

11 Park Village West,
London NW1 4AE

Basement Impact Assessment
Audit

For
London Borough of Camden

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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 11 Park Village West, London NW1 4AE (planning reference 2019/5484/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 (BIA) 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 carried out and reviewed by individuals who possess suitable qualifications.
- 1.5. The BIA has confirmed that the proposed basement will be founded within London Clay Formation and will be constructed using a combination of underpinning and a contiguous pile wall. The proposed excavation depth ranges between c.3.5m and 5.8m.
- 1.6. It is accepted that the basement will not have a significant impact on the hydrology or hydrogeology of the site.
- 1.7. The BIA and supporting documents should be updated to consider the revised scheme, shown in drawings dated May 2020.
- 1.8. Further clarification is required regarding the underpinning sequence, particularly for the basement wall at the front of the property.
- 1.9. The soil parameters used in the structural calculations should be consistent with those given in the BIA, and should be appropriate for the ground conditions described in the site investigation report.
- 1.10. Further clarification is required to support the bearing capacity and ground heave predictions of the London Clay.
- 1.11. The ground movement and damage category assessments should be revised in line with the comments in Section 4. Consideration of the impact to the listed host building should be provided.
- 1.12. The input data for the software assessment presented in the BIA should be provided.

- 1.13. A movement monitoring strategy is proposed, however, the trigger values should be revised to reflect the updated ground movement assessment.
- 1.14. A number of queries have been raised and are summarised in Appendix 2. It cannot currently be confirmed that the proposal adheres to the requirements of the CPG Basements.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 27 May 2020 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 11 Park Village West, London NW1 4AE.
- 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
- Camden Local Plan 2017 - Policy A5 Basements.
 - Camden Planning Guidance: Basements. March 2018.
 - Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- 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 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 level underneath existing side garage addition plus side extensions at lower ground and first floor levels in association with provision of lift; hard and soft landscaping to rear"*.
- The Audit Instruction also confirmed the property is a Grade II* listed building.
- 2.6. CampbellReith accessed LBC's Planning Portal on 15 June 2020 and gained access to the following relevant documents for audit purposes:
- Basement Impact Assessment (BIA) by QED Structures Limited, ref. 19-167, rev 01, dated 18/10/2019.

- Presented within Appendix 10.10 of the BIA by QED: Basement Impact Assessment Report by Soiltechnics Ltd, ref. STR4808-BIA01, rev 01, dated October 2019.
- Presented within Appendix 10.2 of the BIA by QED: Site Investigation Data by Soiltechnics Ltd, ref. STR4808-G01, rev 1, dated September 2019.
- Presented within Appendix 10.5 of the BIA by QED: Structural Engineers Calculations by QED, ref 19-167, dated 15 October 2019.
- Presented within Appendix 10.6 of the BIA by QED: Arboricultural Report and Impact Assessment by Crown Tree Consultancy, ref. 10347, dated 8 October 2019.
- Presented within Appendix 10.7 of the BIA by QED: Flood Risk Assessment and Drainage Statement by Infrastruct CS Ltd, ref. 3557-PARK-ICS-XX-RP-C-001, rev 1, dated 13 August 2019.
- Planning Application Drawings (revised 14 May 2020) consisting of a Location Plan, Existing Plans & Sections and Proposed Plans & Sections.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes / No / NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Soiltechnics BIA reviewed by an independent reviewer who holds a CGeol qualification.
Is data required by Cl.233 of the GSD presented?	Yes	However, documents do not reflect updated drawings dated May 2020.
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 plan/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	
Is a conceptual model presented?	Yes	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	N/A	No items brought forward.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	N/A	No items brought forward. A Flood Risk Assessment has been carried out due to the site being within a Critical Drainage Area.
Is factual ground investigation data provided?	Yes	Appendix 10.2 of the BIA.
Is monitoring data presented?	Yes	Section 6.2.2 of the Soiltechnics BIA indicates 2 groundwater monitoring rounds were undertaken.
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?	No	Assumed neighbouring property No. 10 has a lower ground floor at the same level as No. 11, and that the foundations will be comparable.
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	No	Only density, angle of shearing resistance and undrained shear strength parameters provided. No parameters provided for Made Ground.
Are reports on other investigations required by screening and scoping presented?	N/A	None required, however, a flood risk assessment and an arboricultural survey have been provided.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	No	Ground Movement Assessment (GMA) requires further consideration. Heave estimates due to basement excavations are provided.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	No	The GMA requires further consideration in order to confirm stability.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	However, any mitigation should be revised once the GMA has been updated.
Has the need for monitoring during construction been considered?	Yes	However, trigger levels should be revised to reflect the updated GMA.
Have the residual (after mitigation) impacts been clearly identified?	Unknown	The GMA requires further consideration to address the impact to slope stability.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Further consideration of the GMA is required.
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?	No	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	However, further assessment is required.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried out by Soiltechnics Ltd and forms part of a larger BIA document produced by QED Structures Ltd. The individuals involved in the production of the BIA hold suitable qualifications.
- 4.2. The LBC Instruction to proceed identified that the property is a Grade II* listed building. The surrounding properties in Park Village West are also Grade II* listed.
- 4.3. The proposed development comprises the construction of a new basement below the lower ground floor level of the existing building. The basement will underlie the southeast half of the building and will extend into the rear garden. The QED BIA indicates the basement will be constructed using a combination of underpinning and a contiguous pile wall. According to the BIA, and due to site topography, the proposed excavation depth ranges between c.3.5m (east) and 5.8m (west).
- 4.4. The BIA has been compiled using a previous scheme for the development. Revised drawings were submitted in May 2020, which shows a slightly different profile of the basement where it extends beyond the building to the rear. For the purposes of this audit it is assumed that this change is not significant to the considerations relating to the BIA, however the revised scheme should be presented in the updated BIA and associated documents.
- 4.5. A site investigation carried out by Soiltechnics indicated the underlying soils comprise Made Ground to a maximum depth of 1.5m, with London Clay below this, extending to depth.
- 4.6. No groundwater was encountered during the site investigation works, and two subsequent groundwater monitoring rounds indicated water levels of 7.27m and 7.31m below ground level, in a standpipe extending to 8m depth. The Soiltechnics BIA indicates this level is 1.85m below the underside of the finished basement floor slab.
- 4.7. The London Clay is indicated to be an Unproductive Strata. As such, it is accepted that the development will not significantly impact the hydrogeology at the site.
- 4.8. The hydrology screening exercise did not identify any issues to be considered further, however a Flood Risk Assessment (FRA) has been completed due to the site being within a critical drainage area. A medium risk of overland and groundwater flooding was identified at the site and recommended mitigation measures include pumped drainage for surface water accumulating in the basement lightwell. It is accepted that the proposed development will not adversely impact the hydrology of the site.
- 4.9. The slope stability screening exercise identified that the site includes slopes of more than 7 degrees. The surrounding area was identified to include slopes up to 10 degrees, falling to the

east. A topographic survey of the site indicates a level of 13.00m OD at the front of the property, falling to 9.25m OD in the eastern corner of the site.

- 4.10. The basement will be formed by underpinning using reinforced concrete retaining walls where the basement underlies the existing house, and using a contiguous pile wall where the basement extends beyond the existing building footprint. The piles are indicated to be 350mm diameter and spaced at 500mm centres. A reinforced concrete retaining wall will then be cast against the pile wall.
- 4.11. Section 7.2.4 of the QED BIA indicates the underpins will be formed in short sections not exceeding 1.0m wide. The underpinning will be carried out using a sequence that ensures a distance of at least 3.0m between excavations. A sequence for the underpinning work is shown on drawing 02 within Appendix 10.5. The underpin for the wall at the front of the property is shown to extend the full length of the wall, exceeding the stated 1.0m width. Further clarification of the proposed underpinning sequence in this area is required.
- 4.12. The retaining wall design for the underpin wall in Appendix 10.5 indicates the use of a 250mm long heel in the underpin retaining wall design. Clarification is required regarding the use of a heel in the underpinning works.
- 4.13. Section 7.2.3 of the Soiltechnics BIA report (Appendix 10.10) indicates that there will be no change to loadings from the existing building and that the ULS case will be satisfied due to shear strength increasing with depth. While appears to be correct that the existing structure loads remain the same, the ULS case of bearing capacity needs rechecking due to additional dead and live loads being imposed on the ground from the proposed development. It is requested that this Section is revised accordingly.
- 4.14. Structural calculations for the basement retaining walls are presented in appendix 10.5 of the QED BIA. The soil parameters used in the structural design differ from those indicated in Section 7.1.1 of the QED BIA, and in places the retained soil is indicated to be 'medium dense well graded sand'. Soil parameters should be used consistently in all structural calculations, and should reflect the ground conditions encountered and the parameters presented in the BIA. Soil parameters for the Made Ground should be provided.
- 4.15. Section 7.2.2 of the QED BIA indicates a net allowable bearing pressure of 320kN/m² for the London Clay at basement slab level. Justification of this value is requested.
- 4.16. Section 7.2.12 of the QED BIA estimates less than 10mm heave in the short term and long term heave on the order of 15mm. Further clarification and/or calculations should be provided to support this assessment.

- 4.17. Section 7.3 of the QED BIA presents a ground movement and damage impact assessment. The Ground Movement Analysis (GMA) is indicated to have been undertaken in accordance with guidance provided within CIRIA C760 assuming 'stiff clay' conditions and a 'high stiffness' wall. Whilst the CIRIA approach is intended for embedded retaining walls, it is accepted that this approach can predict ground movements within the range typically anticipated for underpinning techniques carried out with good control of workmanship. This section goes on to discuss an analysis carried out using XDisp software to determine a damage category for the adjacent property at No. 10 Park Village West. It is requested that the anticipated long-term movement and proposed additional loads are included in the GMA and damage assessment.
- 4.18. The GMA should take account of the varying topography and the deeper excavation required for the lift pit and towards the front (west), where the proposed excavation will be up to c.5.8m deep.
- 4.19. The GMA assumes the neighbouring property at No.10 has foundations at a depth of 0.85m, and that therefore the maximum excavation depth assessed is 2.65m. The results of the assessment indicated that damage will not exceed Burland Category 1 (Very Slight) for all walls assessed. The input geometry and parameters should be provided for the XDisp analysis along with a plan showing the adopted numbering for the walls considered. The GMA and damage assessments should also consider the impact to the host property, because of its Grade II* listed status.
- 4.20. Section 7.4 of the QED BIA recommends that adjacent structures and party walls should be monitored throughout demolition and construction works. The proposed trigger levels of 6mm and 10mm seem reasonable but are generic and should be revised once the GMA has been updated, to reflect the amount of ground movement estimated.

5.0 CONCLUSIONS

- 5.1. The BIA has been carried out and reviewed by individuals who possess suitable qualifications.
- 5.2. The BIA has confirmed that the proposed basement will be founded within London Clay Formation and will be constructed using a combination of underpinning and a contiguous pile wall. The proposed excavation depth ranges between c.3.5m and 5.8m.
- 5.3. It is accepted that the basement will not have a significant impact on the hydrology or hydrogeology of the site.
- 5.4. The BIA and supporting documents should be updated to consider the revised scheme, shown in drawings dated May 2020.
- 5.5. Further clarification of the underpinning sequence is required, particularly for the basement wall at the front of the property. Clarification of the use of a 250mm long heel in the underpin design is also required.
- 5.6. The soil parameters used in the structural calculations should be consistent with those given in the BIA, and should be appropriate for the ground conditions described in the site investigation. Soil parameters for the Made Ground should be provided.
- 5.7. Further clarification is required to support the bearing capacity and ground heave predictions of the London Clay.
- 5.8. The Ground Movement Assessment (GMA) should be revised in line with the comments presented in Section 4, and the damage assessment should be updated accordingly. Consideration of the impact to the listed host building should also be provided.
- 5.9. The input data for the XDisp assessment should be provided.
- 5.10. A movement monitoring strategy is proposed however the trigger values should be revised to reflect the updated GMA.
- 5.11. A number of queries have been raised and are summarised in Appendix 2. It cannot currently be confirmed that the proposal adheres to the requirements of the CPG Basements.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	The BIA and associated documents should be updated to reflect the revised scheme.	Open	
2	Stability	Clarification of the underpinning sequence and the use of a heel in the retaining wall design is required.	Open	
3	Stability	Soil parameters used in the structural calculations should be consistent with those presented in the BIA. Parameters for Made Ground should be provided.	Open	
4	Stability	Further clarification is required to support the bearing capacity and ground heave predictions of the London Clay.	Open	
5	Stability	The ground movement assessment and damage assessment should be revised to consider the proposed additional loads and long-term movements.	Open	
6	Stability	The input data for the XDisp assessment and plan with numbered walls should be provided.	Open	
7	Stability	Consideration of the impact to the listed host building should also be included in the ground movement and damage category assessments.	Open	
8	Stability	The monitoring strategy trigger values should be revised to reflect the ground movement assessment.	Open	

Appendix 3: Supplementary Supporting Documents

None

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