

**Flat 1, 99 Priory Road,  
London, NW3 3NL**

**Basement Impact Assessment  
Audit**

For

London Borough of Camden

Project Number: 12466-44  
Revision: F1

May 2017

Campbell Reith Hill LLP  
Friars Bridge Court  
41-45 Blackfriars Road  
London  
SE1 8NZ

T: +44 (0)20 7340 1700  
F: +44 (0)20 7340 1777  
E: [london@campbellreith.com](mailto:london@campbellreith.com)  
W: [www.campbellreith.com](http://www.campbellreith.com)

### Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	February 2017	Comment	GHgk12466-44-20022017-99 Priory Road-D1.doc	GH	GK	GK
F1	May 2017	For planning	GHgk12466-44-260517-99 Priory Road-F1.doc	GH	AJM	AJM

This document has been prepared in accordance with the scope of Campbell Reith Hill LLP’s (CampbellReith) appointment with its client and is subject to the terms of the appointment. It is addressed to and for the sole use and reliance of CampbellReith’s client. CampbellReith accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of Campbell Reith Hill LLP. Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

© Campbell Reith Hill LLP 2015

### Document Details

Last saved	26/05/2017 10:25
Path	GHgk12466-44-260517-99 Priory Road-F1.doc
Author	G Harper, BEng (Hons) PrEng
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	12466-44
Project Name	Flat 1, 99 Priory Road, NW6 3NL
Planning Reference	2016/6710/P

**Contents**

1.0	Non-technical summary .....	1
2.0	Introduction .....	3
3.0	Basement Impact Assessment Audit Check List.....	5
4.0	Discussion .....	8
5.0	Conclusions .....	11

**Appendix**

- Appendix 1: Residents’ Consultation Comments
- Appendix 2: Audit Query Tracker
- Appendix 3: Supplementary Supporting Documents

## 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 Flat 1, 99 Priory Road, London, NW6 3NL (planning reference 2016/6710/P). The basement is considered to fall within Category B 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 Basement Impact Assessment (BIA) has been carried out by Barrett Mahony Consulting Engineers (BMCE) and supplemented by Jomas Associates. The authors involved in its production possess the relevant qualifications.
- 1.5. It is proposed to form the basement structure by constructing reinforced concrete L-shaped underpins to the perimeter masonry walls. Outline structural calculations for the basement retaining wall, basement slab and foundations have been presented, including soil properties and assumed water levels. Temporary propping details, based on the structural designs, have been presented and are accepted.
- 1.6. The BIA has confirmed that the proposed basement will be founded within London Clay. An indicative assessment of the likely heave pressures is presented, including associated mitigation measures.
- 1.7. Perched groundwater is likely to be encountered during basement foundation excavation. Groundwater control measures have been proposed for both the temporary and permanent condition. The contractor should confirm groundwater conditions prior to starting works.
- 1.8. Measures are proposed to offset the impacts of the increase in impermeable area, and these are considered acceptable. Specific discharge flow rates should be agreed with LBC and Thames Water.
- 1.9. A quantitative Ground Movement Assessment (GMA) has been performed. A Damage Category Assessment as per CIRIA C580 indicates the majority of walls fall within Category 0 (Negligible), with a few of No. 97's walls classified as Category 1 (Very Slight). Recommendations to mitigate against excessive ground movements are presented and these are accepted.

- 1.10. The presence of utility infrastructure within the development's zone of influence has been confirmed with suitable mitigation measures incorporated into the proposed development.
- 1.11. It is accepted that the surrounding slopes to the development site are stable.
- 1.12. It is accepted that the development will not impact the wider hydrogeology of the area.
- 1.13. The proposed mitigation recommendations within the flood risk strategy appear appropriate. A Flood Risk Assessment carried out by Jomas Associates as part of the Ground Investigation has confirmed the recommendations proposed within the flood risk strategy.
- 1.14. Queries and requests for further information are discussed in Section 4 and Appendix 2. Considering the revised submissions, the BIA is considered to meet the criteria of CPG4.

## 2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 13 January 2017 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Flat 1, 99 Priory Road, London, NW6 3NL.
- 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;
  - d) 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 "Excavation of basement extension. Erection of single storey rear extension. Erection of entrance porch".
- 2.6. The Audit Instruction also confirmed that the basement proposal does not involve a listed building nor does the site neighbour any listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on 26 January 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) dated 2 December 2016 by Barrett Mahony Consulting Engineers,
- Design and Access Statement dated November 2016 by JAA Studio Architects,
- Planning application drawings by JAA Studio Architects consisting of:

Existing Plans (dated 24 November 2016)

Proposed Plans (dated 30 November 2016)

2.8. Following the issue of CampbellReith's D1 audit report in February 2017, a revised BIA was submitted, dated 12 May 2017, in order to respond to the comments and concerns identified.

### 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Accepted.
Is data required by Cl.233 of the GSD presented?	Yes	Revised BIA.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	BIA.
Are suitable plan/maps included?	Yes	BIA Appendices.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	BIA Appendix III.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Summarised in BIA Section 2.3.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Summarised in BIA Section 2.2.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Summarised in BIA Section 2.1.
Is a conceptual model presented?	Yes	BIA Section 4.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 3.3.



Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 3.2.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 3.1, 5.6.
Is factual ground investigation data provided?	Yes	BIA Section 4.
Is monitoring data presented?	Yes	BIA Section 4.
Is the ground investigation informed by a desk study?	Yes	BIA Section 4.4 – 4.6.
Has a site walkover been undertaken?	Yes	BIA Section 4.7.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	BIA Section 4.
Is a geotechnical interpretation presented?	Yes	BIA Section 4.8. Geotechnical parameters included in Appendix VII.
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA Appendix VII.
Are reports on other investigations required by screening and scoping presented?	Yes	Site investigation and Flood Risk Assessment included within BIA.
Are the baseline conditions described, based on the GSD?	Yes	BIA Section 4 and Appendix VII.
Do the base line conditions consider adjacent or nearby basements?	Yes	BIA Section 5.
Is an Impact Assessment provided?	Yes	BIA Section 5 and Appendix VIII.
Are estimates of ground movement and structural impact presented?	Yes	

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	
Has the need for monitoring during construction been considered?	Yes	BIA Section 5.4, 5.7 and 5.8.
Have the residual (after mitigation) impacts been clearly identified?	Yes	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	BIA Section 5 and Appendix VIII.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	BIA Sections 5.9.
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?	Yes	

## 4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried out by Barrett Mahony Consulting Engineers (BMCE) comprising Chartered Civil and Structural Engineers. Supplementary input has been provided by Jomas Associates. The authors were identified via correspondence and it is accepted that they have suitable qualifications in accordance with the requirements of CPG4.
- 4.2. The existing property is located at 99 Priory Road and consists of a detached four-storey structure including an existing basement. The existing basement is a partial basement, occupying about one-third of the building footprint. The building is currently divided into five separate apartments.
- 4.3. It is proposed to deepen the existing basement level to provide a floor-to-ceiling height of circa 2.70m. Existing floor-to-ceiling heights in the basement are circa 2.20m. The proposed development involves excavation to a depth of circa 3.15m below external ground level. It is further proposed to construct front and rear lightwells to the property. A rear extension is also proposed, together with internal alterations involving the demolition of load-bearing walls.
- 4.4. The BIA has identified that on site ground conditions comprise a variable depth of Made Ground (0.6m to 1.3m bgl) underlain by firm to stiff London Clay. The basement will therefore be founded in London Clay.
- 4.5. It is proposed to form the basement structure by constructing reinforced concrete L-shaped underpins to the perimeter masonry walls. It is proposed to execute all underpinning works in a standard underpinning sequence, in bay widths not exceeding 1.00m. The proposed underpinning will act as foundations to the external walls, distributing the superstructure loads to the subsoil under the basement. The proposed underpinning will also act as retaining structures, retaining the soil outside the basement. The proposed underpinning will be designed to resist lateral earth pressures, lateral water pressure due to a head of water, and surcharge pressures. This is an acceptable methodology using established techniques.
- 4.6. Outline structural calculations are presented in Appendix VI of the BIA for the basement retaining walls, basement slab and foundations, including soil properties and assumed water levels.
- 4.7. A proposed temporary works strategy is discussed in Section 5.3 of the BIA, with an indicative temporary propping scheme included with structural drawings in Appendix V. Perched water is identified within the Made Ground and the temporary works plan includes suitable groundwater control methodologies. The contractor should confirm groundwater conditions prior to starting works.

- 4.8. It is accepted that the basement will be founded in London Clay. Given the high volume change potential of the underlying London Clay, heave pressures under the floor slab have been accounted for in the calculations presented in Appendix VI. The provision of proprietary heave board protection under the proposed basement slab is acknowledged.
- 4.9. A Ground Movement Assessment (GMA) was conducted by Jomas Associates and is presented in Appendix VIII of the BIA. The assessment has been undertaken using proprietary spreadsheets and Pdisp and Xdisp software that adopts normalised ground displacement curves as reported in CIRIA C580 as per current industry standard. An idealised ground model has been evaluated based on the site-specific ground investigation report, and the material properties were assessed to be adequately conservative. Two analyses were conducted that considered a worst-case heave condition, and another considering horizontal and vertical settlements based on the proposed excavation and underpinning works. Tensile strains induced within the building masonry walls have been evaluated based on the deflection ratios estimated from the analyses. The GMA is accepted.
- 4.10. A Damage Category Assessment as per CIRIA C580 was conducted based on the GMA. The majority of the walls fall within Category 0 (Negligible), with a few of No. 97's walls closest to the excavation of No.99 classified as Category 1 (Very Slight). Recommendations to mitigate against excessive ground movements are presented in Section 5.8 of the BIA and these are accepted.
- 4.11. It is agreed that condition surveys of the neighbouring properties should be commissioned and a programme of monitoring the adjoining structures should be established before the work starts. The monitoring strategy presented in Section 5.4 of the BIA contains trigger values based on the GMA and proposes appropriate contingency plans.
- 4.12. The proposed basement will result in an increase in impermeable area due to the formation of the lightwell in the front garden and an extension of the rear patio. As a result, measures are proposed to offset the impacts of the development and these are considered acceptable. Specific discharge flow rates should be agreed with LBC and Thames Water.
- 4.13. Seepage was not encountered during the site investigation, although some shallow groundwater was observed in the Made Ground in subsequent monitoring. Mitigation measures are proposed in the event of water being encountered. It is therefore accepted that there are no significant groundwater flows to be affected by this development. However, temporary groundwater controls should be considered, as per 4.7.
- 4.14. The BIA has shown that the surrounding slopes to the development are stable.

- 4.15. No known tunnels or railway lines are located within the vicinity of the site. Correspondence has confirmed that normal domestic services have been identified as connecting to the site, and these have been considered in the proposed development with suitable mitigation measures incorporated.
- 4.16. It is acknowledged that small shrubs and trees of height less than 3.00m will be removed from the garden as a result of the development, and it is accepted that it is unlikely that proposed tree removal will result in any ground movement.
- 4.17. It is accepted that the site is not located within the catchment area of the Hampstead Heath pond chain.
- 4.18. It is accepted that the site is located within the Goldhurst Local Flood Risk Zone, and the proposed recommendations within the flood risk strategy appear appropriate. A Flood Risk Assessment carried out by Jomas Associates as part of the Ground Investigation has confirmed the recommendations proposed within the flood risk strategy.

## 5.0 CONCLUSIONS

- 5.1. The Basement Impact Assessment (BIA) has been carried out by Barrett Mahony Consulting Engineers (BMCE) and supplemented by Jomas Associates. The authors involved in its production possess the relevant qualifications.
- 5.2. It is proposed to form the basement structure by constructing reinforced concrete L-shaped underpins to the perimeter masonry walls. The proposed underpinning will be designed to resist lateral earth pressures, lateral water pressure due to a head of water, and surcharge pressures. This is an acceptable methodology using established techniques.
- 5.3. Outline structural calculations are presented for the basement retaining wall, basement slab and foundations, including soil properties and assumed water levels.
- 5.4. An indicative temporary propping scheme is included with structural drawings in Appendix V.
- 5.5. It is accepted that the basement will be founded in London Clay. Heave pressures under the floor slab have been accounted for in the BIA with proprietary heave board protection under the proposed basement slab proposed.
- 5.6. A quantitative Ground Movement Assessment (GMA) has been performed. A Damage Category Assessment as per CIRIA C580 indicates the majority of walls fall within Category 0 (Negligible), with a few of No. 97's walls classified as Category 1 (Very Slight). Recommendations to mitigate against excessive ground movements are presented and these are accepted.
- 5.7. The presence of utility infrastructure within the development's zone of influence has been confirmed with suitable mitigation measures incorporated in the proposed development.
- 5.8. Perched groundwater is likely to be encountered during basement foundation excavation. Groundwater control measures have been proposed for both the temporary and permanent condition. The contractor should confirm groundwater conditions prior to starting works.
- 5.9. Measures are proposed to offset the impacts of the increase in impermeable area, and these are considered acceptable. Specific discharge flow rates should be agreed with LBC and Thames Water.
- 5.10. It is accepted that the surrounding slopes to the development site are stable.
- 5.11. It is accepted that the site is not located within the catchment area of the Hampstead Heath pond chain.
- 5.12. It is accepted that the development will not impact on the wider hydrogeology.

- 5.13. The proposed mitigation recommendations within the flood risk strategy appear appropriate. A Flood Risk Assessment carried out by Jomas Associates as part of the Ground Investigation has confirmed the recommendations proposed within the flood risk strategy.

## **Appendix 1: Residents' Consultation Comments**



Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Lucy Findlay c/o CRASH	45 Compayne Gardens, NW6 3DB	30/01/2017	Structural stability and damage to this and neighbouring property.	See Section 4.8 to 4.11 and 4.16.

## **Appendix 2: Audit Query Tracker**

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	BIA Author qualifications.	Closed – Accepted	May 2017
2	Stability	Outline structural calculations for the basement retaining wall, basement slab and foundations are required to demonstrate the viability of the proposals, including soil properties and assumed water levels. Geotechnical parameters as GSD Appendix G3 to be provided.	Closed – Calculations presented in BIA Appendix VI and soil properties in Appendix VII.	May 2017
3	Stability	Assessment required, and mitigation of, likely heave pressures. This would inform the floor slab design.	Closed – Heave pressures accounted for in calculation in Appendix VI and the Ground Movement Assessment in Appendix VIII.	May 2017
4	Stability	Indicative temporary works propping scheme to be provided. Groundwater control measures to be provided.	Closed – Included with structural drawings in Appendix V. Groundwater control measures presented in Appendix VII.	May 2017
5	Stability	Ground Movement Assessment and Structural Impact Assessment to be justified. Appropriate mitigation measures to be considered as required.	Closed – GMA presented in Appendix VIII and mitigation measures presented in Section 5 of BIA.	May 2017
6	Hydrology	Flood risk assessment and proposed protection measures should be confirmed by an appropriately qualified Hydrologist.	Closed – FRA presented in Appendix VII.	May 2017
7	BIA	An outline construction programme is to be provided.	Closed – Indicative programme included in Appendix IX.	May 2017
8	Stability	The presence of utility infrastructure within the zone of influence should be confirmed. Damage impact should	Closed – Confirmed via correspondence, and appropriate	May 2017

		be assessed, if applicable.	measures are proposed.	
--	--	-----------------------------	------------------------	--

### **Appendix 3: Supplementary Supporting Documents**

Revised BIA by Barrett Mahony dated 12 May 2017 (available on LBC Planning Portal)

---

## London

Friars Bridge Court  
41- 45 Blackfriars Road  
London, SE1 8NZ

T: +44 (0)20 7340 1700  
E: london@campbellreith.com

## Birmingham

Chantry House  
High Street, Coleshill  
Birmingham B46 3BP

T: +44 (0)1675 467 484  
E: birmingham@campbellreith.com

## Surrey

Raven House  
29 Linkfield Lane, Redhill  
Surrey RH1 1SS

T: +44 (0)1737 784 500  
E: surrey@campbellreith.com

## Manchester

No. 1 Marsden Street  
Manchester  
M2 1HW

T: +44 (0)161 819 3060  
E: manchester@campbellreith.com

## Bristol

Wessex House  
Pixash Lane, Keynsham  
Bristol BS31 1TP

T: +44 (0)117 916 1066  
E: bristol@campbellreith.com

## UAE

Office 705, Warsan Building  
Hessa Street (East)  
PO Box 28064, Dubai, UAE

T: +971 4 453 4735  
E: uae@campbellreith.com

Campbell Reith Hill LLP. Registered in England & Wales. Limited Liability Partnership No OC300082  
A list of Members is available at our Registered Office at: Friars Bridge Court, 41- 45 Blackfriars Road, London SE1 8NZ  
VAT No 974 8892 43