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Basement Impact Assessment Audit

28 Parliament Hill, London NW3 2TN

For
London Borough of Camden

Project No.
14006-71

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APPENDICES

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 28 Parliament Hill, London NW3 2TN (planning references 2024/0452/P and 2024/2811/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 authors' qualifications do not comply with CPG Basements.

1.5 It is proposed to construct a swimming pool at lower ground floor level. The maximum excavation depth is given as 2.00m.

1.6 The BIA confirms the pool will be founded on the London Clay Formation and will be constructed using a reinforced concrete retaining walls in a 'hit and miss' sequence. The use of piles to support the swimming pool at the rear of the property is also proposed.

1.7 The revised submission includes the screening questions from CPG Basements. However, some 'no' responses do not have justification for the response given and no Scoping Stage is included to consider items where a 'yes' or 'unknown' responses are given.

1.8 It is unlikely that the ground water table will be encountered during basement foundation excavation although suitable mitigation measures are provided for localised perched water.

1.9 It is accepted that the surrounding slopes to the development site are stable.

1.10 It is accepted the site is not within an area prone to flooding and the development will not impact the hydrology of the wider area.

1.11 The depth of the existing underpinning should be confirmed to support the proposed structural scheme for the development.

1.12 The allowable bearing pressures should correspond with the values specified by the geotechnical ground investigation report and should be used consistently in all calculations.

1.13 A Ground Movement Assessment (GMA) has been carried out but requires revision to consider the long- and short-term soil conditions.

1.14 The BIA states that damage to neighbouring properties will not exceed Burland Category 1 (very slight), however justification to support this conclusion should be provided.

1.15 Utility plans should be provided as per the LBC Scope of Engineering Services.

1.16 As described in Section 5, it cannot be confirmed that the BIA complies with the requirements of CPG: Basements and the Principles for Audit set out in the Basement Impact Assessment (BIA) Audit Service Terms of Reference & Audit Process. Queries and comments on the BIA are described in Section 4 and Appendix 2.

2.0 INTRODUCTION

2.1 CampbellReith was instructed by London Borough of Camden (LBC) on 22nd April 2024 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 28 Parliament Hill, London NW3 2TN, and planning reference 2024/2811/P. The planning reference 2024/0452/P was used in the initial application and for the D1 BIA audit.

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

- Camden Local Plan 2017 - Policy A5 Basements.
- Camden Planning Guidance (CPG): Basements. January 2021.
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Hampstead Neighbourhood Plan

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 "Excavation and formation of basement incorporating a swimming pool".

2.6 The Audit Instruction confirmed 28 Parliament Hill neither involved, nor was a neighbour to, listed buildings.

2.7 CampbellReith accessed LBC's Planning Portal on 21 May 2024 and gained access to the following relevant documents for audit purposes:

- Geotechnical Ground Investigation and Ground Movements Report by AVZ GeoEng Ltd, ref. 2166.23, Rev A, dated 02 January 2024.
- Site Location Plan by Neale & Norden Consultants, Ref 463/D01, dated 07 January 2024.

- Lower Ground Floor as proposed by Neale & Norden Consultants, Ref 463/D04, dated 20 January 2024.
- Design & Access Statement by Neale & Norden Consultants, Letter format, dated 05 February 2024.
- Planning consultation responses (see Appendix 1)

2.8 CampbellReith received the following documents for the audit, direct from LBC on 03 June 2024:

- Basement Impact Assessment and Engineering Method Statement by Green Structural Engineers (GSE), ref. 20230153, rev. 1, dated 02 February 2024.

2.9 CampbellReith reviewed the following information on 07 August 2024, submitted in response to the queries raised in the D1 audit:

- Basement Impact Assessment and Engineering Method Statement by Green Structural Engineers (GSE), ref. 20230153, rev. 2, dated 05 August 2024.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	Evidence of engineering geology expertise is not provided.
Is data required by Cl.233 of the GSD presented?	No	Depth of the existing underpinning requires confirmation. Utility data is required.
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	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	BIA Appendix B – desktop study.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA section 7. However, no justification is provided for the 'no' response given for Question 6.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA section 8. However, no justification is provided for the 'no' response given for Questions 9, 11 and 14, and Questions 5, 10, 12 and 13 are not carried forward to Scoping stage.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA section 6. However, Question 6 is not carried forward to Scoping stage.
Is a conceptual model presented?	Yes	AVZ GeoEng Ltd report section 6.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	
Is factual ground investigation data provided?	Yes	AVZ GeoEng Ltd report Appendices A & B.
Is monitoring data presented?	No	
Is the ground investigation informed by a desk study?	Yes	AVZ GeoEng Ltd section 2.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	BIA section 10.
Is a geotechnical interpretation presented?	Yes	AVZ GeoEng Ltd section 6.
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA section 10.
Are reports on other investigations required by screening and scoping presented?	Unknown	Screening and scoping stages are incomplete.
Are the baseline conditions described, based on the GSD?	No	Existing structural foundation information is required.
Do the baseline conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	BIA sections 13-18.
Are estimates of ground movement and structural impact presented?	Yes	AVZ GeoEng Ltd section 9.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screening 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	AVZ GeoEng Ltd section 9.12.
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	Underpin depth and ground bearing capacities should be confirmed and presented/used consistently.
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?	No	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	However justification to support the damage category is requested.
Are non-technical summaries provided?	Yes	BIA executive summary.

4.0 DISCUSSION

4.1 The Basement Impact Assessment (BIA) has been carried out by engineering consultants Green Structural Engineering Ltd (GSE) however the authors' qualifications do not comply with the requirements of CPG Basements. A Ground Movement Assessment has been undertaken by AVZ GeoEng Ltd (AVZ) with input by an individual holding a CEng (MICE) qualification.

4.2 The LBC Instruction to proceed with the audit identified that 28 Parliament Hill is in the Hamstead Conservation Area and it is not a listed building.

4.3 The Design access statement describes 28 Parliament Hill as a semi-detached Victorian 3-storey red brick house with an existing lower ground floor.

4.4 The proposed basement comprises the construction of a new swimming pool at lower ground floor level, within a rear extension to the lower ground floor, which has been approved under a different planning application. This application is for the swimming pool excavation, which has a maximum excavation depth of 2.00m below lower ground floor level.

4.5 The revised submission includes a Screening assessment that follows the flowchart questions provided in CPG Basements. However, some 'no' responses do not have justification for the response given and no Scoping Stage is included to consider items where a 'yes' or 'unknown' responses are given. These should be provided.

4.6 The BIA has been informed by a desk study and a site-specific borehole undertaken within the rear garden. The ground conditions encountered on-site comprise Made ground to 0.5m below ground level (bgl) overlying the London Clay Formation to the maximum depth of investigation (10m bgl).

4.7 Groundwater was not encountered during the investigation. A standpipe was installed within the single borehole in the rear garden. Groundwater monitoring has not been undertaken. The AVZ report notes groundwater seepages could occur within the sandy laminae and claystone bands. The BIA recommends sump pumping as mitigation against water ingress during construction.

4.8 The BIA includes a review of the Camden Flood Risk Management Strategy and shows the site is not located in a Local Flood Risk Zone or Critical Drainage area.

4.9 The surface water aspects of the BIA indicate the site is not in the Hampstead Heath Surface Water Catchments and Drainage area (Figure 14 Arup) and it is at low risk of low risk of river and sea flooding, as well as surface water flooding. The BIA does not note Parliament Hill is recorded in the flooded streets 2002 map (Figure 3 iii) and there was an EA groundwater flood incident upslope of site (Figure 4e). The BIA identifies internal flood risk due to backing up of the existing drainage system and recommends non-return valve installation as mitigation.

4.10 As the proposed basement is within a previously approved scheme for a rear extension to the property, it is accepted that the amount of hardstanding will not change as a result of basement construction.

4.11 Laboratory testing undertaken with the ground investigation indicates the London Clay Formation soils are of high-volume change potential. The AVZ report states foundations should be designed to cater for the high-volume change potential soils. No trees are to be removed as part of the development.

4.12 BIA Section 10 states that lower ground floors similar to the existing one at No.28 Parliament Hill are present at neighbouring properties. No basements are present at neighbouring properties.'

4.13 The BIA states the property is located on a sloped site, but the planned activities are confined to a level portion of the property. It is accepted that the basement will not impact the slope stability of the area.

4.14 Section 4 of the BIA states the property was underpinned to 3m bgl in 1997. However, drawing D21 in BIA Appendix F and the Design Access Statement state the property was underpinned to 6m bgl and the proposed structural scheme package (BIA Appendix C) assumes an existing underpin depth to 2.35m bgl. The BIA states a foundation exposure trial pit was undertaken on the external wall to the rear, however, the trial pit sketch is based on a site video and pertinent foundation information is noted as 'TBC by architect'. Quantitative information on the existing underpin depth is required to support assumptions made in the BIA and verify the construction method.

4.15 Section 10 of the GSE report outlines the structural design proposals involving the formation of reinforced concrete walls to form the swimming pool and piles to support the slab where the pool extends beyond the footprint of the original house at the rear. The BIA notes that maintaining lateral support during the excavation in near proximity to the existing underpins and construction stage, as a major challenge and risk to adjoining properties.

4.16 Temporary propping will be used to maintain stability during construction. The BIA outlines the construction sequence in 15-stages, including the temporary works propping arrangements. Construction will be undertaken in a 'hit and miss' sequence. The BIA provides a series of drawings to illustrate the structural scheme and temporary works in Appendices C and E respectively.

4.17 The Structural Design Package provided in Appendix D of the GSE report assumes a safe bearing pressure of 95kPa based on the AVZ ground investigation. It then goes on to present calculations for the party wall, which assumes a safe bearing pressure of 150kPa, and existing underpin calculations that assumes a safe bearing pressure of 125kPa. Clarification of the variety of parameters used is requested, with reference given to the net allowable bearing pressures identified in Table 2 of the AVZ report.

4.18 Further to the above, the existing underpin bearing pressure checks presented in the GSE report appear to exceed the allowable bearing capacities provided in Table 4 of the AVZ report. These should be revisited to demonstrate the foundation configuration can support the new loads.

4.19 A Ground Movement Assessment (GMA) has been undertaken by AVZ that incudes predicted movements for short-term conditions (underpin construction) and long-term conditions (completed development). Vertical movement predications were carried out using PDISP software. The maximum vertical movement predictions comprise:

- Short-term (undrained) between -0.56mm and +5.1mm
- Long-term (drained) between -3.05mm and +8.53mm.

4.20 The Poisson's ratio used in both PDisp analyses is 0.2 for Made Ground and 0.3 for London Clay. This should be revised to reflect the drained and undrained conditions used in the analyses.

4.21 Section 9.9 of the GMA states bulk lateral ground movement can be limited to less than 5mm with temporary propping and control of good workmanship.

4.22 Section 9.11 of the GMA discusses the impact of the ground movements induced by the basement development and states that the impacts to neighbouring structures are expected to be within Damage Category 1 (Very Slight). Justification to support the conclusion of the damage assessment should be provided.

4.23 The potential impact on utilities and third-party assets is considered in section 16 of the BIA that states impact will be negligible because the services will be maintained. Utility plans should be provided as per LBC's Scope of Engineering Services and the above statement revised accordingly.

4.24 The ground movement report states conditions surveys and movement monitoring of the adjacent properties need to be undertaken although the precise monitoring strategy would be subject to agreements with the neighbouring property owners.

5.0 CONCLUSIONS

5.1 The BIA has been carried out by Green Structural Engineering Ltd (GSE) however the authors' qualifications do not comply with the requirements of CPG Basements.

5.2 It is proposed to construct a swimming pool at lower ground floor level. The maximum excavation depth is given as 2.00m.

5.3 The revised submission includes a Screening exercise that follows the screening questions in CPG Basements. However, some 'no' responses do not have justification for the response given and no Scoping Stage is included to consider items where a 'yes' or 'unknown' responses are given.

5.4 The BIA has confirmed that the proposed basement will be founded within the London Clay Formation. The pool construction comprises reinforced concrete retaining walls constructed using a 'hit and miss' sequence. The use of piles to support the swimming pool at the rear of the property is also proposed.

5.5 It is unlikely that the ground water table will be encountered during basement foundation excavation although suitable mitigation measures are provided for localised perched water.

5.6 It is accepted that the surrounding slopes to the development site are stable.

5.7 It is accepted the site is not within an area prone to flooding and the development will not impact the hydrology of the wider area.

5.8 The depth of the existing underpinning should be confirmed to support the proposed structural scheme for the development.

5.9 The allowable bearing pressures should correspond with the values specified by the geotechnical ground investigation report and should be used consistently in all calculations.

5.10 A Ground Movement Assessment (GMA) has been carried out but requires revision to consider the long- and short-term soil conditions.

5.11 A building damage assessment states that damage to neighbouring properties will not exceed Burland Category 1 (very slight), however justification to support this conclusion should be provided.

5.12 Utility plans should be provided as per the LBC Scope of Engineering Services.

It cannot be confirmed that the BIA complies with the requirements of CPG: Basements and the Principles for Audit set out in the Basement Impact Assessment (BIA) Audit Service Terms of Reference & Audit Process, specifically:

- The person(s) undertaking the BIA do not hold qualifications relevant to the matters being considered, in accordance with the requirements set out in CPG: Basements.
- The Basement Impact Assessment has not been prepared in accordance with the processes and procedures set out in CPG: Basements.

- The methodologies and assumptions are not clearly stated and/or are not appropriate to the scale of the proposals and the nature of the site.
- The conclusions have not been arrived at based on all necessary and reasonable evidence and considerations, in a reliable, transparent manner, by suitably qualified professionals, with sufficient attention paid to risk assessment and use of cautious or moderately conservative engineering values/estimates.
- The conclusions of the various documents/details comprising the BIA are not consistent with each other. The conclusions are not sufficiently robust and accurate and are not accompanied by sufficiently detailed amelioration/mitigation measures to support the grant of planning permission in accordance with Policy A5 of the Local Plan, in respect of:
  - maintaining the structural stability of the building, the ground and any neighbouring properties to within limits set out in the policy/guidance;
  - avoiding adversely affecting drainage and run-off or causing other damage to the water environment; and,
  - avoiding cumulative impacts on ground and structural stability or the water environment in the local area.

5.13 Queries and comments on the BIA are described in Section 4 and Appendix 2.

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Appendix 1

Consultation Responses

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Gascoigne	-	29/05/2024	Impact on neighbours shallow foundations	A query has been raised relating to confirmation of the underpinning undertaken on the property.
Rankin	-	30/05/2024	Building damage assessment and impact to neighbouring structures	This has been queried in the audit.

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Appendix 2

Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Author's qualifications do not comply with CPG basements	Open – See 4.1	
2	Screening	Screening tables are included but some 'no' responses do not have justification for the response given and no Scoping Stage is included to consider items where a 'yes' or 'unknown' responses are given.	Open – See 4.5	
3	Stability	The depth of the existing underpins should be clearly stated and presented consistently in all documents.	Open – para 4.14	
4	Stability	The allowable bearing pressure used in structural calculations should be used consistently and align with the values recommended in the ground investigation report.	Open – See 4.17 and 4.18	
5	Ground Movement Assessment	The poisson's ratio used in the PDisp assessment should use appropriate parameters for the drained and undrained case.	Open – See 4.20	
6	Damage assessment	Justification to support the building damage assessment is requested	Open – See 4.22	
7	BIA	Utility survey information should be provided.	Open – See 4.23	

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Appendix 3

Supplementary Supporting Documents

None

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