

43 Burghley Road, Kentish Town,
London NW5 1UH
Basement Impact Assessment
Audit

For
London Borough of Camden

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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 a Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 43 Burghley Road, London, NW5 1UH (planning reference 2015/6385/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 checklist. Additional information was subsequently issued by email.
- 1.4. The BIA documents have been prepared by personnel with qualifications complying with the requirements of CPG: Basements. A number of discrepancies were noted between the original documents and clarification and/or confirmation was required. This was subsequently received.
- 1.5. The proposed development comprises a single storey basement beneath the footprint of the existing building with small light wells to the front and rear. The nature of, and loadings on, the existing and proposed foundations have been clarified by the structural engineer.
- 1.6. The site is underlain by Made Ground and London Clay, and underpins will be formed in the London Clay. The significance of the shallow perched groundwater with respect to temporary and permanent works is considered and measures for temporary and permanent water control are presented.
- 1.7. The BIA assesses the impact of the basement proposals on a slope to the rear of the property. Queries raised in the initial audit with respect to some of the assumptions made have been addressed in revised information.
- 1.8. A ground movement and building damage assessment is presented in the BIA. Damage up to Burland Category 1 is predicted and this is accepted as reasonable provided there are good controls of workmanship.
- 1.9. Outline structural calculations are presented which are accepted, although they require to be developed as part of detailed design and should consider the ground model presented in the BIA. It is understood that existing underpinning at the front of the property is not to be utilised as a basement retaining wall.

- 1.10. The Structural Feasibility Report provides an outline monitoring strategy, which should be developed as part of detailed design. A sequence of construction is presented which should be reviewed against BIA recommendations for accidental overdig.
- 1.11. An arboricultural assessment confirms the basement will encroach marginally into the root protection zone of a tree at the front of the property, but the effect is insignificant.
- 1.12. Measures to protect the highway are recommended in the BIA. It is accepted that no other significant impacts to land stability exist.
- 1.13. The hydrology and hydrogeology screening and scoping identify no significant impacts on the local and wider water environment. Mitigation measures in the form of drainage around the basement and an attenuation tank are presented.
- 1.14. It is confirmed that revised information has addressed the queries raised and that BIA documentation as referenced in this audit report, complies with the requirements of the CPG. A Basement Construction Plan is not recommended.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 2 February 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 43 Burghley Road, Kentish Town, London, NW5 1UH.
- 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): Basements.
 - Camden Development Policy (DP) 27: Basements and Lightwells.
 - Camden Development Policy (DP) 23: Water.
 - Local Plan Policy A5 Basements.
- 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 an *"Excavation of single storey basement with front and rear lightwells."*

The Audit Instruction confirmed that the basement proposals neither involved, nor were a neighbour to, listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 15 February 2018 and gained access to the following relevant documents for audit purposes:

- Application Form
- Architect's existing and proposed drawings - Martin Evans Architects
- Basement Impact Assessment and Ground Investigation Report, Ground & Water Ltd, Ref GWPR2032/BIA/November 2017, V3.02
- Ground Investigation and Basement Impact Assessment – Non-technical Summary, Ground & Water Ltd, Ref GWPR2032/TS/November 2017
- Structural Feasibility Report, Ian Harben Consulting Engineers, Ref 215130.101 Rev C, October 2017
- Arboricultural Impact Assessment Report, Landmark Trees, Ref MEA/43BGR/AIA/01, November 2017.

2.7. Subsequent to the issue of the initial audit report, further information was submitted by email by the applicant's team to CampbellReith and comments were exchanged. This revised audit considers the reports listed below together with accompanying emails. The updated reports are available on the planning portal; covering emails that accompanied the revised reports is presented in Appendix 3.

- Basement Impact Assessment and Ground Investigation Report, Ground & Water Ltd, Ref GWPR2032/BIA/September 2018, V6.01
- Structural Feasibility Report, Ian Harben Consulting Engineers, Ref 215130.101 Rev E, August 2018.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	However, BIA&GIR not signed by one of the verifying parties.
Is data required by Cl.233 of the GSD presented?	No	Construction programme not presented.
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	Contained in BIA&GIR.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Contained in BIA&GIR.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of BIA&GIR.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of BIA&GIR.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of BIA&GIR.
Is a conceptual model presented?	Yes	Section 3 of BIA&GIR.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 3 of BIA&GIR.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 3 of BIA&GIR.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 3 of BIA&GIR.
Is factual ground investigation data provided?	Yes	Ground Investigation Report.
Is monitoring data presented?	Yes	Single groundwater monitoring result.
Is the ground investigation informed by a desk study?	Yes	Desk study information presented in BIA&GIR.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	It is reported that there are no basements to the adjoining properties, but no evidence has been supplied.
Is a geotechnical interpretation presented?	Yes	Ground Investigation Report
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	Arboricultural Impact Assessment presented. Scoping exercise confirms Flood Risk Assessment not required.
Are baseline conditions described, based on the GSD?	Yes	Ground Investigation Report.
Do the base line conditions consider adjacent or nearby basements?	Yes	Basements assumed to be absent. This is a conservative assumption for this scenario.
Is an Impact Assessment provided?	Yes	

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	Clarification required.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	Although queries are raised in Section 4 of the audit report.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Refer to BIA&GIR Rev 6.01 and SFR Rev E.
Has the need for monitoring during construction been considered?	Yes	Details can be further developed as part of detailed design.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Refer to BIA&GIR Rev 6.01 and SFR Rev E.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Refer to BIA&GIR Rev 6.01 and SFR Rev E.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Refer to BIA&GIR Rev 6.01 and SFR Rev E.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Refer to BIA&GIR Rev 6.01.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) was carried out by Ground and Water Limited and is presented in a combined report with the Ground Investigation Report. The individuals concerned in its production have qualifications that comply with the requirements of CPG: Basements. Supporting information, comprising architects' drawings, a Structural Feasibility Report (SFR) by Ian Harben Consulting Engineers (Rev E) and an Arboricultural Impact Assessment by Landmark Trees, is also presented. Reference should be made in the BIA to the Local Plan.
- 4.2. 43 Burghley Road is a three storey terraced house with a front and rear garden located towards the middle of Burghley Road between No. 41 and 45. The site is reported to slope down from the rear to the front. Ground levels are reported in the BIA&GIR.
- 4.3. It is proposed to construct a single level basement beneath the existing property with lightwells to the front and rear using underpinning techniques. The depth of the basement excavation is approximately 3m, although due to the level change, this reduces to approximately 1.70m at the front. The access to the front of the property remains unchanged. An outline construction sequence is presented in the SFR. The BIA&GIR notes that the existing foundations require to be broken out to 0.15m depth due to uncertain lateral loadings. It has been confirmed that this relates to the possible inadequacy of the underpins to act as retaining walls which is addressed in the construction sequence.
- 4.4. The Stage 1 screening has identified a number of areas that should be taken forward to scoping and sufficient investigations have been submitted.
- 4.5. The BIA&GIR identified a number of potential impacts to land stability comprising the presence of shrink-swell prone London Clay, a slope to the rear of the site, a lost river approximately 100m from the site, the proximity of the highway and the increased differential in foundation depths. The BIA&GIR notes that the London Clay and lost river do not present significant impacts. Impact assessments are presented for slopes and structural stability as discussed below and mitigation measures to protect the highway are described.
- 4.6. The BIA&GIR records the identification of roots to a maximum depth of 1.20m and states that the basement formation level must be inspected for evidence of live roots. It is stated that, if observed, the root affected soils should be removed and replaced with a granular engineered fill.
- 4.7. The BIA&GIR considers slope stability in the temporary and permanent cases resulting from the basement proposals. The approach is described in the text and graphical outputs are presented.

A number of queries were raised on the initial analysis, which have been addressed in the revised BIA&GIR as described below:

- It was initially suggested that an “undrained scenario” had been used to consider longterm stability. It has been clarified that this should have read “drained”.
- The stability assessment assumed that there would be a load of 105kN/m² in front of the wall in the permanent case. It has since been confirmed that whilst this is the case within the building footprint, a reduced load of 40kN/m² has been assumed for the lightwell. Earlier discrepancies regarding the foundation arrangement and loading have largely been addressed.
- It has been clarified that, for the purposes of analysis, the groundwater has been assumed to be at the level observed in the ground investigation.

- 4.8. The BIA&GIR consider the existing and proposed foundation loading arrangements in order to estimate likely settlement. Although there remain some minor discrepancies between the BIA&GIR and SFR with respect to the proposed foundation loading arrangement and the nature of the basement slab, it is understood that the foundations/basement wall are to comprise a reinforced concrete L-shaped structure with a suspended slab between.
- 4.9. Outline structural calculations have been submitted following the issue of the D2 audit report. These consider retaining wall and slab design and provide the anticipated structural loads. The calculations also do not reflect the possibility of the retained soils comprising Made Ground. The calculations are accepted on the basis that the basement walls will be propped in both the temporary and permanent cases, but detailed design should consider the ground model described in the BIA&GIR.
- 4.10. The BIA&GIR considers likely vertical movement of the new foundations due to the altered loading arrangement and predicts around 3mm settlement. It recognises that additional settlement will occur due to the activity of underpinning. This accords reasonably with the prediction of 5mm settlement on the SFR.
- 4.11. Estimates of heave are presented on the assumption that the basement slab is to be suspended. The SFR has been revised to confirm the use of a suspended slab.
- 4.12. A ground movement assessment (GMA) has been presented estimating ground movements associated with the basement construction after CIRIA C760. It is recognised that this is not an entirely appropriate method. On the basis of estimated vertical and horizontal ground movements of 5mm at the party walls, potential damage is predicted not to exceed Burland Category 1. This is accepted as reasonable provided there is good control of workmanship.

- 4.13. The BIA&GIR states that allowance should be made for up to 1m accidental overdig. It has subsequently been clarified that this relates to horizontal, rather than vertical, excavation.
- 4.14. The SFR includes an outline monitoring regime to be adopted during construction.
- 4.15. With respect to hydrogeology, the groundwater BIA&GIR identified perched water in the Made Ground and a water level in the London Clay at around 3.30m depth. The BIA&GIR states that there will be a small increase in impermeable area, whilst the SFR notes that this is not the case. Despite this discrepancy, it is noted that it is intended to install an attenuation tank.
- 4.16. The results of groundwater monitoring are described and it is recommended that 2m head of water be assumed for the design of the basement. It is agreed that this is conservative, and this assumption has been carried through to outline design. The BIA&GIR advises that significant perched water will be encountered and that consideration should be given to forming the basement within a cofferdam. It has subsequently been confirmed that the structural engineer has assessed the ground and groundwater conditions and that the allowance for dewatering during construction is adequate.
- 4.17. The structural engineering information identifies the potential requirement for dewatering during construction and provides details of a French drain and system to prevent water backing up against the basement.
- 4.18. It is noted that the site lies in area potentially at risk from sewer flooding. A description of the topography is given identifying that the basement is not at risk and proposals for a drain around the basement and an attenuation tank are provided. These measures are accepted.
- 4.19. A neighbour has suggested that a tree to the front of the property may be affected by the basement proposals. An arboricultural impact assessment confirms that the encroachment into the root protection zone is minimal and not significant.

5.0 CONCLUSIONS

- 5.1. The revised BIA documents listed in Section 2 have been prepared by personnel who have qualifications complying with the requirements of CPG: Basements, although verification by the structural engineer has not been provided.
- 5.2. The proposed development comprises a single storey basement construction beneath the footprint of the existing building with small light wells planned to the front and rear of the house. The nature of, and loadings on, the existing and proposed foundations should be clarified. This should include confirmation of the basement slab and any allowance for heave.
- 5.3. The BIA&GIR recommends that allowance be made for accidental overdig up to 1m. This has been clarified and does not affect the stability of the host property or its neighbours.
- 5.4. The site is underlain by Made Ground and London Clay and underpins will be formed in the London Clay. Requirements for dewatering confirmed.
- 5.5. The BIA assesses the impact of the basement proposals on a slope to the rear of the property. Queries were raised with respect to some of the assumptions made in the initial audit and these have been addressed in the revised BIA&GIR.
- 5.6. A ground movement and building damage assessment is presented in the BIA. It indicates that if settlement and horizontal movements of the party walls are limited to 5mm, damage to neighbouring properties should not exceed Burland Category 1. This is accepted as reasonable provided there is good control of workmanship.
- 5.7. Outline structural calculations are presented which are accepted, although they require to be developed as part of detailed design and should consider the ground model presented in the BIA. The Structural Feasibility Report provides an outline monitoring strategy which should be developed as part of detailed design.
- 5.8. An arboricultural assessment confirms the basement will encroach marginally into the root protection zone of a tree at the front of the property, but the effect is insignificant.
- 5.9. Measures to protect the highway are recommended in the BIA. It is accepted that no other significant impacts to land stability exist.
- 5.10. The hydrology and hydrogeology screening and scoping identify no significant impacts on the local and wider water environment. Mitigation measures in the form of drainage around the basement and an attenuation tank are presented.

- 5.11. It is confirmed that the revised documents detailed in Section 2 confirm the basement proposals to be in accordance with the requirements of CPG: Basements and DP27.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Derwent May	Not given	Uploaded 06/01/2016	Concerns over subsidence	See audit report paras 4.7 to 4.12
O'Sullivan	47 Burghley Road	07/01/2016	Effect of construction on tree to the front of the property.	See audit report paras 4.19
Benson	41 Burghley Road	Uploaded 14/01/2016	Concerns over subsidence	See audit report paras 4.7 to 4.12

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Verification of BIA by Ian Harben to be confirmed.	Closed	25/09/2018
2	BIA	Outline construction programme to be provided.	Closed	30/05/2018
3	Land stability	Existing and proposed foundation configuration and loading arrangements to be clarified (refer to Section 4).	Closed	10/05/2018
4	Land stability	Queries raised with respect to ground movement and building damage assessment.	Closed	28/09/2018
5	Land stability	Predicted building damage exceeds permissible limits.	Closed	28/09/2018
6	Land stability	Discrepancies between documents with respect to predicted settlement and damage impacts to be clarified (refer to Section 4).	Closed	28/09/2018
7	Land stability	Queries raised with respect to slope stability assessment (refer to Section 4).	Closed	10/05/2018
8	Land stability	Potential impacts of accidental overdig to be considered (refer to Section 4).	Closed	10/05/2018
9	Hydrogeology/Land stability	Requirements for temporary dewatering to be confirmed (refer to Section 4).	Closed	10/05/2018

Appendix 3: Supplementary Supporting Documents

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