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33 Belsize Avenue, London, NW3 4BL

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12727-79
Revision: D1

June 2018

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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 33 Belsize Avenue, NW3 4BL (Camden planning reference 2018/1045/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.

1.1. The qualifications of the individuals involved in the BIA broadly meet the Camden Planning Guidance (CPG) Basements requirements.

1.2. CPG Basements (March 2018) should be referenced together with the other current guidance documents.

1.3. The depths of the neighbouring lower ground floors and foundations should be confirmed prior to construction.

1.4. The site comprises a detached five storey house with a lower ground floor. The proposal involves an extension to the rear of the property within the existing lightwell.

1.5. Appropriate construction details and outline calculations are included in the Elliot Wood submissions. However, there are discrepancies between these and the proposals in the Fairhurst Ground Movement Assessment (GMA) and the proposals should be clarified and consistently presented.

1.6. A flood risk assessment and drainage strategy report is provided and this includes a SUDs proposal.

1.7. The retaining wall parameters in the BIA are incomplete and this should be updated, as discussed in Section 4.

1.8. There are queries with the GMA and these should be addressed, as discussed in Section 4.

1.9. The trigger values for the proposed monitoring should be reviewed and may need to be reconsidered following reassessment of the ground movements.

1.10. An indicative works programme is not included and this is requested.

1.11. It is accepted that there are no slope stability or wider hydrogeological concerns regarding the proposed development and the site is not in an area prone to other flooding issues.

1.12. Queries and requests for information are summarised in Appendix 2. Until the additional information and further assessments requested are presented, the BIA does not meet the requirements of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 14 May 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 33 Belsize Avenue, NW3 4BL (Camden planning reference 2018/1045/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 Basements (March 2018)
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- Local Plan 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;

d) 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 *'Erection of part single, part two storey rear extension at lower ground and ground floor levels with garden excavation; removal of a crossover, and associated landscaping'.*

2.6. CampbellReith accessed LBC's Planning Portal on 30 May and 7 June 2018 and gained access to the following relevant documents for audit purposes:

- BIA Impact Screening Assessment, Site Analytical Services Limited, dated January 2018 (which includes Ground Movement Assessment, Fairhurst, dated January 2018 as Appendix B).
- Structural Engineering Report and Subterranean Construction Method Statement (Revision P2), Elliot Wood, dated February 2018.
- Design and Access Statement, KSR Architects LLP, dated January 2018.
- Flood Risk Assessment and SUDS Strategy, XCO2, dated December 2017.
- Arboricultural Impact Assessment, Landmark Trees, dated 16 February 2018.
- KSR Architects planning application drawings, comprising:

  Drawings dated 26/27 July 2017

  - Location plan (P001)
  - Existing site plan (X010)
  - Existing basement plan (X090)
  - Existing ground floor plan (X100)
  - Existing section AA (X210)
  - Existing front (street) elevation (X301)
  - Existing front elevation (X310)
  - Existing rear (north) elevation (X311)
  - Existing east elevation (X312)
  - Existing west elevation (X313)
  - Proposed lower ground floor (P090)
  - Proposed ground floor (P100)
  - Proposed section AA (P210)
  - Proposed front elevation (P310)
  - Proposed north elevation (P311)
  - Proposed east elevation (P312)
  - Proposed west elevation (P313)

  Drawings dated 12 February 2018

  - Proposed front (street) elevation (P301)
  - Proposed rear (garden) elevation (P302)

2.7. The planning portal was again accessed on 12 June 2018 and it appears revised proposed drawings were uploaded on 11 June 2018. These drawings were dated as per the previous drawings which are now marked as superseded. A comparison of the lower ground floor plan, referenced above, to the new drawing did not indicate any changes. A minor amendment is noted on the ground floor plan, however, this has no impact on the audit.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Table A – Site Analytical Services (SAS) BIA (see Audit paragraph 4.1).
Is data required by Cl.233 of the GSD presented?	No	Contradictory information on proposed construction methodology in structural engineering and construction method statement report (SER&CMS) and the ground movement assessment (GMA) (see Audit paragraphs 4.2, 4.5 and 4.6).Works programme not included (see Audit paragraph 4.15).
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	Contradictory information on the construction methodology and drawings (see Audit paragraphs 4.2, 4.5 and 4.6).
Are suitable plan/maps included?	Yes	SAS BIA Section 3 includes some of the relevant maps with the site location indicated.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	As above.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Table 2, Section 3.8 of the SAS BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Table 2, Section 3.8 of the SAS BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Table 2, Section 3.8 of the SAS BIA which is largely valid, however, the response to Q6 which relates to the risk of flooding is incorrect (see Audit paragraph 4.7).

Item	Yes/No/NA	Comment
Is a conceptual model presented?	Yes	Ground conditions presented in SAS Ground Investigation Report Section 3.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of SAS BIA.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of SAS BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	Section 4 of SAS BIA, not all of the potential issues identified in the BIA although this is addressed in a separate report (see Audit paragraph 4.7).
Is factual ground investigation data provided?	Yes	Appendix A of the SAS BIA.
Is monitoring data presented?	Yes	Section 5.3 the SAS BIA.
Is the ground investigation informed by a desk study?	Yes	Desk study information presented in Section 3 of the SAS BIA.
Has a site walkover been undertaken?	No	Not stated in BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	No	Description of the neighbouring properties not included in the BIA although it is stated in SER&CMS that the neighbouring properties are assumed to have lower ground floors at a similar formation level to No.33 (see Audit paragraph 4.9).
Is a geotechnical interpretation presented?	Yes	Some interpretation presented in Section 6 of SAS BIA.
Does the geotechnical interpretation include information on retaining wall design?	No	Provided in Section 6 of the BIA, however, this is incomplete as stiffness parameters are not included (see Audit paragraph 4.11).

Item	Yes/No/NA	Comment
Are reports on other investigations required by screening and scoping presented?	Yes	Ground investigation report and GMA.
Are the baseline conditions described, based on the GSD?	No	Description of the neighbouring properties not included in the BIA although it is stated in SER&CMS that the neighbouring properties are assumed to have lower ground floors at a similar formation level to No.33 (see Audit paragraph 4.9).
Do the base line conditions consider adjacent or nearby basements?	No	As above.
Is an Impact Assessment provided?	Yes	SAS BIA Section 7.
Are estimates of ground movement and structural impact presented?	Yes	Fairhurst Ground Movement Assessment (GMA) report, however, there are queries (see Audit paragraph 4.12).
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	Potential risk of sewer flooding not identified in screening and scoping, however considered within FRA (see Audit paragraph 4.7).
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	SER&CMS.
Has the need for monitoring during construction been considered?	Yes	SER&CMS, however, there are queries on the GMA which informs the trigger values.
Have the residual (after mitigation) impacts been clearly identified?	N/A	None identified.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	There are queries on the GMA (see Audit paragraphs 4.5, 4.6 and 4.12).

Item	Yes/No/NA	Comment
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Flood risk assessment and drainage strategy report (see Audit paragraph 4.8).
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Structural stability not demonstrated.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	GMA predicts Category 0, however, there are queries on the GMA and contradictory information given on the construction methodology (see Audit paragraphs 4.5, 4.6 and 4.12).
Are non-technical summaries provided?	Yes	SAS BIA Sections 3.9, 4.2, 5.5, 6.9 and 7.4.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) was undertaken by Site Analytical Service (SAS) Ltd and the individuals involved hold CEng MIStructE and CGeol MCIWEM qualifications. A separate flood risk assessment (FRA) was undertaken by XCO2, however, the qualifications of the individuals involved are not included. A structural engineering report and construction method statement (SER & CMS) by Elliot Wood is provided and the reviewer holds CEng MIStuctE qualifications.

4.2. The BIA was undertaken by SAS and this includes a ground movement assessment (GMA) by Fairhurst. A separate flood risk assessment and drainage strategy was undertaken by XCO2 which was not referenced in the hydrology (surface flow and flooding) screening despite being undertaken prior to the BIA. The SER & CMS report prepared by Elliot Wood provides a summary of the findings of the other reports, however, there are discrepancies between the reports which is discussed below.

4.3. The Elliot Wood report makes reference to CPG4, however, this document is superseded by the Camden Planning Guidance (CPG) Basements (2018). This together with other current guidance should be referenced.

4.4. It is stated in the SER & CMS that 33 Belsize Avenue comprises a detached five storey house with a lower ground floor. To the rear is a lightwell which was previously extended to create a terraced area and lower ground floor level. The property is not listed but it is within the Belsize Park conservation area.

4.5. The proposal involves an extension to the rear of the property within the existing lightwell. The depth of the excavations vary between 0.80 and 3.55m. The Elliot Wood SER & CMS states the existing lightwell is enclosed by a contiguous piled wall which is to be retained. A reinforced concrete liner wall is to be constructed within this to support the new ground floor above. The Elliot Wood SER & CMS contains a construction sequence described in the text and illustrated on sketches included in Appendix A of the report. Drawing S.90 (revision P2 dated January 2018) indicates the lateral extent of the new basement to be the similar to the existing lightwell. Outline structural calculations are included in the SER & CMS.

4.6. The proposals in the Elliot Wood report are, however, contradictory to the construction sequence referenced in Section 4.4 of the Fairhurst GMA, which indicates the first stage of construction as '*install contiguous piled wall to perimeter of the basement'* despite an Elliot Wood sequence drawing (SK.01 dated December 2017) being included as appendices to the GMA. The proposed lower ground floor plan and north (rear) elevation markups (P090 and P311 dated 29/09/17) included in Appendix B differ from the proposals in the SER & CMS and the

architect's drawings. This plan indicates a lateral extension of approximately 10m to the rear of the existing lower ground floor for a pool and associated facilities.

4.7. Some of the relevant figures/maps from the Arup GSD and other guidance documents are included with the site location indicated to support the statements made in the screening assessments which are largely valid. The response to question 6 of the hydrology screening which relates to flood risk is, however, incorrect as this did not consider the risk of internal sewer flooding which is identified on one of the Camden SFRA maps. This issue was considered in the FRA and appropriately addressed.

4.8. It is stated in the FRA that the proposal will result in a reduction in the volume of run-off due to the impermeable paved areas reducing. The potential risk of sewer flooding is concluded to be low. The site is not at risk from flooding from any other sources. The report includes a SUDs proposal which comprises permeable paving and a non-infiltrating blanket system to the rear with a raingarden planter proposed to intercept run-off from the roof prior to discharge into the sewer network.

4.9. There is no mention of the neighbouring properties in the BIA, nor was it confirmed whether these comprise basements or not. This is also not addressed in the GMA which gives approximate heights of the properties considered with no indication of the foundation depths assumed. It is however stated in the SER & CMS that the existing lower ground floor levels to nos. 31 and 35 Belsize Avenue are assumed to be of similar construction and level to the subject site, No. 33.

4.10. A ground investigation was undertaken by SAS and this comprised two 15m boreholes to the rear and front of the property respectively. Made Ground was encountered to a maximum depth of 1.90m over London Clay. The shallowest groundwater level recorded during monitoring was 1.80m bgl. The BIA states this is likely to be '*surface water entering the pipe'* due to the geology. Groundwater monitoring prior to the site works is recommended in the SER & CMS together with sump pumping should groundwater be encountered during the works.

4.11. Although some interpretation and recommendations for design are included in Section 6 of the SAS report, the retaining wall parameters on Table 3 are considered incomplete as strength and stiffness values (Cu and E) are not included.

4.12. Heave and settlement analysis within the new basement due to excavation and the new construction and respectively were undertaken using Settle3D analysis. Section 4.7 of the GMA states that the CIRIA C760 curves for the 'installation of a contiguous bored pile wall' has been used in the Oasys Xdisp analysis together with the excavation movements to undertake a damage assessment for the neighbouring properties. Category 0 (Negligible) damage is predicted. The full Xdisp input is not provided and the assumptions made with regards to the

wall depth are not stated. Regardless of this, the development proposals are unclear as there are discrepancies in the proposals between the Elliot Wood SER & CMS and the Fairhurst GMA. The proposals should be clarified and consistently presented.

4.13. A structural monitoring strategy with proposed trigger levels is included in the SER & CMS. These are based on the GMA which has queries raised on the construction methodology, as discussed above. The monitoring strategy should be reviewed and updated as necessary, following updates to the GMA.

4.14. An arboricultural impact assessment is included. Tree removal is not proposed and the report concludes that the proposals will not have any impact on the retained trees or wider landscape.

4.15. An indicative works programme is not included, as required within clause 233 of the Arup GSD, and should be provided for review.

4.16. It is accepted that there are no slope stability concerns regarding the proposed development. The site is not in an area prone to other flooding issues and the wider hydrogeology of the area is unlikely to be affected.

5.0 CONCLUSIONS

5.1. The qualifications of the individuals involved in the BIA broadly meet the CPG Basements requirements.

5.2. CPG Basements (March 2018) should be referenced together with the other current guidance documents.

5.3. The depths of the neighbouring lower ground floors and foundations should be confirmed prior to construction.

5.4. The site comprises a detached five storey house with a lower ground floor. The proposal involves an extension to the rear of the property within the existing lightwell. Appropriate construction details and outline calculations are included in the Elliot Wood SER & CMS.

5.5. There are discrepancies in the proposals between the Fairhurst GMA and the Elliot Wood SER & CMS. The proposals should be clarified and consistently presented.

5.6. A flood risk assessment and drainage strategy report is provided and this includes a SUDs proposal.

5.7. The interpreted retaining wall design parameters in the BIA are incomplete and should be updated to include Cu and E values.

5.8. The ground movement assessment predicts negligible damage, however, there are queries on this as discussed in Section 4. The GMA should be updated to reflect the current proposals and the full input from the software should be provided to validate the conclusions.

5.9. A structural monitoring strategy with proposed trigger levels is included in the SER & CMS. This may need to be reconsidered following review of the GMA.

5.10. An indicative works programme is not included and this is requested.

5.11. It is accepted that there are no slope stability or wider hydrogeological concerns regarding the proposed development and it is not in an area prone to other flooding issues.

5.12. Queries and requests for information are summarised in Appendix 2. Until the additional information and further assessments requested are presented, the BIA does not meet the requirements of 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	BIA format	Works programme	Open – outline works duration to be provided.	
2	BIA format/stability	Discrepancies in the proposed development between the GMA and SER & CMS	Open – to be clarified and consistently presented (see Audit paragraphs 4.5 and 4.6).	
3	Stability	Ground movement assessment (GMA)	Open – to be updated to reflect the proposals. Full input and output from analysis required (see Audit paragraph 4.12)	
4	Stability	Retaining wall design parameters	Open – to be updated as per Audit paragraph 4.11.	
5	Stability	Movement monitoring proposal	Open – trigger values may need to be reconsidered following GMA update.	

*Please provide complete and clear responses to the above queries. Where the BIA and other documents are updated/revised, please include a covering letter or email to indicate the amended sections.

Appendix 3: Supplementary Supporting Documents

None

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