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Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12727-50
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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 4 Bloomsbury Place, Bloomsbury WC1A 2QA (planning reference 2017/6579/P and 2017/6724/L). 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 and CMS have been carried out by engineering consultants using individuals who possess suitable qualifications according to CPG4.

1.5. It has been identified in the CMS that the property, 4 Bloomsbury Place, and the neighbouring properties are Grade II.

1.6. The proposed basement consists of a single storey construction beneath the courtyard to the rear of the property, and the new basement will incorporate an existing vault. The BIA has confirmed an adequate founding stratum. Perched water seepage from the Made Ground is to be expected. The CMS should be updated to describe suitable mitigation measures

1.7. The basement will be formed by underpinning beneath the walls of an existing extension, demolition of this extension and creating new retaining walls adjacent to the boundary with 5 Bloomsbury Place and 67-71 Southampton Row. The BIA states that the existing lower ground floor beneath the main building footprint will not be deepened or structurally altered as part of this proposal.

1.8. The existing courtyard boundary walls are freestanding. The CMS states that it is proposed to underpin these although the BIA states that neighbouring walls are not to be underpinned. This requires clarification and an assessment of potential impacts.

1.9. Adequate investigation of the below ground soils, neighbouring foundations and groundwater has been carried out and reports provided.

1.10. Analysis has been undertaken of horizontal and vertical ground movements. Queries are raised in respect of the suggested horizontal movements. An assessment of potential damage to underpinned walls is required including the host property and boundary walls.

1.11. The CMS report recommends detailed structural analysis in order to determine lateral loads and enable wall design. Indicative calculations to demonstrate the feasibility of the proposals are required, both for the temporary and permanent conditions.

1.12. The BIA identifies that basements exist at neighbouring properties 3 Bloomsbury Place and 67 to 71 Southampton Row. The BIA states that the proposal depths will allow groundwater to flow beneath the basement, and therefore the basement structure will have no adverse effect on the local hydrogeology.

1.13. The BIA has identified that the Piccadilly Line runs some 20 m to the east of the site, and following a depth analysis, concludes that the development will have negligible impact on London Underground Limited tunnels.

1.14. The BIA recommends a movement monitoring strategy during excavation and construction. The monitoring scheme should be developed as part of detailed design.

1.15. The BIA identifies that the existing surface water drainage system will be utilised, which pumps water into drainage channels which discharge into the mains sewer beneath Bloomsbury Place. The site lies within a borough Critical Drainage Area; outline details of proposed SUDs and/or attenuation should be provided.

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

1.17. Until the queries described in Section 4, and summarised in Appendix 2, are addressed, it cannot be confirmed that the BIA complies with the requirements of CPG4.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 16 February 2017 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 4 Bloomsbury Place, Bloomsbury, WC1A 2QA reference 2017/6579/P and 2017/6724/L.

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 *"Extension to basement, reconstruction of existing ground floor rear extension, replacement first floor rear extension, reinstatement of chimney stacks at roof level, installation of 5x AC units at roof level and to rear courtyard, provision of terrace at roof level and erection of balustrading."*

2.6. The Audit Instruction also confirmed 4 Bloomsbury Place is a Grade II listed building. It is noted that the adjoining properties are also listed.

2.7. CampbellReith accessed LBC's Planning Portal on 05 March 2018 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) reference CG/28342 by Card Geotechnics Limited dated November 2017;
- Structural Engineering Construction Method Statement reference 217214, by Mason Navarro Pledge Limited (MNP) and dated November 2017;
- Heritage Assessment for 4 Bloomsbury Place by DLG Architects LLP, no date given;
- Planning Application Drawings consisting of

  Site Location Plan reference 257.04-001, by Johanna Molineus Architects, dated May 2017;

  Existing Drawings reference 257.04-100 to 257.04-105, 257.04-160, 257.04-161 and 257.04-150 by Johanna Molineus Architects, dated May and October 2017;

  Proposed Plans and sections reference 257.04-200 to 257.04-205 and 257.04-260 by Johanna Molineus Architects, dated May and October 2017;

  Building Services Drawings Rev 0 by Taylor Project Services LLP (TPS), dated November 2017;
- Planning, Design & Access Statement by Johanna Molineus Architects Limited, not dated;
- Photographic Survey by Johanna Molineus Architects, not dated;
- Response email from Thames Water, reference 98425, dated 19 December 2017;
- Acoustic Assessment Report by PC Environmental, dated 09 November 2017.

2.8. It should be noted that no residents comments or responses had been received at the time of audit.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The combined authors of the BIA and Construction Method Statement are suitable, as required by CPG4.
Is data required by Cl.233 of the GSD presented?	Yes	
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	The Construction Method Statement is comprehensive although detailed retaining wall design has not yet been undertaken.
Are suitable plan/maps included?	Yes	Historic maps provided in both Groundsure Report and Heritage Assessment. Arup GSD map extracts not included, however they are referred to in the BIA text.
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	Relevant BGS records are included. Arup GSD map extracts not included, however they are referred to in the BIA text.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Screening is as per the CPG4 guidance.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Camden SFRA referenced.
Is a conceptual model presented?	Yes	Figures 4 & 5 of the BIA adequately summarise the anticipated and known ground and groundwater conditions.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Points from screening carried forward, including proximity to LU tunnels (within 20m).

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	Included in BIA report.
Is monitoring data presented?	Yes	3 return groundwater and ground gas monitoring visits were undertaken.
Is the ground investigation informed by a desk study?	Yes	Adequate desk study information is contained within the body of the BIA report.
Has a site walkover been undertaken?	Yes	Carried out on 29 September 2017 and described in Section 2.2 of the BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Although minor contradiction in CGL report re 67-71 Southampton Row.
Is a geotechnical interpretation presented?	Yes	Forms part of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	Condition Survey recommended as part of the monitoring strategy.
Are the 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	
Are estimates of ground movement and structural impact presented?	Yes	

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	
Has the need for monitoring during construction been considered?	Yes	BIA section 8.3 provides an outline monitoring strategy, however more detail is required.
Have the residual (after mitigation) impacts been clearly identified?	No	Further clarification required.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	However more details of the proposed monitoring strategy are required.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	The proposed development will not significantly change the amount of hardstanding present on the site.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Further clarification required with respect to stability.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	The damage assessment identifies that damage can be limited to Category 1.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) and accompanying Construction Method Statement (CMS) have been carried out by engineering consultants Card Geotechnics Limited (CGL) and Mason Navarro Pledge (MNP) respectively. The individuals concerned in their production have suitable qualifications as required by CPG4.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal involved a listed building. The CMS identified that the property itself, 4 Bloomsbury Place, is Grade II listed. The accompanying Heritage Assessment report identifies that the site is also located in the Bloomsbury Conservation Area, and is situated in a short terrace of properties which are all Grade II listed, 1-5 Bloomsbury Place.

4.3. The proposed basement consists of a single storey construction beneath the courtyard to the rear of the property. The new basement will incorporate an existing vault.

4.4. The basement will be formed by underpinning beneath the walls of an existing extension, demolition of this extension and the construction of new retaining walls adjacent to the neighbouring properties on Bloomsbury Place and 67-71 Southampton Row using conventional 'hit and miss' techniques in order to enable the 3.2m deep basement excavation in the rear courtyard of the property. The excavation is planned to some 1.1m below the existing vault. A gap of 1.0m width will be left between the basement wall along the sites' north eastern boundary and the neighbouring boundary wall to 5 Bloomsbury Place. There will also be small gaps between the proposed basement walls and the party wall of 67 to 71 Southampton Row, at the rear of the property. The BIA states that the existing lower ground floor beneath the main building footprint will not be deepened or structurally altered as part of this proposal.

4.5. The existing courtyard boundary walls are freestanding with spread brick foundations at approximately 0.7m bgl. The CMS states that it is proposed to underpin these in order to carry their loads to a level below the new basement floor slab construction. The underpinning will be carried out by conventional hit and miss sequencing. However, the BIA states that neighbouring walls are not to be underpinned. This requires clarification and an assessment of potential impacts.

4.6. The CMS has confirmed that the proposed basement will be founded beneath the Made Ground, in the Lynch Hill Gravels, and the BIA states that the foundations will not extend into the London Clay. This concurs with the findings of the Site Investigation. The Made Ground was found to be up to 2.4 m thick at the site, and the Lynch Hill Gravel beneath extending to a maximum of 8.6m bgl (16m OD). Adequate investigation of the below ground soils, neighbouring foundations and groundwater has been carried out and reports provided.

4.7. The groundwater was found to sit at 4.8m bgl within the Lynch Hill Gravel, approximately 1.5m below the proposed basement formation level. The BIA concludes that even if allowance is made for seasonal variations in water level, it is not likely that groundwater would come into contact with the proposed basement, however perched water seepage from the Made Ground is to be expected.

4.8. The BIA notes the need to make allowance for pumping from sumps should groundwater be encountered. This should be incorporated into the CMS with a consideration of any potential impacts.

4.9. The CMS report recommends detailed structural analysis in order to determine lateral loads and enable wall design. These details are required to be presented for assessment, both for the temporary and permanent conditions.

4.10. The BIA notes it is proposed to underpin through gravel and suggests the need for sacrificial trench sheeting and possibly dewatering. This should be addressed in the CMS.

4.11. The CMS identifies that basements exist at neighbouring properties 3 Bloomsbury Place and 67 to 71 Southampton Row, at a similar level to those proposed. In addition, a lower ground floor exists beneath the main 4 Bloomsbury Place building. The BIA states that the presence of a basement at 67-71 Southampton Row is unknown, although it is referred to in drawings in the BIA appendix. The assumption of the absence of a basement is conservative in this instance. The report states that the basement at 5 Bloomsbury Place, adjacent to the north of the site, does not neighbour the proposed basement area, and so an increase in differential foundation depth will exist here.

4.12. Analysis has been undertaken of horizontal and vertical ground movements, and is summarised in Sections 7 and 8 of the BIA with predictions of building damage. The GMA states that underpinning depth is shallow; it is reported elsewhere that new retaining walls up to c3.20m deep will be constructed. The suggested 2mm horizontal movement requires justification.

4.13. Damage assessment for the surrounding buildings estimates any potential damage will be limited to Category 1 on the Burland scale. It further states that damage could be restricted to Category 0 if horizontal movement is restricted to 3mm. It should be confirmed that Category 1 damage to listed buildings is acceptable and, if not, how horizontal movements will be limited to 3mm.

4.14. A ground movement/damage assessment required for underpinned walls.

4.15. The BIA has identified that the Piccadilly Line runs some 20m to the east of the site, with tunnels crowning at approximately -8.7mOD and -11.7mOD. The BIA concludes that the

development will have negligible impact on London Underground Limited tunnels. This is accepted.

4.16. The BIA outlines that the basement is unlikely to impact any highways or pavements due to its distance from such infrastructure; Southampton Row is 12m to the north east and Bloomsbury Place is 22m to the south east of the proposed excavation area.

4.17. A number of small trees within the excavation area will be felled as part of the proposal. The BIA states that the risk from tree related heave is low as the site is underlain by granular materials, and the London Clay which is known to have medium shrink/swell potential is some 8.6m below the site. It is accepted that there are no slope stability concerns regarding the proposed development.

4.18. The BIA recommends a movement monitoring strategy during excavation and construction, and it states that horizontal movements should be kept to within 5-6mm. It recommends that a construction monitoring scheme is devised by contractors in order to demonstrate that movements are within those predicted in the GMA. Outline details of the monitoring scheme are required for assessment.

4.19. It is accepted that the development is not in an area subject to flooding, however it is stated in the BIA that the site lies within a borough Critical Drainage Area. Details of proposed SVDs/attenuation should be provided.

4.20. Table 13 of the BIA states that the proposal depths will allow groundwater to flow beneath the basement, and therefore the basement structure will have no adverse effect on the local hydrogeology.

4.21. The BIA identifies that the existing surface water drainage system will be utilised, which pumps water into drainage channels which discharge into the mains sewer beneath Bloomsbury Place. The proposal does not significantly change the proportion of hard standing to soft landscaping.

4.22. The BIA has shown that even though the development is within 100m of a watercourse, an unnamed culvert some 80m to the north east, it will not impact on the wider hydrogeology of the area, any other watercourses, springs or the Hampstead Heath Pond chain catchment area.

5.0 CONCLUSIONS

5.1. The BIA and CMS have been carried out by engineering consultants using individuals who possess suitable qualifications according to CPG4.

5.2. It has been identified in the CMS that the property, 4 Bloomsbury Place, and the neighbouring properties are Grade II.

5.3. The proposed basement consists of a single storey construction beneath the courtyard to the rear of the property, and the new basement will incorporate an existing vault. The BIA has confirmed that the proposed basement will be founded below the Made Ground in the Lynch Hill Gravel formation. It is stated that foundations will not extend into the London Clay. It is unlikely that the groundwater table will be encountered during basement foundation excavation, however perched water seepage from the Made Ground it to be expected. The CMS should be updated to describe suitable mitigation measures in this event.

5.4. The basement will be formed by underpinning beneath the walls of an existing extension, demolition of this extension and creating new retaining walls adjacent to the boundary with 5 Bloomsbury Place and 67-71 Southampton Row. The BIA states that the existing lower ground floor beneath the main building footprint will not be deepened or structurally altered as part of this proposal.

5.5. The existing courtyard boundary walls are freestanding. The CMS states that it is proposed to underpin these in order to carry their loads to a level below the new basement floor slab construction. However, the BIA states that neighbouring walls are not to be underpinned. This requires clarification and an assessment of potential impacts.

5.6. Adequate investigation of the below ground soils, neighbouring foundations and groundwater has been carried out and reports provided.

5.7. Analysis has been undertaken of horizontal and vertical ground movements. Queries are raised in respect of the suggested horizontal movements. An assessment of potential damage to underpinned walls is required including the host property and boundary walls.

5.8. The CMS report recommends detailed structural analysis in order to determine lateral loads and enable wall design. Indicative calculations to demonstrate the feasibility of the proposals are required to be presented for assessment, both for the temporary and permanent conditions.

5.9. The BIA identifies that basements exist at neighbouring properties 3 Bloomsbury Place and 67 to 71 Southampton Row. The BIA states that the proposal depths will allow groundwater to flow beneath the basement, and therefore the basement structure will have no adverse effect on the local hydrogeology.

5.10. The BIA has identified that the Piccadilly Line runs some 20 m to the east of the site, and following a depth analysis, concludes that the development will have negligible impact on London Underground Limited tunnels.

5.11. The BIA recommends a movement monitoring strategy during excavation and construction. The monitoring scheme should be developed as part of detailed design.

5.12. The BIA identifies that the existing surface water drainage system will be utilised, which pumps water into drainage channels which discharge into the mains sewer beneath Bloomsbury Place. It is stated in the BIA that the site lies within a borough Critical Drainage Area; outline details of proposed SUDs and/or attenuation should be provided.

5.13. A number of small trees within the excavation area will be felled as part of the proposal, however this will not impact the proposed basement or surrounding structures. It is accepted that there are no slope stability concerns regarding the proposed development.

5.14. Until the queries described in Section 4 are addressed, it cannot be confirmed that the BIA complies with the requirements of CPG4.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	GMA - justification for predicted horizontal ground movement required, assessment of underpinned walls required.	Open	
2	Stability	Confirmation that Category 1 damage acceptable to listed properties required or measures to limit horizontal movement to 3mm.	Open	
3	Stability	Outline details of structural analysis and wall design to be provided to demonstrate that proposals are feasible.	Open	
4	Stability	BIA identifies potential for water ingress during construction. Mitigation to be described in CMS.	Open	
5	Hydrology	Details of SUDS and/or attenuation to be presented for review.	Open	

Appendix 3: Supplementary Supporting Documents

None

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