CampbellReith
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31 St Mark's Crescent, London, NW1 7TT

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-65

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 31 St Mark's Crescent, London NW1 7TT (planning reference 2017/1534/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 development involves the construction of a basement level beneath the lower ground floor to a depth of 3.50m bgl and the extension of the basement approximately 6m out to the rear of the building beneath the garden. The rear garden will be lowered to the equivalent of lower ground floor level to a distance of 10m from the existing property.

1.5. Two BIAs have been provided for review, by Chelmer Consultancy Services and Croft Structural Engineers. The authors' qualifications are in accordance with CPG4 guidelines for all sections.

1.6. Information within the two BIA documents is occasionally contradictory. Where this occurs, the audit has considered the most conservative approach. However, in any revised BIA submission documents should consistently present the assessments and related information.

1.7. The BIA includes the majority of the information required from a desk study in line with the LBC guidance. However, utility companies have not been approached with regards to the presence of underground infrastructure within the development's zone of influence.

1.8. A site investigation confirmed ground conditions comprising Made Ground overlying the London Clay Formation. However, factual site investigation data (logs) has not been presented and should be provided for review.

1.9. Groundwater monitoring indicates that the proposed basement excavation is likely to encounter groundwater. The Chelmer BIA notes that consideration should be given to temporary dewatering and also recommends that further groundwater monitoring is undertaken. Such monitoring should be undertaken prior to construction.

1.10. It is accepted that the proposed development will not impact the wider hydrogeological environment. This assumes the site investigation logs, to be provided for review, confirm the ground conditions as Made Ground over London Clay.

1.11. The site is within the Primrose Hill Local Flood Risk Zone, which is acknowledged in the BIA. The BIA assesses the flood risk as very low, based upon Environment Agency and LBC SFRA data, and provides generic flood risk mitigation advice. The flood risk assessment is accepted assuming that the mitigation measures proposed are adopted. The final development levels should be confirmed, including that threshold and lightwell levels are suitably elevated.

1.12. The development results in an increase in impermeable site area. The proposal is to construct the paved areas using permeable paving, including in the rear garden above the basement. It is proposed to place 0.5m of soil above the basement roof within the rear garden (below the paving), whereas LBC guidance recommends a minimum of 1m of soil cover. Assessment to demonstrate that the proposals will allow mature vegetation to develop and that infiltration capacity will be suitably mitigated in accordance with LBC's and Thames Water's requirements should be provided.

1.13. Outline retaining wall calculations are presented, which includes a conservative allowance for groundwater at 1m below ground level. An appropriate outline temporary works plan and sequence is proposed. An outline construction programme has been provided.

1.14. A Ground Movement Assessment (GMA) has been presented, including an assessment of heave, which indicates movements broadly in accordance with expectations, considering the proposed dimensions and methodology. Damage impacts of Category 1 (Very Slight) to surrounding structures, in accordance with the Burland Scale, are predicted which are accepted. This assumes ground conditions are confirmed, as per 1.8. Appropriate structural monitoring of adjacent structures is proposed during the construction period.

1.15. The distance between the proposed development and the retaining wall with the Regent's Canal should be confirmed. If the retaining wall is within the zone of influence of the development, a damage impact assessment should be undertaken.

1.16. Non-technical summaries should be provided within any revisions to the BIA submitted

1.17. Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. Until the additional information requested has been provided, it is not possible to assess whether the requirements of CPG4 have been met.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 3 April 2017 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 31 St Mark's Crescent, London NW1 7TT, Camden Reference 2017/1534/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) 4: Basements and Lightwells.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.

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 planning proposal as: "Excavation of a basement extension below the footprint of the dwelling (Use Class C3) including no.1 rear lightwell."

2.6. The planning portal has confirmed that the development is not a listed building but does lie within the Primrose Hill Conservation Area.

2.7. CampbellReith accessed LBC's Planning Portal on 27 April 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (ref BIA/8084A) dated February 2017 by Chelmer Consultancy Services.
- Basement Impact Assessment: summary and design and construction proposals (ref 161202) dated 15 March 2017 by Croft Structural Engineers.
- Design and Access Statement by the Basement Design Studio.
- Draft Construction Management Plan dated March 2017 by London Basement.
- SUDs report (ref 1767/RE/01) dated 2 February 2017 by Evans Rivers and Coastal.
- Existing and proposed floor plans and sections dated January 2017 by Sher and White Architects.
- Comments and objections to the proposed development from local residents.

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?	No	Utility companies have not been approached with regards to underground infrastructure.
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	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Mapping referenced to provide evidence of Screening assessment. Proposed basement will result in increase in impermeable area. Site located in Primrose Hill Local Flood Risk Zone.
Is a conceptual model presented?	Yes	Chelmer BIA Report, section 4.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	However, consideration of proximity of retaining wall along the canal required and further consultation with the Canal & River Trust should be undertaken.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	There is a change in permeable / impermeable site ratio. Attenuation drainage assessment states that permeable block paving will be adopted with 0.5m soil above basement roof. This should be considered with regards to CPG4 2.16.
Is factual ground investigation data provided?	Yes	Summary provided in Chelmer BIA Section 3. However, report / logs of investigation not presented.
Is monitoring data presented?	Yes	Additional monitoring is recommended by the BIA.
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?	Yes	The neighbouring properties in close proximity to the proposed development all have existing basements / lower ground floors to a similar level as No. 31's lower ground floor level.
Is a geotechnical interpretation presented?	Yes	Chelmer BIA Section 5.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Croft Structural Engineers BIA Appendix A.
Are reports on other investigations required by screening and scoping presented?	No	Site investigation report / logs required.

Item	Yes/No/NA	Comment
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	Chelmer BIA Section 4 (scoping / impact assessment combined).
Are estimates of ground movement and structural impact presented?	Yes	Chelmer BIA Sections 5 and 6.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	The Impact Assessment addresses those issues identified by screening and scoping. However, it does not address the potential stability impacts to the retaining wall of the Regent's Canal.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Temporary propping, monitoring and trigger levels are discussed (Croft Structural Engineers BIA Report: Appendix C (Basement Construction Method) and Appendix E (Proposed Monitoring Statement)).
Has the need for monitoring during construction been considered?	Yes	Croft Structural Engineers BIA Report: Appendix E (Proposed Monitoring Statement).
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?	No	Utility information to be provided. Proximity to Regent's Canal to be provided.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	There is a change in permeable / impermeable site ratio. Attenuation drainage assessment states that permeable block paving will be adopted with 0.5m soil above basement roof. This should be considered with regards to CPG4 2.16.

Item	Yes/No/NA	Comment
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Longer term groundwater monitoring should inform temporary works design. Permanent works have adopted conservative water level for design purposes.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Damage Impact limited to Category 1 (Very Slight).
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. Two BIAs have been provided for review. The BIA prepared by Chelmer Consultancy Services includes the screening, ground investigation, impact assessment, ground movement assessment and damage impact assessment. The BIA prepared by Croft Structural Engineers includes a summary of the Chelmer BIA along with the construction sequence, temporary work systems, a monitoring strategy and structural calculations. There is not a single BIA report and as such statements within the documents do not always reference each other and are contradictory in places. The authors' qualifications are in accordance with CPG4 guidelines for all sections.

4.2. Where contradictory information is presented between BIA documents, the audit has considered the most conservative approach. However, in any revised BIA submission documents should consistently present the assessments and related information.

4.3. The proposed development involves the construction of a basement level beneath the lower ground floor to a depth of 3.50m bgl and the extension of the basement approximately 6m out to the rear of the building beneath the garden. The rear garden will be lowered to the equivalent of lower ground floor level to a distance of 10m from the existing property.

4.4. The BIA includes the majority of the information required from a desk study in line with the GSD Appendix G1. However, utility companies have not been approached with regards to the presence of underground infrastructure within the development's zone of influence. These records should be obtained and presented, including an impact assessment and mitigation proposals, if required.

4.5. The Regent's Canal is at the end of the rear garden. Water level is approximately 1m below garden level. There is a retaining wall along the canal and the canal is understood to be lined with clay. The proximity of the wall to the development has not been identified. The distance between the proposed development and the retaining wall with the Regent's Canal should be confirmed. If the retaining wall is within the zone of influence of the development, a damage impact assessment should be undertaken. Notwithstanding this, further consultation should be undertaken with the Canal & River Trust in regards to the proposed construction management e.g. utilisation of the canal for removal of construction waste on barges.

4.6. High Speed 2 (HS2) is proposed to run 32m to the northeast of the site and the top of the tunnel would be 15m below the proposed founding level of the basement. A railway line runs 75m east of the site. It is accepted that the proposed basement will not affect these infrastructure assets.

4.7. A site investigation was undertaken by Chelmer Consultancy Services in November 2016 and January 2017. The 2016 investigation comprised two boreholes to 6.1m below ground level (bgl). The second investigation comprised extending one borehole to a depth of 10.4m bgl and the excavation of two hand dug trial pits. The ground conditions comprise Made Ground underlain by

the London Clay. The site investigation report / logs should be presented to confirm the ground conditions.

4.8. Three rounds of groundwater monitoring were undertaken and levels were recorded at depths of 4.67m, 3.43m and 3.08m bgl. The proposed basement excavation is therefore likely to encounter groundwater. The Chelmer BIA notes that consideration should be given to temporary dewatering and also recommends that further groundwater monitoring is undertaken. Such monitoring should be undertaken prior to and during construction to inform temporary works design. It is accepted that the permanent design incorporates waterproofing and a conservative groundwater level for design purposes (i.e. 1m bgl).

4.9. It is accepted that the proposed development will not impact the wider hydrogeological environment. This assumes the site investigation logs, to be provided for review, confirm the ground conditions as Made Ground over London Clay.

4.10. St Mark's Crescent did not suffer from surface water flooding in 1975 or 2002 and the Environment Agency indicates the site to be at a 'very low' risk of surface water flooding. However, in line with CPG4 (section 3.48), as the proposed development is located within LBC's defined 'Primrose Hill' Local Flood Risk Zone (Critical Drainage Area Group 3-003), a flood risk assessment has been undertaken. Generic flood risk mitigation advice is provided. The flood risk assessment is accepted assuming that the mitigation measures proposed are adopted. The final development levels should be confirmed, including that threshold and lightwell levels are suitably elevated.

4.11. The development results in an increase in impermeable site area. The SUDS statement has assessed the attenuation options and concluded that it would be impractical to capture and attenuate surface water across the rear of the property due to the lack of space and difficulties in draining through the property to the sewers. The proposal is therefore to construct the paved areas using permeable block paving, including in the rear garden. However, it is noted that permeable paving is to be adopted in the area above the proposed basement in the rear garden, and that only 0.5m of soil is proposed to overly the basement (below the permeable paving). CPG4 section 2.16 indicates that a minimum of 1m of soil should be provided in order to enable garden planting and mitigate the effect on infiltration capacity. Assessment to demonstrate discharge flows will be in accordance with LBC's and Thames Water's requirements should be provided.

4.12. Outline retaining wall calculations are presented, which includes a conservative allowance for groundwater at 1m below ground level. An appropriate outline temporary works plan and sequence is proposed. The basement will be constructed by underpinning on a hit and miss sequence. The basement walls will be appropriately propped in both the temporary and permanent conditions.

4.13. An outline construction programme has been provided.

4.14. A Ground Movement Assessment (GMA) has been presented, including an assessment of heave, which indicates movements broadly in accordance with expectations, considering the proposed dimensions and methodology. Damage impacts of Category 1 (Very Slight) to surrounding structures, in accordance with the Burland Scale, are predicted which are accepted. This assumes ground conditions are confirmed, as per 4.7. A damage impact assessment of utility assets and the Regent's Canal retaining wall should be undertaken, if required (as 4.4 and 4.5).

4.15. Appropriate structural monitoring of adjacent structures is proposed during the construction period. Trigger values are reasonably conservative to limit damage impacts to within the Category 1 predicted. The Contractor should adopt a monitoring strategy in accordance with the recommendations made, including preparing appropriate contingencies.

4.16. Non-technical summaries should be provided within any revisions to the BIA submitted.

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

5.0 CONCLUSIONS

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

5.2. The presence of any underground utility infrastructure within the zone of influence should be identified. The distance between the proposed development and the retaining wall with the Regent's Canal should be confirmed. Damage impact assessments should be undertaken for any assets within the zone of influence, if applicable.

5.3. A site investigation has confirmed the underlying ground conditions to comprise Made Ground over the London Clay Formation. The site investigation report / logs should be provided for review.

5.4. Groundwater is likely to be encountered during construction. Further groundwater monitoring is recommended prior to construction to inform temporary works design.

5.5. It is accepted that the proposed development will not impact the wider hydrogeological environment. This assumes the site investigation logs will confirm the presented ground conditions.

5.6. It is accepted that the site is at very low risk of flooding. Flood risk mitigation measures proposed should be adopted.

5.7. The development will result in an increase in impermeable site area. The proposed soil cover above the basement roof in the rear garden should be confirmed in accordance with CPG4 Section 2.16.

5.8. Assuming ground conditions are confirmed by presentation of the report / logs, structural calculations, temporary works and the GMA are accepted. Damage impacts of Category 1 (Very Slight) to surrounding structures, in accordance with the Burland Scale, are predicted.

5.9. A reasonably conservative outline methodology and guidance for monitoring structural movements during construction has been provided, which should be adopted.

5.10. Non-technical summaries should be provided within any revisions to the BIA submitted.

5.11. Queries and matters requiring further information or clarification are summarised in Appendix 2. Until the additional information requested has been provided, it is not possible to assess whether the requirements of CPG4 have been met.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Sarah	11 St Mark's Crescent	10 April 2017	Objections to: structural integrity due to proximity of canal and HS2.	Proximity and impact to canal (if any) to be confirmed. HS2 beyond the zone of influence.
Beard	61 Gloucester Avenue	19 April 2017	Objections to: proximity of canal bank.	Proximity and impact (if any) to be confirmed.

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1.	Stability	Underground utility infrastructure within the zone of influence should be identified and risk / impacts assessed, as required.	Open	
2.	BIA	Site investigation data (logs) should be provided for review.	Open	
3.	Stability	Additional groundwater monitoring should be undertaken, as recommended in the BIA. Temporary works should be re-assessed if groundwater levels differ from those currently used for assessment.	Open	N/A – to be undertaken by contractor prior to construction
4.	Hydrology	In line with CPG4 2.16, depth of soil cover above the basement in the rear garden should be a minimum of 1m.	Open	
5.	Stability	The proximity of the retaining wall to the Regent's Canal should be provided. Damage impact should be confirmed if within the zone of influence.	Open	
6.	BIA	Non-technical summaries to be provided	Open	

Appendix 3: Supplementary Supporting Documents

None

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