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Basement Impact Assessment Audit

5 Templewood Avenue, London, NW3 7UY

For
London Borough of Camden

Project No.
14291-06

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 5 Templewood Avenue, London, NW3 7UY (planning reference 2024/4157/P).

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 proposed basement development comprises a reduced version of a previous application made in 2017 (ref. 2017/1229/P).

1.5 The BIA has been prepared by an individual who does not hold suitable qualifications in accordance with CPG Basements.

1.6 The BIA has confirmed that the proposed basement will be founded within Claygate Member and its foundations will be below the water table.

1.7 No information has been provided to confirm the proposed loading of the foundations or the assumed bearing capacity of the founding stratum. Details of these are requested.

1.8 The Structural Feasibility Report (SFR) discusses three alternative basement construction proposals. The preferred option includes underpinning the host building and part of the neighbouring property with the remaining walls constructed using a secant piled retaining wall. The underpins will require two phases to extend to the full target depth. The alternative option involves a complete secant piled box omitting the need to underpin any of the existing structures; however, this option results in a reduced floor space within the basement. The construction sequence includes for temporary propping arrangements. Further details outlining how stability will be maintained during the underpinning construction and the propose dewatering methods are requested.

1.9 Clarification of the depth of the proposed basement and underpins should be provided.

1.10 Screening and scoping assessments are presented; however, there are errors and omissions in the responses. The responses should be updated following review of the comments within Section 4.0.

1.11 It is accepted that the development will not impact on the wider hydrology of the area and is not in an area subject to flooding.

1.12 A ground movement assessment carried out for the previous application in 2017 determined a maximum Burland damage category of Category 1 (very slight) to the neighbouring properties. Further justification to show that the previous GMA is suitably conservative for the updated basement proposal is required.

1.13 The BIA states that a monitoring plan and allowable trigger limits should be included in the CMP; however, no details of monitoring or mitigation measures have been included within the CMP provided.

1.14 Insufficient impact assessment has been provided in regard to land stability and groundwater flow.

1.15 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 27th November 2024 to carry out a Category C audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 5 Templewood Avenue, London, NW3 7UY (planning reference 2024/4157/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.
- Redington and Frognal (RedFrog) 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 "erection of extensions at side, rear and basement levels, internal re-configuration, boundary alterations, landscaping and associated works".

2.6 The Audit Instruction confirmed 5 Templewood Avenue is not involved, or neighbour to, listed buildings.

2.7 CampbellReith accessed LBC's Planning Portal on 27th November 2024 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) by Matt Dean, reference 5063_BIA, dated 31st August 2024
- Structural Feasibility Report by CampbellReith, reference 14250-CRH-xx-RP-S-0001, revision F01, dated 2nd September 2024

- Construction Management Plan by CampbellReith, reference 14250-CRH-XX-XX-RP-D-6001_CMP_F1, revision F1, dated 8th August 2024
- Design and Access Statement by Brod Wight Architects, reference 1046-AP4-DAS, dated 4th July 2024
- Surface and SuDS Assessment by Base Energy, revision 1, dated 5th September 2024
- Planning Application Drawings by Brod Wight Architects dated May 2024 include the following:
  - Site Location Plan, reference 1046-S2-15 (undated)
  - Existing & Proposed Site Plans, references 1046-S2-01B/ 1046-AP4-01B
  - Existing & Proposed Basement Floor, references 1046-S2-02/ 1046-AP4-02
  - Existing & Proposed Ground Floor, references 1046-S2-03/ 1046-AP4-03
  - Existing & Proposed Front Elevation, references 1046-S2-07/ 1046-AP4-07
  - Existing & Proposed Rear Elevation, references 1046-S2-08/ 1046-AP4-08
  - Existing & Proposed N-E Side Elevation, references 1046-S2-09/ 1046-AP4-09B
  - Existing & Proposed S-W Side Elevation, references 1046/S2-10/ 1046-AP4-10
  - Existing Sections A-A, B-B & C-C, references 1046-S2-11/12/13
  - Proposed Sections A-A, B-B & C-C, references 1046-AP4-11A/12/13
- Planning consultation comments.

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3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	It should be demonstrated that the BIA has been approved by a CEng MICE and a CGeol FGS.
Is data required by Cl.233 of the GSD presented?	No	Further clarifications on mitigation measures and permission for underpinning the neighbour's property are required. See comments within Section 4.0.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	Further details of the proposed dewatering methods are requested.
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	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Slopes greater than 7 degrees are indicated in several sources, these should be considered and brought through to scoping if required. See comments within Section 4.0.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	The Redington and Frognal neighbourhood plan should be considered (specifically the "Arup RedFrog Sub Surface Water Features Map and Spring Line" report). See comments within Section 4.0.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	Yes	Provided in Section 3.0 of the BIA

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	However, this should be reviewed following updates to the screening.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	However, this should be reviewed following updates to the screening.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	Provided in Appendix 4 of the BIA
Is monitoring data presented?	No	Groundwater monitoring data has not been provided; however, groundwater monitoring results from the previous application (2017/1229/P) is discussed.
Is the ground investigation informed by a desk study?	Yes	Note the ground investigation was undertaken as part of the previous application (2017/1229/P).
Has a site walkover been undertaken?	No	A site walkover was part of the previous application made in 2017.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Provided in Appendix 4 of the BIA.
Is a geotechnical interpretation presented?	Yes	Provided in Appendix 4 of the BIA. However, bearing capacity information relevant to the proposed scheme should be provided.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Provided in Appendix 4 of the BIA.
Are reports on other investigations required by screening and scoping presented?	Yes	

Item	Yes/No/NA	Comment
Are the baseline conditions described, based on the GSD?	Yes	
Do the baseline conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	No	Insufficient land stability and hydrogeological assessment provided.
Are estimates of ground movement and structural impact presented?	No	Not specific to the proposed works. However, the GMA from the previous application (2017/1229/P) has been used. Justification to show this GMA is suitably conservative for the updated basement proposal is required.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	No	Further justification is required as discussed in Section 4.0.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Further details outlining the proposed mitigation for dewatering is requested. See comments within Section 4.0.
Has the need for monitoring during construction been considered?	Yes	However, no detailed proposals have been provided.
Have the residual (after mitigation) impacts been clearly identified?	No	Further details of the proposed dewatering methods and potential impacts are requested.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	See above comments.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	

Item	Yes/No/NA	Comment
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	See above comments.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	No	The assessment presented in not specific to the proposed works. Further justification of the GMA presented is required.
Are non-technical summaries provided?	Yes	Section 10 of the BIA.

4.0 DISCUSSION

4.1 The Basement Impact Assessment (BIA) has been carried out by an individual, Matt Dean. The individual concerned in its production does not provide evidence to show that they hold suitable qualifications as required by CPG Basements for assessment of land stability or hydrogeological impacts

4.2 The Structural Feasibility Report (SFR) has been carried out by CampbellReith. The structural engineering input, whilst fundamental to informing the baseline conditions for the BIA, is separate from production of the BIA report and no conflict of interest arises in the audit process.

4.3 The LBC Instruction to proceed with the audit identified that the basement proposal does not involve nor is adjacent to a listed building. The BIA identifies that 5 Templewood Avenue is located in the Redington/Frognal Conservation Area. The report also highlights that this application is a reduced version of a previous application (ref. 2021/2793/P) that was approved in October 2023. It should be highlighted that the original application was made under reference 2017/1229/P in 2017. An audit was carried out by CampbellReith for this application which was issued in August 2017. No updated BIA submission or audit was carried out as part of the application reference 2021/2793/P.

4.4 The site currently comprises a three-storey detached residential property split into 3 flats with a single storey extension to the side and rear. It is not clear if the 3 flats within the host building are under a single ownership or occupied by separate parties / tenants. Clarification is requested.

4.5 The proposed development includes the demolition of the existing extension, replacing it with a two-storey extension and single storey basement. The basement includes lightwells at the front and rear of the extension. The footprint of the basement (including the lightwells) is 106m^2 and does not extend beneath the main building. The BIA suggests that the finished floor level of the basement is at an elevation of 101.4m AOD, some 2.70m below ground level (bgl) with the base of the underpins to extend to 3.25m bgl. The Structural Feasibility Report indicates that the proposed basement is approximately 4.00m below ground level. The reports should be updated to present consistent depths.

4.6 A ground investigation was carried out as part of the earlier application (ref. 2017/1229/P) comprising two continuous flight auger boreholes to 15.00m bgl and four hand dug foundation inspection pits. The BIA summaries that the ground comprises Made Ground to 1.45m bgl over firm (becoming stiff from 3.00m bgl) silty clay interpreted to be of the weathered Claygate Member. Stiff silty clay of the London Clay Formation was encountered at 3.80m to 4.70m bgl, extending to the full depth of the boreholes. Seepages were reported between 4.10m and 5.30m bgl with subsequent monitoring measuring groundwater to be between 1.53m and 2.79m bgl.

4.7 No information has been provided to confirm the proposed loading of the foundations or the assumed bearing capacity of the founding stratum. Details of these are requested.

4.8 The screening responses are provided in Section 4.0 of the BIA report and have been based on desktop study information provided in Section 3.0.

4.9 The subterranean flow screening responses identify that the site is directly underlain by the Claygate Member which is classified as a Secondary A aquifer and that the basement will extend beneath the water table surface; these have been brought through to scoping. It is stated that the site is not within 100m of any watercourses or spring lines; however, review of the "Arup RedFrog Sub Surface Water Features Map and Spring Line" report (associated with the Redington Frognal Neighbourhood Plan) suggests a spring line may be in proximity to the site. Further comment on this is requested and the screening and scoping responses should be updated if required.

4.10 The stability screening responses confirm that the site, and surrounding area, do not include slopes greater than 7 degrees (although the response does highlight that there is a tiered garden to the rear of the property including retaining walls to accommodate the change in elevation). Figure 16 of the Guidance for subterranean development by Arup shows the site to be in an area where slopes are between 7 and 10 degrees; additionally, within 2.5.3 of the BIA report it is acknowledged that the access to the site "is likely to have a >7° incline". The screening responses should therefore be updated to consider the surrounding slopes.

4.11 The screening responses state that trees will be felled as part of the development and that the development will significantly increase the differential depth of foundations relative to neighbouring properties. These items have been brought through to scoping.

4.12 The surface water and flooding screening responses confirm that the ratio of hardstanding will not be increased as the extension (and basement) are proposed in an area currently surfaced with paving slabs.

4.13 It is accepted that the proposed basement development will not adversely impact surface water flow and is not in an area prone to flooding. A Surface Water and SuDS Assessment has been provided as part of the application; drainage proposals will require approval by the LLFA and Thames Water.

4.14 The scoping, covered in Section 5.0 of the BIA, includes that the ground investigation confirms the site is underlain by the Claygate Member (a Secondary A aquifer) and monitoring indicated shallow groundwater to be present. The scoping outlines that the shallow groundwater will need to be mitigated using dewatering methods and waterproofing measures will need to be included in the basement design. The structural report suggests that a coffer dam solution is proposed to allow the basement construction. Further details outlining how the dewatering will be undertaken, and how the impacts will be mitigated are requested. In the permanent state, the impact of the basement on groundwater flow should be assessed.

4.15 The development will encroach into the root protection zone of an oak tree at the front of the property. The scoping outlines that the development will only impact a very small part of the root protection area and thus no root cutting is required. The BIA concludes that no further assessment is required assuming that the recommended tree protection methods are included in the Construction Management Plan (CMP); however, there is no mention of these methods

within the CMP provided, which should be further clarified.

4.16 The proposed basement will significantly increase the differential depth of foundations relative to neighbouring properties. The BIA makes reference to the Ground Movement Assessment that was carried out as part of the original application in 2017. Due to this previous GMA determining a maximum Burland damage category of Category 1 (very slight) to the neighbouring properties, the BIA concludes that no further assessment is required. Further justification is requested to show that the GMA carried out for the previous application is suitably conservative for the updated basement proposals.; the GMA should be specific to the construction methodologies to be employed and the proposed layout / geometry of the basement relative to neighbouring structures.

4.17 5.1.5 of the BIA states that no further site investigation works are considered necessary as measures to mitigate against the documented risks and impacts have already been considered within the structural feasibility designs. However, the SFR states that site investigation is required to confirm ground conditions, contamination and water table constraints. Further comment is requested to clarify this contradiction.

4.18 The SFR discusses three alternative proposals to construct the basement. Option 1 includes a combination of methods with secant piling (constructed along the 'open areas' of the basement) and reinforced underpins beneath the existing walls that border the basement. The underpinning would be carried out along several of the perimeter walls of the host building and the western boundary wall of the neighbouring property at 5A Templewood Avenue. The underpins are proposed to extend to 4.00m bgl requiring them to be carried out in two phases. The SFR states that "the high-water table would need to be reviewed by the temporary works team to develop a robust solution for excavating the underpins and dewatering the site to allow forming and casting the concrete". Option 2 considers constructing a complete secant piled box omitting the need to underpin any of the existing structures. This option would result in a reduced footprint of the basement; thus Option 1 would be preferred. Option 3 offers a variation of Option 1. This option includes the secant piled wall continuing in front of the neighbouring property. This section of the piled wall would then be cut down and the boundary wall underpinned to allow the full size of the proposed lightwell.

4.19 The proposed construction sequence for Option 3 includes the following:

1. Install the secant piles along the perimeter of the open areas and in front of the neighbouring property.
2. Excavate and cast the first phase of concrete underpins up to 2.00m bgl.
3. Allow concrete to cure and undertake localised reduce dig to allow for temporary propping to be installed.
4. Reduce dig to the bottom of the underpins employing temporary dewatering methods.
5. Install temporary propping at base of underpins and break out the top of piles installed through the lightwell and install capping beam.
6. Undertake phase 2 of underpinning and reduce dig to proposed basement level.

7. Install temporary propping at base of underpins. Install drainage requirements and prepare subbase of basement slab.
8. Install basement slab along with waterproofing measures.
9. Install ground floor slab to form permanent prop to the top of the retaining wall.

4.20 Further details are required to outline how the stability will be maintained during construction of the underpins and the proposed dewatering methods. Confirmation that authorisation to carryout underpinning of the neighbouring property can be obtained is required as this will be needed to allow options 1 and 3 to be viable. Previous reports also note some cracking present along the party wall, further clarification on the condition of the neighbouring structure should be provided. The BIA will need to present an assessment of each of the construction options and demonstrate that they each comply with the requirements of CPG Basements.

4.21 An Impact assessment has not been provided within the BIA report and should be included as part of the CPG Basement requirements. Insufficient assessment has been presented in regard to potential land stability and hydrogeological impacts.

4.22 The BIA states that “an instrumentation and monitoring plan detailing the monitoring regime, allowable limits/trigger levels and mitigation measures should be included in the construction management plan”; however, no mention of a monitoring plan is included in the CMP provided, which should be updated with the appropriate information.

5.0 CONCLUSIONS

5.1 The BIA should be updated by authors with suitable qualifications to assess land stability and hydrogeological impacts as required by CPG Basements.

5.2 It should be confirmed if the host building (comprising 3 flats) is under a single ownership / tenancy.

5.3 Clarification of the depth of the proposed basement and underpins should be provided an the BIA and SFR updated, as required.

5.4 The BIA confirms that the basement will extend below the water table and will be founded within the Claygate Member.

5.5 No information has been provided to confirm the proposed loading of the foundations or the assumed bearing capacity of the founding stratum. Details of these are requested.

5.6 The screening and scoping assessments should be updated following review of the comments within Section 4.0.

5.7 It is accepted that the development will not impact on the wider hydrology of the area and is not in an area subject to flooding.

5.8 The Structural Feasibility Report (SFR) discusses three alternative basement construction proposals. The BIA will need to present an assessment of each of the construction options and demonstrate that they each comply with the requirements of CPG Basements.

5.9 A ground movement assessment carried out for the previous application in 2017 has been presented. The GMA should be specific to the construction methodologies to be employed and the proposed layout / geometry of the basement relative to neighbouring structures.

5.10 The BIA states that a monitoring plan and allowable trigger limits should be included in the CMP; this should be presented.

5.11 An Impact assessment has not been provided within the BIA report and should be included as part of the CPG Basement requirements.

5.12 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 methodologies and assumptions are not clearly stated.
- 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 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 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

None

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Appendix 2

Audit Query Tracker

Audit Query Tracker

Query No.	Subject	Query	Status	Date closed out
1	Qualifications	Provide evidence that the BIA has been undertaken by individuals with suitable qualifications and experience in accordance with the CPG Basements	Open – paragraph 4.1	
2	Construction methodology	Provide clarification on the ownership of the host building and the permissions to underpin part of the neighbouring property.	Open – paragraphs 4.4 & 4.20	
3	Construction methodology	Conflicting information is provided concerning the depth of excavation and underpins. Provide clarification.	Open – paragraph 4.5	
4	Land stability	Details of the foundation loading and bearing capacity of the foundations should be provided.	Open – paragraphs 4.7	
5	Land stability and hydrogeology	Responses to screening questions are incorrect or lack sufficient justification as described in Section 4.0.	Open – paragraphs 4.9 & 4.10	
6	Land stability and hydrogeology	Scoping and impact assessments to be confirmed when screening exercise revisited	Open	
7	Land stability and hydrogeology	Further details of the mitigation measures are requested.	Open – paragraphs 4.14 to 4.17, 4.20 & 4.22	
8	Land stability	Ground movement and building damage assessment requires further justification as described in Section 4.	Open – paragraph 4.16 & 4.20	
9	Impact Assessment	The BIA report should include an impact assessment section as per the CPG guidance requirements.	Open – paragraph 4.21	

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Appendix 3

Supplementary Supporting Documents

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