CampbellReith
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15 Glenmore Road, Belsize, London NW3 4BY

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-74

Revision: F1

February 2018

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D2	August 2017	Updated Tracker only after BIA rev 3 review	AFLemb 12466-74-130617-15 Glenmore Road-D2.docx	AFL	GK	GK
D3	October 2017	Report updated after BIA rev 4 review	AFLemb 12466-74-201017-15 Glenmore Road-D3.docx	AFL	EMB	EMB
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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 15 Glenmore Road, Belsize, London NW3 4BY, (planning reference 2017/2153/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 proposed development involves conversion of a single dwelling house into 4 x 2 bed flats; enlargement of existing basement level; creation of rear lightwell and enlargement of existing front lightwell.

1.5. The original BIA has been prepared by Ecos Maclean with some of the supporting documents prepared by London Design Office. An addendum to the BIA has been written by Gabriel Geo Consulting Limited.

1.6. The authors' qualifications of the most recent BIA Addendum are accepted.

1.7. Desk study information required to inform the BIA process was requested in the initial audit report. This was included in the BIA revision 3 submission. Further information regarding the walkover survey and site visits is included in the addendum BIA report.

1.8. Section 2.7 of the BIA Addendum states that there is no underground infrastructure below the property or within the zone of influence of the basement excavation.

1.9. Non-technical summaries were requested against each stage of the BIA, as described in CPG4, and provided in the BIA Addendum.

1.10. The site is within an area of Very Low flood risk as identified by the BIA. A site-specific flood risk assessment is not required.

1.11. Suitable factual and interpretive geotechnical information is presented in the addendum BIA report, which included re-logging of the existing trial pits.

1.12. The proposed basement is to be constructed by underpinning methods, with lightwell retaining walls cast in an underpinning style sequence.

1.13. A conceptual site model has been provided, which has been reviewed and updated in the BIA Addendum.

1.14. A ground movement assessment is provided in the BIA Addendum, which defines the zone of influence due to the proposed development. Damage impacts have been calculated for all structures within the zone, including the highway and any sensitive underground infrastructure (utilities). The GMA assumes that the neighbouring basement (at No. 13) will be compete prior to work commencing. If this is not the case, the GMA and structural monitoring proposal documented in the addendum BIA will require updating.

1.15. The structural monitoring proposal has been updated in the BIA Addendum and is linked to the ground movement assessment. It includes appropriate trigger values and contingency actions in order to ensure damage impacts are limited to a maximum of Category 1 (Very Slight).

1.16. The BIA Addendum confirms there will be no significant increase in impermeable site area. Information contained in an email from January 2018 outlines that changes to off-site discharge flow rates will be negligible.

1.17. Queries and matters that required further information or clarification are discussed in Section 4 and summarised in Appendix 2. The additional information requested has been provided and the requirements of CPG4 have been met.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 25 April 2017 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 15 Glenmore Road, Belsize, London NW3, Camden Reference 2017/2153/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: *"Conversion of single dwelling house into 4 x 2 bed flats; enlargement of existing basement level; creation of rear lightwell and enlargement of existing front lightwell."*

2.6. CampbellReith accessed LBC's Planning Portal on 15 May 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment, 15 Glenmore Rd NW3 4BY (ref 16058) dated March 2017 by Ecos Maclean.
- Basement Impact Assessment Appendices 2-4, 5a, 5b & 6, for 15 Glenmore Road, Belsize, London NW3 dated February 2017 by Ecos Maclean and London Design Office.
- Location and Block plan file name A1.100 dated March 2016, by London Design Office.
- Proposed and existing plans, elevations and sections by London Design Office and Ecos Maclean numbered A1109, A1110 GF, A1111 1F, A1112 2F, A1113 3F, A1301, A1302, A1401, A1402, A1X301, dated October 2016 and March 2017.
- Design and Access Statement, 15 Glenmore Road, dated March 2017 by London Design Office.
- No comments and objections to the proposed development from local residents were available at the time of writing.

2.7. CampbellReith accessed the LBC Planning Portal on 08 August and 19 September 2017 and gained access to the following additional documents for audit purposes:

- Appendix 2b Site Survey – 15 Glenmore Rd, date and author unknown.
- Appendix 7 (ref Borehole log No 13), dated 21 September 2016 by LMB Geosolutions Ltd.
- Basement Impact Assessment Glenmore Rd rev 3 dated 31 July 2017 by Ecos Maclean Ltd.
- Historic Maps, dated 1871 and 1915 by Ordnance Survey.
- Notes (ref Basements rev4Nick), date unknown, by Ecos Maclean Ltd.
- Basement Impact Assessment, 15 Glenmore Rd NW3 4BY (ref 16058) revision 4, dated 06 September 2017 by Ecos Maclean Ltd.

2.8. CampbellReith accessed the LBC Planning Portal on 18 December 2017 and gained access to the following additional documents for audit purposes:

- Addendum Basement Impact Assessment, 15 Glenmore Road (ref 18663/R1), dated December 2017 by Gabriel GeoConsulting Limited.
- Email regarding consideration of SUDs drainage, dated 30 January 2018, from Keith Gabriel.

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	
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 BIA report and associated appendices consider both temporary and permanent cases.
Are suitable plans/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	Underground infrastructure in the vicinity is confirmed to be absent.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	The nearest watercourse to the site is a culverted tributary of the River Tyburn some 70m to the northwest. The site is not underlain by an aquifer and shallow groundwater is not anticipated at the site.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	Yes	

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Consideration of the cumulative impact from this proposal and an adjacent basement proposal at no. 13 is given in the BIA Addendum.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	The proposed development is not within an area of Flood Risk. A detailed Flood Risk Assessment is not required.
Is factual ground investigation data provided?	Yes	Three foundation inspection pits were dug inside the building and unlabelled photographs are provided. Reference is made to a borehole drilled to 8.45m at the adjacent property and an engineer's log provided in BIA rev 3. Factual and interpretative reporting as required by GSD G2 and G3 has been provided in the BIA Addendum.
Is monitoring data presented?	N/A	BIA Addendum confirm groundwater not encountered.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	Reference is made to a Site Walkover Survey in the BIA and later BIA revisions present sufficient detail of this survey.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	The BIA Addendum identifies that a basement development is underway at an adjacent property (No. 13).
Is a geotechnical interpretation presented?	Yes	Adequate geotechnical discussion is provided in the BIA Addendum.

Item	Yes/No/NA	Comment
Does the geotechnical interpretation include information on retaining wall design?	Yes	Underpinning and retaining wall methodology in Appendix 5b.
Are reports on other investigations required by screening and scoping presented?	Yes	Sufficient Site Investigation information at the adjacent property is presented in the BIA Addendum.
Are baseline conditions described, based on the GSD?	Yes	Updated in the BIA Addendum.
Do the base line conditions consider adjacent or nearby basements?	Yes	The GMA presented in the BIA Addendum assumes the adjacent basement will be complete prior to these works, however if this is not the case, the GMA and structural monitoring programme will need to be reviewed.
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	A GMA and linked monitoring strategy is presented in the BIA Addendum.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	Impact assessment considers flood risk, groundwater issues, drainage and land stability.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	The BIA Addendum considers damage impacts / ground movements.
Has the need for monitoring during construction been considered?	Yes	Updated in the BIA Addendum.
Have the residual (after mitigation) impacts been clearly identified?	Yes	

Item	Yes/No/NA	Comment
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Updated in the BIA Addendum.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Updated in the BIA Addendum and Email (Keith Gabriel).
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Updated in the BIA Addendum.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Updated in the BIA Addendum.
Are non-technical summaries provided?	Yes	Updated in the BIA Addendum.

4.0 DISCUSSION

4.1. The proposed development involves conversion of a single dwelling house into 4 x 2 bed flats; enlargement of existing basement level; creation of rear lightwell and enlargement of existing front lightwell.

4.2. The original BIA has been prepared by Ecos Maclean with some of the supporting documents prepared by London Design Office. An Addendum BIA has been prepared by Gabriel Geo Consulting Limited and the authors' qualifications have been accepted.

4.3. Desk study information required to inform the BIA process was requested in the initial audit report, including the provision of historical mapping and details of a site walkover, to describe conditions at and local to the site according to the guidance in Appendix G of the GSD. This information was included in the BIA revision 3 submission, along with supplementary information regarding additional site visits in the BIA Addendum.

4.4. The absence of underground infrastructure/services has been identified in the BIA Addendum.

4.5. Non-technical summaries are provided for each stage of assessment in the BIA Adendum, as described in CPG4.

4.6. The BIA identified that the nearest watercourse to the site is a culverted tributary of the River Tyburn some 70m to the northwest. The site is not underlain by an aquifer and shallow groundwater in hydraulic continuity is not anticipated at the site. The conclusions of the amended hydrogeological assessment in the BIA Addendum are accepted, which identify the absence of significant perched water at the site.

4.7. The screening stage identified that the site lies in an area of Very Low flood risk. A site-specific flood risk assessment is therefore not required, although the design of the drainage will need regulatory approval.

4.8. The BIA states that the site lies on Made Ground overlying designated unproductive strata, the London Clay. The London Clay is identified as the bearing formation for the proposed foundations. A borehole from an adjacent site is referred to and the engineer's log provided in the BIA rev 3, and this, along with historic BGS borehole information from 300m away together form the basis of the geotechnical parameters. Ground investigation reporting including geotechnical design parameters are required are provided in sufficient detail within the BIA Addendum.

4.9. Groundwater was not detected in the trial pits and no standpipe installation or subsequent water monitoring was carried out. It is accepted that any water held in the London Clay is

likely to be held in discrete units and not be laterally continuous and that no perched water was recorded. However, allowance should be made for dewatering during construction. Additional hydrogeological assessment was included in the BIA rev 3 and its' conclusions are agreed with.

4.10. The BIA Addendum includes comment on contingency requirements for temporary dewatering during construction, any permanent waterproofing requirements, and potential impacts to neighbouring properties / basements and cumulative effects of adjacent basements.

4.11. There is no impact to slopes or the wider hydrogeological environment.

4.12. The screening and scoping stage in the original BIA did not consider the potential for seasonal shrink swell subsidence in the London Clay at the site. The original BIA did not state if trees are required to be felled as part of the proposal, although an arboricultural report was included in the provided documents. This is referred to in section 7.2.14 of the BIA Addendum, along with consideration of root protection areas and tree root induced ground movements. Details of insitu testing to confirm geotechnical properties is described in the BIA Addendum.

4.13. The scheme utilises mass concrete underpinning and reinforced concrete floors for the basement construction and reinforced concrete for the lightwell, with floor and side walls acting as restraint of the adjacent soil and pavement. Construction methodology and sequencing is outlined in the BIA appendices.

4.14. Temporary works and propping arrangements are detailed in the Construction Method Statement (CMS). These are generally considered appropriate, given the clarification of the construction methodology and confirmation of ground conditions in the BIA Addendum. Propping and sequencing drawings of the temporary works have been provided in this recent submission, along with an update for groundwater control methodologies. Outline structural calculations for slabs and retaining walls are also provided.

4.15. A ground movement assessment is provided in the addendum BIA report. Corresponding contour plans in accordance with CIRIA C580 / 760 are presented, identifying the load bearing walls, the movements along them and the consequential predicted damage. Damage impacts are calculated for all structures within the zone of influence, including the highway and any sensitive underground infrastructure (utilities). This GMA assumes the basement to No.13 (adjacent) will be completed before excavation on no.15 commences, however, if this is not the case, the engineer should re-evaluate their GMA and monitoring regime, as required.

4.16. The updated damage assessment in the BIA Addendum concludes that a maximum of Category 1 damage in accordance with Burland Scale will be sustained, which is considered reasonably conservative. This updated assessment considers the proven ground conditions across the site and the settlement / movements anticipated to be generated by underpinning. If a specialist

underpinning contractor is to be appointed, their review of the scheme and their confirmation of predicted ground movements would be beneficial.

4.17. The structural monitoring proposal is linked to the ground movement assessment in the BIA Addendum. It includes appropriate trigger values and contingency actions in order to ensure damage impacts are limited to a maximum of Category 1 (Very Slight).

4.18. The BIA Addendum confirms there will be no significant increase in impermeable site area. Information contained in an email from January 2018 outlines that changes to off-site discharge flow rates will be negligible.

4.19. A conceptual site model is presented in the BIA Addendum.

5.0 CONCLUSIONS

5.1. The proposed development involves conversion of a single dwelling house into 4 x 2 bed flats; enlargement of existing basement level; creation of rear lightwell and enlargement of existing front lightwell.

5.2. The authors' qualifications are in accordance with CPG4.

5.3. Desk study information, including historical mapping and a site walkover to assess conditions at and local to the site has been provided in the BIA Addendum. Comment on underground infrastructures / utilities information is also included.

5.4. The site is located within an area of Very Low flood risk and as such a site-specific flood risk assessment is not required.

5.5. There is no impact to slopes or the wider hydrogeological environment.

5.6. Sufficient site investigation has been undertaken with insitu and laboratory testing and monitoring of groundwater levels described in the BIA Addendum.

5.7. The construction methodology, including temporary and permanent works, geotechnical design parameters and outline retaining wall and slab calculations are provided.

5.8. The BIA Addendum assesses maximum damage to neighbouring structures to be Category 1 (Very Slight). The assessment assumes the basement to No.13 (adjacent) will be completed before construction on no.15 commences. If this is not the case, the engineer should re-evaluate their GMA and monitoring regime, as required.

5.9. The BIA Addendum confirms there will be no significant increase in impermeable site area. Information contained in an email from January 2018 outlines that changes to off-site discharge flow rates will be negligible.

5.10. A conceptual site model is provided in the BIA Addendum.

5.11. Queries and matters that required further information or clarification are summarised in Appendix 2. The additional information requested has been provided and the BIA meets the requirements of CPG4.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	BIA	Desk Study information and assessment – historical mapping, site walkover and services information.	Closed	January 2018
2	BIA	Non-technical summaries.	Closed	January 2018
3	Stability / Hydrogeology	Site specific investigation required – including insitu testing and groundwater monitoring.	Closed	January 2018
4	Hydrogeology	Temporary dewatering, waterproofing, impacts to neighbouring basements and cumulative impact of adjacent basements.	Closed	August 2017 / January 2018
5	Stability	Geotechnical parameters.	Closed	January 2018
6	Stability	Temporary works methodologies to be confirmed and updated, if required, following additional site investigation to include further mitigation.	Closed	January 2018
7	Stability	Seasonal shrink swell subsidence and arboriculturalist recommendations.	Closed	January 2018
7	Stability	Ground movement and damage impact assessments – to be revised.	Closed	January 2018
8	Hydrology	Attenuation SUDS Assessment in accordance with CPG4 3.51.	Closed	January 2018
9	BIA	Conceptual Site Model.	Closed	January 2018
10	BIA	Authors qualifications are not as required by CPG4 for comment on subterranean groundwater flow	Closed	January 2018

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Appendix 3: Supplementary Supporting Documents

Addendum Basement Impact Assessment 15 Glenmore Road

Email from Keith Gabriel dated 30 January 2018

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