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106 Highgate Road, London, NW5 1PB

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-55

Revision: F1

September 2017

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Appendix

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 106 Highgate Road, London NW5 1PB (planning reference 2017/0924/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 extension of the existing lower ground floor, to continue at the same level under part of the existing rear garden.

1.5. The BIA, in regards to land stability issues, has been prepared by Michael Chester & Partners. The author's qualifications are not in full accordance with LBC guidance. However, the author's relevant ground engineering experience has been proven.

1.6. The BIA sections for subterranean flow and surface flow and flooding have been prepared by ESI Ltd. The author's qualifications are in accordance with LBC Guidance.

1.7. The original BIA was not informed by a desk study in full accordance with the LBC guidance. In the revised submissions, adequate desk study information has been provided.

1.8. A limited site investigation has been undertaken, which is appropriate to the scale of the proposed development. In the revised submissions, appropriate geotechnical parameters are presented for foundation and retaining wall design purposes.

1.9. The BIA indicates that the proposed development will be founded in the London Clay. The supporting arboricultural report has identified suitable foundation depths in accordance with relevant guidance to avoid shrink / swell movements related to water demand from nearby trees.

1.10. Structural drawings and an outline description of temporary works suitable to the scale of development has been provided. In the revised submissions, outline retaining wall design information has been presented.

1.11. It is accepted that the proposed development will be founded higher than the existing foundations to 106 Highgate Road and the neighbouring terrace houses and as such will not undermine the existing foundations. However, should deeper foundations be required (e.g. due to the presence of roots being encountered during construction, for instance) then impact to the terrace of houses should be further assessed.

1.12. Reference is made to a similar basement extension adjacent to the south of the site (104 Highgate Road). The proposed development appears to be deeper than the 104 extension, and certainly deeper than the garden wall foundations to both adjacent properties. A ground movement and damage impact assessment has been provided, confirming damage will be a maximum of Burland Category 1.

1.13. In the revised submissions, an adequate structural monitoring scheme is proposed.

1.14. In the revised submissions, an outline construction programme is presented.

1.15. In the revised submissions, flood risk is identified as being negligible, which is accepted.

1.16. The development results in a mino increase in impermeable site area. A SUDS assessment is presented.

1.17. Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. Considering the revised submissions the criteria of CPG4 have been met.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 10 March 2017 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 106 Highgate Road, London NW5 1PB, Camden Reference 2017/0924/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 Audit Instruction described the planning proposal as: "Demolition of rear outbuilding and lowering of existing rear patio area with alterations to rear window and door configurations. Lowering of internal ground floor level by 200mm and various internal alterations."

2.6. The planning portal has confirmed that the proposal involves a Grade II listed building within Dartmouth Park Conservation Area.

2.7. CampbellReith accessed LBC's Planning Portal on 17 March 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment for slope stability (ref 16038) dated 5 September 2016 by Michael Chester & Partners.
- Basement Impact Assessment for subterranean flow and surface flow and flooding (ref 65145 R1) dated August 2016 by ESI Ltd.
- Drawings of existing front, rear and side elevations, ground floor, location plans, roof plans and sections (including a lower ground floor substrate section) dated February 2017 by Drawing and Planning.
- Drawings of proposed front, rear and side elevations, ground floor, location plans, roof plans and sections dated February 2017 by Drawing and Planning.
- Planning, Design, Access and Heritage Statement (ref HIRFT) dated February 2017 by Drawing and Planning.
- Flood Risk Assessment (ref 65146.01R1) dated October 2016 by GeoSmart Information Ltd.
- Arboriculture Report (ref 16/046) dated 17 August 2016 by Simon Pryce Arboriculture.

2.8. CampbellReith were provided with the following additional information for audit purposes between June and September 2017:

- Outline Construction Programme.
- SUDS and Flood Risk Assessment dated June 2017 by GeoSmart.
- Response to BIA Audit Report dated May 2017 by Michael Chester & Partners (including calculations, assessments and utilities surveys).
- Email from Michael Chester & Partners including revised Monitoring Strategy Drawings and Desk Study Hydro-Geological Map References.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Updated / proven in revised submissions.
Is data required by Cl.233 of the GSD presented?	Yes	Updated / proven in revised submissions.
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	Updated / proven in revised submissions.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Updated / proven in revised submissions.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Updated / proven in revised submissions.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Updated / proven in revised submissions.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Updated / proven in revised submissions.
Is a conceptual model presented?	Yes	Considering scale of development, development proposals accepted within the context of assessments presented.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Updated / proven in revised submissions.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Updated / proven in revised submissions.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Updated / proven in revised submissions.
Is factual ground investigation data provided?	Yes	The site investigation is limited. However, it is considered appropriate to scale of development.
Is monitoring data presented?	N/A	However, groundwater not encountered in site investigation and development does not extend deeper than current building.
Is the ground investigation informed by a desk study?	Yes	Updated / proven in revised submissions.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	The property adjacent to the south of the site (104 Highgate Road) has reportedly already had an extension of the existing lower ground floor level out into the rear garden.
Is a geotechnical interpretation presented?	Yes	Updated / proven in revised submissions.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Updated / proven in revised submissions
Are reports on other investigations required by screening and scoping presented?	Yes	Updated / proven in revised submissions. Arboricultural Report – indicates suitable foundation depths in line with NHBC standards.

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	Updated / proven in revised submissions.
Are estimates of ground movement and structural impact presented?	Yes	Updated / proven in revised submissions.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	Updated / proven in revised submissions.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Updated / proven in revised submissions.
Has the need for monitoring during construction been considered?	Yes	Updated / proven in revised submissions.
Have the residual (after mitigation) impacts been clearly identified?	N/A	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Updated / proven in revised submissions.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Updated / proven in revised submissions.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Updated / proven in revised submissions.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Updated / proven in revised submissions.

Item	Yes/No/NA	Comment
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. The BIA for slope stability has been prepared by Michael Chester & Partners and the BIA for subterranean flow and surface flow and flooding has been prepared by ESI Ltd. Supporting flood risk, drainage and arboricultural documents have been presented.

4.2. There is not a single BIA report and as such statements within the documents ignore some aspects of the requirements and do not reference each other. However, through discussion with the Engineer it is considered that the revised submissions are adequate to address any queries, given the limited scale of the development..

4.3. The authors' qualifications for the surface flow and flooding and subterranean flow sections are in accordance with CPG4 guidelines. The author's qualifications for the land stability section are not fully in accordance with CPG4 guidelines. However, suitable experience of ground engineering has been demonstrated.

4.4. The original BIA was not informed by a desk study in full accordance with the LBC guidance. In the revised submissions, adequate desk study information has been provided.

4.5. Appropriate Scoping has been undertaken within revised submissions and through discussion with the Engineer.

4.6. The extent of the ground investigation does not follow LBC's Guidance for Subterranean Development (Section 7.2.2) or Eurocode 7. However, considering the limited extent of the proposed development, the extension of the existing lower ground floor to continue at the same level under part of the existing rear garden, it is considered appropriate. The shear strength of the London Clay at founding depth should be confirmed as consistent with the design requirements, during construction.

4.7. Groundwater has not been recorded in the site investigation logs and the proposed development is no deeper than the current lower ground floor level. As such, considering the underlying London Clay is classified as unproductive strata, it is accepted there will be no impact to the wider hydrogeological environment, and encountering perched water of any significant volume during construction is unlikely.

4.8. In the revised submissions, geotechnical parameters suitable for foundation and retaining wall design have been presented.

4.9. Structural drawings and an outline description of temporary works suitable to the scale of development has been provided. In the revised submissions, outline retaining wall design information has been presented.

4.10. The arboricultural report recommends minimum foundation depths, in accordance with NHBC guidelines, considering the nearby trees and the requirement to mitigate against potential shrink/swell risk.

4.11. It is accepted that the proposed development will be founded higher than the existing foundations to 106 Highgate Road and the neighbouring terrace houses and as such will not undermine the existing foundations. However, should deeper foundations be required (e.g. due to the presence of roots being encountered during construction, for instance) then impact to the terrace of houses should be further assessed.

4.12. Reference is made to a similar basement extension adjacent to the south of the site (104 Highgate Road). The proposed development appears to be deeper than the 104 extension, and certainly deeper than the garden wall foundations to both adjacent properties. In the revised submissions, a ground movement and damage impact assessment has been provided, confirming damage will be a maximum of Burland Category 1.

4.13. A brief temporary works sequence is provided in Appendix A of the Michael Chester & Partners BIA. Due to the limited extent of the proposed development, this is accepted. In the revised submissions, ground movements and damage impacts are accepted as being acceptable and will be controlled by monitoring.

4.14. It is accepted that no other residential structures are likely to be impacted by the proposed development. The revised submissions confirm there will be no impact to underground infrastructure.

4.15. In the revised submissions, an adequate structural monitoring scheme is proposed.

4.16. In the revised submissions, an outline construction programme is presented.

4.17. The Flood Risk Assessment states that the site is at very low risk of surface water flooding and is at risk of flooding from reservoirs. The site lies outside of a Critical Drainage Area (as determined by LBC) but Highgate Road was subject to flooding in 1975. In the revised submissions, flood risk is identified as being negligible, which is accepted.

4.18. The development results in a minor increase in impermeable site area. A SUDS assessment is presented.

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

5.0 CONCLUSIONS

5.1. The author's qualifications are / or experience are accepted as appropriate.

5.2. In the revised submissions, suitable desk study / reference information has been provided.

5.3. A site investigation which is appropriate to the scale of the proposed development has been undertaken. Geotechnical parameters suitable for foundation and retaining wall design purposes are presented. These should be confirmed by insitu testing during construction.

5.4. The BIA indicates that the proposed development will be founded in the London Clay. The depth of foundations to mitigate against shrink/swell impacts are stated.

5.5. Structural drawings and an outline description of temporary works suitable to the scale of development has been provided. Outline retaining wall design information has been presented.

5.6. A ground movement and damage impact assessment has been provided, confirming damage will be a maximum of Burland Category 1.

5.7. An appropriate outline methodology and guidance for monitoring structural movements during construction has been provided.

5.8. Flood risk is identified as being negligible, which is accepted.

5.9. The development results in a minor increase in impermeable site area. A SUDS assessment is presented.

5.10. Queries and matters requiring further information or clarification are summarised in Appendix 2. Considering the revised submissions, the requirements of CPG4 have been met.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1.	BIA Format	The BIA should be presented as a single report, including Screening, Scoping, Impact Assessment, Mitigation, Summaries	to be provided as 4.2, 4.5, 4.19, 4.20	Supplementary information accepted
2.	Author's qualifications	Land stability author	Closed	July 2017
3.	Desk study / reference mapping	Evidence for screening assessment / utility infrastructure search	Closed	September 2017
4.	Scoping	Scoping discussion for each impact identified in Screening	N/A	N/A
5.	Site investigation	Shear strength at formation level to be confirmed	Insitu testing to confirm strength in accordance with design, as 4.6.	N/A – during construction
6.	Geotechnical parameters	Geotechnical interpretation in line with GSD G3.	Closed	July 2017
7.	Land Stability	Depth of foundations, structural calculations	Closed	July 2017
8.	Land Stability	Ground movement and damage assessment	Closed	July 2017
9.	Stability	Structural monitoring	Closed	September 2017
10.	BIA Format	Construction programme	Closed	August 2017
11.	Surface Water Flow	Flood risk mitigation measures	Closed	Aug 2017
12.	Surface Water Flow	SUDS Assessment	Closed	Aug 2017

Appendix 3: Supplementary Supporting Documents

Outline Construction Programme

SUDS and Flood Risk Assessment dated June 2017 by GeoSmart

Response to BIA Audit Report dated May 2017 by Michael Chester & Partners (including calculations, assessments and utilities surveys)

Email from Michael Chester & Partners including revised Monitoring Strategy Drawings and Desk Study Hydro-Geological Map References.

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