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Basement Impact Assessment Audit

9 Woodchurch Road

For
London Borough of Camden

Project No.
14006-40

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 Address (planning reference 2023/3909/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 individuals who possess suitable qualifications.

1.5 The BIA has confirmed that the proposed basement will be founded within the London Clay and no impacts to the local and wider hydrogeology are anticipated. Although not anticipated, minor groundwater management may be required during the excavation as recommended in the BIA.

1.6 It is accepted the site is at very low or low risk of flooding from all the sources. A Flood Risk Assessment and SuDs report has been presented which concludes the development will not increase the flood risk.

1.7 The basement will be constructed using underpinning techniques. A Construction Method Statement is provided detailing water control, waterproofing strategy, party wall matters, outline sequence of works and temporary works alongside structural calculations.

1.8 Geotechnical parameters are presented and are appropriately conservative. Values for the bearing capacity adopted in the retaining wall design are also provided.

1.9 A Ground Movement Assessment has been undertaken and predicts damage no worse that Burland Category 1, however clarifications on the approach are requested before the impact to neighbouring structures can be determined.

1.10 Outline proposals are provided for a movement monitoring strategy during construction which should be checked once the GMA has been updated. A detailed monitoring strategy will need to be produced as part of the Party Wall negotiations.

1.11 It cannot be confirmed that the BIA complies with the requirements of CPG: Basements until the queries raised in Section 4 and Appendix A are addressed.

2.0 INTRODUCTION

2.1 CampbellReith was instructed by London Borough of Camden (LBC) on 02/11/2023 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 9 Woodchurch Road, NW6 3PL, reference 2023/3909/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 of basement extension with front and rear lightwells; erection of single storey plus basement side extension and single storey rear extension; new side and rear dormers; and internal reconfiguration to convert from 1 x 1 bed flat, 1 x studio, 5 x bedsits and 1 x 2 bedroom flat, to provide 1 x 1 bed flat, 1 x 2 bed flat, 1 x 3 bed flat, 1 x 2 bed house and 4 bedsits; erection of new bin stores and long-stay and visitor cycle facilities.*"

2.6 The Audit Instruction confirmed 9 Woodchurch Road did not involve, nor was a neighbour to, listed buildings.

2.7 CampbellReith accessed LBC's Planning Portal on 20/11/2023 and gained access to the following relevant documents for audit purposes:

- Desk Study, Ground Investigation, Basement Impact Assessment Report (BIA) & Ground Movement analysis (GMA). Geotechnical & Environmental Associates Limited (GEA). Reference J23117. Rev 1. September 2023

- Construction Method Statement. Michael Barclay Partnership Consulting Engineers (MBP). Reference 140014-MBP. Rev P02. September 2023.
- Design and Access Statement by Modulor Studio Ltd. Reference 22034-MS-PL-XX-TX-A-001_DesignAccessStatement-P01. Rev P04. September 2023.
- Flood Risk Assessment and SuDS Strategy (FRA). The Property, Energy and Sustainability Company (PES). Reference FRA20146.2A. September 2023.
- Planning Application Drawings prepared by Modulor Studio Ltd consisting of:
- Location Plan. Reference 22034 MS PL XX DR A 002 P04. September 2023.
- Existing and Demolition Plans and Sections. Ref 22034-MS-PL-00-DR-A-010 to 22034-MS-PL-XX-DR-A-073. September 2023.
- Proposed Plans and Sections. Ref 22034-MS-PL-XX-DR-A-102 to 22034-MS-PL-XX-DR-A-310. September 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 GEA BIA.
Is data required by Cl.233 of the GSD presented?	No	A programme has not been provided. The MBP CSM advises one will be finalised when the contractor is appointed.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	GEA BIA.
Are suitable plan/maps included?	Yes	Modulor Studio Ltd drawings and GEA BIA.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	GEA BIA and Desk study.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.2 GEA BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.1 GEA BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.3 GEA BIA.
Is a conceptual model presented?	Yes	Section 6.0 GEA BIA.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.0 GEA BIA.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.0 GEA BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.0 GEA BIA.
Is factual ground investigation data provided?	Yes	Appendix A and B GEA BIA.
Is monitoring data presented?	Yes	Appendix A GEA BIA.
Is the ground investigation informed by a desk study?	Yes	Appendix C GEA BIA.
Has a site walkover been undertaken?	Yes	Appendix A GEA BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	No	Section 3.1.2 of the GEA BIA assumes No. 11 Woodchurch Road to the west does not include a basement. A review of documents on the planning portal indicates a cellar level but this has not been confirmed. Section 3.1.2 of the GEA BIA assumes No. 7 Woodchurch Road to the east does include a basement. This has been corroborated by a review of related documents on the planning portal, a site walkover and a foundation inspection pit undertaken adjacent to this property.
Is a geotechnical interpretation presented?	Yes	Section 7.0 GEA BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 7.2.1 GEA BIA.

Item	Yes/No/NA	Comment
Are reports on other investigations required by screening and scoping presented?	Yes	FRA provided.
Are the baseline conditions described, based on the GSD?	Yes	Section 7.0 of the GEA BIA and the Modulor Studio Ltd drawings.
Do the base line conditions consider adjacent or nearby basements?	Yes	Section 8.0 GEA BIA.
Is an Impact Assessment provided?	Yes	Section 12.0 GEA BIA.
Are estimates of ground movement and structural impact presented?	Yes	GMA provided in Section 8.0 of the GEA BIA. However, clarifications on the method are requested.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	No	As above.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	To be determined once the GMA has been updated.
Has the need for monitoring during construction been considered?	Yes	Section 10.2 GEA BIA.
Have the residual (after mitigation) impacts been clearly identified?	No	To be reviewed once the GMA has been updated.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	GMA clarifications are required. Structural calculations are provided in the MBP CMS.

Item	Yes/No/NA	Comment
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	PES FRA.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Building damage assessment to be determined once the GMA has been updated. Impact to the road to be assessed.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	No	As above.
Are non-technical summaries provided?	Yes	Section 12.3 GEA BIA.

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 LBC instruction to proceed with the audit identified that the basement proposal does not involve a listed building nor was adjacent to listed buildings.

4.3 The site consists of a detached two-storey masonry house with an existing cellar and a single storey rear extension. The site gently slopes to the south with the northern part of site at 45.60m OD and the southern part of site at 44.60m OD. A paved front driveway is present on the northern side, a patio on the eastern side currently occupied by a shed used as a vehicle workshop and to the south a rear garden lawn is accessed via some steps. A number of trees 5 to 15m in height are present in both the front and rear of the site.

4.4 The proposed development consists of a single storey basement beneath the existing building and proposed two storey side extension extending to a maximum depth of 3.40m bgl and is to include front and rear lightwells, alterations to the internal layout with the side extension on the eastern side replacing the existing garage. Section 8.0 of the GEA BIA identifies the basement to be formed in three zones at elevations of 41.67, 42.52 and 42.71m OD. The basement excavation will abut the neighbouring property No. 7 to the east.

4.5 The neighbouring properties No. 7 and No. 11 Woodchurch Road comprise two storey detached masonry houses. The GEA BIA indicates that No. 7 Woodchurch Road to the east has a single storey basement. This was identified in a review of related documents on the planning portal and confirmed during a site walkover as described in Section 12.3.1 of the GEA BIA. A foundation inspection pit was also undertaken as part of the GEA ground investigation and identified a concrete wall proven to a depth of 1.23m bgl (44.25m OD). The BIA identifies that No. 11 Woodchurch Road is indicated to have a cellar on the planning portal, but this was not confirmed to have been constructed.

4.6 Screening and scoping assessments are presented and informed by desk study information. Most relevant figures/maps from the ARUP GSD and other guidance documents are referenced within the BIA to support responses to screening questions.

4.7 A site walkover was undertaken as part of the GEA Ground Investigation, which forms Appendix A and B of the GEA BIA. The ground investigation was undertaken in April 2023 and identified the site to be underlain by Made Ground to a maximum depth of 1.00m bgl. Below the Made Ground, London Clay was found to the base of the exploratory holes to a maximum depth of 8.00m bgl (37.50m OD). It is accepted the basement will found within the London Clay. The BIA identifies the London Clay as susceptible to heave and shrink swell movements, however, it is reported that no trees are being felled to accommodate the basement.

4.8 Groundwater was not encountered during drilling of the exploratory hole locations. Groundwater monitoring was undertaken on one occasion, six weeks after installation and did not record a groundwater level. Given the London Clay is classified as unproductive stratum, it is accepted the proposed development will not adversely affect the local and wider hydrogeological environment. The potential for groundwater ingress during excavation is discussed in Section 7 of the BIA and recommendations for suitable mitigation are provided.

4.9 It is accepted the site is at very low or low risk of flooding from all sources and the site is not within the London Borough of Camden Flood Risk Zone. A limited change in hardstanding areas is proposed. A Flood Risk Assessment and SuDs Strategy is provided and details suitable mitigation such as green roofs and permeable paving. The FRA concludes in Section 7 the development will not increase the risk of flooding from any source.

4.10 A Construction Method Statement (CMS) is provided detailing water control, waterproofing strategy, party wall matters, outline sequence of works and temporary works. The scheme will use underpinning techniques to construct reinforced concrete L shaped retaining walls around the perimeter of the basement. A reinforced suspended concrete slab will then be constructed between the toes of the L shaped retaining wall sections. Tension piles alongside loading of the superstructure are proposed to mitigate the effects of heave within the London Clay.

4.11 Temporary works design will be the responsibility of a specialist contractor; however, the CMS recommends the use of stiff props to ensure the stability of the retaining walls and to reduce the magnitude of ground movements.

4.12 Geotechnical parameters including those for retaining walls are presented in Section 7.0 of the GEA BIA and are considered to be appropriately conservative. Values for the bearing capacity to be adopted in the retaining wall design are also presented and foundations are proposed to found below the depth of influence of any trees present at the site.

4.13 A Ground Movement Assessment (GMA) has been undertaken by GEA. Ground movements due to the following activities have been included in the analysis:

1. Excavation and Construction of underpins.
2. Excavation of the basement.

4.14 No. 7 Woodchurch Road is identified to have a basement, the formation of which was determined to be 4.00m bgl (41.50m OD), i.e. below the depths of the basement to be constructed as part of this proposal. As such the GMA has determined there to be no significant ground movements at No. 7 Woodchurch Road as a result of the proposed basement construction. No. 11 Woodchurch Road is assumed not to have a basement for the GMA and this is considered to be conservative.

4.15 The GEA BIA states an XDisp analysis has been undertaken to determine vertical and horizontal movements related to installation of the underpins and excavation of the basement. Whilst the CIRIA C760 curves used by XDisp are intended for embedded retaining walls, it is accepted that in some circumstances the ground movements predicted by the software can reflect those typically seen during underpinning for basement construction. The BIA reports the maximum movements predicted by XDisp are presented in the table in Section 9.1.2 of the BIA, however values higher are reported in the accompanying text.

4.16 In addition to XDisp, PDisp has been used to determine vertical movements related to excavation of the basement and the application of additional structural loads. The modelling does not appear to capture settlement of the underpins prior to bulk excavation and the predicted movements do not appear to have been taken into account in determining impacts to neighbouring structures.

4.17 The BIA concludes that the XDisp analyses justify the adoption of low predicted ground movements. Noting that XDisp is intended for use with a different form of construction, this is not accepted as being conservative.

4.18 The BIA advises damage to neighbouring structures may be limited to Burland Category 1. However clarification is required as to how the horizontal and vertical movements have been predicted and combined to determine a damage category, and justification provided to demonstrate that predicted ground movements are conservative.

4.19 Screening in Section 3.1.2 of the GEA BIA advises the topographic survey shows the existing property to be >5m from Woodchurch Road to the north. However proposed sections and plans indicate the proposed basement to be c. 4.6m from Woodchurch Road pavement. The impact to the road should be confirmed once the GMA has been updated.

4.20 A proposed monitoring regime has been included in the BIA including preliminary trigger values based on the movement predicted. The BIA advises this will be subject to discussions and agreements with the owners of the adjacent properties and structures. This should be reviewed once the GMA has been updated.

4.21 Structural calculations are provided in the MBP CMS.

4.22 Non-technical summaries are presented in Section 12.0 of the GEA BIA.

5.0 CONCLUSIONS

5.1 The Basement Impact Assessment (BIA) has been carried out by engineering consultants Geotechnical and Environmental Associates Ltd and the individuals concerned in its production have qualifications in accordance with CPG Basements.

5.2 The BIA has confirmed that the proposed basement will be founded within the London Clay which is not classified as an aquifer. Groundwater was not encountered during drilling and subsequent monitoring and groundwater management measures are considered in the BIA. No impact to the local and wider hydrogeological environment is expected.

5.3 It is accepted the site is at very low or low risk of flooding from all the sources. The Camden SFRA indicates the site to not be within a Critical Drainage Area. A Flood Risk Assessment and SuDs assessment completed by The Property, Energy and Sustainability Company (PES) has been presented which concludes the development will not increase the flood risk.

5.4 The basement will be formed mainly by mass reinforced concrete underpinning in a typical 'hit and miss' sequence. A Construction Method Statement has been prepared by Michael Barclay Partnership Consulting Engineers (MBP) and is presented with the BIA.

5.5 Geotechnical parameters including for retaining walls are presented and are considered to be appropriately conservative. Foundations are to be founded below the influence of any trees. Values for the bearing capacity adopted in the retaining wall design are provided.

5.6 A GMA was undertaken however further clarifications are required before the assessment can be accepted.

5.7 Outline proposals are provided for a movement monitoring strategy during construction but should be updated one the GMA has been refined. A detailed monitoring strategy will need to be produced and agreed as part of the Party Wall negotiations.

5.8 Considering the information submitted, it cannot be confirmed that the BIA complies with the requirements of CPG: Basements until the queries raised in Section 4 and Appendix 2 are 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	Land stability	The GMA should be reviewed and clarified as required.	Open – Section 4.15 – 4.18	
2	Land Stability	The impact to the road should be assessed once the GMA has been revised.	Open Section 4.19	
3	Land stability	Ground movement monitoring proposals to be revised according to the revised GMA as required.	Open – Section 4.20	

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Appendix 3

Supplementary Supporting Documents

None

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