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106 Highgate Road, London, NW5 1PB

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-55

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Contents

1.0 Non-Technical Summary 1
2.0 Introduction 2
3.0 Basement Impact Assessment Audit Check List 5
4.0 Discussion 9
5.0 Conclusions 12

Appendix

Appendix 1: Residents' Consultation Comments
Appendix 2: Audit Query Tracker
Appendix 3: Supplementary Supporting Documents

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 and should demonstrate input from a Chartered Geologist or experience in ground engineering.

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 BIA has not been informed by a desk study in full accordance with the LBC guidance. The presence or absence of underground infrastructure within the proposed development's zone of influence should be confirmed. Reference mapping to evidence Screening assessments should be provided.

1.8. Scoping discussions should follow from all Screening assessments where potential impacts have been identified.

1.9. A limited site investigation has been undertaken, which is appropriate to the scale of the proposed development. Interpretative geotechnical parameters should be presented suitable for foundation and retaining wall design purposes.

1.10. 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. This should be discussed and recommendations to be adopted should be confirmed in the BIA.

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

1.12. 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.

1.13. 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. The depth of underpinning beneath the extension and garden wall foundations should be confirmed, along with an assessment of movement and resultant damage impacts.

1.14. An outline methodology and guidance for monitoring structural movements during construction should be provided which should reflect the actual ground / structural movements predicted, in accordance with LBC guidance.

1.15. An outline construction programme should be presented.

1.16. 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 flood risk assessment recommends specific mitigation measures are implemented. The BIA should confirm these measures will be incorporated into the final design.

1.17. The development results in an increase in impermeable site area. The drainage report recommends that a SUDS assessment is undertaken in accordance with LBC guidance, and this should be presented.

1.18. 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 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.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	The land stability assessment should include evidence of input by a Chartered Geologist or demonstrable ground engineering experience.
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?	No	Reference mapping to evidence Screening assessment should be provided.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	Not provided.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Reference mapping to evidence Screening assessment should be provided.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Reference mapping to evidence Screening assessment should be provided. However, some relevant information provided in GeoSmart report.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Reference mapping to evidence Screening assessment should be provided. However, some relevant information provided in GeoSmart report.

Item	Yes/No/NA	Comment
Is a conceptual model presented?	No	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	Scoping discussion should confirm comments within the Screening assessment and arboricultural report regarding: London Clay, shrink / swell potential and differential foundation depths.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	Assumptions about the drainage design and discharge flow (Q4 and Q5) require further assessment.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	There is a change in permeable / impermeable site ratio. Attenuation drainage assessment required. Flood Risk Assessment has been provided. Mitigation measures proposed should be adopted within the BIA.
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?	No	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?	No	Not demonstrated.
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?	No	No geotechnical data presented.
Does the geotechnical interpretation include information on retaining	No	Retaining wall referred to in Section 2-2 of Michael Chester and

Item	Yes/No/NA	Comment
wall design?		Partners report (page 6) but no detail provided.
Are reports on other investigations required by screening and scoping presented?	Yes	GeoSmart flood risk and drainage assessment – recommends mitigation and further assessment which should be adopted in the BIA. Arboricultural Report – indicates suitable foundation depths in line with NHBC standards.
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?	No	No impact assessment submitted for subterranean flow or for surface flow and flooding. An impact assessment has been submitted for land stability (section 4).
Are estimates of ground movement and structural impact presented?	No	Depth of underpinning below 104 extension and garden walls to be detailed, movements and damage impact confirmed.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	No impact assessment submitted for subterranean flow or for surface flow and flooding. An impact assessment has been submitted for land stability (Section 4 of Michael Chester and Partners report) but this does not address the matters identified by screening and scoping.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	A temporary works sequence is presented, although without movement / damage assessments no conclusion can be reached as to adequacy. Flood risk mitigation and drainage should be addressed.
Has the need for monitoring during construction been considered?	No	More information is required on the proposed construction including a construction management plan in line with CPG4.

Item	Yes/No/NA	Comment
Have the residual (after mitigation) impacts been clearly identified?	No	To be further assessed, as applicable.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	No structural calculations provided. Ground movement assessment and damage impact assessments required.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	Attenuation in line with CPG4 3.51 should be assessed, as recommended in GeoSmart report.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Assessment of impacts to 104 extension and garden walls required.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	No	No assessment has been provided with the report.
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. A revised BIA should bring together and present all the assessment and recommendations made within each of the documents. Non-technical summaries should be provided in any revised BIA.

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, and should either demonstrate experience of ground engineering or be co-authored by a Chartered Geologist

4.4. The BIA has not been informed by a desk study in line with GSD Appendix G1; reference mapping supporting answers to Screening questions has not been provided and utility companies have not been approached with regards to underground infrastructure. These should be presented.

4.5. Scoping discussions should follow from all Screening assessments where potential impacts have been identified. These should then follow through to a final impact assessment, which discusses assessments presented in the supporting documents and provides final conclusions and recommendations, including mitigation actions to be adopted within the final design or construction activities.

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. Geotechnical data should be presented in an interpretative report in accordance with GSD Appendix G3, including a conceptual site model. Geotechnical parameters required for foundation and retaining wall design should be presented.

4.9. Retaining wall design has been referred to in the BIA but no structural calculations have been provided. Outline retaining wall and foundation design information should be 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. This should be discussed in the BIA and recommendations to be adopted during construction should be confirmed.

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. The depth of underpinning beneath the extension and garden wall foundations should be confirmed, along with an assessment of movement and resultant damage impacts.

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, pending confirmation of the final excavation / underpinning depths and that ground movements and damage impacts are acceptable.

4.14. It is accepted that no other residential structures are likely to be impacted by the proposed development. Once utility infrastructure in the vicinity has been confirmed, damage impacts to any infrastructure within the zone of influence should be assessed.

4.15. An outline methodology and guidance for monitoring structural movements during construction should be provided which should reflect the actual ground / structural movements predicted, in accordance with LBC guidance.

4.16. An outline construction programme should be 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. The flood risk

assessment recommends specific mitigation measures are implemented. The BIA should confirm these measures will be incorporated into the final design.

4.18. The development results in an increase in impermeable site area. In line with CPG4 (Section 3.51), and the recommendations of the GeoSmart report, a drainage solution should be presented incorporating attenuation SUDS to reduce peak discharge rates. In accordance with the guidance, only where attenuation SUDS cannot be practically implemented should direct discharge to sewers be considered.

4.19. Assessments should be reviewed once the additional information required has been presented, and the impact assessment and mitigation proposals updated, as required.

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

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

5.0 CONCLUSIONS

5.1. The BIA is not presented as a single document. Any revised BIA presented should draw together all the discussions and assessment, and confirm final recommendations and mitigation actions.

5.2. The author's qualifications for land stability are not in full accordance with LBC guidance and should demonstrate input from a Chartered Geologist or experience in ground engineering.

5.3. Reference mapping to evidence Screening assessments should be provided. The presence or absence of underground utility infrastructure within the proposed development's zone of influence should be confirmed

5.4. Scoping discussions should follow from all Screening assessments where potential impacts have been identified.

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

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

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

5.8. The proposed development appears to be deeper than the 104 extension and the garden wall foundations to both adjacent properties. The depth of underpinning should be confirmed, along with an assessment of movement and resultant damage impacts.

5.9. An outline methodology and guidance for monitoring structural movements during construction should be provided.

5.10. The flood risk assessment recommends specific mitigation measures are implemented. The BIA should confirm these measures will be incorporated into the final design.

5.11. The drainage report recommends that a SUDS assessment is undertaken in accordance with LBC guidance, and this should be presented.

5.12. 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

None

Appendix 2: Audit Query Tracker

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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	Open – to be provided as 4.2, 4.2, 4.5, 4.19, 4.20	
2.	Author's qualifications	Land stability author	Open – to be provided as 4.3	
3.	Desk study / reference mapping	Evidence for screening assessment / utility infrastructure search	Open – to be provided as 4.4	
4.	Scoping	Scoping discussion for each impact identified in Screening	Open – to be provided as 4.5	
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.	Open – to be provided as 4.8	
7.	Land Stability	Depth of foundations, structural calculations	Open – to be provided as 4.9 – 4.12	
8.	Land Stability	Ground movement and damage assessment	Open – to be provided as 4.12 – 4.14	
9.	Stability	Structural monitoring	Open – to be provided as 4.15	
10.	BIA Format	Construction programme	Open – to be provided as 4.16	
11.	Surface Water Flow	Flood risk mitigation measures	Open – to be confirmed as 4.17	
12.	Surface Water Flow	SUDS Assessment	Open – to be provided as 4.18	

Appendix 3: Supplementary Supporting Documents

None

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