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Basement Impact Assessment Audit

27 Elizabeth Mews, London NW3 4UH

For
London Borough of Camden

Project No.
14006-96

Date
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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 27 Elizabeth Mews London NW3 4UH (planning reference 2024/2988/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 using individuals who possess suitable qualifications.

1.5 The BIA has confirmed that the proposed basement will be founded 3.50m below ground level.

1.6 It is unlikely that groundwater will be encountered during basement foundation excavation. BIA recommendations include mitigation measures to control localised water ingress.

1.7 It is accepted that the development will not impact on the wider hydrogeology of the area.

1.8 It is accepted that the basement will not impact the hydrology of the area and the site is not in an area subject to flooding.

1.9 The BIA outlines the construction sequence, and the revised submission confirms a single lift underpinning method.

1.10 The BIA predicts potential damage to neighbouring structures and the Thames Water sewer can be controlled within acceptable limits.

1.11 The revised submission states there are no concerns on the potential impact to the highways and buried services.

1.12 It is 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.

2.0 INTRODUCTION

2.1 CampbellReith was instructed by London Borough of Camden (LBC) on 18th August 2024 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 27 Elizabeth Mews, London NW3 4UH, and Planning Reference 2024/2988/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

- 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.

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 for a new basement extension, erection of a new dormer roof extension including external alterations for new office space at basement and ground floor levels and the change of use of the first floor from office accommodation to 1 x self-contained flat at first and second floor level.*"

2.6 The Audit Instruction confirmed 27 Elizabeth Mews, London NW3 4UH is not involved, or neighbour to, listed buildings.

2.7 CampbellReith accessed LBC's Planning Portal on 17th September 2024 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) by Geotechnical & Environmental Associates Limited (GEA), ref. J23095, rev. 1, dated 11th July 2024.
- BIA Structural Design by Harrison Shortt Structural Engineers Ltd. ref. 2421_Issue 01, rev. B, dated 3rd May 2024.

- Construction Management Plan Proforma completed by Rohan Sherlock of Sherlock London Ltd. ref. -, rev. 01, dated 8th April 2024.
- Flood Risk Assessment (FRA) by Evans River and Coastal Ltd. ref. 3202/RE/05-23/01, rev. 01, dated May 2024.
- Site Location Plan by Charlton Brown Architecture & Interiors, ref. 21026 PR-100, rev. -, dated 22nd June 2022.
- Existing Plans Elevations and Sections by Charlton Brown Architecture & Interiors, ref. 21026, rev. -, dated 22nd June 2022:
  - Floor Plans, ref. PR-101
  - Sections AA, ref. PR-102
  - Elevation NW, ref. PR-103
  - Elevation NE, ref. PR-104
- Proposed Plans Elevations and Sections by Charlton Brown Architecture & Interiors, ref. 21026, rev. -, dated 22nd June 2022:
  - Floor Plans, ref. PR-105 and PR-106
  - Sections AA, ref. PR-107
  - Elevation NW, ref. PR-108
  - Elevation NE, ref. PR-109
- Demolition Plans Elevations and Sections by Charlton Brown Architecture & Interiors, ref. 21026, rev. -, dated 22nd June 2022:
  - Floor Plans, ref. PR-110
  - Sections AA, ref. PR-111
  - Elevation NW, ref. PR-112
  - Elevation NE, ref. PR-113
- Consultation Responses

2.8 The following information was submitted in November 2024 in response to the queries raised in the D1 audit:

- Basement Impact Assessment Report (BIA) by Geotechnical & Environmental Associates Limited (GEA), ref. J23095, rev. 2, dated 17th October 2024.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	BIA section 1.3.2
Is data required by Cl.233 of the GSD presented?	Yes	
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	The revised submission includes utility plans
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA section 3.2
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA section 3.1
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA section 3.3
Is a conceptual model presented?	Yes	BIA section 7.0
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA section 4.0
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	NA	No items brought through to scoping

Item	Yes/No/NA	Comment
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	NA	No items brought through to scoping
Is factual ground investigation data provided?	Yes	BIA appendix A
Is monitoring data presented?	No	
Is the ground investigation informed by a desk study?	Yes	BIA section 2.0
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	BIA section 9.1
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA section 8.1.1
Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment provided.
Are the baseline conditions described, based on the GSD?	Yes	BIA section 5.0
Do the baseline conditions consider adjacent or nearby basements?	Yes	BIA section 9.1
Is an Impact Assessment provided?	Yes	BIA Part 4
Are estimates of ground movement and structural impact presented?	Yes	BIA section 10.0
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	The GMA in the revised submission considers the impact to the highway.

Item	Yes/No/NA	Comment
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 11.2
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 11.0 however, some further clarification is required as outlined in Section 4.0 below.
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	BIA section 11.0 however, some further clarification is required as outlined in Section 4.0 below.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	BIA section 11.0 however, some further clarification is required as outlined in Section 4.0 below.
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 Geotechnical & Environmental Associates (GEA) and the individuals concerned in its production have suitable qualifications. The BIA Structural Design Report (SDR) has been carried out by Harrison Shortt Structural Engineers Ltd.

4.2 The LBC Instruction to proceed with the audit states the basement proposal is neither involved with, nor adjacent to, listed buildings.

4.3 The site is within the Belsize Conservation area.

4.4 The existing 27 Elizabeth Mews structure comprises a two-storey structure with a flat roof. Proposals involve construction of a new residential floor and mansard extension on the existing structure. The proposed basement will comprise a single-storey beneath the full footprint of the building, with a formation of c.3.50m below the existing ground level at the front of the house.

4.5 The BIA has been informed by a desk study and site-specific ground investigation comprising a single borehole to 9.45m below ground level (bgl) of the existing structure. The investigation identified that the ground slab is underlain by Made Ground to a depth of 1.20m over Head Deposits of soft to firm clays to 5.00m bgl. The London Clay Formation, comprising firm to stiff clays, was encountered from 5.00m to the maximum depth of investigation (9.45m bgl).

4.6 Groundwater was encountered at 4.50m in BH01. No groundwater monitoring has been undertaken. The BIA recommends that the basement retaining walls are designed to assume groundwater is 1.00m bgl.

4.7 Geotechnical parameters have been provided within Section 8.0 of the BIA and are accepted to be suitable for the ground conditions described.

4.8 The BIA includes a summary of anticipated foundation depths of the neighbouring property. This is based on publicly available information from nearby planning applications. The findings suggest basements exist beneath the properties fronting onto England's Lane to a depth of 2.50m bgl.

4.9 The Subterranean (groundwater) Screening Assessment indicates that the site is underlain by the London Clay Formation, with an aquifer classification as unproductive strata. There are no watercourses or potential spring lines recorded within 100m distance of site.

4.10 The screening responses confirm that the development will not alter the area of hardstanding.

4.11 The site investigation suggests the basement will not extend below the groundwater table although isolated pockets of perched water maybe encountered. The BIA advises sump pumping is used as a control measure for limited water ingress and that the contractor should have a contingency plan to deal with more significant inflows as a precautionary measure.

4.12 It is accepted the will be no significant impact to the local and wider hydrogeological environment.

4.13 The Surface Flow and Flooding Screening Assessment states that the site has a very low flooding risk from surface water, sewers, reservoirs (and other artificial sources), groundwater and fluvial/tidal watercourses. The BIA also confirms the nearest lost river is some 450m west of the site.

4.14 The Flood Risk Assessment (FRA) confirms the site is within Flood Zone 1 and states the following:

- there is a low risk of groundwater flooding;
- there is very low surface water flood risk; and,
- the site is within an area at low risk of sewer flooding.

4.15 It is accepted there will be no impact to the hydrological setting of the area, although this should be confirmed by the LLFA.

4.16 The Land Stability Screening Assessment identifies that London Clay is the shallowest stratum and thus there is a potential risk of seasonal shrink swell subsidence. The screening also confirms the site is within 5m of a highway and will significantly increase the differential depth of the foundations relative to neighbouring properties. These items have been brought through the scoping assessment.

4.17 Geotechnical laboratory testing has been undertaken to confirm the volume change potential of the near surface soils. The BIA refers to NHBC guidelines and states the basement foundation depths are at sufficient depth that they will not be impacted from seasonal shrink swell subsidence. In addition, the BIA confirms there are no trees in proximity to the proposed basement.

4.18 The development is bounded to the northwest and northeast by Elizabeth Mews and Primrose Gardens respectively. The revised submission includes utility plans showing underground infrastructure and utilities within the public roads and pavements.

4.19 The land stability screening responses identify that the proposed works could potentially impact the surrounding structures and thus a Ground Movement Assessment (GMA) has been undertaken to assess the impact of the proposed basement on the neighbouring structures.

4.20 The basement construction method, outlined in the SDR, involves underpinning the existing foundations. The revised submission confirms underpinning will be carried out in a single lift using a hit-and-miss installation sequence with a maximum excavation width of 1m.

4.21 The construction sequence provided in the SDR includes the propping arrangements during construction which will comprise a combination of needle props, perimeter upper-level props and the basement slab.

4.22 Geotechnical parameters are provided within the revised submission that are used in the retaining wall calculations within the SDR. It's noted these have not been updated for the temporary propping condition, which should be checked and updated prior to construction.

4.23 The BIA indicates a net allowable bearing pressure of 100kN/m^2 within the firm clays of the Head Deposits and recommends a suspended basement floor slab to accommodate heave.

4.24 The GMA is provided within Part 3 of the BIA report. The assessment assumes the basement is to be formed by traditional hit and miss underpinning with a maximum excavation depth of 3.50m. The soil parameters used are accepted to be suitable for the anticipated ground conditions.

4.25 The GMA uses Oasys PDisp and XDisp software to predict vertical (heave and settlement) and horizontal/lateral ground movements in two stages of construction:

- Installation of proposed underpinning.
- Combined movements from installation and subsequent excavation in front of underpinned walls.

4.26 Section 10 of the GMA includes a statement suggesting that the use of CIRIA C760 is considered a conservative approach for underpinning; its noted that CIRIA C760 is intended for the installation of embedded retaining walls but where used cautiously can be used to predict movements for underpinning.

4.27 Minimum ground movements of 5mm to 10mm from underpinning are used in the assessment. This is considered to meet the requirement of being a cautious and moderately conservative engineering estimate as set out in the Terms of Reference.

4.28 A modified movement curve (for a planar diaphragm wall installed in stiff clay from CIRIA C760) has been used to estimate the movements from the underpinning installation. Movements from the basement excavation have been estimated using the CIRIA C760 curve for 'excavations in front of high stiffness wall in stiff clay'. Combined movements indicate total vertical settlements between 5mm to 6mm and horizontal movements of 4mm to 5mm. These correspond with typical movements expected for a single lift of underpinning.

4.29 The GMA results indicate short term and long-term movements beneath the basement slab (from loading and heave) of -5mm to -8mm respectively, with movements of 2mm to 3mm and 3mm to 5mm beneath the retaining walls.

4.30 The neighbouring structures assessed in the GMA include 26, 25 and 25A Elizabeth Mews along with 28A, 28, 30 and 32 England's Lane, and the Thames Water Sewer in the public highway. The foundation depths of the neighbouring properties have been assumed to be 0.50m bgl; however, existing basements along England's Lane are assumed to extend to 2.50m bgl. The building damage assessment results predict damage to the structures will not exceed Burland Damage Category 1 (Very Slight).

4.31 The assessment includes the Thames Water sewer surrounding the property and predicts Burland Damage Category 0 (Negligible). The revised submission states that there are no concerns to the stability of the adjacent public highway resulting from the development, although this will be confirmed during further investigation.

4.32 The BIA states the ground movement predictions should be checked by monitoring the existing structures to ensure no excessive movements occur that would lead to damage.

5.0 CONCLUSIONS

5.1 The BIA has been carried out using individuals who possess suitable qualifications as required by CPG Basements.

5.2 The BIA has confirmed that the proposed basement will be founded 3.50m below ground level (bgl) within Head Deposits.

5.3 The ground investigation findings suggest that groundwater will not be encountered during the basement foundation excavation. The BIA states any perched water encountered can be controlled using sump pumps.

5.4 It is accepted that the development will not impact on the local or wider hydrogeology of the area and is not in an area subject to flooding.

5.5 The revised submission includes utility information.

5.6 The BIA confirms basement construction involves underpinning and a construction sequence has been provided.

5.7 Outline retaining wall calculations have been provided.

5.8 The Ground Movement Assessment (GMA) concludes that the maximum Burland Scale damage category is Category 1 (Very Slight).

5.9 A movement monitoring strategy during excavation and construction is recommended.

5.10 It is 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.

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Appendix 1

Consultation Responses

None

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Appendix 2

Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Plans	Utility information should be provided.	Closed – paragraph 4.18	December 2024
2	Land stability/ Construction Methodology	The structural report calculations uses different geotechnical parameters to those provided in the BIA. Parameters should be presented and used consistently throughout the submission.	Note – paragraph 4.22	December 2024
3	Land stability	Number of underpin stages/ lifts must be clearly stated and the ground movement assessments revised accordingly.	Closed – paragraph 4.20 and 4.28	December 2024
4	GMA	Reference to CampbellReith providing or requesting movement values in the GMA should be removed, as it is not factually accurate.	Closed – paragraph 4.27	December 2024
5	Land Stability	Provide confirmation of the impact to the highways and buried services.	Closed – paragraph 4.31	December 2024

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Appendix 3

Supplementary Supporting Documents

None

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