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77 Avenue Road, London NW8 6JD

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12985-56

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1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by London Borough of Camden (LBC) on 2 May 2019 to carry out an Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 77 Avenue Road, London NW8 6JD, Camden Reference 2019/1747/P. The basement is considered to fall within Category C 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. Two BIA reports have been provided for review prepared by Constructure Ltd and Chelmer Global Ltd. The two documents repeat some aspects of the requirements, ignore other aspects and inconsistently reference each other. Proposals should be consistently presented.

1.5. It should be demonstrated the authors of the BIAs possess suitable qualifications in accordance with LBC guidance.

1.6. The site currently comprises a three-storey property with a single storey garage. The proposed development comprises the replacement of the existing structure with a new five-storey property including a basement and sub-basement level. Proposed formation and relative levels should be confirmed.

1.7. A site investigation indicates the site to be underlain by Made Ground overlying the London Clay Formation. It was reported that the River Tyburn may have been in close proximity to the site; however, no evidence was found during the ground investigation. There are no impacts to the wider hydrogeological environment.

1.8. Only one round of groundwater monitoring has been undertaken, in March 2017. Longer term monitoring and / or by the contractor in advance of the works is recommended in the BIA. Localised perched groundwater may be encountered in the Made Ground and this will need to be controlled during the proposed underpinning works.

1.9. The site investigation and BIA have been informed by a desk study, although utility companies have not been approached with regards to underground infrastructure.

1.10. Interpretative geotechnical information including retaining wall design parameters should be provided.

1.11. Outline temporary works information has been presented. The basement will be constructed utilising underpinning and secant piling techniques. Reasonably conservative assumptions have been made in regards to pile toe depths.

1.12. An outline construction programme should be presented.

1.13. A ground movement assessment (GMA) is presented which considers the movements and resultant impacts to neighbouring buildings. A maximum of Category 1 (Very Slight) damage in accordance with the Burland Scale is indicated. As discussed in Section 4, assumptions made within the GMA should be clarified.

1.14. An outline monitoring specification has been provided. Following clarification of the GMA, the monitoring specification should be confirmed and agreed under the Party Wall Act.

1.15. The BIA notes that Avenue Road was subject to surface water flooding in 2002. The Environment Agency indicates the rear garden of the site to be at a 'medium' risk of surface water flooding with a low risk of flooding on the front driveway. Flood risk mitigation measures such as up-stands to protect lightwells and a ground level difference at external doorways are proposed. Protection against surcharging of the public sewers should be implemented.

1.16. The site is within a critical drainage area. Change in impermeable site area should be confirmed and appropriate impact assessment and mitigation proposals presented.

1.17. Non-technical summaries should be provided in any revised BIA presented.

1.18. Discussion and requests for further information are presented in Section 4 and summarised in Appendix 2. Until the information requested is presented, the BIA does not meet the criteria of CPG: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 2 May 2019 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 77 Avenue Road, London NW8 6JD, Camden Reference 2019/1747/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 (CPG): Basements.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- The 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; and,

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 planning portal describes the proposal as: "*Demolition of existing dwelling and erection of replacement three-storey detached dwelling with double basement*".

The planning portal also confirmed the site does not lie within a Conservation Area and that the site is not listed and neither are the adjacent buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 26th May 2019 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment and Structural Impact Assessment (ref 1678) dated April 2018 by Constructure Structural Designers.
- Basement Impact Assessment (ref BIA/9815) dated March 2018 by Chelmer Global Ltd including:
    - Factual Report (ref FACT/8562) dated 23 February 2017 by Chelmer Site Investigation Laboratories Ltd.
- Existing and Proposed Plans, Elevations and Section drawings (ref 1716) dated March and April 2018 by Wolff Architects.
- SuDSmart Pro Report (ref 64958R1REV4) dated June 2018 by GeoSmart Information Ltd.
- Design & Access Statement (ref 1716-PL2-DAS Revision 0) dated April 2018 by Wolff Architects.
- Arboricultural Assessment and Method Statement (ref 16377-AA2-AS) dated 14 June 2018 by Barrell Tree Consultancy.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	The qualifications of the authors of the revised Chelmer BIA (2018) should be demonstrated.
Is data required by Cl.233 of the GSD presented?	No	Utility companies have not been approached with regards to underground infrastructure. Outline construction programme to be presented.
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 plans/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?	Yes	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	The lost river Tyburn has been identified running in the vicinity of the site.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	The screening has not identified that the site is within Critical Drainage Area 3_005. Changes in impermeable site area to be confirmed.

Item	Yes/No/NA	Comment
Is a conceptual model presented?	Yes	Chelmer Global Ltd BIA report, Section 4. However, relative levels (ground level, proposed formation level, neighbouring foundation levels etc) to be confirmed.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	Clarification on assumptions adopted in GMA and proposed construction methodology required.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Basement formation within unproductive strata, London Clay.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	Constructucture and Chelmer documents inconsistent. The screening has not identified that the site is within Critical Drainage Area 3_005. Changes in impermeable site area to be confirmed. Proposed drainage and mitigation measures to be confirmed.
Is factual ground investigation data provided?	Yes	Chelmer Global Ltd BIA report, Section 3.5 and 3.6 and Appendix F.
Is monitoring data presented?	No	Chelmer BIA confirms that monitoring standpipes were installed to in BH1 and BH2 in February 2017 and return monitoring was completed/planned. No such data has been provided for review.
Is the ground investigation informed by a desk study?	Yes	Chelmer Global Ltd BIA report, Section 3 and Constructure BIA report, Section 2.
Has a site walkover been undertaken?	Yes	Chelmer Global Ltd undertook a site walkover in February 2017. Updates to the BIA should confirm there have been no material changes to the site.

Item	Yes/No/NA	Comment
Is the presence/absence of adjacent or nearby basements confirmed?	No	Chelmer BIA, Section 6, indicates that Nos 73-75 and 81 Avenue Road have registered basement applications. The presence of basements has not been confirmed. No. 79 is reported as not having a basement. GMA assumes shallow foundations for neighbouring structures.
Is a geotechnical interpretation presented?	No	Design parameters as required by the GSD, Appendix G3, to be provided, including for retaining wall design.
Does the geotechnical interpretation include information on retaining wall design?	No	Secant piled wall depth assumed.
Are reports on other investigations required by screening and scoping presented?	Yes	GMA, FRA and Drainage. However noted that impermeable site area changes are to be confirmed and proposals reviewed / revised as appropriate.
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	As above, assessments assume no neighbouring basements.
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	However, GMA assumptions to be clarified as Section 4.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	Stability and hydrological assessments to be reviewed.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Stability and hydrological assessments to be reviewed.
Has the need for monitoring during construction been considered?	Yes	Constructure Ltd BIA report, Section 7.2 and 7.3. To be reviewed following GMA clarifications.

Item	Yes/No/NA	Comment
Have the residual (after mitigation) impacts been clearly identified?	No	Stability and hydrological assessments to be reviewed.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Stability assessments to be reviewed.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	Changes in impermeable site area to be confirmed. Hydrological / drainage assessments to be reviewed.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Stability and hydrological assessments to be reviewed.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	However, stability assessment to be reviewed.
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. Two BIA reports have been provided for review, prepared by Constructure Ltd and Chelmer Global Ltd. As there is not a single BIA report, statements within the two documents repeat some aspects of the requirements, ignore other aspects and inconsistently reference each other. The BIA has not been presented in a single, coherent format, and non-technical summaries have not been provided, as requested in the LBC guidance.

4.2. It is noted that the original Chelmer BIA (March 2017) was reviewed by an appropriately qualified professional. It should be demonstrated the authors of the 2018 BIAs possess suitable qualifications in accordance with LBC guidance.

4.3. The site currently comprises a three-storey property with a single storey garage extension to the southeast which is adjoined to No. 73-75 Avenue Road. The proposed development comprises the replacement of the existing structure with a new five-storey property including a basement and sub-basement level. The maximum dig level is indicated as approximately 8.65m bgl. It is recognised that formation level varies and is referenced at different levels within the BIA documents. Ground level, proposed formation level and neighbouring foundation levels should be clarified and adopted consistently throughout the assessments.

4.4. Its noted that the site walkover and original documents were prepared more than 2 years ago. Any material changes to the site and neighbouring sites should be described in any update to the BIA.

4.5. A site investigation was undertaken by Chelmer Site Investigation Laboratories Ltd (now Chelmer Global) in February 2017 comprising two boreholes on site (one in the rear garden, one on the front driveway) drilled to 15.1m and 25.5m bgl respectively. The investigation identified Made Ground underlain by the London Clay Formation. With regards to groundwater, a slight seepage was noted in BH1 during the ground investigation at 3.8m bgl. Monitoring standpipes were installed to 15.0m and 20.0m bgl in BH1 and BH2 respectively with one return monitoring visit being completed in March 2017. BH1 was recorded as dry to the maximum measurable depth of the standpipe (14.7m). No data has been provided for BH2 in March 2017. The BIA states that 'two further monitoring visits are currently planned to monitor groundwater levels in BH1 and BH2' but no such data has been provided for review. The Chelmer BIA states that waterproofing and groundwater control may be required during the construction works. The BIA also recommends that further groundwater monitoring is undertaken on site to 'record the long-term data which is more representative of the low permeability strata'.

4.6. A tributary of the River Tyburn has been identified (Lost Rivers of London, Barton 1992), running in the vicinity of the site. However, the site investigation found no evidence of the former river

during the study and Chelmer Global Ltd anticipate that the tributary has been culverted and now runs beneath the carriageway in Avenue Road. It is accepted that there are no significant groundwater flows which could be adversely affected and that there will be no impact to the local or wider hydrogeological environment.

4.7. The site investigation and BIA have been informed by a desk study broadly in accordance with the GSD Appendix G1, although utility companies have not been approached with regards to underground infrastructure. This information should be obtained and impacts assessed, and mitigated, as required.

4.8. Interpretative geotechnical information should be provided including retaining wall design parameters, based on the site specific investigation data, in accordance with the GSD, Appendix G3.

4.9. Outline temporary works have been presented. The proposed development will be formed using secant piled retaining walls and underpinning. Assumptions have been made on the depth of the piled retaining walls; these appear to be reasonably conservative but should be confirmed as appropriate once geotechnical parameters are presented. Underpinning works include a section to be undertaken in three lifts.

4.10. An outline construction programme should be presented.

4.11. Chelmer Global confirmed that Nos 73-75 and 81 Avenue Road have registered basement applications. Given the date of these applications (both in 2016) it would be prudent to establish whether these basements had been constructed and assessments updated if required. However, the assumption of no basements is considered conservative in terms of stability assessments. It is stated that the adjacent No. 79 has no basement.

4.12. A ground movement assessment (GMA) is presented which considers the movements relating to the proposed basement construction and the effect on the adjacent properties at 73-75 Avenue Road (in its existing state and also with the proposed two-storey basement development), the single storey garage extension at No. 73-75, and to 79 Avenue Road. A maximum of Category 1 (Very Slight) damage in accordance with the Burland Scale is indicated. However, the following clarifications are requested:

- ground levels and proposed formation levels relative to neighbouring structures to be confirmed.

- geotechnical parameters to be established, maximum toe depth of secant piled walls and adequate bearing resistance to be confirmed.

- Underpinning works include a proposed section to be constructed in 3 lifts. It should be confirmed the GMA has considered the likely movements from this sequence of works, which are likely to be in the order of 5mm to 10mm vertically and horizontally per lift.
- Whilst PDisp contour plots are provided, XDisp contour plots that support the calculations, including indicating the walls assessed, should be provided. Due to the changes in level and geometry of the proposed basement, all walls within the zone of influence of the works should be assessed.
- The assessment appears to offset short term settlements with long term heave. This is not considered a reasonably conservative approach.

4.13. An outline monitoring specification has been provided. Following clarification of the GMA, it should be confirmed that the monitoring specification is still appropriate, although final details can be agreed under the Party Wall Act.

4.14. The BIA notes that Avenue Road was subject to surface water flooding in 2002. The Environment Agency indicates the rear garden of the site to be at a 'medium' risk of surface water flooding with a low risk of flooding on the front driveway. Flood risk mitigation measures such as up-stands to protect lightwells and a ground level difference at external doorways are proposed. Protection against surcharging of the public sewers should be implemented.

4.15. The site is within a critical drainage area. The Chelmer BIA indicates that the impermeable site area will increase as a result of the proposed development. The Constructure BIA states that the proposed scheme will decrease the impermeable area by approximately 24% through the use of permeable paving. Changes to the impermeable site area should be confirmed and an appropriate impact assessment and mitigation proposals presented. An Outline SUDS strategy is presented. SUDs should be adopted, with final scheme design approved by LBC and Thames Water.

4.16. Non-technical summaries should be provided in any revised BIA presented.

4.17. Queries and matters requiring further information or clarification are summarised in Appendix 2.

5.0 CONCLUSIONS

5.1. It should be demonstrated the authors of the BIAs possess suitable qualifications. An outline construction programme should be presented.

5.2. Proposed formation and relative levels should be confirmed and proposals should be consistently presented between BIA documents.

5.3. A site investigation indicates the site to be underlain by Made Ground overlying the London Clay Formation. There are no impacts to the local or wider hydrogeological environment. The BIA notes localised perched groundwater may be encountered in the Made Ground and this will need to be controlled during the proposed underpinning works.

5.4. Utilities / underground infrastructure information should be provided and impacts assessed.

5.5. The basement will be constructed utilising underpinning and secant piling techniques. Interpretative geotechnical information including retaining wall design parameters should be provided and the construction methodology/assumptions made reviewed for reasonableness.

5.6. A ground movement assessment (GMA) indicates a maximum of Category 1 (Very Slight) damage to neighbouring structures. As discussed in Section 4, clarification is required.

5.7. An outline monitoring specification has been provided. Following clarification of the GMA, the monitoring specification should be confirmed and agreed under the Party Wall Act.

5.8. Flood risk mitigation measures such as up-stands to protect lightwells and a ground level difference at external doorways are proposed. The BIA should be updated to identify the site is within a critical drainage area. Changes in impermeable site area should be confirmed and appropriate impact assessment and mitigation proposals presented. Protection against surcharging of the public sewers should be implemented.

5.9. Non-technical summaries should be provided in any revised BIA presented.

5.10. Requests for further information are summarised in Appendix 2. Until the information requested is presented, the BIA does not meet the criteria of CPG: Basements.

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Appendix 1: Residents' Consultation Comments

None

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Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	BIA	The proposed development and assumptions adopted for assessment should be consistently presented between BIA documents.	Open	
2	BIA	The qualifications of the authors of the revised Chelmer BIA (2018) should be demonstrated.	Open	
3	BIA	Underground infrastructure information should be provided (utility / transport).	Open	
4	BIA	An outline construction programme should be provided.	Open	
5	BIA	Non-technical summaries to be presented in any revised submissions	Open	
6	Stability	Groundwater conditions should be confirmed in advance of the works to ensure appropriate control of construction works during underpinning.	Note Only	N/A
7	Stability	Interpretative geotechnical information to be provided, including retaining wall design parameters.	Open	
8	Stability	Assumptions made within the GMA should be reviewed and clarified as indicated in Section 4.	Open	
9	Hydrology	Changes in impermeable site area to be confirmed. Drainage proposals including sufficient assessment and mitigation (if required) to be provided.	Open	

Appendix 3: Supplementary Supporting Documents

None

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