CampbellReith
consulting engineers

5 Hermit Place, London, NW6 4BZ

Basement Impact Assessment Audit

For

London Borough of Camden

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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
W:www.campbellreith.com

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Project Partner	E M Brown, BSc MSc CGeol FGS
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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 5 Hermit Place, London NW6 4BZ (planning reference 2015/2171/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 subterranean and surface flow impact assessment parts of the BIA has been prepared by well-known firms of engineering consultants using individuals who possess suitable qualifications, although the author of the subterranean assessment did not provide evidence of suitable engineering geology expertise. The land stability impact should have been assessed by a chartered geologist.

1.5. The provided information on the ground water level on the site is found to be insufficient to assess the basement impact on the local ground water flow regime. The consulted information for assessing the surface flooding appeared to be incomplete, and hence impact assessments of the subterranean and surface flow is recommended to be completed and updated accordingly.

1.6. It is acknowledged that the basement development is proposed to be undertaken with low-stiffness excavation with temporary support. The basement will be founded on shallow RC footings, and the walls will be designed as reinforced cantilever.

1.7. Whilst the temporary support during the excavation has been discussed as a mitigation measurement for limiting the induced ground movements, and the use of 'claymaster' beneath the foundation slab to minimise any potential heave in London Clay, no analysis is undertaken to estimate the horizontal and vertical movements and their impact on the neighbouring structures. Therefore, an estimation of the ground movements and assessment of the damage on the surrounding structures are required.

1.8. The angle of shearing resistance employed for design of the cantilever retaining walls is considered not to be appropriately conservative. Assumptions with respect to water pressures on the back of the wall should also be confirmed.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 18 November 2015 to carry out a Category A Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 5 Hermit Place, London NW6 4BZ, Camden Reference 2015/2171/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; and,

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 *"Erection of part one/part two storey plus basement dwelling following demolition of garage."*

The Audit Instruction also confirmed that the basement proposals did not involve any listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 15 December 2015 and again on 11 January 2016 once further information had been uploaded. Access was gained to the following relevant documents for audit purposes:

- Design Study & Basement Impact Assessment Report (BIA)
- Planning Application Drawings consisting of

  Location Plan

  Existing Plans

  Demolition Plans

  Proposed Plans

  Structural drawings and construction sequence

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	The BIA has been prepared by a chartered engineer, CEng, FIStructE who is qualified for surface flow, and land stability, although some proof of experience in ground engineering should be provided. For assessing the impacts on subterranean flows, a CGeol qualification is required.
Is data required by Cl.233 of the GSD presented?	No	Non-technical summary of the construction methodology and sequence is not available. BIA should have extended into impact assessment stage.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	
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 appendices
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	BIA sec. 2.11; Some of the 'No' answers have not been justified properly.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	BIA sec. 2.12; Some of the 'No' answers have not been justified properly.
Hydrology Screening: Have appropriate data sources been consulted?	No	BIA section 3.10; Some of the 'No' answers have not been justified properly.

Item	Yes/No/NA	Comment
Is justification provided for 'No' answers?		
Is a conceptual model presented?	Yes	Ground Investigation report, section 6.0
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA section 3.2; however, it is not accepted.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA section 3.1; however, it is not accepted.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA section 3.3; however, it is not accepted.
Is factual ground investigation data provided?	Yes	BIA appendix 3
Is monitoring data presented?	No	BIA appendix 3, section 4.3
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	BIA appendix 3, section 3.1
Is the presence/absence of adjacent or nearby basements confirmed?	No	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA appendix 3, section 6.4
Are reports on other investigations required by screening and scoping presented?	Yes	

Item	Yes/No/NA	Comment
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	BIA section 5.0; however, it is not accepted.
Are estimates of ground movement and structural impact presented?	No	
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	
Has the need for monitoring during construction been considered?	No	
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?	No	
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	NA	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	NA	
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	No	
Are non-technical summaries provided?	No	There is a brief description of the construction sequence on the

Item	Yes/No/NA	Comment
		structural drawings; however, no clear non-technical summary is provided.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Michael Blacker Consulting Engineers. Whilst the author of the BIA report has the specified qualifications for the land stability and surface flow sections, no proof of the expertise in ground engineering has been provided as required by CPG4. Also, the assessment of subterranean groundwater flow has not been prepared by a chartered geologist.

4.2. The proposed development consists of demolishing the existing single-storey garage, and constructing a two-storey house with basement within the footprint of the existing garage.

4.3. On the basis of the drawings, it is understood that the basement will be founded on a combination of shallow RC slabs and strip footings with a 'bottom-up' construction sequence. The excavation for the foundations will be carried out using a 'hit-and-miss' approach on one metre wide sections, and supported by temporary propping. Reinforced 'cantilever' walls will then be cast and cured for 72 hours. Temporary horizontal bracings are fixed in the middle, around the perimeter, and corners just below the ground level before commencing the rest of the excavation. Prior to casting the foundation concrete, a 'Clay master' layer is installed underneath the RC slab in order to minimise the impact of any possible heave. This should be confirmed in a clear Construction Method Statement.

4.4. The retaining wall is to be embedded within the London Clay formation; whilst the depth of the groundwater level has yet to be confirmed, with reference to BS8002:2015, and section 6.4 of the provided ground investigation report, the angle of shearing resistance employed for design of the cantilever retaining walls is considered not to be appropriately conservative. Assumptions with respect to water pressures on the back of the wall should also be confirmed.

4.5. The presence of a 'lost' river, Westbourne, in a close proximity to the site was mentioned in the ground investigation report; however, this has not been taken into account in the screening part of the BIA report.

4.6. The screening has not identified that the site is in an area where properties had previously been affected by external sewer flooding according to Camden's Strategic Flood Risk Assessment.

4.7. It is stated that the proposed basement will not extend beneath the groundwater table. However no justification is provided. The site investigation report does not include the groundwater monitoring results, and the groundwater table stated in the report is only based on hydrological and topographical maps.

4.8. It should be noted that in addition to the concerns pointed out in section 4.5, 4.6, and 4.7; a single-storey garage is proposed to be replaced by a two-storey building with basement where

an increase in the occupancy of the dwelling may increase the load on the sewer and drainage system.

4.9. The proposed development necessitates the reduction in size of trees and dense shrubbery overhanging the existing garage which may affect the ground stability of the site. It is mentioned in the BIA report, section 2.2, that the scheme will be subjected to an arboricultural report; however, the document cannot be found on the Camden Planning Portal. The impact of the reduction in height of the shrubs and the incursion into the tree root zones should be confirmed.

4.10. It was noted in the ground investigation report that London Clay is the shallowest strata, present at a depth of 0.4mbgl, beneath the Made Ground. The London Clay typically has a high volume change potential, also fine roots and decayed rootlets were encountered at 1.50m below ground level.

4.11. It is stated in the BIA screening for land stability that 'The proposed basement will clearly be at a lower level than the footings to the adjacent buildings.' As there is only 1m distance to the neighbouring property, No.7, and adjacent buildings, this will necessitate an impact assessment of the induced ground movements on the surrounding structures.

5.0 CONCLUSIONS

5.1. The Basement Impact Assessment (BIA) has been carried out by Michael Blacker Consulting Engineers. Whilst the author of the BIA report has the specified qualifications for the land stability and surface flow sections, no proof of the expertise in ground engineering has been provided as required by CPG4. Also, assessment of the subterranean flows should have been prepared by a chartered geologist. Evidence of experience should have been provided or the BIA reviewed by appropriately qualified engineers/ geologists and updated accordingly.

5.2. It is accepted that the site is located outside the catchment of the pond chains on Hampstead Heath, and is not at considerable risk of surface water flooding according to the Environment Agency, neither has suffered from the 1975 and 2002 historical floods.

5.3. It is confirmed that the grading of the ground and the proportion of hard surface/ paved areas would not be altered, no trees will be felled (although refer to the discussion relating to shrubs above), and the site lies outside the influence zone of tube tunnels.

5.4. There is not enough information provided on the depth of the groundwater table, therefore any possible impact of the proposed basement development on the 'subterranean' flow regime could not be confidently assessed with that respect, neither can an assessment of the need for dewatering during construction be made. The influence of the identified lost river in the S.I. report should have also been considered in the screening stage, as well as the previously flooded external sewer mentioned in section 4.5. It is recommended that an impact assessment to be undertaken for potential surface and subterranean flow risk.

5.5. As discussed in section 4.10, it is required to carry out a ground movement assessment to investigate the impact of horizontal and vertical movement induced by the excavation and construction of the basement retaining walls on the surrounding buildings, and pedestrian right of way in front of the site. It is noted that it is intended to install a product such as 'Clay Master' beneath the slab to accommodate possible heave movements due unloading of London Clay as a consequence of the garage demolition and basement excavation. Once the possible damage risk is assessed, a need for ground movement monitoring or further mitigation measures should be discussed accordingly.

5.6. The retaining wall is to be embedded within the London Clay formation; whilst the depth of the groundwater level has yet to be confirmed, with reference to BS8002:2015, and section 6.4 of the provided ground investigation report, the angle of shearing resistance employed for design of the cantilever retaining walls is considered not to be appropriately conservative. Assumptions with respect to water pressures on the back of the wall should also be confirmed.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA – General	The subterranean flow screening has not been undertaken by a person with relevant qualifications. In addition, some proof of ground engineering experience should be provided for the structural assessment. See section 5.1.	Open.	
2	Surface flow and flooding	Site is potentially at risk of surface flow and flooding. See section 4.5, 4.6, 4.7, 4.8, and 5.2. Impact assessment is required.	Open.	
3	Subterranean flows	Site is potentially at risk of subterranean flow impact. See section 4.5, 4.7, and 5.4. Impact assessment is required.	Open.	
4	Land stability	Site and its surrounding are potentially at risk of land instability. See section 4.9, 4.10, 4.11, and 5.5. Ground movement assessment is required. [The availability of an arboricultural report should also be clarified.]	Open.	
5	Land stability	Retaining wall calculations to be clarified and revised. See section 5.6	Open.	

Appendix 3: Supplementary Supporting Documents

None

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