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Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12985-70
Revision: D1

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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 1 Hillfield Road (planning reference 2019/3109/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 CGL and SD Structures, using individuals who possess suitable qualifications in accordance with LBC guidance.

1.5. The proposed scheme neither involves nor neighbours Listed buildings.

1.6. A site investigation has been conducted. Factual data and geotechnical interpretation is presented in the BIA. Further in-situ tests will need to be carried out at foundation formation level to validate the shear strength assumed by the design.

1.7. It has been confirmed that the basement is to be founded approximately 3m bgl within London Clay. Perched groundwater inflows may potentially be encountered during basement excavation and contingency measures to control these should be allowed for.

1.8. The basement structural solution proposed by the engineer comprises RC underpins and an RC slab at basement level. Outline permanent and temporary structural information has been provided and is accepted.

1.9. A Ground Movement Assessment (GMA) has been carried out. However, further information is required to clarify the methodology and some of the assumptions used.

1.10. A movement monitoring strategy relating to all existing structures is recommended by the BIA during construction and this should be implemented.

1.11. It is accepted that the surrounding slopes to the development site are stable; and the development will not impact on the hydrological or wider hydrogeological environment, and is not in an area subject to flooding.

1.12. A preliminary construction programme will be required to assess likely duration of basement construction activities.

1.13. Requests for further information are presented in Section 4 and summarised in Appendix 2. The BIA cannot be confirmed to meet the requirements of CPG Basements, until the requested information is provided.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 29th August 2019 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 1 Hillfield Road, Camden reference 2019/3109/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

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance: Basements (March 2018).
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- Local Plan (2017): Policy A5 (Basements).

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;

d) 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 including new front bay window, erection of single storey rear extension, installation of two rooflights to front roof slope and dormer window to rear roof slope in the creation of one additional residential unit".

2.6. CampbellReith accessed LBC's Planning Portal on 22nd August 2019 and gained access to the following relevant documents for audit purposes:

- Design Statement by Martin Evans Architects (MEA) dated May 2019.
- Geotechnical and Geoenvironmental Interpretative Report and Basement Impact Assessment (BIA - Revision 1) by Card Geotechncs Limited (CGL).
- Structural Report by SD Structures (Revision P0) adated 11th June 2019
- Planning Application Drawings BY MEA, all dated 21st May 2019, consisting of:

  Location Plan - drwg. HFR-PL-EX_00

  Existing Plans – drwg. HFR-POL-EX_01,_02

  Demolition Plans drwg. HFR-PL-DEM_02

  Proposed Plans drwgs. HFR-PL-PRO_01,_02)

  Proposed Elevations and Sections drwgs. HFR-PL-PRO_07,_08)

- Proposed Structural drawings SDS632-3D001, -PL001, -PL002, -PL003 all dated 11th June 2019
- Tree Survey report dated 12th April 2019
- Consultation responses.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
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	BIA Ch. 2-12.
Are suitable plan/maps included?	No	Maps not included, however these are referred to in the text. See BIA Ch. 3&4.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	Limited maps are presented in the BIA, but relevant maps are referenced by CGL.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Ch. 4.3
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Ch. 4.2.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Ch. 4.4.
Is a conceptual model presented?	Yes	BIA Ch. 3.7.2, 8.5, 11.3.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes/Yes	BIA Ch. 4.3.1, 4.5, 11.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No/Yes	Scoping not required.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No/Yes	Scoping not required
Is factual ground investigation data provided?	Yes	BIA Ch. 6 & 7.
Is monitoring data presented?	Yes	BIA Ch. 6 & 7.
Is the ground investigation informed by a desk study?	Yes	BIA Ch. 3.
Has a site walkover been undertaken?	Yes	Site walkover undertaken on 12th March 2019
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	The BIA author states that visual inspection suggest there may be a lower ground floor at no. 3 Hillfield Road.
Is a geotechnical interpretation presented?	Yes	BIA Chapters 7-10.
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA Appendix G
Are reports on other investigations required by screening and scoping presented?	No	
Are the baseline conditions described, based on the GSD?	Yes	BIA – various sections.
Do the base line conditions consider adjacent or nearby basements?	Yes	The GMA assumes no neighbouring basements, which is conservative assuming basements may exist.
Is an Impact Assessment provided?	Yes	BIA Ch. 11&12.
Are estimates of ground movement and structural impact presented?	Yes	BIA Ch. 11&12.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes/Yes	Appropriate temporary works and ground movement monitoring are recommended by the BIA.
Has the need for monitoring during construction been considered?	Yes	Outline movement monitoring strategy provided in the structural report.
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 various sections.
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	However, further clarification on the GMA is required.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	GMA confirms damage no worse than Category 1.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by CGL and the individuals concerned in its production have suitable qualifications. The Structural Report has been prepared by SD Structures and the report reviewer is a Chartered Structural Engineer.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal neither involved a Listed building nor neighboured one.

4.3. The development proposals comprise the extension of the single-storey existing part-basement to the rear and front of the property. The basement slab level is proposed to be approximately 3m below external ground level.

4.4. The basement construction is proposed to comprise reinforced concrete underpins cast in a “hit & miss” sequence and a new 250mm thick RC slab, with a 450mm perimeter edge thickening.

4.5. The BIA confirmed that underpinning would be carried out to depths varying between 0.3m and 3.0m, depending on location relative to the existing Party Walls. The report noted that a Party Wall condition exists on the two neighbouring sides of the property.

4.6. The BIA identified the need for a propping strategy designed to maintain lateral stability of the excavation and retaining wall during construction. In addition, the propping system and permanent retaining wall will need to be designed to resist surcharge loads due to the rear external wall to Gondar House being set back between 0.8m and 2.2m.

4.7. The Structural Report outlines proposals for the temporary basement propping. However, these will need to be developed in further detail giving consideration all site specific loading conditions and requirements.

4.8. A site specific investigation (SI) was carried out, which was based on 2 no. drive-in window sampler boreholes to a depth of approximately 10.0m bgl and 11 trial pits to a depth of approximately 1.6m bgl. The existing building foundations were exposed and confirmed to generally comprise corbelled brick footings, typical of Victorian era dwellings.

4.9. The findings of the SI confirmed the presence of Made Ground to an approximate depth of 0.8m bgl, underlain by firm brown becoming stiff London Clay Formation. The BIA also confirmed that possible Head Deposits, approximately 0.4m in thickness, were found underlying the Made Ground in one of the boreholes that were drilled on site.

4.10. The BIA reported that the new basement formation level would be within firm to stiff London Clay, which was identified to the full depth of the exploratory holes (i.e. 10.0m). It is noted that

the type of clay identified on site is of high plasticity and volume change potential. Therefore, it is generally prone to shrinkage and heave depending on the moisture content.

4.11. In-situ geotechnical testing was undertaken in the form of Standard Penetration Testing (SPT) in order to determine likely strengths of the existing soil formations. Geotechnical interpretation suggests that a presumed bearing capacity of 120kPa may be assumed for foundation design purposes at 3.0m bgl.

4.12. The BIA confirmed that the shear strength of the underlying soils would need to be confirmed on site when the foundation formation levels are exposed. Whilst no method of testing is suggested in the BIA, it is anticipated that a suitably experienced Geotechnical Engineer will perform one of the commonly accepted methods of soil in-situ testing to validate the SI findings.

4.13. It is noted that the structural calculations indicate a bearing pressure at the toe of the proposed retaining wall of approximately 129kPa. However, given that this figure is nominally higher that the presumed bearing capacity (i.e. 120kPa) advised by the Geotechnical Engineer, the stresses are considered acceptable.

4.14. The BIA states that groundwater was noted during monitoring visits at approximately 4.0m bgl. The report suggests that "this is representative of perched water within the London Clay formation, possibly as a result of inflow from ground level, and is not considered to be indicative of a continuous groundwater body". The BIA suggests that a pump and sump system could be used as a control measure should groundwater inflows be encountered during excavation. It may be prudent to allow for this during construction.

4.15. The BIA reports that the London Clay is a low permeability, unproductive stratum that is not capable of supporting a groundwater table.

4.16. A GMA is presented indicating damage to neighbouring structures will be a maximum of Burland Category 1 (Very Slight). However, the following clarifications are required:

- It is unclear which methodology has been used for assessing horizontal movements. It is noted that section 11.6 suggests movements of <2mm can be anticipated; however, Table 19 indicates movements in the range of 0.5mm to 3.8mm, presumably calculated along the critical section / wall length. The methodology should be clarified and contour plots provided.
- Section 11.5 indicates that a 5mm allowance for settlement due to workmanship should be considered. In Table 17, the total settlement column appears to omit the settlement due to workmanship, as do the Plates 4 to 8, and consequently calculations presented in Table 19.
- The maximum vertical deflection adopted for the critical sections is not considered representative or in accordance with the guidance, as the intercept between the chord

and the predicted deflection curve (in Plates 4 to 8) has not been taken at the same horizontal distance along the section / wall being assessed. Consequently, the maximum deflection appears to have been under-estimated in some cases.

4.17. Both the GMA and structural report identify the need for movement monitoring of existing neighbouring structures during basement construction. An outline movement strategy, indicating frequency of monitoring and trigger levels, is presented in the structural report and this should be adopted during construction.

4.18. The BIA confirmed that the site is located in an area which is at a very low risk of flooding due to surface water. However, the BIA identified that the street was flooded during the 2002 floods according to Camden's SFRA.

4.19. Given the above, it may be prudent to adopt anti-flood measures to the front of the basement.

4.20. The BIA states that the redevelopment plans will nominally increase the areas of hardstanding, although the Structural Report confirmed that permeable paving would be adopted to limit any increase in run-off rates. These were demonstrated to be less than 5l/s.

4.21. Given the redevelopment proposals, it is accepted that the impact on the wider hydrological environment is low. However, the final drainage design will need to be approved by LBC and Thames Water.

4.22. The BIA identified that the site slopes to the north at no greater than 1 in 8 slope. The report also confirmed that the steep slope to the front of the building would be re-profiled such that this is removed to create a flat patio. The BIA considers that there are no slope stability concerns regarding the proposed development, which is accepted.

4.23. An outline construction programme relating to the basement works should be provided.

5.0 CONCLUSIONS

5.1. The BIA has been prepared by individuals who possess suitable qualifications in accordance with LBC guidance.

5.2. The proposed development does not involve or neighbour a Listed building.

5.3. The basement proposals comprise the extension of the existing single storey part-basement to the rear of and front of the property.

5.4. The engineering report indicates RC underpins and a new 250mm thick RC slab for the basement construction. Drawings presenting permanent and temporary structural information have been included in the BIA.

5.5. A site investigation has been conducted. Prior to construction, in-situ tests will need to be performed to validate the soils strengths assumed in the BIA.

5.6. It has been confirmed that the basement is to be founded approximately 3m bgl within London Clay. Perched groundwater inflows may potentially be encountered during basement excavation and contingency measures to control these should be allowed for.

5.7. A Ground Movement Assessment (GMA) has been carried out, which identifies damage to neighbouring properties to be no worse than Burland Category 1 (very slight). However, further clarification will be required on some of the assumptions made in the GMA, as discussed in Section 4.

5.8. A movement monitoring strategy relating to all existing structures is recommended by the BIA during construction and this should be implemented.

5.9. It is accepted that the development will not impact on the site hydrology and wider hydrogeological environment; and there are no slope stability concerns.

5.10. Whilst it is accepted that the site is located in an area of low flood risk, it is recommended that anti-flood measures are considered given that the street was affected by surface water flooding in 2002.

5.11. An outline construction programme should be provided.

5.12. Discussion and requests for further information are presented in Section 4 and summarised in Appendix 2. The BIA cannot be confirmed to comply with CPG Basements, until further information is provided.

Appendix 1: Residents' Consultation Comments

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Residents Consultation Comments

Surname	Address	Date	Issue raised	Response
Alexander	Unknown	14/08/2019	The resident raised concerns with regards to impact of construction of raft foundation	A GMA has been undertaken which looked at the impact of basement construction in terms of likely ground movement and associated structural damage to neighbouring properties.
Naughten	Unknown	12/08/2019	The resident is concerned about the stability of the properties due to basement excavation.	The Structural Report presented a construction methodology that is suitable for a basement of this scale. The GMA undertaken confirmed that limited ground movement will occur due to basement proposals and damage will be no worse than Category 1. Subject to good workmanship, the basement excavation is not anticipated to lead to any possible structural instabilities.
Morris	Unknown	16/08/2019	The resident raised concerns regarding the risk of subsidence associated with the basement excavation. The resident also discusses issues with drainage of rain water.	The GMA demonstrated that any structural damage to Party Walls will be no worse than Damage Category 1. It is anticipated that the proposed underpinning, as part of the basement construction, will reduce the risk of subsidence, if any. Whilst the area of hardstanding will generally increase relative to the landscape area, permeable paving has been proposed in the BIA which is anticipate to minimse any increases in surface run-off rates.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Further clarification on the methodology will be required as outlined in section 4.18 of this audit report.	Open	
2	Stability	Suitable in-situ shear tests to be undertaken at formation level prior to construction.	The Engineer / Contractor should confirm that the presumed bearing capacity is equal to / greater than the anticipated bearing pressures.	Note Only
3	Programme	Outline construction programme should be provided.	Open	

Appendix 3: Supplementary Supporting Documents

None.

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