CampbellReith
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13a Pond Street
London
NW3 2PN

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12727-46
Revision: F1

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Contents

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 13a Pond Street NW3 2PN (planning reference 2017/6907/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 Basement Impact Assessment (BIA) and structural report has been carried out by those holding appropriate qualifications.

1.5. It has been identified that the entire terrace of adjacent properties located on Pond Street are Grade 2 listed.

1.6. It is proposed to demolish the existing building with the retention of the single storey extension only, with a new four storey property including single basement level proposed alongside the retained single storey.

1.7. The basement walls are proposed to be formed using piling methods, with concrete floors and liner walls. This is accepted as an appropriate structural form for the proposed basement in respect of the identified ground conditions.

1.8. An appropriate site investigation has been carried out, including investigation of ground water levels.

1.9. The ground conditions have been identified as a moderate depth of made ground overlaying London Clay. Ground water was observed at a relatively shallow depth below ground level.

1.10. The basement is to found below the anticipated ground water level. However, an appropriate construction method has been proposed to account for this, and the impact on ground water flows is accepted as being negligible.

1.11. An outline structural design for the basement walls has been provided.

1.12. Appropriate SUDs have been considered for the proposal.

1.13. Movement monitor strategy for the surrounding properties has been presented.

1.14. A ground movement assessment has been produced that predicts damage category 1 for the immediate neighbouring structures which are grade II listed.

1.15. It is accepted that nearby rail assets are outside of the zone of influence of the proposed site.

1.16. It is accepted that there are no slope stability concerns regarding the proposed development.

1.17. It is confirmed that the site is in an area that has been identified as having a low risk of flooding.

1.18. An outline works programme has been provided.

1.19. Given the above it can be confirmed that the proposal confirms to the requirements of CPG4. A number of queries summarised in appendix 2 have been closed.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 12/02/18 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 13a Pond Street, NW3 2PN, planning ref: 2017/6907/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.
- 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;

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 the two-storey former stable and cottage. Replacement with a 3-storey extension, plus the formation of a new single storey basement. Alterations to existing 1969 extension. Refurbishment of existing roof terrace, and associated landscaping.*"*

The Audit Instruction also confirmed 13a Pond street involved, or was a neighbour to, listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 5/03/18 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment, Revision 3 – Chelmer Global Ltd
- Structural Report and Basement Impact Assessment, Rev 7 - Entuitive
- Planning Application Drawings, 25/05/16 – Gianni Botsford Architects
  consisting of;
  - Location Plan
  - Existing plans, elevations, and sections
  - Proposed plans, elevations, and sections
- Design & Access Statement, 27/11/17 - Gianni Botsford Architects
- Heritage Assessment, October 2017 - HeritageCollective
- Planning comments – Where pertinent to scope of audit

2.7. CampbellReith received additional information requested in the rev. D1 via the Portal on 26/04/18 and gained access to the following relevant documents:

- Transmittal - 00009
- 180426 13a Pond Street - BIA Audit Response COMPLETE
- 180426 13a Pond Street - BIA Audit Response
- CGL - Ground Movement Assessment, by CGL dated April 2018
- Chelmer - Geo-environmental Interpretative Report by Chelmer Consultancy Services, dates 20th February 2017
- DAS - p.34 Surfacing
- DAS - p.35 Green Roof
- Retaining Wall - Preliminary Design RW01-03
- SES - Section 2.4 SUDS
- DAS - p.37 SUDS

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Those involved with the production the BIA and Structural Report hold CGeol and MIStructE accreditation respectively
Is data required by Cl.233 of the GSD presented?	Yes	An outline works programme has been submitted
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	An appropriate statement of justification has generally been provided for all 'no' answers
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	An appropriate statement of justification has generally been provided for all 'no' answers
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	An appropriate statement of justification has generally been provided for all 'no' answers
Is a conceptual model presented?	Yes	Section 4 of the basement impact assessment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	While a formal scoping discussion is not present, some scoping is provided within the responses to the screening questions
Hydrogeology Scoping Provided?	Yes	While a formal scoping discussion is not present, some scoping is

Item	Yes/No/NA	Comment
Is scoping consistent with screening outcome?		provided within the responses to the screening questions
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	While a formal scoping discussion is not present, some scoping is provided within the responses to the screening questions
Is factual ground investigation data provided?	Yes	Factual ground investigations report
Is monitoring data presented?	Yes	
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	Reference is made to a site walkover being undertaken in January 2017
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	The GMA states that a number of the surrounding buildings contain existing basements.
Is a geotechnical interpretation presented?	Yes	Geotechnical interpretation has been submitted as part of the additional information submitted.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	A ground movement assessment has been produced
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	The conceptual model includes the presence of neighbouring basements
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	

Item	Yes/No/NA	Comment
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	
Has the need for monitoring during construction been considered?	Yes	Recommendation for movement monitoring strategy has been submitted as part of the additional information submitted.
Have the residual (after mitigation) impacts been clearly identified?	No	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Damage Category 1 has been predicted for No. 13 and 15 Pond Street.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	SUDs measures are proposed
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Category 1 is predicted for the immediately neighbouring properties. It is accepted that the damage category will not be greater than 1 for further away properties.
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Chelmer Global Ltd, who are a well known firm of Geotechnical & Environmental Associates. The individuals concerned in its production hold suitable qualifications.

4.2. The Structural Report has similarly been produced by Entuituve, an established firm of Structural engineering consultants, with the author holding the appropriate qualifications for assessment of stability.

4.3. The LBC Instruction to proceed with the audit identified that the basement proposal either involved a listed building. The Design & Access Statement identified that the entire terrace of adjacent properties located on Pond Street are Grade 2 listed.

4.4. The proposal consists of the partial demolition of the existing two storey building, with the retention of the large single storey extension. In place of the demolished property, a new four storey property is proposed which includes a single basement level.

4.5. The basement is proposed to be formed of a 350mm diameter secant piled wall with RC capping beam, with a 100mm RC liner wall. A ground bearing RC basement slab, and RC ground slab, are proposed to form a RC box within the piled wall. The general basement excavation is to be 4.1mbgl in depth, with localised deeper excavations to 4.5mbgl and 4.9mbgl for planting and mechanical plant.

4.6. Site investigations were carried out in 2016, which consisted of two 10m boreholes, and a number of trial pits to investigate the foundations to the existing property and its extension. Two return ground water monitoring visits were undertaken in January 2017.

4.7. The ground conditions have been identified as up to 2m of made ground overlaying London Clay to depth. Ground water was not identified during drilling, however it was recorded during the two return monitoring visits at depths recorded of up to 4.90mbgl in BH1, and 0.97mbgl in BH2.

4.8. The basement is to found within the London Clay at a general depth of 4.1mbgl, with the basement foundation level is below that of the maximum recorded groundwater level by 3.5m. It is stated that the permeability of the London Clay is expected to be very low, and therefore the basement is not anticipated to significantly impact on ground water flows which would be present predominantly within the made ground.

4.9. It is accepted that the basement is unlikely to impact on the wider ground water flows, other than locally within the immediate vicinity of the basement, due to its detached nature, and shallow flows on top of the largely impermeable London clay. However due to the large variation in ground water levels recorded it is suggested that ground water monitoring continue in order to better understand the variation in local ground water levels.

4.10. The construction method is described as being carried out in a bottom up sequence, with excavation carried out inside of the piled wall and temporary propping provided as the ground level is reduced. The basement slab is then to be constructed to provide a permanent prop to the base of the piled wall, with the liner walls and internal RC walls constructed internally, with the ground slab constructed at the head of the piled wall providing a permanent prop. Ground water is described as being excluded in the temporary case by the secant piled wall. It is accepted that the provided description of the temporary works demonstrates the feasibility of providing stability at all times during construction.

4.11. Outline structural calculations have been provided demonstrating the feasibility of the proposal as part of the additional information package submission.

4.12. Soil properties relating to retaining wall design have been provided as part of the additional information submission. These are based on the factual site investigation information and utilise the outline retaining wall design.

4.13. The basement is to extend outside of the footprint of the existing building by a small amount at the front and the rear. SUDs measures have been considered which consist of green roof with overflow going to be stored in the greywater storage tank below ground level, which will be used for irrigation of the garden. It is stated that the existing stone pavement is going to be replaced with lawn allowing permeability. A soakaway is also proposed in the rear garden.

4.14. A recommendation is made for ground movement monitoring within the BIA and the Ground Monitoring Strategy has been proposed as part of the additional information provided. The monitoring strategy is proposed to be in accordance with the 'Observational Method' define in CIRIA Report R185. Monitoring data will be checked against predefined trigger limits to demonstrate they are below the predicted horizontal and vertical movements.

4.15. Short and long term heave displacements are provided in the BIA for the differing basement depths and areas of the proposed basement. It is stated that the basement slab will be designed to resist a heave pressure of 34kPa with an appropriate reinforcement, which will be designed in the detailed design stage.

4.16. A ground movement assessment has been provided, where vertical movements are calculated using PDISP method. Horizontal movements are presented in form of a tables as described in CIRIA580. Consideration has been given to the presence of neighbouring basements, with only single storey structures to number 13 and 15 Pond Street considered for damage category determination. As part of the additional information submission, the revised Ground Movement Assessment has proven the grade II listed properties No. 13 and 15 Pond Street fall within damage category 1 on Burland scale.

4.17. The movements have utilised the values associated with contiguous piled wall construction, rather than those associated with secant piled wall construction which are more onerous. However, it is accepted that movements will not be significant with adequate control of workmanship.

4.18. An outline works programme has been provided, which indicates main phases of work and durations.

4.19. It is stated that a railway tunnel runs 52m north of the site, and a Northern Line tunnel runs 114m south west of the site. While no evidence of consultation has been provided with these asset owners, it is accepted that the site is not likely to fall within safeguarding or influence zones of these public assets.

4.20. It is accepted that there are no slope stability concerns regarding the proposed development.

4.21. It is confirmed that the site is in an area that has been identified as having a low risk of flooding. This is accepted.

4.22. Given the above it can be confirmed that the proposal confirms to the requirements of CPG4. A number of queries summarised in appendix 2 have been closed.

5.0 CONCLUSIONS

5.1. The Basement Impact Assessment (BIA) has been carried out by a well-known firm of Geotechnical & Environmental Associates. The individuals concerned in its production hold suitable qualifications.

5.2. The Structural Report has similarly been produced by an established firm of Structural engineering consultants, with the author holding the appropriate qualifications for assessment of stability.

5.3. It has been identified that the entire terrace of adjacent properties located on Pond Street are Grade 2 listed.

5.4. It is proposed to demolition the existing building with the retention of the single storey extension only, with a new four storey property including single basement level proposed alongside the retained single storey.

5.5. The basement is proposed to be formed of a secant piled wall, with internal RC box, with the basement slab ground bearing. The general basement excavation is to be 4.1mbgl in depth, increasing up to 4.9mbgl locally.

5.6. A site specific SI has been carried out consisting of two boreholes and trial pits. A brief period of ground water monitoring was undertaken.

5.7. The ground conditions have been identified as a moderate depth of made ground overlaying London Clay. Ground water was observed as at a maximum level of 0.97mbgl during a brief period of monitoring.

5.8. The basement is to found below the anticipated ground water level. It has been concluded that ground water flows are not significant and would occur primarily above the Clay within the made ground, which has been deemed as having a low permeability. This conclusion is agreed with and it is accepted that wider ground water flows are unlikely to be impacted.

5.9. A bottom up construction sequence is proposed with temporary propping described as being provided to the secant piled walls at all times until the permanent RC box is constructed. This is accepted as an appropriate method of construction.

5.10. Soil engineering properties specific to retaining wall design, along with an outline retaining wall structural design have been submitted as part of the additional information requested.

5.11. The basement is to extend beyond the footprint of the existing building, beneath areas of hardstanding. Appropriate outline SUDs measures have been considered.

5.12. A recommendation is made for ground movement monitoring within the BIA and the Ground Monitoring Strategy has been proposed as part of the additional information provided.

5.13. It is accepted the basement slab will be designed to resist a heave pressure with an appropriate slab reinforcement.

5.14. A GMA has been produced that predicts damage category 1 for 13 and 15 Pond Street.

5.15. It is accepted that nearby rail assets are outside of the zone of influence of the proposed site.

5.16. It is accepted that there are no slope stability concerns regarding the proposed development.

5.17. An outline works programme has been provided that indicates main phases of work and durations.

5.18. It is confirmed that the site is in an area that has been identified as having a low risk of flooding.

5.19. Given the above it can be confirmed that the proposal confirms to the requirements of CPG4. A number of queries summarised in appendix 2 have been closed.

Appendix 1: Residents' Consultation Comments

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Residents' Consultation Comments

Paraphrased objections pertinent to the scope of this audit are presented.
Where the same or a similar objection has been raised more than once, it has only been listed in the first instance it was received.

Surname	Address	Date	Issue raised	Response
Davey	17a Pond Street	-	Unacceptable risk to stability and integrity of surrounding properties	The applicant has adequately demonstrated the predicted damage category and measures to mitigate the risk associated with the damage to the surrounding properties.
Othick	Flat 3, 33 Hill Gardens	-	Consideration of movement of ground water	The applicant has investigated ground water levels and identified that ground water flows are not strategic to the wider area and not likely to constitute a significant volume. Therefore the basement is not anticipated to cause significant disruption to flows, and rather will displace mostly perched water. This conclusion is accepted.
Harding	-	-	Inadequate ground water monitoring	It has been demonstrated that ground water flows are not likely to be significant due to the impermeability of the underlying clay soil and the identified geology, with the ground water monitoring undertaken during the winter months considered as appropriate to identify an snapshot of the characteristic ground water level at that time of year.
Harding	-	-	Disruption to ground water flows, and misinterpretation of permeability of clay soil.	It is felt that the applicant has adequately assessed the geological and hydrogeological conditions with respect to ground water flows, which are anticipated as being low. The description of the clay provided is consistent with a low permeability soil.

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Hydrogeology	Further details of the existing site drainage are required in order to demonstrate that the discharge to the surface water system is not increasing. SUDs should be considered if the surface water discharge is found to be increasing.	Closed	21/05/18
2	Stability	Parameters associated with retaining wall design are required to enable design of the retaining wall	Closed	21/05/18
3	Stability	Outline structural design is required of the retaining wall in order to demonstrate the feasibility of the structural proposal	Closed	21/05/18
4	Stability	Confirmation that ground movement monitoring is to be adopted during the works, in order to effectively limit movements to those predicted with the GMA.	Closed	21/05/18
5	Stability	Confirmation as to how ground heave is to be structurally resisted or mitigated in line with recommendations made in BIA report.	Closed	21/05/18
6	Stability	Inclusion of listed buildings on Pond Street for damage category determination, and all surrounding buildings that fall within the zone of influence of the basement excavation.	Closed	21/05/18
7	Stability	GMA to be revised to use values associated with movements of secant piled walls in accordance with the proposed structural solution.	Closed	21/05/18
8	General	An outline works programme is required detailing the main phases of works and their durations.	Closed	21/05/18

Appendix 3: Supplementary Supporting Documents

None