CampbellReith
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Ground Floor Flat, 53 Howitt Road, Belsize Park, NW3 4LU

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12727-57
Revision: D2

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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 Ground Floor Flat, 53 Howitt Road, Belsize Park NW3 4LU (planning reference 2017/7050/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 BIA has been prepared by engineering consultants Concept Consultancy. Since the initial audit report, a number of supporting documents have been submitted. It is accepted that the authors and/or reviewers have the qualifications required by the CPG.

1.5. The BIA has confirmed that the proposed basement will be founded within the London Clay formation.

1.6. The proposed works involve lowering the existing basement floor and constructing a new single storey basement to extend beneath the full footprint of the building, with lightwells to the front and rear. Discrepancies exist with respect to the underpinning of party walls which are required to be resolved.

1.7. Outline calculations for retaining walls and the basement floor slab do not consider hydrostatic pressures or the heave pressure predicted in the geotechnical assessment.

1.8. Desk study information, including historic maps and details of the site walkover survey, the factual ground investigation report and geotechnical interpretation have been presented since the initial report.

1.9. Discrepancies exist in the main BIA document as to the recorded water level and whether or not the basement will intercept the groundwater, although it does consider the need for dewatering during construction and basement waterproofing. The hydrogeological assessment concludes that the basement extends below the water level and recommends drainage is installed to mitigate any impact to No 51 Howitt Road. This should be addressed in the construction methodology.

1.10. Analysis has been undertaken of horizontal and vertical ground movements, and potential damage is predicted to fall into Burland Category 1. However the feasibility of limiting horizontal

movements to those suggested in the GMA requires confirmation. Additionally the assessment should consider the other properties at 53 Howitt Road.

1.11. Proposals are provided for a movement monitoring strategy during excavation and construction, but these are still required to be linked to the GMA.

1.12. Clarification has been presented regarding surrounding cellars and basements.

1.13. It is accepted there is no change to impermeable areas. A positive pumped drainage system is proposed.

1.14. Whilst the site is plotted incorrectly on the Camden Watercourses Figure 11 map, this is superseded by SBEC's BIA.

1.15. It is accepted that there are no surrounding slopes to the development.

1.16. Queries and requests for clarification are described in Section 4 and summarised in Appendix 2. Until they are resolved, it cannot be confirmed that the BIA complies with the requirements of the CPG.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 2 March 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 53 Howitt Road, Belsize Park NW3 4LU and reference 2017/7050/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.
- Local Plan 2017, 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;

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 "Construction of a basement extension with front and rear lightwells and a replacement rear extension from basement level following the demolition of the existing rear extension."*

2.6. Although a response from a resident suggest the building is historic and listed, the Audit Instruction confirmed that 53 Howitt Road does not involve, or is a neighbour to, listed buildings.

2.7. Once the consultation period had closed (15 March 2018) CampbellReith accessed LBC's Planning Portal on 30 March 2018 and 09 April 2018 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA), reference 2841, dated November 2017 by Concept Consultancy;
- Planning Application Drawings by Simon Miller Architects consisting of:
  - Location Plan reference 437 OS 00, dated December 2017;
  - Existing Plans and Sections numbered 437 EX 01-05 and 437 EX 07, dated December 2017;
  - Proposed Plans and Sections numbered 437 PL00 – PL05, dated December 2017;
- Design & Access Statement, reference 437, dated 22 December 2017 by Simon Miller Architects;
- Structural Drawings and Notes, reference 2841, numbered 1, 2, 3, 50, 51, 52, 800, 810, 811, dated November 2017 by Concept Consultancy Structural Designers Limited;
- Planning Comments and Responses.

2.8. Subsequent to the issue of the initial audit report, the applicant's team submitted a series of documents to CampbellReith during December 2018 and January and February 2019. Some of the documents had been submitted for the initial audit, some had been partially updated and other documents were being provided for the first time. The documents that have been audited in this revised audit are listed below. It has been assumed that planning application drawings, the D&A statement and structural drawings audited previously are still current.

- Basement Impact Assessment Report (BIA), reference 2841, dated January 2019 by Concept Consultancy, containing
  - Appendix A – Proposed underpinning sequence
  - Appendix B – Site Investigation Report/Geotechnical Assessment Report, reference R17-12519, dated November 2017, by Ashdown Site Investigation Ltd
  - Appendix C – BIA Subsurface Flow and Hydrology, reference 2018-009-031-001, dated 10 May 2018 by Steve Buss Environmental

- Appendix D – Ground Movement Assessment, reference CGL/09327, dated June 2018 by CGL Ltd

- Appendices B and D (source document not given) containing historic maps and GeoInsight desk study report
- Structural wall and slab calculations, reference 2841, Rev A, dated 05 February 2019.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Qualifications of authors and/or reviewers of revised/additional BIA documents confirmed to comply with requirements of CPG4.
Is data required by Cl.233 of the GSD presented?	Yes	Screening and scoping carried out.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	There are discrepancies between the documents which require clarification.
Are suitable plan/maps included?	Yes	Site location arrow in the Concept Consultancy BIA text still does not point to the site on the 'watercourses' map; however, this impact is correctly screened in BIA App C. Historic maps have been presented for review.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	See above
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	As noted above, errors exist in Concept Consultancy's BIA text; however, hydrogeology is screened correctly in BIA App C.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	No	However the BIA is written so as to clearly lay out the anticipated ground and groundwater conditions. This is further supported by the new BIA appendices.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	As noted above, errors exist in Concept Consultancy's BIA text; however, hydrogeology scoping is correctly presented in BIA App C.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	A ground investigation by Ashdown Site Investigation Ltd. is presented in the BIA as App B.
Is monitoring data presented?	No	Groundwater monitoring is described. Concept Consultancy's BIA text and App B do not reflect the latest monitoring data as reported in BIA App C.
Is the ground investigation informed by a desk study?	No	This is not stated; however, desk study information is presented.
Has a site walkover been undertaken?	Yes	By SBEC.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	The BIA states that adjacent properties do not have basements; however, one resident's response refers to excavation of a basement 'in front' of the property. This is clarified in BIA App C which notes that the neighbouring properties include cellars.
Is a geotechnical interpretation presented?	Yes	In Ashdown Site Investigation Ltd's Geotechnical Assessment Report (BIA App B).
Does the geotechnical interpretation include information on retaining wall design?	Yes	In Ashdown Site Investigation Ltd's Geotechnical Assessment Report (BIA App B).
Are reports on other investigations required by screening and scoping presented?	Yes	Desk Study and Factual and Interpretative Ground Investigation presented (BIA App B).

Item	Yes/No/NA	Comment
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Refer to BIA (App C).
Is an Impact Assessment provided?	Yes	Refer to Appendices C and D of Concept Consultancy's BIA.
Are estimates of ground movement and structural impact presented?	Yes	Refer to BIA Appendix D
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	However, discrepancies exist between the description of the basement construction and the recommendations in the other BIA appendices.
Has the need for monitoring during construction been considered?	Yes	A monitoring regime with trigger values is presented. However, these do not reflect the maximum horizontal movement permitted by the Ground Movement Assessment (1.8 – 3mm).
Have the residual (after mitigation) impacts been clearly identified?	Yes	Damage of Burland Category 1 is predicted in the GMA but further justification is required.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	The GMA requires justification.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	BIA Appendix C confirms no adverse impacts to the water environment.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	The GMA requires justification.

Item	Yes/No/NA	Comment
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	However, the GMA requires justification.
Are non-technical summaries provided?	Yes	A non-technical summary is presented at the beginning of the BIA report.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Concept Consultancy engineering consultants and the individual concerned in its production is a chartered structural engineer. Since the initial audit, a number of supporting documents have been submitted, the authors and/or reviewers of which have qualifications complying with those required by the CPG.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal does not either involve a listed building nor is adjacent to listed buildings. This is confirmed by reference to LBC's website.

4.3. The property is a four storey terraced house with three above ground levels and one partial basement, which is divided into flats. The proposal is to lower an existing basement area beneath part of the development site by approximately 1.60 metres and to excavate beneath the remainder of the building footprint by around 3.70 metres to form a single storey basement beneath the entire building footprint with front and rear lightwells.

4.4. A ground investigation at the site comprising 1 No. window sampler borehole with water monitoring installation and 2 No. foundation inspection trial pits is described in the BIA. Made Ground was encountered to 0.45 - 1.20m bgl, underlain by the London Clay formation to 10.0m bgl, the full depth of exploration. The borehole was dry at the time of drilling, however water was subsequently recorded in the standpipe at 2.74m bgl, thought to be perched water. SBEC's BIA notes that the groundwater level subsequently rose further to 0.67m bgl. This is not reflected in the main BIA or geotechnical assessment.

4.5. CGL Ltd have presented their own interpretation of the site investigation data and concluded that it cannot be relied on. They refer instead to a borehole some 130m from the site. Despite the discrepancies over groundwater and the quality of the site investigation data, it is accepted that sufficient information has been gathered on the site specific ground conditions to allow the impact of the basement to be determined.

4.6. The Desk Study including historic maps and details of the site walkover survey, factual ground investigation report, and geotechnical interpretation have been presented for review since the issue of the initial audit report. The geotechnical interpretation recommends that the basement slab is designed for an uplift pressure of 60kPa.

4.7. Section 3.4 of the BIA relates to surface water features, and while the Camden GSD maps are referred to, it was noted in the initial audit that an extract given of Figure 11 (Barton Lost Rivers of London) plots the site location incorrectly. The site is in fact much closer to a watercourse than stated. However, this query has been addressed by the submission of a

supporting BIA by SBEC assessing the impacts to surface water and groundwater from the basement.

4.8. Existing foundations are identified as stepped brick supported on strip foundations within the London Clay at 0.45m and 1.20m below existing ground level. The proposal states that existing perimeter walls shall be underpinned at the front and rear, with new retaining walls constructed inside the existing party wall foundations. A requirement for underpinning depths of c3.50m is shown in the structural drawings. The London Clay is identified as the bearing stratum.

4.9. This form of construction is not reflected in the description of the methodology in the BIA, nor the GMA, both of which appear to show the party walls being underpinned. This requires clarification. Furthermore, the construction methodology should be expanded to refer to temporary dewatering, waterproofing and the installation of a vertical drainage membrane as recommended by SBEC.

4.10. Outline calculations to demonstrate the feasibility of the underpinning and retaining wall and slab design were requested in the initial audit and have subsequently been provided. It is noted that the basement slab has been designed for an uplift pressure of 30kPa. In light of the recommendations in the geotechnical assessment, this requires justification. It is also noted that the wall and slab calculations do not consider hydrostatic pressures. This is not considered to be a moderately conservative approach as required by LBC's policy guidance.

4.11. A GMA and building damage assessment have been presented by CGL Ltd. The settlement predictions within the GMA (11-13mm) are significantly at odds with those predicted in the main BIA (5mm). There is also a discrepancy with respect to heave with Concept Consultancy noting it will be negligible and CGL predicting up to 8mm heave. However, it is noted that the damage assessment uses the higher figures. Whilst the building damage assessment methodology is generally accepted, it is noted that in order not to cause damage greater than Burland Category 1 to Nos 51 and 55 Howitt Road, horizontal movements of the underpinned walls must be limited to 1.8mm and 3mm (for assessed sections A and B). It is not accepted that this is a suitably conservative estimate of likely movement. Additionally, the GMA does not consider the impact of the basement construction on the properties above the ground floor flat. The GMA should be reassessed once it is confirmed whether the party walls are being underpinned.

4.12. A movement monitoring strategy with trigger values for out of plan movements is identified in the BIA. However, these should be linked to the GMA. Presently the monitoring permits up to 5mm movement before the methodology is reviewed, whilst the GMA requires that horizontal movement is limited to 1.8mm and 3mm.

4.13. It is identified in the BIA that the surrounding buildings do not have basements, and therefore a differential depth of approximately 1.00m at the front and 2.50m to the remainder of the house

will exist on completion of the excavation. This does not allow for the excavation of the lightwell and contradicts structural drawings showing around 3.50m underpinning. However, it is noted that the GMA assumes the maximum excavation depth.

4.14. A response received from a local resident mentions a basement excavation 'in front' of 53 Howitt Road. It has been confirmed that cellars exist beneath both neighbouring properties.

4.15. Concept Consultancy's BIA is contradictory with respect to whether or not the basement will extend below the water table (although they do recognise the potential need for dewatering during construction). The BIA by SBEC notes that the basement extends below the monitored water level and could cause water levels beneath No 51 Howitt Road to rise slightly. SBEC recommend the installation of a vertical drainage membrane on the up-gradient (northern) face of the new basement to mitigate against issues arising from a rise in water level. Concept Consultancy note the potential need for dewatering during construction and for waterproofing of the basement.

4.16. SBEC's BIA has shown that the development is not near any known watercourses, and it will not therefore impact on the wider hydrogeology of the area, any other watercourses, springs or the Hampstead Heath Pond chain catchment area. This is accepted.

4.17. It is accepted that the proposal will not impact on the amount of hardstanding present on site, and that the existing connections to the combined public sewer on Howitt Road will be re-used. The provided documents state that an attenuation system is not applicable in this case, which is agreed. It is noted that Concept Consultancy are recommending a positive pumped drainage system.

4.18. It is accepted that there are no slope stability concerns regarding the proposed development and it is not in an area prone to flooding.

5.0 CONCLUSIONS

5.1. The BIA has been prepared by engineering consultants Concept Consultancy. Since the initial audit report, a number of supporting documents have been submitted. It is accepted that the authors and/or reviewers have the qualifications required by the CPG.

5.2. The BIA has confirmed that the proposed basement will be founded within the London Clay formation.

5.3. The proposed works involve lowering the existing basement floor and constructing a new single storey basement to extend beneath the full footprint of the building, with lightwells to the front and rear. The proposal states that existing perimeter walls shall be underpinned at the front and rear, with new retaining walls constructed inside the existing party wall foundations. This does not agree with the construction methodology as described, nor the assumptions made in the GMA.

5.4. Subsequent to the initial audit report, outline calculations for retaining walls and the basement floor slab have been presented. It is noted that they do not consider hydrostatic pressures. Additionally, they do not consider the heave pressure predicted in the geotechnical assessment.

5.5. Desk study information including historic maps and details of the site walkover survey, the factual ground investigation report and geotechnical interpretation have been presented since the initial report.

5.6. There are discrepancies in the main BIA document as to the recorded water level and whether or not the basement will intercept the groundwater. SBEC's BIA (App C to the main BIA) recommends that drainage is installed to mitigate any impact to No 51 Howitt Road. This is not addressed in the construction methodology.

5.7. Analysis has been undertaken of horizontal and vertical ground movements, and potential damage is predicted to fall into Burland Category 1. However, the feasibility of limiting horizontal movements to those suggested in the GMA requires confirmation. Additionally the assessment should consider the other properties at 53 Howitt Road.

5.8. Proposals are provided for a movement monitoring strategy during excavation and construction, but these are still required to be linked to the GMA.

5.9. The BIA states that there are no existing basements at surrounding properties. However, one resident's response refers to a basement excavation in the vicinity. Clarification has been presented.

5.10. The BIA states that no change to impermeable areas will result from the development, and therefore the existing surface water drainage system will be utilised. A positive pumped system is proposed.

5.11. Whilst the site is plotted incorrectly on the Camden Watercourses Figure 11 map, this is superseded by SBEC's BIA.

5.12. It is accepted that there are no surrounding slopes to the development.

5.13. Queries and requests for clarification are described in Section 4 and summarised in Appendix 2. Until they are resolved, it cannot be confirmed that the BIA complies with the requirements of the CPG.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Guadalupe	2nd Floor Flat, 53 Howitt Road	27 February 2018	Concerned that excavation will exacerbate existing subsidence at property. Concerned that cumulative impact of basement construction in the vicinity will cause ground movement. Concerned that structural integrity of historic listed building will be compromised.	See audit paragraphs 4.8 to 4.10.

Appendix 2: Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Qualifications do not comply with requirements of CPG.	Closed – supporting evidence presented	28/02/2019
2	BIA	Required to be submitted for review: -Desk Study information including historic maps and Site Walkover Survey -Factual Ground Investigation report including engineers logs and water monitoring data -Geotechnical interpretation	Closed – presented as appendices to BIA	28/02/2019
3	Hydrogeology	Check site location on GSD Watercourses map and update BIA as necessary.	Open – map remains incorrect, but superseded by BSEC BIA (App C) Newly submitted BIA recommends installation of drainage to northern face of basement to avoid potential adverse impact to No 51 Howitt Road	
4	Stability	Outline retaining wall design required including geotechnical assumptions and further details of any necessary mitigation strategy.	Open – retaining wall and slab design do not consider hydrostatic pressures. Geotechnical assessment recommends that slab designed for 60kPa heave pressure; structural calculations assume 30kPa. It should be confirmed whether party walls are to be underpinned.	
5	Stability	Ground movement and building damage assessment require revision.	Open – conclusions require horizontal movement to be limited to 1.8 and 3mm. Upper flat(s) at 53 Howitt Road not considered. May need revision once confirmation of underpinning to party walls received.	
6	Stability	Movement monitoring strategy to be linked to GMA.	Open – trigger levels do not reflect GMA.	
7	Stability	Re-assess proximity to other basements and consider cumulative impacts if necessary.	Closed	28/02/2019

Appendix 3: Supplementary Supporting Documents

None

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