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2 Wadham Gardens, London NW3 3DP

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13693-55
Revision: F1

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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 2 Wadham Gardens (planning reference 2021/4432/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 proposed redevelopment works comprise the construction of a single storey basement beneath the existing house footprint with an 8m extent beneath the rear garden and 5m extent beneath the front driveway of the house.

1.5. The qualifications of the BIA authors are in accordance with LBC guidance.

1.6. The drawings presented in the revised BIA are fully dimensioned.

1.7. Screening and Scoping assessments are presented, supported by desk study information.

1.8. The Flood Risk Assessment states that the site is at low risk of flooding from all sources and is unlikely to increase flood risk elsewhere. An Attenuation Tank and SuDs measures have been implemented as part of the drainage design to store and mitigate excess surface water run-off resulting from the increase in impermeable surfaces.

1.9. Groundwater may be encountered during construction, the BIA states that any small water ingress will be managed with pumping.

1.10. It is accepted that the proposed basement will not impact the hydrogeology, hydrogeology or slope stability in the surrounding area.

1.11. A site investigation has been undertaken indicating that the basement will be constructed within the London Clay Formation.

1.12. Geotechnical parameters to inform design have been provided and are accepted.

1.13. The Ground Movement Assessment (GMA) using reduced CIRIA curves has been presented which predicts damage impacts of Category 0 to 1 (Negligible to Very Slight) to surrounding

structures. It is recommended that a Basement Construction Plan (BCP) is provided to ensure a suitably robust scheme is adopted, and to support the assumptions made in the GMA.

1.14. Considering the additional information presented, it can be confirmed that the BIA meets the requirement of Camden Planning Guidance: Basements, subject to a BCP being presented.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on the 19th of April 2022 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 2 Wadham Gardens, London, NW3 3DP, planning reference 2021/4432/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 "*Variation of Condition 5 (Approved Drawings) of planning permission ref: 2007/6360/P dated 01/07/2008 for 'The excavation of the basement and erection of a glazed extension to the rear and new door to replace existing within the rear elevation.' namely to omit part of the basement under the driveway, addition of lightwells to the front, reduction of skylights to the rear, basement slab lowered, skylight reconfigured to reflect red line boundary and omission of internal skylight and internal glazed stairwell".*

2.6. CampbellReith accessed LBC's Planning Portal on the 10th of May 2022 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment by Card Geotechnics Limited CGL, Revision 0, ref: CGL/00022, dated March 2022.
- Consented Drawings by Greig-Ling Architects and Consulting Engineers dated July 2007.
    - Proposed General Arrangement Basement
    - Proposed Section AA
    - Proposed Section BB
    - Elevations Front and Rear Proposed Work
- Structural drawings by Elite Designers Structural Engineers, dated August 2021.
    - Proposed Basement Plan
    - Proposed Ground Floor Plan
- Architectural drawings by Marek Wojciechowski Architects Ltd, dated August 2021.
    - Location Plan
    - Site Plan
    - Proposed Ground Floor Plan
    - Proposed Basement Plan
    - Proposed Section A-A
    - Proposed Section B-B
    - Proposed East Elevation
    - Proposed West Elevation
- Revised Basement Plan by FIMA Architecture and Planning Ltd., dated 14 March 2022.
    - Proposed Basement Level
- Planning Consultation Responses.

2.7. Subsequent to the initial audit report, CampbellReith gained access to the following relevant documents:

- Basement Impact Assessment by Card Geotechnics Limited CGL, Revision 2, ref: CGL/00022, dated October 2022.
- Rainfall runoff from site estimation by Elite Designers Structural Engineers, ref.: 22148, dated September 2022.
- Stormwater Attenuation Design by Elite Designers Structural Engineers, ref.: 2021-148 dated 10 November 2022.
- Proposed Basement Drainage Plan by Elite Designers Structural Engineers, ref.: 2021-148-100 Rev C, dated 11 November 2022.
- Proposed Drainage Ground Floor Plan by Elite Designers Structural Engineers, ref.: 2021-148-101 Rev C, dated 11 November 2022.
- Flood Risk Assessment by Ashfield Solutions Group, ref.: 159022-F01, dated 14 October 2022.
- Revised Basement Plan by FIMA Architecture and Planning Ltd., ref.: 2105(02)005, dated 14 March 2022.
- Construction Management Plan by ABTECH Basements, ref.: A1519.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The authors have the required qualifications as CPG Basements.
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	Revised drawings are fully dimensioned.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 4.3 of the BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 4.2 of the BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 4.4 of the BIA.
Is a conceptual model presented?	Yes	Section 5 of the BIA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.3.1 of the BIA.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.2.1 of the BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.4.1 of the BIA.
Is factual ground investigation data provided?	Yes	Appendix C of the BIA.
Is monitoring data presented?	No	Groundwater strike noted during site investigation. Section 5.5 of the BIA.
Is the ground investigation informed by a desk study?	Yes	Section 3 of the BIA.
Has a site walkover been undertaken?	NA	It is unclear whether a site walkover was undertaken.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Section 2.3 of the BIA.
Is a geotechnical interpretation presented?	Yes	Section 5 of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 5.6 of the BIA.
Are reports on other investigations required by screening and scoping presented?	Yes	GMA, Temporary Works Method Statement, Factual Report and Flood Risk Assessment are presented.
Are the baseline conditions described, based on the GSD?	Yes	Section 7.2 of the revised BIA. Outline structural calculations are presented in the revised BIA.
Do the base line conditions consider adjacent or nearby basements?	Yes	Sections 2.3 & 4.4 of the revised BIA.
Is an Impact Assessment provided?	Yes	Sections 7,8 & 9 of the revised BIA.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	Section 7 of the revised BIA. GMA provided and movements are accepted
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	Section 9 of the BIA. Movement Monitoring is recommended.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Section 7 of the revised BIA. Negligible.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Section 7 of the BIA. GMA provided; movements are accepted.
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	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Section 7 of the revised BIA.
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 Card Geotechnics Limited (CGL) and the qualifications of the authors involved in the BIA meet the requirements of CPG Basements.

4.2. The site is occupied by a two-storey detached property and associated private front drive and rear garden. The site is bordered to the north and the south by retaining walls at the property boundary between 4 Wadham Gardens and 64 Elsworthy Road. The ground level between the site and 4 Wadham gardens is estimated to be elevated by 0.5m, while that between the site and 64 Elsworthy Road is estimated to have a reduced level of 0.5m.

4.3. The proposed redevelopment works comprise the construction of a single storey basement beneath the existing house footprint with an 8m extent beneath the rear garden and 5m extent beneath the front driveway of the house. The basement will comprise a garage including a car lift, living room and pool area. The garage is locally deeper where the car lift is proposed. The formation levels of the garage, living room area and pool are anticipated to be 43.19m OD, 42.84m OD, and 40.93m OD respectively. The basement beneath the existing building is proposed to be formed by underpinning. The basement which extends past the existing front and back of the house is proposed to be formed within a secant pile wall.

4.4. The final revised Architectural drawings presented by FIMA are fully dimensioned.

4.5. Screening and Scoping assessments are presented and informed by desk study information. Relevant figures/maps and other guidance documents are referenced within the BIA to support responses to the Screening questions.

4.6. A site investigation was carried out in June 2021 and comprised a single 15m deep cable percussion borehole, 2 hand auger boreholes and 3 foundation inspection pits. The ground investigation encountered Made Ground in all exploratory holes to a maximum depth of 1m bgl, followed by Head Deposits to a depth of 3.1m bgl and London Clay to a proven depth of 15.45m bgl.

4.7. Groundwater seepage was noted during the site investigation within the Head Deposits at 2.5m bgl in one of the hand auger boreholes. No rise in the groundwater level was recorded after 20minutes. A standpipe is shown to have been installed in the cable percussion borehole, but no subsequent groundwater monitoring data is provided.

4.8. The site is approximately 50m west of the river Tyburn, a lost river of London. The BIA states that it may have since been culverted.

4.9. Section 8 of the BIA states that the groundwater encountered in one of the investigation locations at 2.5m depth is considered to be isolated and perched. The BIA states that any small water ingress will be managed with pumping. It Is accepted that the basement will not have a significant impact on the hydrogeology of the area.

4.10. The proposed development extends into the existing garden and will result in an increase in hardstanding areas. The BIA identifies the site as being within a Critical Drainage Area. The Flood Risk Assessment states that the site is at low risk of flooding from all sources and that the development is unlikely to increase flood risk elsewhere. An attenuation tank and SuDs measures have been implemented as part of the drainage design to store and mitigate excess surface water run-off.

4.11. A Temporary Works Method Statement and Temporary Works drawings are provided in Appendix A of the BIA, and it sets out the design philosophy for the proposed temporary works to support the existing building during proposed alterations. The drawings showing the loads on the underpins and pile wall indicates a 'hit and miss' construction sequence for the underpins. The construction sequence for the underpinning is confirmed as part of a Construction Method Statement.

4.12. The geotechnical parameters to be adopted in the retaining wall calculations, foundation design and ground movement assessment (GMA) are presented and accepted. The Made Ground has an angle of friction, φ, of 24^{o} and a drained Young's Modulus of 10 MPa. Whereas the Head Deposits have an an angle of friction, φ, of 25^{o} and a drained Young's Modulus of 12 MPa. The Undrained Young's Modulus value for the London Clay have been calculated using a multiple of 600 time the cu, where cu is 50+6.6z. The drained Young's Modulus is calculated by multiplying the undrained modulus by 0.75. The Geotechnical parameters were used in the settlement calculation, and outline retaining wall calculations have been provided in the revised BIA and are accepted.

4.13. A Ground Movement Assessment (GMA) has been undertaken to demonstrate that ground movements resulting from the basement construction and the associated impact on neighbouring properties will be within LBC's policy requirement. Ground movements due to underpinning, retaining wall installation and consequent excavation have been modelled using OAYSIS PDisp Pressure Displacement analysis software.

4.14. Outline structural calculations to support assumptions regarding embedded retaining wall pile length have been provided. The pile lengths chosen are accepted and allow a conservative assessment to be undertaken.

4.15. Ground movements resulting from wall installation have been reduced compared to what is suggested by CIRIA C760. Those are highly dependent on the construction methods adopted.

The ground conditions, construction methods, site controls and monitoring regimes adopted on this site should be comparable to the ones adopted in the case study used to modify the CIRIA curve. Ground movements generated are accepted. A detailed temporary works design and construction methodology should be presented within a Basement Construction Plan (BCP) and the GMA should be updated to reflect any amendments of the current proposal.

4.16. The results of the Building Damage Assessment indicate that the damage to neighbouring properties will not exceed Burland Category 1 (Very Slight).

4.17. The BIA indicates that a movement monitoring scheme is to be adopted to ensure that the movements generated are maintained within predicted limits. Monitoring proposals for buildings should ensure movements are controlled to create no greater than Category 1 damage impacts. It is recommended that a monitoring strategy and mitigation scheme are submitted as part of a Basement Construction Plan to ensure a suitably robust scheme is adopted, in line with the assumptions made in the ground movement assessment (GMA).

5.0 CONCLUSIONS

5.1. The qualifications of the BIA authors are in accordance with LBC guidance.

5.2. The drawings presented in the revised BIA are fully dimensioned.

5.3. Screening and Scoping assessments are presented, supported by desk study information.

5.4. The Flood Risk Assessment states that the site is at low risk of flooding from all sources and is unlikely to increase flood risk elsewhere. An Attenuation tank and SuDs measures have been implemented as part of the drainage design to store and mitigate excess surface water run-off that results from the increase to impermeable surfacing.

5.5. Groundwater may be encountered during construction, the BIA states that any small water ingress will be managed with pumping.

5.6. It is accepted that the proposed basement will not impact the hydrogeology, hydrogeology or slope stability in the surrounding area.

5.7. A site investigation has been undertaken indicating that the basement will be constructed within the London Clay Formation.

5.8. Geotechnical to inform design have been provided and are accepted.

5.9. The Ground Movement Assessment (GMA) using reduced CIRIA curves has been presented which predicts damage impacts of Category 0 to 1 (Negligible to Very Slight) to surrounding structures. It is recommended that a Basement Construction Plan (BCP) is provided to ensure a suitably robust scheme is adopted and to support the assumptions made in the GMA.

5.10. Considering the additional information presented, it can be confirmed that the BIA meets the requirement of Camden Planning Guidance: Basements subject to the satisfactory completion of a BCP.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Brown	2 Wadham Gardens, London, NW3 3 DP	10/12/2021	• Impact on drainage, flooding, and groundwater conditions • Structural stability	• Sections 4.7, 4.8, 4.9 & 4.10. • Section 4.13, 4.14 & 4.15.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	The qualifications of the individuals involved in the BIA have not been demonstrated to be in accordance with LBC guidance.	Closed – See Section 4.1	01/12/2022
2	BIA	Architectural and structural drawings should be updated to report levels and dimensions. Drawings should present the proposed development consistently. Clarification is required regarding the areas where the development extends beyond the site boundary.	Closed – See Section 4.4	01/12/2022
3	Hydrogeology	Details of the mitigation measures to be implemented if groundwater is encountered during construction are required.	Closed – See Section 4.9	01/12/2022
4	Hydrology	A Flood Risk Assessment and outline drainage strategy are required.	Closed – See Section 4.10	01/12/2022
5	Land Stability	Clarification on the Construction Method Statement and temporary works drawings should be provided.	Closed – See Section 4.11	01/12/2022
6	Land Stability	GMA to be revised and updated.	Closed – See Section 4.13 – 4.16	01/12/2022
7	Land Stability	Outline structural calculation to be provided.	Closed – See Section 4.14	01/12/2022

Appendix 3: Supplementary Supporting Documents

None

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