existing drainage network.

6.6.3 The proposed development is therefore unlikely to have an accumulative impact on the local hydrogeology.

6.7 Ground Movement

6.7.1 CIRIA C580 Table 2.5 uses information on the damage to walls of buildings based on Burland et al (1977), Boscardin and Cording (1989) and Burland (2001) to categorise damage into 5 categories. A summary of Table 2.5 from CIRIA C580 is provided below.

6.7.2 It would be generally good practise to ensure that the design and construction should aim to limit damage to all buildings to a maximum of Category 2 (Slight) as set out in CIRIA Report 580.

Table 6.1: Summary of CIRIA C580 Table 2.5 (after Burland et al (1977), Boscardin and Cording (1989) and Burland (2001))

Category of damage		Description of Typical Damage	Approximate crack width (mm)	Limiting tensile strain (%)
0	Negligible	Hairline cracks of less than about 0.1mm are classes as negligible.	< 0.1	0.0-0.05
1	Very Slight	Fine cracks that can easily be treated during normal decoration. Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection.	<1	0.05-0.075
2	Slight	Cracks easily filled. Redecoration probably required. Several slight fractures showing inside of building. Cracks are visible externally and some repointing may be required externally to ensure weather tightness. Doors and windows may stick slightly	<5	0.075-0.15
3	Moderate	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weather-tightness often impaired.	5-15 or a number of cracks >3	0.15 – 0.3
4	Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Windows and frames distorted, floors sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted.	15-25 but also depends on number of cracks	>0.3
5	Very Severe	This requires a major repair involving partial or complete rebuilding. Beams lose bearings, walls	Usually >25 but depends	

Category of damage	Description of Typical Damage	Approximate crack width (mm)	Limiting tensile strain (%)
	lean badly and require shoring. Windows broken with distortion. Danger of instability.	on number of cracks	

6.7.3 The first three categories (namely Negligible, Very Slight and Slight categories) are generally regarded as acceptable for buildings where no structural damage is permissible.

6.7.4 Assuming cantilever retaining walls are formed in short sections, it is considered that in the short term maintaining the category of damage to Category 1 could be relatively easily achieved. It would be recommended that a full inspection of the neighbouring properties should be undertaken prior to starting work and a watching brief of the structure, the excavations and the adjacent properties is maintained during the works.

6.7.5 In the long term a suitably designed and constructed retaining wall should provide sufficient support to ensure that post construction movement is minimal and the damage classification post construction of any cracks caused in the short term should not get worse. It is considered unlikely that new cracks would occur post construction.

6.7.6 This advice is provided based on the limited ground investigation undertaken and is not a full Ground Movement Assessment.

6.8 Size of Basement

6.8.1 The London Borough of Camden document "Camden Planning Guidance Basements" (January 2021) outlines how Local Plan Policy A5 on basements limits the size of basement developments.

Table 6.1: Policy A5 Basement Criteria regarding the size of basement developments

Criterion from LBC Policy A5	Jomas Comments on the Proposed Development in relation to LBC Policy A5
f. not comprise of more than one storey;	The proposed basement is only a single storey.
g. not be built under an existing basement;	The proposed basement is an extension to the existing basement under the existing ground floor and therefore not beneath an existing basement.
h. not exceed 50% of each garden within the property;	The Camden guidance notes that this applies to the front garden, the rear garden and gardens to the side of the property individually, rather than calculated as an aggregated garden area for the whole property.

Criterion from LBC Policy A5	Jomas Comments on the Proposed Development in relation to LBC Policy A5
	The rear garden space is approximately 570m^2 with the proposed basement being approximately 261m^2 and therefore passes. The front driveway is approximately 315m^2 and the proposed basement therefore exceeds 50% of this area.
i. be less than 1.5 times the footprint of the host building in area;	The proposed ground floor area is approximately 538m^2 and the proposed basement is approximately 261m^2, and will therefore not exceed this.
j. extend into the garden no further than 50% of the depth of the host building measured from the principal rear elevation;	The proposed basement will not protrude into the garden from the face of the proposed building.
k. not extend into or underneath the garden further than 50% of the depth of the garden;	The proposed basement will not extend into the garden area.
l. be set back from neighbouring property boundaries where it extends beyond the footprint of the host building;	The proposed basement will not extend beyond the proposed building footprint.
m. avoid the loss of garden space or trees of townscape or amenity value	The proposed basement will not extend into the garden area.

6.8.2 Within the London Borough of Camden, the criteria of policy A5 must be considered together, therefore the area where a basement may be developed is the smallest of these areas.

6.8.3 With respect to the front driveway it is likely that the proposed basement will contravene criterion h above. This should be considered in the final design.

6.9 Summary

6.9.1 The overall assessment of the site is that the creation of a basement for the existing development should not adversely impact the site or its immediate environs, providing measures are taken to protect surrounding land and properties during construction.

6.9.2 A Ground Investigation is recommended to confirm the assumptions in this report, as well as to inform the recommended Ground Movement Assessment.

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APPENDICES

APPENDIX 1 – FIGURES

APPENDIX 2 – GROUNDSURE REPORTS

APPENDIX 3 – OS HISTORICAL MAPS

APPENDIX 4 – LBC MAP EXCERPTS

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