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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 addendum submitted as part of the planning submission documentation for a non-material amendment (NMA) to planning permission granted to the Former University of Westminster Central St Martins College Campus, London, WC1B. The site comprises the Lethaby Building, Former Cochrane Theatre, 12-42 Southampton Row & 1-4 Red Lion Square. The planning reference number relating to the consented scheme is 2020/2470/P. The NMA is registered under planning reference 2021/3577/P. The basement is considered to fall within Category C as defined by the Terms of Reference.

1.2. The audit reviewed the Basement Impact Assessment (BIA) addendum 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 for the latest revision of submitted documentation and reviewed it against an agreed audit check list. This audit considers only the BIA addendum and should be read in conjunction with CampbellReith's audit of the original BIA (reference CBemb 13398-32 201221 Former Central St Martins College-F1, issued December 2021 under planning reference 2020/2470/P).

1.4. The Basement Impact Assessment (BIA) has been carried out by individuals with suitable qualifications.

1.5. The scope of the development includes a three-level basement with proposed average depth to formation level of approximately 22m below ground level (bgl) beneath much of the site. The proposed amendment reduces the depth of the basement beneath the Red Lion building to a single storey and increases its extent eastwards in this area.

1.6. Screening and scoping assessments were undertaken in the BIA in accordance with CPG: Basements and reviewed in the addendum for any changes resulting from the revised basement proposals. It is concluded that there are no changes.

1.7. No further ground investigation has been undertaken. As noted in the BIA audit, additional investigation should be undertaken and presented in a Basement Construction Plan (BCP).

1.8. The BIA addendum concludes that the impacts to the adjacent properties, slopes and infrastructure remain limited (no worse than Burland Category 1 for surrounding buildings) and will be mitigated to ensure they do not contravene policy criteria.

1.9. Addendum confirms that the impact on groundwater flow remains very low. The assessment should be refined after additional site-specific ground investigation and groundwater monitoring, and reported in the BCP.

1.10. Additional ground investigation, a project-specific performance specification, design details, a monitoring strategy, an action plan and refined mitigation measures shall be presented within a BCP to confirm the BIA assumptions and results and to ensure that the anticipated ground movements presented in the GMA are not exceeded.

1.11. A minor decrease of the impermeable areas is proposed for the subject development. The BIA concluded that the development is not anticipated to impact the hydrological environment. This is not considered any further in the BIA addendum as the impact assessment is not influenced by the changes to the proposed basement.

1.12. Based on the BIA addendum, it can be confirmed that the revised scheme complies with the requirements of CPG: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 17th December 2021 to carry out a Category C audit on the BIA addendum submitted as part of the planning submission documentation to support an NMA for a consented scheme at the Former Central St Martins College, London, WC1B (planning reference 2021/3577/P).

2.2. The audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the BIA addendum 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 *"Non-material amendment to planning permission 2020/2470/P dated 30/10/2020 for 'Redevelopment of the site including refurbishment of the Lethaby Building, partial demolition, external alterations, basement excavations and extensions to the existing buildings to form a hotel (Use Class C1), with flexible ground floor and basement uses including retail/restaurant/drinking establishment (Use Class A1/A3/A4), office (Use Class B1), exhibition and lecture halls (Use Class D1/D2/C1).Bar/restaurant spaces (Use Class A3/A4) at first, and upper floor levels with associated roof terrace. Erection of standalone block comprising a cultural use (Use Class D1) at ground and first floor level with affordable residential housing (Use Class C3) above with*

provision of balconies, terraces and a roof terrace. Re-instatement of former Orange Street, together with highway improvements, public realm, landscaping, cycling parking, waste storage and other associated works.' changes to reduce the size of the approved basement."

2.6. The Audit Instruction confirmed that the application site contains the Grade II* listed Lethaby Building. Also, there are adjacent listed buildings, including the subterranean Kingsway Tram substation (Grade II) and 8-10 Southampton Row (Grade II).

2.7. CampbellReith accessed LBC's Planning Portal on 20th December 2021 and gained access to the following relevant documents for audit purposes:

- "Basement Impact Assessment Addendum", A-squared Studio Engineers Ltd, Ref. No.: 1129-A2S-XX-XX-RP-Y-0004-00, Rev.00, October 2021;
- Planning Application Drawings, Orms Designers and Architects, as follows:
  - GSM-ORM-ZZ-AA-DR-A-12400-P03-Proposed Planning Section AA
  - GSM-ORM-ZZ-CC-DR-A-12402-P03-Proposed Planning Section CC
  - GSM-ORM-ZZ-DD-DR-A-12403-P02-Proposed Planning Section DD
  - BSMT 1 Plan GSM-ORM-ZZ-B1-DR-A-12248-P03-Proposed General Arrangement Plans
  - BSMT 2 Plan GSM-ORM-ZZ-B2-DR-A-12247-P03-Proposed General Arrangement Plans
  - BSMT 3 Plan GSM-ORM-ZZ-B3-DR-A-12246-P03-Proposed General Arrangement Plans
  - Superseded previously Approved Drawings.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	Yes	With respect to NMA.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	With respect to NMA.
Are suitable plan/maps included?	Yes	With respect to NMA.
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	Refer to Section 4.2 of the BIA addendum. No change in screening responses.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer to Section 4.1 of the BIA addendum. No change in screening responses.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer to Section 4.3 of the BIA addendum. No change in screening responses.
Is a conceptual model presented?	No	Not presented in BIA addendum, but contained in original BIA report.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	Section 5 of BIA addendum notes no change in scoping from original BIA.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	Section 5 of BIA addendum notes no change in scoping from original BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	No impacts raised during screening.
Is factual ground investigation data provided?	No	Contained within Appendix D of BIA. No additional ground investigation undertaken.
Is monitoring data presented?	No	Groundwater monitoring data presented in Appendix D of BIA.
Is the ground investigation informed by a desk study?	Yes	As evidenced in BIA.
Has a site walkover been undertaken?	Yes	As evidenced in BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	No	No further information than contained in BIA. Buildings included in Ground Movement Assessment (GMA) conservatively assumed to be founded at ground surface.
Is a geotechnical interpretation presented?	No	Contained in Appendix E of BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	As above.
Are reports on other investigations required by screening and scoping presented?	NA	Screening and scoping outcomes as original BIA.
Are the baseline conditions described, based on the GSD?	Yes	Within BIA.
Do the base line conditions consider adjacent or nearby basements?	Yes	The nearby buildings are assumed to be founded at ground surface.
Is an Impact Assessment provided?	Yes	Refer to Section 7 of the BIA addendum.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	No	Addendum describes impacts of revised basement proposals on conclusions within BIA.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Addendum make reference to mitigation and controls described in BIA. Mitigation methods remain to be refined and presented within a Basement Construction Plan (BCP).
Has the need for monitoring during construction been considered?	Yes	Addendum make reference to mitigation and controls described in BIA. Mitigation methods remain to be refined and presented within a Basement Construction Plan (BCP).
Have the residual (after mitigation) impacts been clearly identified?	Yes	As above.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Addendum describes impacts of revised basement proposals on conclusions within BIA.
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?	Yes	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	BY reference to original BIA.
Are non-technical summaries provided?	Yes	Refer to Section 1 of the BIA report.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) addendum has been carried out by 'A-squared Studio Engineers Ltd'. The addendum considers only the changes to impacts resulting from the NMA and provides updates to the assessments of stability and groundwater (surface flows being unaffected by the proposed changes to the scheme). The addendum refers back regularly to the original BIA. The BIA addendum has been prepared by individuals with suitable qualifications.

4.2. The site is bound by Southampton Row to the west, Theobalds Road to the north, Drake Street and Red Lion Square to the east, and Fisher Street to the south. The campus is currently occupied by five distinct buildings, between three and thirteen storeys. The existing ground level is at c. +25m OD. A single level basement with average depth to formation level of approximately 4m bgl (+21m OD) is present underneath the existing structures and occupies the majority of the site's footprint.

4.3. The site is surrounded by a number of buildings, some of which are Grade II listed. However, none share party walls with any of the campus buildings; the closest being 10m from the subject site. Adjacent infrastructure includes Crossrail tunnels and a shaft to the immediate south, Piccadilly line tunnels, Kingsway Tram tunnel and utility tunnels on either side of the latter to the west. Thames Water and other utilities surround the site. A Post Office Tunnel runs beneath Theobalds Road to the north.

4.4. The proposed development includes the refurbishment of the Lethaby Building, extensions to the Red Lion building, construction of a new building to the north (Theobalds building) and new basement levels. The Cochrane Theatre, the Innovation Centre, the Link Bridge buildings, and part of the Red Lion building, will be demolished. The basement of Lethaby building will be retained. The consented scheme includes the deepening of the basement beneath the remainder of the site to three levels with a proposed average formation level of approximately of +3m OD (22m bgl). The NMA comprises the omission of the deep basement beneath the Red Lion building beneath the east of the site, instead extending the existing single storey basement to the east.

4.5. According to the BIA, the proposed basement excavation will be supported by a combination of two to three stages of mass concrete underpins installed in a sequential hit-and-miss process with permeation grouting along the western boundary where the excavation interfaces with the Lethaby building. A secant pile wall is proposed around the remaining excavation perimeter. The bulk excavation and construction of permanent works will take place following the installation of all retention systems including multi-level temporary props/shoring utilising a bottom-up methodology.

4.6. Screening and scoping assessments have been undertaken in accordance with CPG Basements and are included in Sections 4 and 5 of the BIA. The addendum confirms that the screening and scoping outcomes are unaltered by the revised basement proposals.

4.7. No additional ground investigation has been undertaken or reported since the issue of the BIA for the consented scheme. The need for additional investigation is discussed in Sections 6.1.1 and 6.1.13 of the BIA. The additional investigation should be presented within a Basement Construction Plan (BCP), as agreed with LBC in 2020 under the original application, in order to confirm the BIA assumptions and assessment, and inform detailed design.

4.8. A ground movement assessment (GMA) was undertaken using industry standard software (PDisp, XDisp) and the CIRIA C760 methodology, with modifications described in the BIA and BIA audit. The GMA concluded that none of the surrounding buildings should experience damage worse than Burland Category 1.

4.9. The addendum notes that the scheme changes are limited to the basement extent in the east of the site, so changes to the original GMA are limited to that area. It concludes that predicted horizontal and vertical ground movements are anticipated to be similar to those predicted in the initial ground movement assessment, although the areas with the largest magnitudes of movement along the eastern boundary will now fall within the site beneath the Red Lion Building rather than outside the site. The addendum states that building damage classification will therefore remain a maximum of Category 1 – Very Slight.

4.10. It is accepted that the reduced basement extent will reduce potential impacts beyond the site perimeter to the east and that they should be largely unchanged elsewhere. Nevertheless, due to modifications to the CIRIA C760 methodology and the intention to use permeation grouting, special precautions in terms of design details, monitoring strategy, action plans and mitigation measures will be required to be put in place, and presented within a BCP, to ensure that construction ground movements are kept within the GMA predictions.

4.11. According to the GMA, maximum ground movements of 30mm are anticipated in the surrounding footpaths and highways. Allowance for making good of any cracking to adjacent pavement surfaces, if required, is recommended in the BIA report (Section 5.3.13). It has been confirmed (Section 5.3.14) that the applicant's consultants are in the process of seeking Approval in Principle from LBC's highway protection team.

4.12. According to the BIA (Section 7), the GMAs for the infrastructure and utilities surrounding the site have also been reassessed and the results continue to indicate that ground movements will be within the acceptable limits of the respective asset owners. The assumptions, calculations and results of these GMAs were not presented and it is understood that the asset protection

teams of these third parties will be engaged or have been engaged already under a separate process.

4.13. A full groundwater cut-off system is proposed via the secant pile wall, permeation grouting and underpinning works. A preliminary groundwater assessment presented in the BIA indicated that any damming effect will be minimal, resulting in heave movements and settlements of less than 2mm. The BIA concluded that the impact on groundwater flow will be very low. The addendum notes that the obstruction and cut-off areas remain very similar to the initial scheme and that the results of the assessment are therefore unlikely to differ significantly

4.14. The groundwater analysis and assessment should be refined after additional site-specific ground investigation and groundwater monitoring is undertaken and presented in the BCP.

4.15. Additional ground investigation, a project-specific performance specification, design details, a monitoring strategy, an action plan and detailed mitigation measures, should be presented within a BCP to confirm the BIA assumptions and results and to ensure that the anticipated impacts are not exceeded. Details of temporary works should be developed and presented in the BCP, in order to ensure structural stability is maintained throughout construction.

4.16. The BIA concluded that the surface water flood risk due to the proposed development will be low and the development is not anticipated to impact the wider hydrological environment. It is accepted that the proposed changes to the scheme do not alter the impact to surface water.

5.0 CONCLUSIONS

5.1. The Basement Impact Assessment (BIA) has been carried out by individuals with suitable qualifications.

5.2. The scope of the development includes a three-level basement with proposed average depth to formation level of approximately 22m bgl. The BIA addendum reviews the impact assessment in light of the proposal to reduce the basement scheme.

5.3. Screening and scoping assessments was undertaken in accordance with CPG: Basements in the original BIA. The addendum concludes that the outcomes are unaltered by the revised basement proposals.

5.4. Limited ground investigation has been undertaken. Additional investigation should be presented in a Basement Construction Plan (BCP) to confirm the BIA assumptions and assessment, and inform detailed design.

5.5. The BIA addendum concludes that the impacts to the adjacent properties, slopes and infrastructure remain limited and will be mitigated to remain within policy criteria as part of design development.

5.6. GMAs undertaken for the infrastructure and utilities surrounding the site are reviewed in the BIA addendum. These are to be assessed by the relevant third party asset protection teams.

5.7. The addendum confirms the impact on groundwater flow remains very low. Further assessment will be presented during the BCP stage.

5.8. Additional ground investigation, a project-specific performance specification, design details, a monitoring strategy, an action plan and refined mitigation measures shall be presented within a BCP.

5.9. The development is not anticipated to impact the hydrological environment.

5.10. Based on the BIA addendum, it can be confirmed that the revised basement proposals comply with the requirements of CPG: Basements.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

None

Appendix 3: Supplementary Supporting Documents

None

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