

59 Croftdown Road,  
London NW5 1EL

Basement Impact Assessment  
Audit

For  
London Borough of Camden

Project Number: 12336-96

Revision: F1

February 2017

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## Document History and Status

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D1	September 2016	Comment	AJMav12336-96-080916-59 Croftdown Road-D1.doc	A J Marlow	F Drammeh/A J Marlow	E M Brown
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## Document Details

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## 1.0 NON-TECHNICAL SUMMARY

- 1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for 59 Croftdown Road, NW5 1EL (planning reference 2016/3596/P). The basement is considered to fall within Category A as defined by the Terms of Reference.
- 1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.
- 1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.
- 1.4. The BIA was undertaken by Momentum Structural Engineers and its latest revision includes a Site Investigation Report completed by Ground & Water. Taken together, the qualifications and experience of the various authors and reviewers meet the requirements of CPG4.
- 1.5. The proposal comprises the deepening, by 0.5m, of the partial basement below the three storey semi-detached property and extending it by 2.3m into the rear garden as a full-height basement.
- 1.6. The Site Investigation Report has identified that the lowered basement will be founded in London Clay and is overlain by Made Ground. It has also investigated adjacent existing foundations and has confirmed that its neighbour has a similar basement.
- 1.7. An additional BIA Appendix has provided acceptable methodology and details of the basement construction which consists of underpinning and insitu concrete retaining walls cast in narrow bays. Details of temporary propping arrangements should be agreed during the detailed design process and secured by a planning condition in order that the criteria of CPG4 are met.
- 1.8. A further revision of the BIA now recognises that the site is adjacent to an area which previously flooded and anti-flood mitigation measures have been proposed which should be incorporated into the design.
- 1.9. The additional Site Investigation Report includes a Ground Movement Analysis which identifies that its neighbour will suffer Very Slight damage, Burland Category 1. Void formers will be introduced below the basement slab to overcome heave movement due to excavation.
- 1.10. It is accepted that a monitoring strategy and relevant trigger levels can be agreed as part of the detailed design process, secured by a planning condition in order that the criteria of CPG4 are met.

- 1.11. The revised BIA identified that ground movements elsewhere will be Negligible, Burland Category 0, although utilities in the adjacent pavement should be identified prior to construction commencement.
- 1.12. The revised BIA refers to the Architect's works programme and a copy of this document has now been provided.
- 1.13. It is accepted that there are no slope stability concerns, wider hydrogeological issues or any other surface water considerations with the exception of the potential flood risk discussed above regarding the proposed development.
- 1.14. The requirements of CPG4 have generally been met by the BIA subject to the need for planning conditions described in Section 4 and summarised in Appendix 2.

## 2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 11 August 2016 to carry out a Category A Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 59 Croftdown Road, Camden Planning Reference 2016/3596/P.
- 2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.
- 2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
  - Camden Planning Guidance (CPG) 4: Basements and Lightwells.
  - Camden Development Policy (DP) 27: Basements and Lightwells.
  - Camden Development Policy (DP) 23: Water.
- 2.4. The BIA should demonstrate that schemes:
- a) maintain the structural stability of the building and neighbouring properties;
  - b) avoid adversely affecting drainage and run off or causing other damage to the water environment;
  - c) avoid cumulative impacts upon structural stability or the water environment in the local area, and;
- evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.
- 2.5. LBC's Audit Instruction described the planning proposal as "Single storey rear extension with basement below; and replacement outbuilding for use ancillary to main building."
- 2.6. The Audit instruction confirmed that the basement proposals does not involve a listed building or neighboured a listed building but the submitted Design and Access Statement indicated that the property made a positive contribution to the Dartmouth Park Conservation Area.

2.7. CampbellReith accessed LBC's Planning Portal on 26 August 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA) dated March 2016 by Momentum
- Desktop Study dated March 2016 by Groundsure
- Design and Access Statement dated June 2016 by Amos Goldreich
- Architectural Floor Plans, Elevations and Sections, Existing and Proposed, nos 087/101, 102, 200, 201, 202, 300 dated June 2016 by Amos Goldreich

2.8. Following the issue of CampbellReith's revision D1 Audit Report, an email was received from LBC dated 23 December 2016 which contained the following revised or additional information:

- Basement Impact Assessment (BIA) dated 22 December 2016 by Momentum

2.9. Following the issue of CampbellReith's revision D2 Audit Report, emails were received from LBC dated 31 January and 08 February 2017 which contained the following revised or additional information:

- Basement Impact Assessment (BIA) dated 07 February 2017 by Momentum
- Architect's Preliminary Programme of Works

### 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	See Audit paragraph 4.1.
Is data required by Cl.233 of the GSD presented?	Yes	See Audit paragraph 4.3.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	See Audit paragraph 4.3.
Are suitable plan/maps included?	Yes	See Audit paragraph 4.4.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	See Audit paragraph 4.4.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See Audit paragraph 4.4.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See Audit paragraphs 4.4 and 4.5.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See Audit paragraphs 4.4 and 4.6.
Is a conceptual model presented?	Yes	Site specific investigation now undertaken.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	



Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	See Audit paragraph 4.5.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	See Audit paragraph 4.6.
Is factual ground investigation data provided?	Yes	Site specific ground investigation now undertaken.
Is monitoring data presented?	Yes	
Is the ground investigation informed by a desk study?	No	Desk study not presented.
Has a site walkover been undertaken?	No	Not stated although Section 1 of the SIR describes the property.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	See Audit paragraph 4.9.
Is a geotechnical interpretation presented?	Yes	Ground investigation not undertaken.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Ground investigation not undertaken.
Are reports on other investigations required by screening and scoping presented?	N/A	
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Presence of basements now identified.
Is an Impact Assessment provided?	No	BIA not undertaken beyond screening and scoping although mitigation measures are now provided to prevent basement flooding.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	No	Impact assessment not provided.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	BIA states no adverse effects from basement construction.
Has the need for monitoring during construction been considered?	Yes	Details to be considered in Party Wall process.
Have the residual (after mitigation) impacts been clearly identified?	No	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	See Audit paragraph 4.10.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	See Audit paragraph 4.6.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	
Are non-technical summaries provided?	No	Not provided.

## 4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried out by Momentum Structural Engineers and the checker has a CEng MStructE qualification, however, no proof of expertise in engineering geology is provided with respect to the land stability assessment. The production of a BIA also required input from a Hydrogeologist with a CGeol. qualification with respect to the appraisal of groundwater flow and a Chartered Hydrologist or Chartered Civil Engineer specialising in flood risk management and surface water drainage. Whilst this does not appear to be the case, the proposals are modest and this issue could be addressed once further information on a few items is received as discussed below.

Revised documentation received from Momentum did not provide the additional information requested. However, a Site Investigation Report, dated December 2016, by Ground & Water, included as Appendix E in the BIA, provides the required expertise in engineering geology.

- 4.2. The site comprises a three storey semi-detached building which has an existing partial basement below the rear half of its ground floor footprint. This will be lowered by 0.50m, to increase the floor to ceiling height, and extended below a new single storey rear extension by 2.30m within the rear garden.
- 4.3. It is stated in the BIA that the existing masonry walls '*may require underpinning*' although details are not provided. There is no indication of the proposed construction methodology for the basement extension retaining walls. A construction sequence or an indicative bay sequence is not provided. A trial pit adjacent to the party wall to indicate existing foundations has not been undertaken. A statement is made in the BIA that temporary works may be required during although no indicative solution is provided.

Additional information has been provided as Appendix F of the BIA and consists of typical underpinning and retaining wall details, a construction bay layout sequence and methodologies, as well as typical structural calculations for the retaining wall, all of which are acceptable. Although, the need for stiff temporary propping is identified to limit potential horizontal movements, no detail is provided and this should be considered further during the detailed design process, particularly, for the full-height West return wall adjacent to the boundary wall with No.57, and secured by an appropriate planning condition in order that the criteria of CPG4 are met.

- 4.4. Although it is evident that a thorough screening process has been largely undertaken, it would be beneficial if relevant Arup GSD and Camden Strategic Flood Risk Management Assessment maps are referenced and extracts identifying the site location on each map are included. These extracts would help to support statements made in the BIA screening process.

- 4.5. A 'Unknown' response is given to Question 1b of the Hydrogeology screening which relates to whether or not the basement will extend beneath the water table. This was carried forward to scoping, however, this issue is not considered to be appropriately addressed. No ground investigation has been undertaken to establish the groundwater table. Whilst the London Clay is an unproductive stratum, the scoping ignores the potential for perched water to exist within any Made Ground which may require mitigation measures such as dewatering during construction.

The Appendix E Site Investigation Report has established the stratigraphy and groundwater regime as well as investigating existing foundations.

- 4.6. An 'Unknown' response is given to Question 6 of the Hydrology screening, however, this was not appropriately addressed. The BIA makes no assessment on whether the development is likely to be affected by surface water flooding, given that it is adjacent to a Local Flood Risk Zone. York Rise and Woodsome Road were flooded in the 1975 event and lie immediately south of the development site. It is possible that any basement construction, however minimal, will impact on the sensitive hydrogeology of the area and surrounding properties.

The response to Question 6 of the Hydrology Screening in the revised BIA refers to "the proposed basement will not extend below that static water level". This response is inadequate as the likelihood of surface water flooding is due to the inadequacies of the local surface water sewer network capacity to deal with significant rainfall events. The design should incorporate anti-flood measures to prevent potential flooding of the basement.

The February 2017 revision to the BIA recognises that the property is adjacent to a Local Flood Risk Zone and could potentially suffer from surface water flooding from rainfall events and reservoirs. The BIA now proposes anti-flood mitigation measures which are acceptable and these should be incorporated into the final design.

- 4.7. It is stated in the BIA that there will be no increase in impermeable area therefore the surface water flow regime and volume will be unchanged.
- 4.8. No desk study or intrusive ground investigation has been carried out. A suitable ground investigation establishing the sequence and depth of the strata and groundwater levels is required to confirm the adequacy of the proposed construction methodology, identify the depth of the foundations being underpinned, the potential impacts arising from the basement proposals and to allow appropriate mitigation to be proposed.

The Appendix E Site Investigation Report has established the stratigraphy and groundwater regime as well as investigating adjacent existing foundations.

- 4.9. No indication is provided whether an existing basement exists below the adjacent property, No. 57 Croftdown Road.

The revised BIA has identified that No.57 has a similar existing basement to that within No.59.

- 4.10. Once a revised BIA has been submitted and an assessment of below ground soils provided, it may be acceptable to confirm that it is unnecessary to develop the BIA beyond screening and scoping. However, no assessment of movements resulting from underpinning and extension retaining wall construction has currently been made. Potential vertical and horizontal movements from the underpinning and excavation together with heave movements from the excavation should be considered and any resultant damage clearly assessed.

A Ground Movement Assessment has been undertaken by Ground & Water within Appendix E of the BIA which shows that the adjacent property, No.57, will suffer Very Slight damage, Burland Category 1. Heave movement below the basement slab has been recognised and void formers are to be included in the construction.

- 4.11. It is stated in the land stability screening that the proposed development extends to the back of the pavement, however, the impacts to the pavement and any utilities running beneath it are not discussed.

It is anticipated in the revised BIA that the movements to the back of pavement will be Negligible although the successful contractor should identify all utilities in the pavement prior to commencing construction.

- 4.12. The BIA does not consider movement monitoring of the neighbouring properties.

It is accepted that a monitoring strategy and relevant trigger levels can be agreed as part of the detailed design process secured by an appropriate planning condition in order that the criteria of CPG4 are met.

- 4.13. A works programme has not been provided as required by Cl. 233 of the Arup GSD.

Although the revised BIA refers to the Architect's works programme, no copy of this document has been provided.

The Architect's Preliminary Programme of Works has been provided and this is acceptable.

- 4.14. It is accepted that there are no slope stability concerns, wider hydrogeological issues or any other surface water considerations regarding the proposed development.

## 5.0 CONCLUSIONS

- 5.1. The BIA was undertaken by Momentum Structural Engineers and its latest revision includes a Site Investigation Report completed by Ground & Water. Taken together, the qualifications and experience of the various authors and reviewers meet the requirements of CPG4.
- 5.2. The proposal comprises the deepening, by 0.5m, of the partial basement below the three storey semi-detached property and extending it by 2.3m into the rear garden as a full-height basement.
- 5.3. The Site Investigation Report has identified that the lowered basement will be founded in London Clay and is overlain by Made Ground. It has also investigated adjacent existing foundations and has confirmed that its neighbour has a similar basement.
- 5.4. An additional BIA Appendix has provided acceptable methodology and details of the basement construction which consists of underpinning and insitu concrete retaining walls cast in narrow bays. Details of temporary propping arrangements should be agreed during the detailed design process and secured by a planning condition in order that the criteria of CPG4 are met.
- 5.5. A further revision of the BIA now recognises that the site is adjacent to an area which previously flooded and anti-flood mitigation measures have now been proposed which should be incorporated into the design.
- 5.6. The additional Site Investigation Report includes a Ground Movement Analysis which identifies that its neighbour will suffer Very Slight damage, Burland Category 1. Void formers will be introduced below the basement slab to overcome heave movement due to excavation.
- 5.7. It is accepted that a monitoring strategy and relevant trigger levels can be agreed as part of the detailed design process, secured by a planning condition in order that the criteria of CPG4 are met.
- 5.8. The revised BIA identified that ground movements elsewhere will be Negligible, Burland Category 0, although utilities in the adjacent pavements should be identified prior to construction commencement.
- 5.9. The revised BIA refers to the Architect's works programme and a copy of this document has now been provided.
- 5.10. It is accepted that there are no slope stability concerns, wider hydrogeological issues or any other surface water consideration with the exception of the potential flood risk discussed regarding the proposed development. .

## Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Willmott	Not provided	N/A	Adjacency to original course of River Fleet and Flood Risk Area	BIA states the 'Lost River' is located at c.150m away. See Audit paragraph 4.6.
Bradfield	DPCAAC	N/A	Adjacency to original course of River Fleet	BIA states the 'Lost River' is located at c.150m away.



## Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	BIA author qualifications	Evidence now provided to demonstrate author has some expertise in engineering geology.	January 2017
2	BIA format	Works programme not provided.	Outline duration now provided, see 4.13.	February 2017
3	BIA format/Stability/Hydrogeology	No site specific ground investigation to confirm sequence of strata and groundwater level.	Site specific ground investigation informed by desk study with groundwater monitoring now provided.	January 2017
4	Hydrogeology/Stability	Temporary dewatering measures not considered.	To be considered once ground investigation is undertaken and groundwater level is established, not now required.	January 2017
5	Hydrology	Screening did not identify that the site is located in an area which previously flooded.	Now considered and addressed as necessary, see 4.6.	February 2017
6	Stability	Presence or absence of basement neighbouring properties not discussed in BIA text and foundations depths not determined.	Presence or absence of basements beneath adjacent properties now provided.	January 2017
7	Stability	Proposed construction methodology not sufficiently detailed. No construction sequence, inadequate sketches and no temporary works proposal.	Construction sequence and temporary works now provided but planning condition required, see 4.3.	January 2017
8	Stability	Ground movement assessment (GMA) not provided.	Now provided.	January 2017
9	Stability	Movement monitoring proposal not provided.	Open – Outline proposal to be provided. Details and trigger levels to be agreed but planning condition required.	February 2017

## Appendix 3: Supplementary Supporting Documents

Revised BIA dated February 2017  
Architect's Programme of Works

# 59 Croftdown Road

## Basement Impact Assessment

07 February 2017 . Ref 2702

## Background

This document has been prepared for the sole benefit, use and information of the client and for the purposes set out in the following pages.

The liability of Momentum Consulting Engineers Ltd in respect of the information contained in the document will not extend to any third party.

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### Issue History

Rev.	Date	Comments
0	31.03.16	First Issue
1	15.12.16	Updated information from site investigation
2	22.12.16	Updated SI (figures 6,7 and 8) Updated Construction methodology and provided typical calculations
3	07.02.17	Update for surface and reservoir flooding from updated maps

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## 1.0 Introduction

### 1.1 Existing structure

59 Croftdown Road is a 3-storey load bearing masonry structure with an existing part basement in the Dartmouth Park area of Camden, London.

The building is located on a corner site, with one party wall on the South Western Boundary. A spire-style structure exists on the street corner, providing additional floor area at each level. The facade is typical for the street, being of red brick construction.

Timber floor joists are assumed to span between the external load bearing masonry and internal stud walls.

A raised timber platform exists at the rear of the structure at ground level.

The building is assumed to have traditional shallow corbeled footings bearing on London Clay.



Figure 1: Section through existing structure

### 1.2 Proposed works

All the existing superstructure is to be retained, with the exception of modifications to the rear external masonry wall. The existing basement is to be lowered by 0.5m and extended by 2.3m towards the rear of the site, covering the area of the existing deck. A new internal stairway is proposed for access to the basement. Above the basement extension, a single storey conservatory is proposed to extend the kitchen area.

For duration of the works please refer to the Architect's works programme.

### 1.3 Construction methodology

It is proposed the basement floor will be lowered by breaking out and excavating under the existing floor.

Existing masonry walls (and the south western party wall) will require underpinning to ensure the existing foundations capacity are sustained. This will be done sequentially in 1m sections.

A new concrete floor will be installed at the lower level. It is proposed that this will prop the retaining wall at the base.

The new retaining walls within the garden extension will consist of RC propped at the top via a new concrete suspended floor, and propped at the base via a new basement floor slab. This is to be constructed typically by battering back the soil and building the retaining wall either sequentially or as one. The wall will need to be propped until both floors are in place.

Temporary works will be required to support the retained masonry walls and floors during construction.

Refer to appendix F for further information on the design of the walls, typical cross sections, proposed construction methodology and temporary propping requirements.

The basement will be waterproofed using a proprietary product as specified by the Architect.



Figure 2: Section through proposed structure



### **1.3 Basement Impact Assessment**

Planning guidance states that a site specific Basement Impact Assessment (BIA) is required for a development where either a new basement or an extension to an existing basement is proposed.

The purpose of this BIA is to assess whether any predicted damage to neighbouring properties and the water environment is acceptable or can be satisfactorily ameliorated.

The BIA methodology process includes the following steps:

- Stage 1- Initial screening: to identify whether there are any matters of concern.
- Stage 2- Scoping: to further define the matters of concern identified in the screening stage.
- Stage 3- Site investigation and study: to establish baseline conditions
- Stage 4- Impact assessment: to determine the impact of the proposed basement on baseline conditions.
- Stage 5- Final review and decision making by approving authority.

### **1.4 Site specific investigation**

A site specific investigation has been undertaken by Ground and Water in November 2016. Refer to appendix E for the document dated December 2016 which is referenced throughout this report.



## 2.0 Stage 1: Screening

The first stage in assessing the impact of any proposed basement development is to recognise what issues are relevant to the proposed site and to identify those matters of concern which should be investigated further.

We have reviewed Camden Planning Guidance document CPG 4 (July 2015) on assessing the impact of basements and have therefore used the relevant headings and assessments adopted in the guide.

This Basement Impact Assessment has been carried out based on a desk study, refer to appendices A-D for information. A trial pit will be dug prior to starting work on site to confirm the assumptions made at this stage.

The screening flow charts cover the following topics:

- Groundwater flow (Table 1)
- Land stability (Table 2)
- Surface flow and flooding (Table 3)

### 2.1 Groundwater flow

Table 1: Subterranean (ground water) flow screening chart

No.	Question	Impact	Source/Comment
1a	Is the site located directly above an aquifer?	No	Based on Groundsure Enviroinsight aquifer maps, the site is not on a known aquifer.
1b	Will the proposed basement extend beneath the water table surface?	No	<p>New basement level is approximately 0.5m below existing basement level, which is currently ~2.2m bgl.</p> <p>Based on the site specific site investigation, groundwater was not identified in the 5m deep borehole. From the desktop study this was expected to be at ~7m bgl. Standing water was identified at a depth of 4.28m bgl but was considered to be perched or surface water only.</p> <p>Based on the above information the proposed basement level will not extend beneath the water table surface.</p>
2	Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	No	<p>From Groundsure Enviroinsight report the site is not over a groundwater source protection zone.</p> <p>There is no detailed river network entries within 500m of the study site.</p> <p>Based on Lost Rivers of London (Barton), an unused watercourse existed approximately 150m from the site.</p>





No.	Question	Impact	Source/Comment
3	Is the site within the catchment of the pond chains on Hamstead Heath	No	The site is close to the Highgate chain on Hampstead Heath however based on Figure 14 of the Camden geological, hydrogeological and hydrological study, the site is not within the catchment area.
4	Will the proposed basement development result in a change in the proportion of hard surfaced/ paved areas	No	The overall extent of hard-standing will not change. The proposal occupies a similar footprint to the existing.
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	Initial review suggests that because the decking area is proposed to be replaced by roof area, the extent of hard-standing remains the same. Therefore surface water and runoff will remain similar to that at present.
6	Is the lowest point of the proposed excavation (allowing for 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	There are no local ponds or surface water features within 250m of the site  Highgate Pond No1 is approximately 500m away.

## 2.2 Land Stability

Table 2: Slope Stability Screening Chart

No	Question	Impact	Source/Comment
1	Does the existing site include slopes, natural or manmade, greater than 7° (approx 1 in 8)	No	The site is relatively flat based on Figure 16 of Camden Geological, Hydrogeological and Hydrological Study.
2	Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7° (approx 1 in 8)	No	The proposed will maintain the existing site slopes.
3	Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7° (approx 1 in 8)	No	There are no significant artificial slopes or cuttings in the neighbouring land.
4	Is the site within a wider hillside setting in which the general slope is greater than 7° (approx 1 in 8)	No	There are no significant slopes in the neighbouring land.



No	Question	Impact	Source/Comment
5	Is the London Clay the shallowest strata at the site?	Yes	Based on the British Geological Survey results and the SI undertaken, London Clay is the shallowest strata on the site.
6	Will any tree/s 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? (Note that consent is required from LB Camden to undertake work to any tree/s protected by a Tree Protection Order or to tree/s in a Conservation Area if the tree is over certain dimensions)	No	The new basement extension does not require any trees to be removed as it is in the same location as the existing structure.
7	Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	No	No evidence of shrink swell subsidence on site.
8	Is the site within 100m of a watercourse or a potential spring line?	No	<p>From Groundsure Environinsight report the site is not over a groundwater source protection zone.</p> <p>There is no detailed river network entries within 500m of the study site.</p> <p>Based on Barton, Lost Rivers of London, an unused watercourse existed approximately 150m from the site.</p>
9	Is the site within an area of previously worked ground?	No	There is no history of ground improvements or worked ground at this 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	<p>The site is not located within a known aquifer and is considered to be in an unproductive strata.</p> <p>Based on the SI undertaken, the basement will not extend below the ground water table. However temporary dewatering may be required for standing water.</p>
11	Is the site within 50m of the Hampstead Heath ponds?	No	The site is approximately 500m form the ponds.
12	Is the site within 5m of a highway or pedestrian right of way?	Yes	<p>The site is on the corner of two residential roads.</p> <p>On one of these roads, the basement will be within 5m of the footpath.</p>



No	Question	Impact	Source/Comment
13	Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	No	<p>Based on information provided by the owner, the neighbouring site has an existing basement of similar depth to that that exists on our site. There is a party wall that is shared by the properties with a basement on either side.</p> <p>Assuming that the ground floor level of the semi-attached 57 Croftdown Road does not change, then there will only be a 0.5m differential depth increase between neighbouring properties.</p>
14	Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No	Based on Groundsure's Geosight investigation, the site is not located within 250m of any railway lines or tunnels.



## 2.3 Surface flow and flooding

Table 3: Surface flow and flooding screening flowchart

No	Question	Impact	Source/Comment
1	Is the site within the catchment of the pond chains on Hamstead Heath?	No	Based on Figure 14 of the Camden geological, hydrogeological and hydrological study the site is not within the catchment area.
2	As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	No	The amount of hardstand at the site occupies a similar area to the existing. Therefore the surface water flows will not be changed from the existing route.
3	Will the proposed basement development result in a change in the proportion of hard surfaced/paved external areas?	No	The amount of hardstand at the site occupies a similar area to the existing.
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	The site profile is not being changed and will not impact on any adjacent properties.
5	Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	No significant changes to the landscaping at the rear garden.
6	Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature?	Yes	<p>Not identified on Figure 15 of the Camden geological, hydrogeological and hydrological study as an 'area with potential to be at risk of surface water flooding'.</p> <p>However is identified on Groundsure Floodinsight report as having a significant risk of Pluvial flooding during a 1 in 75 year event.</p> <p>The street potentially flooded in the 1975 storm event according to 'Floods Scrutiny Panel flooded Roads 1975 and 2002 Figure 1'.</p> <p>Based on the Environment Agency maps, the site is subject to a low-medium risk of surface water flooding. The site is also identified as being at risk of flooding from reservoir (Highgate ponds neighbouring).</p>



### 3.0 Stage 2: Scoping

The purpose of scoping is to assess in more detail the potential impacts of the proposed scheme. Potential consequences are assessed for each of the identified potential impact factors.

No public consultation has been undertaken during this scoping exercise as the proposed construction work is minimal and will have a negligible effect on the adjoining or nearby properties.

#### 3.1 Groundwater flow

Matter carried forward	Scope of investigation and assessment
New basement level is at approximately 0.5m below the existing floor level. Standing water identified.	Based on the SI undertaken, the new basement will not be extended into the ground water table.  It is possible that standing water within the strata will need to be temporarily dewatered during construction, which is to be taken into account by the Contractor when forming their methodology.

#### 3.2 Land Stability

Matter carried forward	Scope of investigation and assessment
London Clay is the shallowest strata at the site.	The area and nominal depth of the structure extending into the ground is unlikely to pose any significant risk of instability. However a site investigation was undertaken to determine impact of this on the structure.
The site is within 5m of a pedestrian right of way.	Slope stability within this area is unlikely to be affected by lowering the basement floor 0.5m. The altered retaining wall will be designed and constructed to mitigate impacts on the adjacent structures. No further assessment is required.



### 3.3 Surface flow and flooding

Matter carried forward	Scope of investigation and assessment
<p>The site was identified to have previously had surface water flooding and is at risk of future surface or reservoir flooding.</p>	<p>Further investigation of the Environment Agency Maps (shown below for reference) shows that the site is subjected to the following levels of flooding for surface water under different return periods:</p> <p>High risk scenario - 0mm depth (i.e not high risk)  Medium risk scenario - Below 300mm depth  Low risk scenario - 300mm- 900mm depth, below 300mm on two sides.</p> <p>For reservoir flood risk:</p> <p>300-2000mm depth, but directly next to 300mm depth therefore expect ~300mm.</p> <p>Therefore the site needs to be investigated further to determine local risk and any potential anti-flood measures that are required.</p>

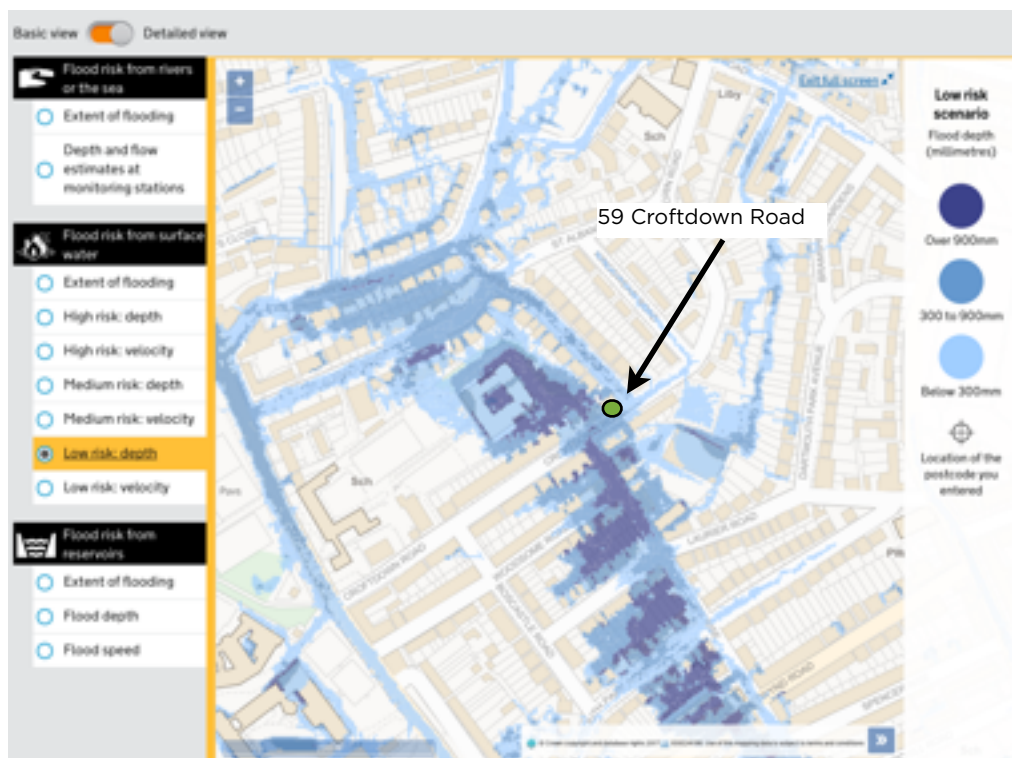


Figure 3: Environment Agency Map for Low Risk surface flooding.



## 4.0 Stage 3: Site Investigation and Study

The site investigation and study stage is undertaken to develop an understanding of the site and its immediate surroundings, in order to further investigate the matters of concern raised in stages 1 and 2.

### 4.1 Site specific investigation and ground movements

A site specific investigation has been undertaken to confirm the existing ground water table, existing foundations and the existing soil strata. The report can be found in Appendix E, with key points highlighted below:

- Existing water table is anticipated to be at 7m bgl (lower than the borehole investigation)
- Party wall foundations are at 0.6m (below basement level) which means underpinning will be necessary
- Geotechnical testing revealed that the Clay has a high volume change potential

Furthermore, a ground movement analysis was undertaken on the site, for lowering the basement to approximately 3.0m bgl (refer to section 6.6 of Appendix E for further parameters). This found:

- Maximum horizontal movement expected is between 1.5 and 5.25mm.
- This is expected to have negligible impact on neighbouring sites, except for 57 Croftdown road for which damage is expected to be very slight (in accordance with Table 2.5 of C580).
- This movement is noted as being able to be minimised during construction via careful temporary propping.

The above is for the excavation of the basement only. It is noted that due to the method of installation along the long basement wall that only the excavation deflection will be expected (wall to be cast then backfilled up to, minimising any deflection). With the shorter side walls, a similar method is applied however with a more vertical excavation which will be staged and propped at regular centers to minimise any construction deflection.

Table 2.2 and figures 2.8, 2.9 of CIRIA C580 estimate up to 0.5% deflection for a diaphragm wall installation however that is excessive when we consider the actual wall construction methodology, therefore has not been applied to this analysis. The movement we do expect is to be very slight.

We therefore expect overall damage to be very slight on 57 Croftdown Road. Regardless, monitoring of movement and condition surveys will likely be required for 57 Croftdown Road, along with a careful temporary propping methodology from the Contractor to ensure any potential movements are minimised during construction. Details of these, including trigger levels are to be confirmed and agreed as part of the Party Wall award.



#### 4.2 Surface water and reservoir flooding investigation

As identified in Stage 2 the site has potential for surface water flooding. Given the risk identified in the Environment Agency maps we are expecting below 300mm on 2 sides of the building, and 0.3-0.9m on the remaining sides. Based on this, and the lower backyard level (raising the potential flooding depth above 0.3m on EA maps) the flood risk for the site is 300mm above street level. Subsequently the new design requires anti-flood measures to be allowed for to this.

The anti-flood measures to be incorporated within the design are:

- Non return valves on below ground drainage (prevent back flow into basement)
- Entrance doors at ground level to have removable flood barriers installed. Existing window openings are above these levels and do not require further alterations.
- Smart Airbrick or similar to replace existing air vents preventing openings in external walls.
- Waterproof basement that incorporates a sump and pump system (part of cavity drain), this includes watertightness of any new works above.
- Structural design of basement to sustain surcharge loading applied via surface water at depth (structural stability during flooding, also strengthen existing masonry walls if necessary)
- Using concrete as main basement material to sustain stability during flooding.

In addition the site has additional landscaping benefits to assist in preventing surface water flooding:

- The site is surrounded by a masonry wall, >600mm high street side, with a higher timber fence elsewhere that will assist in keeping surface water out of the site. A removable barrier is to be installed over small fence openings to prevent water entering the site. Refer photo below for street view of site.
- At the rear of the building, the entrance is raised above the backyard level and is accessed via a timber deck (to be replaced with structure at same level).

These measures aim to prevent water at 300mm above street level entering the building, with redundancy in the basement design if they exceed this level. These minimise the impacts of surface water flooding on the proposed basement.



Figure 4: Google street view of site with wall surrounding





## 5.0 Stage 4: Impact assessment

The impact assessment stage evaluates the implications of the proposed project.

For this site, no scoped implications required further investigation and subsequently no impact assessment has been carried out for this project. Refer to stage 3 for details on the ground movement analysis for the proposed works.



## 6.0 Conclusion

The following section summarises the findings based on the 3 topics outlined at the screening stage.

The Basement Impact Assessment has been carried out based on a desk study only. Trial pits will be dug prior to starting work on site to confirm assumptions made at this stage.

### 6.1 Groundwater flow

The area and depth of the structure extending into the ground is unlikely to have any adverse affects on the ground water flow.

No known aquifers exist at the site.

Although nearby to the Hampstead Heath ponds- Highgate chain, the site is not within the catchment area.

The potential impact of the proposed lowering of basement level on ground water flow and nearby structures or environmental features is considered negligible as the development is above the ground water table.

### 6.2 Land stability

Slope stability within this area is unlikely to be affected by the lowering and extension of the basement. Any adverse effects to the neighbouring sites will be mitigated by the remediated retaining wall design, temporary propping and construction methodology.

The potential impact of the proposed lowering of basement level on ground movement and slope stability is considered 'negligible', with 'very slight' damage possible on the neighbouring 57 Croftdown road which is to be addressed and mitigated during the party wall award and construction sequencing (temporary propping included).

### 6.3 Surface flow and flooding

The site has flooded previously (in 1975), and is at low-medium risk of flooding from surface water with 300mm above street level being the design depth. The site was also identified as a risk during reservoir flooding. Anti-flood measures are subsequently to be provided, as outlined in section 4.2 to minimise the risk of flooding in the basement.





59 CROFTDOWN ROAD - PERLIMINARY PROGRAMME

NO	DESCRIPTION	Week Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		Month																					
		Week Commencing																					
1	SITE SET UP																						
	<b>GENEREAL</b>																						
2	SCAFFOLDING - REAR ELEVATION																						
3	STRIP OUT																						
	<b>LOWER FLOOR</b>																						
4	UNDERPINNING AND BASEMENT EXCAVATION																						
5	TEMPORARY SUPPORT																						
6	DRAINAGE AND SUMP CHAMBARES																						
7	BASEMENT SLAB																						
8	WATERPROOFING																						
9	INTERNAL PARTITIONS																						
10	SERVICE FIRST FIX																						
11	INTERNAL DOOR LINING																						
12	TACKING AND PLASTERING																						
13	SANITARYWARE																						
14	JOINERY AND DOORS																						
15	TILING																						
16	SERVICES SECOND FIX																						
17	INTERNAL DECORATIONS																						
18	SUNDRIES AND FINAL FIX																						
19	FLOOR COVERINGS																						
21	<b>EXTERNAL WORKS</b>																						
22	EXTERNAL DECORATIONS																						
23	EXTERNAL WORKS																						
24	<b>COMPLETION</b>																						
25	SNAGGINGS AND HANDOVER																						