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# Basement Impact Assessment Audit

## 1 Templewood Avenue, London NW3 7UY

For
London Borough of Camden

Project No.
14006-23

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 1 Templewood Avenue, London NW3 7UY (planning reference 2023/2134/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 Basement Impact Assessment (BIA) and Construction Method Statement (CMS) have been prepared by well-known firms of engineering consultants using individuals who possess suitable qualifications.

1.5 Development proposals comprise 2-storey residential house with a partial basement. This site is located in part of the garden at 1 Templewood Avenue.

1.6 The CMS confirms the proposed basement will utilise a contiguous pile retaining wall with a reinforced concrete beam to provide support during excavation for the proposed new house. Additional temporary support will also be required during construction. Confirmation of the stability of the retaining wall is requested.

1.7 Localised ground water seepage maybe encountered within during basement foundation excavation. Groundwater seepages were identified in the Claygate Member. The BIA advises traditional sump pumping will likely be adequate although the chosen contractor must have a contingency plan in place.

1.8 The GMA states that damage occurring to neighbouring properties will be within Category 0 of the Burland Scale however, these GMA predictions should be confirmed due to incorrect application of the software.

1.9 It is accepted that the surrounding slopes to the development site are stable. The existing sloping driving way is to be removed to accommodate the development proposals.

1.10 It is accepted that the development will not impact on the wider hydrogeology of the area and will not increase the risk of flooding.

1.11 It cannot be confirmed that the BIA complies with the requirements of CPG: Basements until the query raised over Sections 4.14, 4.15, and Appendix 2 is addressed.

## 2.0 INTRODUCTION

2.1 CampbellReith was instructed by London Borough of Camden (LBC) on 13th July 2023 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 1 Templewood Avenue, London NW3 7UY (planning reference 2023/2134/P). The site is within the Redington Frognal Neighbourhood Area.

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 Frognal Neighbourhood Plan
- 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.

2.4 LBC's Audit Instruction described the planning proposal as "Demolish existing garage and erect a 2-storey house, including the erection of associated cycle storage and refuse enclosures, set behind the front boundary wall to be extended and to incorporate a new pedestrian entrance with a metal gate."

2.5 The Audit Instructions indicates 1 Templewood Avenue does not involve, or was a neighbour to, listed buildings.

2.6 CampbellReith accessed LBC's Planning Portal on 17th July 2023 and gained access to the following relevant documents for audit purposes:

- Construction Method Statement (CMS) by Conisbee Consulting Engineers, ref. 220779, Version 2 dated February 2023.
- Ground Investigation & Basement Impact Assessment (BIA) Report by Geotechnical and Environmental Associates, ref. J22354, rev 0, dated 13/02/2023 (presented as Appendix

D of the above). This document includes existing and proposed development plans in appendix a.

- Flood Risk Assessment and Surface Water Drainage Strategy by Conisbee Consulting Engineers, ref. 220779/A Prais, Version 2 dated May 2023.
- Arboricultural Impact Assessment by Elemental Consulting, ref: 220402_AIA, rev 2, dated May 2023

## 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

| Item | Yes/No/NA | Comment |
|---|---|---|
| Are BIA Author(s) credentials satisfactory? | Yes | Section 1.3.2 of the BIA |
| 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 | |
| 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:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | Yes | Section 3.1.2 of the BIA |
| Hydrogeology Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | Yes | Section 3.1.1 of the BIA |
| Hydrology Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | Yes | Section 3.1.3 of the BIA |
| Is a conceptual model presented? | Yes | |

| Item | Yes/No/NA | Comment |
|---|---|---|
| Land Stability Scoping Provided?<br>Is scoping consistent with screening outcome? | Yes | Section 4.0 of the BIA |
| Hydrogeology Scoping Provided?<br>Is scoping consistent with screening outcome? | Yes | |
| Hydrology Scoping Provided?<br>Is scoping consistent with screening outcome? | Yes | |
| Is factual ground investigation data provided? | Yes | BIA appendix b |
| Is monitoring data presented? | Yes | |
| Is the ground investigation informed by a desk study? | Yes | |
| Has a site walkover been undertaken? | Yes | |
| Is the presence/absence of adjacent or nearby basements confirmed? | No | Depth of adjacent foundations is unknown (refer to land stability screening). |
| Is a geotechnical interpretation presented? | Yes | |
| Does the geotechnical interpretation include information on retaining wall design? | Yes | |
| Are reports on other investigations required by screening and scoping presented? | NA | |
| Are the baseline conditions described, based on the GSD? | Yes | |

| Item | Yes/No/NA | Comment |
|---|---|---|
| Do the base line conditions consider adjacent or nearby basements? | No | Depth of adjacent foundations is unknown (refer to land stability screening) |
| Is an Impact Assessment provided? | Yes | |
| Are estimates of ground movement and structural impact presented? | Yes | Ground movements Section 10.0 of the BIA |
| Is the Impact Assessment appropriate to the matters identified by screening and scoping? | Yes | Section 13.1 of BIA |
| Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme? | Yes | The BIA outlines potential impacts and reasonable engineering mitigation in Section 13.0. |
| Has the need for monitoring during construction been considered? | Yes | GEA state the ground conditions should be reviewed as work proceeds. In addition, condition surveys of the above existing structures should be carried out before and after the proposed works. Detailed monitoring strategy to be developed at a later stage (Section 12.0 of the BIA). |
| Have the residual (after mitigation) impacts been clearly identified? | No | Further information is required with respect to the stability of the retaining walls and the predicted damage to neighbouring properties. |
| Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained? | No | As above |
| Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment? | Yes | As above |

| Item | Yes/No/NA | Comment |
|---|---|---|
| Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area? | No | As above |
| Does report state that damage to surrounding buildings will be no worse than Burland Category 1? | Yes | However, further information is required with respect to the stability of the retaining walls and the predicted damage to neighbouring properties. |
| Are non-technical summaries provided? | Yes | CMS page 3 and BIA page 1 |

## 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.

4.2 The site is a rectangular shape plot measuring approximately 11m by 22m and is located within the eastern part of the garden of no. 1 Templewood Avenue. The site features a garage, wooden shed, remains of a small outbuilding, and is accessed via a sloping driveway off Templewood Avenue.

4.3 Development proposals comprise a new two-storey residential property with a green roof in the North-Eastern end of the garden. Due to the sloping nature of the site, the proposed lower-ground level is designed as a partial basement. The proposed ground level around the structure and upper tier garden will be approximately 102m OD. The lower ground floor will have a finished floor level of 99m OD.

4.4 Plans provided in the CMS indicate a contiguous piled wall will be used on 3 sides of the structure tied with a reinforced concrete beam. According to the Ground Movement Assessment, the contiguous piled wall and retaining structure will retain approximately 5m height of ground at its highest, i.e. the north-western part of the site.

4.5 A desk top study and site-specific intrusive ground investigation have been undertaken prior to the BIA. The ground conditions encountered agree with those anticipated. Made Ground was found between 0.2m and 0.9m bgl, over the Claygate Member which extends to depths of between 4m and 5m bgl, underlain by the London Clay Formation to the maximum depth of investigation, c.25m bgl (75.5m OD). Groundwater was not encountered in any of the trial pits nor window sample boreholes, although it was encountered at 6.5m depth in BH1. Subsequent monitoring visits record groundwater between 3.5m to 3.9m bgl (c.97m OD).

4.6 The site is within an area where slopes are generally less than 7°. However, the land stability screening assessment indicates the existing driveway slopes greater than 7°. It is a manmade slope with hardstanding cover and is bound by the existing retaining walls. The BIA states this driveway will be removed as part of the development.

4.7 There is a history of shrink-swell subsidence in the area due to the volume change potential of the Claygate Member and London Clay Formation cohesive soils. The BIA states any new foundations must be deepened in the zone of influence of nearby trees in accordance with NHBC guidelines.

4.8 Land stability screening indicates a number of trees are likely to be felled as part of the proposed development, although the majority of the existing trees around the site perimeter will be retained. The BIA states whilst shrinkable soils are present at shallow depth, there are no critical slope angles that are dependent on the existing trees to aid long-term stability. The BIA states the tree felling is not expected to have any impact on the proposed development or nearby buildings.

4.9 Geotechnical parameters to be adopted in the design, including retaining wall design have been presented and generally accepted.

4.10 The BIA states it is unlikely the proposed development will increase the foundation depths relative to the neighbouring properties because the proposed foundation level is similar to the ground floor level of the neighbouring 3 Templewood Avenue. The foundation depths of the neighbouring structures have not been proven.

4.11 A Ground Movement Assessment (GMA) was undertaken for the proposed lower ground floor and foundation scheme using XDisp and PDisp software to predict ground movements due to proposed piling and excavation and to demonstrate damage to neighbouring properties and infrastructure is limited to Category 1 of the Burland Scale.

4.12 The approach reported in CIRIA C760 has been adopted and the software XDisp used to undertake the analysis. The 'installation of a contiguous bored pile wall' curve is used for the pile installation analysis, and 'excavations in front of a stiff wall in stiff clay' curve has been adopted for the subsequent excavation as the BIA confirms the embedded retaining wall will be propped in both temporary and permanent conditions.

4.13 A maximum excavation depth of 5m bgl has been assumed, while the embedded piled retaining wall depth is assumed to be 8.5m bgl. Confirmation of the stability of the wall against overturning is required. Section 8.1 of the BIA indicates the embedded retaining wall will be incorporated into permanent works and provide support for structural loads. Outline calculations will be required to support assumptions regarding the pile length.

4.14 Ground movements calculated using the software PDisp have been imported into XDisp to determine the category of damage occurring to neighbouring properties. XDisp predicts all anticipated ground movements due to the excavation and the use of PDisp is not appropriate. It may offset predicted settlement and underestimate ground movements

4.15 The GMA states that damage occurring to neighbouring properties (including boundary and garden walls) will be within Category 0 of the Burland Scale. However, if the damage assessment is undertaken using XDisp, the GMA should be revised to correctly apply the software.

4.16 The GMA states the ground movement predictions should be checked by monitoring the adjacent properties and structures to ensure no excessive movements occur that would lead to damage. A detailed monitoring strategy will be developed at a later stage.

4.17 The site is within 5m of a highway and pedestrian right of way (Templewood Avenue), although the proposed structure is greater than 5m distance from this public footpath and road. No significant impact is anticipated on the infrastructure.

4.18 The site is located within the Redington Frognal Neighbourhood Plan area, known for localised rapid groundwater flow. The Redington Frognal Spring Line map by Arup indicates the site is located down gradient c.80m distance south of the spring line and is located within 100m of 2 former tributaries to the River Westbourne. The BIA indicates the nearby water features have been diverted to form part of the local surface water sewer system.

4.19 The hydrogeology screening indicates the Claygate Member is classified as a Secondary A Aquifer, and the London Clay Formation at depth is classified as an unproductive aquifer, although the Claygate Member aquifer is likely to have 'Unproductive Strata' characteristics The BIA suggests any localised perched water inflow can be dealt with through sump pumping although the contractor should make allowance for mitigation measures should this not be feasible. The BIA also recommends groundwater monitoring and/or trial excavations should be undertaken to further assess the groundwater inflow. Due to the limited extend of the development, its location and ground conditions, no significant impact on the wider hydrogeological environment is expected.

4.20 The CMA indicates the site is classed as being Flood Zone 1 and identified as a Critical Drainage Areas. The BIA surface flow and flooding screening assessment indicates there will be a slight increase in the hard surface area as part of the development. The FRA has been presented by Conisbee and states any additional surface water flow will be attenuated and discharged into the local sewer network therefore there will be no significant changes to the existing drainage routes. It is noted the drainage design will need to be validated by the local flood authority and public sewer owner to ensure the proposed development will not result in an increase of surface water flood risk in the area.

## 5.0 CONCLUSIONS

5.1 The BIA and CMS have been carried out by well-known firms of engineering consultants using individuals who possess suitable qualifications.

5.2 The BIA has confirmed that the proposed structure will comprise a partial basement with piled foundations extending into cohesive soils of the Claygate Member and London Clay Formation.

5.3 Further information is required to demonstrate the contiguous pile walls and retaining structure has been designed to maintain the stability of the surrounding ground. Temporary propping is required.

5.4 The existing driveway sloping c.10° is to be removed and it is accepted that the surrounding slopes to the development site are stable.

5.5 The GMA presents ground movement predictions and states that damage to neighbouring properties will be within Category 0 of the Burland Scale, although this must be revised once the GMA query raised over Sections 4.14, 4.15, and Appendix 2 is addressed.

5.6 The BIA identifies no impacts to subterranean flows, and it is unlikely groundwater will be encountered during the excavation, although perched water within the Made ground and Claygate Member must be accounted for. It notes traditional sump pumping should be adequate but that the contractor should prepare a contingency plan.

5.7 The BIA identifies no significant impacts to surface water although impermeable areas are increasing slightly. Surface water will be attenuated before it is discharged to the sewer network.

5.8 It cannot be confirmed that the BIA complies with the requirements of CPG: Basements until the query raised over Sections 4.14, 4.15, and Appendix 2 is addressed.

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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 | Lnad stability | Outline calculations required to demonstrate stability of piled retaining wall | Open | |
| 2 | Land stability | GMA to be revised as per paragraphs 4.14 and 4.15. | Open | |

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# Appendix 3

# Supplementary Supporting Documents

None

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