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231 Goldhurst Terrace, NW6 3EP

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12066-33

Revision: D1

August 2015

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	28/08/15	Comment	SKjw12066-33-280815 D1.doc	SK	EMB	EMB

Document Details

Last saved	28/08/2015 10:27
Path	SKjw12066-33-280815 D1.doc
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Project Number	12066-33
Project Name	Camden BIA Audits
Planning Reference	2015/2384/P

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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 231 Goldhurst Terrace, London NW6 3EP (planning reference 2015/2384/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 BIA, Flood Risk Assessment and Basement Structural Method Statement (BSMS) have been prepared by individuals who possess suitable qualifications.

1.5. The BIA has confirmed that the proposed basement will be founded within the London Clay.

1.6. It is unlikely that the groundwater table will be encountered during basement foundation excavation. However, also refer to point 1.9.

1.7. The site lies within a street identified as being at risk of flooding. However, the FRA indicates that this risk applies to the far end of the street only.

1.8. An assessment of expected ground movement has been carried out. However, as will be discussed later in this report, there are queries regarding this assessment.

1.9. The BIA discusses the discovery of foul water within the bore holes. It is suggested this is from damaged drain runs in the local vicinity and suggests these will be repaired as part of the works. A CCTV survey should be carried out to try to obtain the cause of this.

1.10. It is accepted that the surrounding slopes to the development site are stable and that any slopes are below the 7^{o} gradient threshold.

1.11. It is noted that the Ground Investigation suggests maximum allowable bearing pressures should be assumed to be 70-112kN/m^2. However, the BSMS uses a value of 120kN/m^2. Further clarification should be provided to justify this.

1.12. The depth of adjacent property foundations is yet to be confirmed. The public footpath lies further than 5m away from the excavation and so should not be affected by the works.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 17/07/15 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 231 Goldhurst Terrace, NW6 3EP, 2015/2384/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 *"Excavation at basement level for ancillary floorspace with front and rear lightwells, erection of a single storey rear extension with bay window and roof lantern, installation of external staircases between the ground floor and basement, new lift platform to the front, disabled ramp to the rear elevation and new decking area to the rear."*

2.6. CampbellReith accessed LBC's Planning Portal on 18th August 2015 and gained access to the following relevant documents for audit purposes:

- 231 Goldhurst Terrace Design Statement
- Basement Impact Assessment
- Block Plan
- Location Plan18112014
- Existing Drawings
- Proposed Drawings.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	YES	See page 1 of BIA
Is data required by Cl.233 of the GSD presented?	NO	No programme of works provided.
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	Various maps and plans throughout BIA and appendices
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	YES	See BIA table 4, Section 10.1
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	YES	See BIA table 4, Section 10.1
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	YES	See BIA table 4, Section 10.1
Is a conceptual model presented?	YES	Not referred to as a Conceptual Model, however, detailed Site Description (section 2.1), Ground Conditions (Section 12.2) and Site Settings (Section 13.2) are provided.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	YES	See BIA table 5, Section 10.2

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	YES	See BIA table 5, Section 10.2
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	YES	See BIA table 5, Section 10.2
Is factual ground investigation data provided?	YES	See BIA Section 12 and Appendix C
Is monitoring data presented?	YES	See BIA Section 12.5
Is the ground investigation informed by a desk study?	YES	See BIA Section 13.1
Has a site walkover been undertaken?	YES	Stated in BIA Section 13.1
Is the presence/absence of adjacent or nearby basements confirmed?	NO	Not confirmed. Refer to BIA Section 13.8.
Is a geotechnical interpretation presented?	YES	See BIA Section 12
Does the geotechnical interpretation include information on retaining wall design?	YES	See BIA Section 13.6
Are reports on other investigations required by screening and scoping presented?	YES	See BIA Section 11 and 12, and Appendix C and D for FRA and GI.
Are baseline conditions described, based on the GSD?	YES	See BIA Table 4
Do the base line conditions consider adjacent or nearby basements?	YES	See BIA Table 4, although further investigation required.
Is an Impact Assessment provided?	YES	See BIA Section 13
Are estimates of ground movement and structural impact presented?	YES	See Section 1 of the 'Basement Structural Method Statement', however methodology not clear.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	YES	See BIA Section 13
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	YES	See BIA Table 5
Has the need for monitoring during construction been considered?	YES	See Section 1 of the 'Basement Structural Method Statement'
Have the residual (after mitigation) impacts been clearly identified?	YES	See BIA Section 10.2
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	NO	See Section 1 of the 'Basement Structural Method Statement'
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	YES	Attenuation and grey water recycling proposed to minimise additional run-off to public sewer. This will require agreement with Thames Water.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	NO	No clear assessment of ground movements and impacts on adjacent structures.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	NA	Methodology is not clear and needs re-submitting before the Burland Category can be confirmed.
Are non-technical summaries provided?	YES	Overall summary provided on page 2 of the BIA

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by engineering geologists, Ashton Bennett, and the individuals concerned in its production have suitable qualifications.

4.2. The Basement Structural Method Statement (BSMS) has been carried out by engineering consultants, Croft Structural Engineers. The reviewer is a chartered structural engineer. No evidence is provided that the structural assessment has been made in conjunction with a Chartered Geologist (as required in CPG4), however, the report lists that they have extensive experience in completing 120 basements in the last 4 years.

4.3. The LBC Instruction to proceed with the audit identified that there are no listed buildings present and the BIA agrees with this statement.

4.4. The proposed works include lowering an existing undercroft to form a basement under the entire footprint of the building. This basement will also extend to the rear of the property. A new lightwell will form a separate entrance at the front. It is proposed to excavate approximately 1.5m to form a 2.5m deep basement space.

4.5. The BIA has identified the basement (and associated underpins) will extend into the London Clay Formation. The Ground Investigation confirms that the depth of Made Ground is relatively shallow at 0.20-0.80m, beneath which is London Clay of increasing strength.

4.6. The BSMS discusses the underpinning construction sequence. This sequence is described in detail with mention of maximum dimensions for underpins that can be carried out in each dig as well as timescales between pours. Sequence of underpinning drawings are also provided. Structural analysis has been carried out to confirm reinforcement of pins and propping positions. This analysis makes suitable assumptions on loading including hydrostatic pressures from the water table rising. There is no mention of the need to provide heave protection below the basement slab in the BSMS. However, this is suggested as a requirement in the main BIA in Section 10.2.

4.7. It is noted that the Ground Investigation suggests maximum allowable bearing pressures should be assumed to be 70-112kN/m^2. However, the BSMS uses a value of 120kN/m^2. Further clarification should be provided to justify this.

4.8. The design of the basement has been checked for overall buoyancy of the structure during peak groundwater levels. This concludes that the structure is not buoyant.

4.9. The BIA, Flood Risk Assessment and Basement Structural Method Statement were all written towards the end of 2014, suggesting all parties were referring to similar documents at the time.

4.10. Groundwater was encountered in the boreholes, although, this was later confirmed through testing, to be foul water. It is suggested, in the BIA, that this is from damaged or leaking foul drainage runs in the local vicinity of the site. These are to be repaired as part of the construction works. We accept this is a sensible assumption and solution.

4.11. Although groundwater is not expected to be encountered during excavation, provision for sump pumping has been suggested and the BIA states that any softened materials should be removed. The design of the underpin retaining walls has allowed for worst case water levels at ground level. The basement is to be tanked to account for any water that penetrates through the underpin retaining wall.

4.12. An assessment of expected movement to adjacent properties has been based calculated and has classified anticipated damage as Category of Damage 0, although the damage is described as negligible to slight which equates to Burland Category 0 to 2. It is stated that minor repairs to hairline cracks to neighbouring properties will be carried out where required. However, it is not clear which building the assessment relates to and more detail is required to confirm that the assessment is adequate and has been correctly applied. No assessment has been made of the settlement of the underpins.

4.13. There are several assumptions and statements in the ground movement assessment (GMA) that need justification. These are:

- The figure at the start of the GMA appears to show the property being underpinned as opposed to the neighbouring property being assessed for movement. It is not clear which building /part of building is being assessed.
- The estimate of movement for installation seems adequate, however, the assessment for movements due to excavation assume a high stiffness support, confirmation is required that this is appropriate for a cantilevered wall.
- The plotted ground movement does not appear to agree with the figures predicted.
- It is not clear where vertical ground movements have been considered.
- The BSMS states damage will be 'Negligible to Slight Category 0'. This is confusing - Negligible is Category 0 (hairline crack) and Slight is Category 2 (cracks up to 5mm).

4.14. It is noted that the current adjacent foundations are unknown, and it is recommended that further investigation is undertaken to confirm foundations depths in this area. However, the assumption of the absence of a basement is conservative with respect to the building damage assessment.

4.15. No proposals are provided for a movement monitoring strategy during excavation and construction.

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

5.0 CONCLUSIONS

5.1. The BIA and BSMS have been carried out by engineering consultants using individuals who possess suitable qualifications, other than the authors of the BSMS not identifying suitable expertise in engineering geology.

5.2. The BIA has confirmed that the proposed basement will be founded within the London Clay. It should be confirmed that the bearing strata has an adequate bearing capacity.

5.3. It is unlikely that the groundwater table will be encountered during basement foundation excavation. However, proposal for the removal of water from the excavation during construction are provided.

5.4. It is recommended that further investigation of the neighbouring foundations is carried out.

5.5. No proposals are provided for a movement monitoring strategy during excavation and construction although a proposal is provided to record conditions before and after construction. Monitoring is recommended.

5.6. Further investigation should be undertaken to identify the cause (location of damaged drainage runs) of the foul water encountered in the bore holes.

5.7. No Construction Programme has been provided, as required in Cl.233 of GSD. This has been requested in the Audit Query Tracker in Appendix 2.

5.8. It is accepted that, providing the owners achieve Thames Water approval to discharge the additional surface water run-off to the public sewer, the development will not impact further on the wider hydrology and hydrogeology of the area.

5.9. The GMA is to be resubmitted in order to close out the all the queries as discussed in Section 4.11 of this report.

5.10. It is accepted that the surrounding slopes to the development site are stable.

Appendix 1: Resident's Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Nasser	233 Goldhurst Terrace, NW6 3EP	07/06/15	The actual plans and outline are fine with me provided we negotiate a party wall agreement with the Zur-Spiros. In addition I would like to see more details of the construction plan, how long it will take and environmental impact during construction. We have a new baby on the way and we would want to make sure that safeguards are put in place to reduce noise, dust etc etc. Knowing the Zur-Spiros personally and therefore knowing they are responsible and good neighbours we believe they will keep inconvenience to a minimum but would still like to see the timeline etc etc.	A construction Sequence is provided in the 'Basement Structural Method Statement', however, there does not appear to be an indication of time scales or Construction Programme dates. We note that the method of construction is underpinning which, although generally has a longer construction phase, will be less noise intrusive than other methods such as piling. The request to provide a Construction Programme has been added to the Audit Query Tracker in Appendix 2.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	The ground investigation has suggested maximum bearing capacities at the level of the basement of 70-112kN/m^2. The Basement Structural Method Statement has used 120kN/m^2. Please confirm why a higher value has been used.	Open	
2	Stability	Construction Programme required.	Open	
3	Stability	Depth and type of adjacent foundations to be confirmed.	Open	
4	Stability	The Ground Investigation has identified the need for heave protection below the basement slab. This is not covered in the design of the basement.	Open	
5	Stability	Movement Assessment to be reviewed and re-issued for comment. See Section 4.11 of this report.	Open	
6	Surface Flow and Flooding	Agreement required from Thames Water in order to discharge additional run off to the public sewer.	NA	

Appendix 3: Supplementary Supporting Documents