

38 Glenloch Road
London, NW3 4DN

Basement Impact Assessment
Audit

For
London Borough of Camden

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Contents

1.0 Non-technical summary 3
2.0 Introduction 5
3.0 Basement Impact Assessment Audit Check List..... 7
4.0 Discussion 10
5.0 Conclusions 13

Appendix

- Appendix 1: Residents' Consultation Comments
- Appendix 2: Audit Query Tracker
- Appendix 3: Supplementary Supporting Documents

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 (BIA) submitted as part of the Planning Submission documentation for 38 Glenloch Road (planning reference 2018/4200/P). The basement is considered to fall within Category B as defined by the Terms of Reference.
- 1.2. The Audit reviewed the BIA 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 qualifications of the individuals involved in the BIA meet Camden Planning Guidance requirements. Details for the Construction Methodology Statement (CMS) checker's qualifications have been included as part of the updated information.
- 1.5. As requested in the previous version of the audit, reference to the current LBC guidance has been made in the BIA and the query is considered closed.
- 1.6. The potential for perched groundwater and seasonal groundwater rise has been considered in the updated version of the CMS and adequate mitigation measures presented.
- 1.7. Clarification of the neighbouring foundation depths was requested in the previous audit. Although the typology and depth of neighbouring foundations have not been confirmed, assumptions made in the BIA in this regard are considered conservative.
- 1.8. A utilities search has been undertaken and presented in Appendix F of the CMS.
- 1.9. The updated information provided in the BIA confirms the maximum pressure applied as a result of the proposed development to not exceed the value for the allowable bearing pressure indicated in the BIA (90kPa).
- 1.10. The Ground Movement Assessment (GMA) has been reviewed and estimates a maximum category of damage for the neighbouring properties to be within the limits specified in LBC guidance.
- 1.11. It is accepted there is not any slope stability concerns regarding the site and the proposed development.
- 1.12. It is accepted that there is not any impact on surface water from the basement proposal.

- 1.13. It is accepted that there is not any impact on the local and wider hydrogeology from the basement proposal.
- 1.14. Queries and requests for information are summarised in Appendix 2. Considering the additional information provided, the BIA meets the requirements of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 11 September 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 38 Glenloch Road, London NW3 4DN (Reference: 2018/4200/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, 2018.
- 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 *"Enlargement of existing basement including creation of rear lightwell and enlargement of front lightwell, erection of replacement rear extension and other external alterations in association with conversion of dwelling house into 3 units."*

2.6. The audit instruction also confirmed that the proposal does not involve any listed building.

2.7. CampbellReith accessed LBC's Planning Portal on 15 October 2018 and gained access to the following relevant documents for audit purposes:

- Construction Methodology Statement (CMS, Rev P1) by Form Structural Design (ref: 172904), dated December 2017 with appended Desk Study, Ground Investigation and Basement Impact Assessment Report by Jomas Associates Ltd (ref: P1207J1245), dated January 2018.
- Ground Movement Analysis Report by Ground and Water Ltd (Ref. GWPR2718/GIR, Rev. V1.00), dated August 2018.
- Nash Baker Architects Planning Application drawings:
 - Existing plans, sections and elevations (1706/101A-102A-103A-104A-105A),
 - Proposed plans, sections and elevations (1706/301B-302B-303B-304B-305B),
 - Below ground drainage sketch (SK_20171211_01),
 - Design and Access Statement.
- Arboricultural Impact Assessment (by Landmark Trees, reference: NBA/38/AIA/01b, February 2018).
- Flood Risk Assessment (FRA) (by GeoSmart Information Ltd, reference: 70356R1REV2, February 2018).
- Draft Construction Programme (V1), author and date not given.
- Consultation responses.

2.8. The following revised information was received via LBC in response to the queries raised in the previous (rev. D1 and D2) BIA audit report. All the documents are available on the planning portal and have therefore not been included in Appendix 3.

- 38 Glenloch Rd Audit Response Letter to CampbellReith, dated January 2019
- Revised CMS (Rev. P2) and associated appendices, dated January 2019.
- Revised Desk Study, Ground Investigation and Basement Impact Assessment Report (Rev. Final v1.1) dated January 2019.
- Revised Ground Movement Analysis Report (Rev. V2.00), dated December 2018.
- 38 Glenloch Road Geotechnical analysis Final (GWPR3049).
- Revised Ground Movement Analysis Report (Rev. V3.00), dated Aril 2019.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Details of CMS checker's qualifications have now been presented.
Is data required by Cl.233 of the GSD presented?	Yes	Characteristics and location of the project are presented in the BIA along with characteristics of the potential impact.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	CMS report text, BIA and FRA.
Are suitable plan/maps included?	Yes	Maps and plans are provided in the BIA.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	The relevant area of study for each of the project impacts is shown in sufficient detail.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Data sources are presented in Appendix 2 of the BIA. Justification is provided for 'No' answers.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Data sources are presented in Appendix 2 of the BIA and in the FRA. Justification is provided for 'No' answers.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Data sources are presented in Appendix 2 of the BIA and in the FRA. Justification is provided for 'No' answers.
Is a conceptual model presented?	Yes	A conceptual model has been described from the site investigation findings in the BIA. See Section 3 of the BIA and Sections 2.0 and 6.4 of the GMA.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 7.2 of the BIA.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 7.2 of the BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 7.2 of the BIA.
Is factual ground investigation data provided?	Yes	Section 8 of the BIA and associated appendices.
Is monitoring data presented?	Yes	Section 14.10 of the BIA.
Is the ground investigation informed by a desk study?	Yes	Desk study information presented in the BIA.
Has a site walkover been undertaken?	Yes	Section 2.2 of the BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	No	Although typology and depth of neighbouring foundations have not been confirmed, assumptions made in the BIA on this regard are considered conservative.
Is a geotechnical interpretation presented?	Yes	Clarification on the bearing capacity of the London Clay has been provided.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	FRA and GMA are presented.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	As above.

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	Section 15 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	Ground movement analysis report (GMA) from Ground and Water Ltd.
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	Both the BIA and the CMS consider appropriate mitigation measures
Has the need for monitoring during construction been considered?	Yes	Outline proposals have been presented in a movement monitoring specification (see audit paragraph 4.14).
Have the residual (after mitigation) impacts been clearly identified?	Yes	The BIA considers residual impacts to be negligible, however this requires further qualification.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Refer to the GMA revision
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	See Section 15 of the BIA.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	As above.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Refer to the GMA revision
Are non-technical summaries provided?	No	However, all the information provided can be easily understood.

4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) is presented as an appendix to a Construction Methodology Statement undertaken by Form Structural Design. The author of the CMS holds CEng MStructE qualifications. Qualification details for CMS checker's, which were requested in the previous version of the audit, are now presented in the BIA and the query is considered closed. The BIA was prepared by Jomas Associates Ltd and the individuals involved hold CGeol, SiLC and MCIWM qualifications.
- 4.2. The BIA report originally made reference to CPG4: Basements and Lightwells together with the Local Plan (2017) and other guidance documents. As requested in the previous version of the audit, reference to the current Camden Policy Guidance: Basements March 2018 has been made in the updated BIA and the query is considered closed.
- 4.3. The site comprises a three storey terraced residential structure with a garden at the rear. It is proposed to enlarge a basement beneath the building which involves extending the existing lower ground floor 2.00m beyond the rear façade to form a rear lightwell adjacent to the garden. The maximum depth of excavation is indicated to be c. 3.50m and the basement is to be constructed using underpinning.
- 4.4. A ground investigation undertaken by Jomas Associates Ltd identified Made Ground to a maximum 1.65m bgl underlain by London Clay which was proven to 5.45m bgl. Groundwater was not struck during the site investigation. However, during four monitoring visits after groundworks, groundwater was monitored up to 2.42m bgl which is within the proposed basement depth.
- 4.5. The BIA states: *'Given the recorded geology and the lack of groundwater reported during drilling, it is likely that the water levels recorded during monitoring does not represent a true groundwater level, and it likely due to surface water ingress into the well.'* Despite this being the case, the monitored water level cannot be fully discounted and, as noted in the BIA, groundwater may be encountered during the site works.
- 4.6. Clarification on the potential for perched groundwater, seasonal groundwater rise and mitigation measures to deal with groundwater during construction was requested in the previous version of the audit. The issue has been considered in the updated version of the CMS and adequate mitigation measures presented. The query is considered closed.
- 4.7. Although the site is reported to be within a wider hillside setting in which the general slope may be locally greater than 7 degrees, the site and its surroundings are not on a slope greater than 7 degrees, such that slope stability is not considered an issue.

- 4.8. The BIA assumes that it is likely the basement foundations will increase the differential depth relatively to neighbouring properties. However, the typology and depth of neighbouring foundations have not been confirmed. The BIA has been updated to show the exact locations of the foundations inspection pits to clarify this matter. Although the presence of a basement underneath 36 Glenloch Road is unlikely, the presence of a basement underneath 40 Glenloch Road cannot be fully discounted. However, this is not considered to affect the hydrogeological setting of the area. In the Ground Movement Assessment, the neighbouring properties have been conservatively assumed to not have a basement.
- 4.9. The site is reported to be in area of moderate risk from shrink-swell clays. However, no evidence of structural damage caused by seasonal shrink-swell was noted during the walkover. The site investigation confirmed the London Clay to have a moderate to high volume change potential. Considering the typology of trees to be retained on site and the proposed foundation depth, it is accepted that seasonal shrink and swell of the London Clay do not represent an issue for the development.
- 4.10. The arboricultural report identifies only a very low impact to a single tree resulting from the basement proposal and describes mitigation that may be employed. It is accepted on that basis that there are no significant adverse impacts on surrounding properties.
- 4.11. Section 8.0 of the CMS states that no underground structures, tunnels or vaults are expected near the proposed works. However, a utilities search was requested in the previous version of the audit to inform the baseline conditions. A utilities search has been undertaken and presented in Appendix F of the CMS. The query is considered closed.
- 4.12. A summary of geotechnical laboratory test data is provided in the BIA and a retaining wall analysis has been presented in Appendix E. Clarifications on the allowable bearing capacity presented in the retaining wall calculations was requested. The updated information provided by Form Structural Design confirms the maximum pressure applied as a result of the proposed development to not exceed the value for the allowable bearing pressure indicated in the BIA (90kPa).
- 4.13. Outline structural proposals are presented on sketches which also indicate temporary propping in the CMS. The installation of temporary piles and associated ground beams is proposed to support the first floor during construction. An outline construction programme is also presented in the BIA.
- 4.14. A Ground Movement Assessment (GMA) was undertaken by Ground and Water Ltd following CIRIA C760 guidance for embedded retaining walls. Whilst CIRIA C760 is not intended for use with underpinning, it may predict ground movements of the magnitude expected from this activity. As requested in the previous version of the audit, a settlement calculation has been

presented in the BIA and the predicted movements have been included in the revised version of the GMA. Although input and output of the software used in the settlement analysis was requested in the previous version of the audit, these have not been presented.

- 4.15. Vertical movements due to excavation have been estimated based on the presence of soft to firm clay, whilst horizontal movements have been estimated based on the presence of stiff clay. The GMA predicts damages to surrounding buildings to be within Burland Category 1.
- 4.16. Although the interpreted geotechnical parameters and methodology of assessment in relation to ground movements are not wholly agreed with, by means of independent calculation and verification the predicted movements presented within the BIA are accepted as being within the range expected from the scale of the basement and construction technique proposed, within the London Clay.
- 4.17. The site is within 5m of a footpath and a road on the south-eastern side. As part of the previous audit, an estimation of ground movements occurring at the road was requested. The updated GMA estimates maximum ground movements at Glenloch Road to be less than 5mm.
- 4.18. Outline monitoring proposals with trigger levels were requested as part of the previous version of the audit. Form Structural Design have submitted a movement monitoring specification where amber and red trigger values has been set to 5 and 7mm respectively in both the horizontal and vertical directions. This is accepted and the query is considered closed.
- 4.19. A FRA is presented in the BIA. This concludes the development is at a low fluvial flood risk, a very low surface water flood risk and negligible groundwater flood risk.
- 4.20. Queries and requests are described in Section 4 and summarised in Appendix 2.

5.0 CONCLUSIONS

- 5.1. The qualifications of the individuals involved in the BIA meet Camden Planning Guidance requirements. Details of the CMS checker's qualifications have been included as part of the updated information.
- 5.2. As requested in the previous version of the audit, reference to the current Camden Policy Guidance: Basements March 2018 has been made in the BIA and the query is considered closed.
- 5.3. The potential for perched groundwater and seasonal groundwater rise has been considered in the updated version of the CMS and adequate mitigation measures presented.
- 5.4. Clarification of the neighbouring foundation depths was requested in the previous audit. Although the typology and depth of neighbouring foundations have not been confirmed, assumptions made in the BIA in this regard are considered conservative.
- 5.5. A utilities search has been undertaken and presented in Appendix F of the CMS.
- 5.6. The GMA has been reviewed as discussed in Section 4. Impacts to neighbouring properties will be within Category 1 of the Burland Scale.
- 5.7. Outline monitoring proposals with trigger levels have been presented.
- 5.8. It is accepted there are not any slope stability concerns regarding the site and the proposed development.
- 5.9. It is accepted that there is not any impact on surface water from the basement proposal.
- 5.10. It is accepted that there is not any impact on the local and wider hydrogeology from the basement proposal.
- 5.11. Queries and requests for information are summarised in Appendix 2. Considering the additional information provided, the BIA meets the requirements of the Camden Planning Guidance.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Morris	40 Glenloch Road	27 Sept 2018	Stability and structural integrity concerns	See Audit paragraph 4.12. to 4.17.
Juliet West	Redacted	4 Oct 2018	Stability and structural damages concerns	See Audit paragraph 4.12. to 4.17.
Dr. R. Fernandez	Redacted	3 Oct 2018	Stability and structural damages concerns	See Audit paragraph 4.12. to 4.17.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	Camden Policy Guidance: Basement March 2018 to be referenced in any future revision. Details for CMS checker's qualifications are required.	Closed – See audit paragraph 4.1. - 4.2.	11/04/2019
2	BIA hydrogeology	Potential for perched groundwater and seasonal groundwater rise to be considered in the impact assessment. Mitigation measures to deal with groundwater during construction should be presented in the CMS and impact assessment.	Closed – See audit paragraph 4.6.	11/04/2019
3	BIA land stability	The scoping presented in the BIA should be reviewed and land stability risk be re-assessed in the impact assessment.	Closed – See audit paragraph 4.7.	11/04/2019
4	BIA land stability	Typology and depth of neighbouring foundations to be confirmed.	Closed – See audit paragraph 4.8.	11/04/2019
5	BIA land stability	Utility search not undertaken.	Closed – See audit paragraph 4.11.	11/04/2019
6	BIA land stability	An interpretation of geotechnical parameters with characteristic values should be presented. Clarification about allowable bearing capacity should be presented.	Closed – See audit paragraph 4.12. - 4.13.	11/04/2019
7	Stability	GMA not based on consistent assumptions. A 'conservative' estimation predicts Burland Cat. 2 damage. Ground movements for the adjacent road should also be estimated. Revised GMA should be provided. Settlement calculations to be provided.	Close – See audit paragraphs 4.14 - 4.16.	23/05/2019
8	Stability	Monitoring proposal.	Closed – See audit paragraph 4.17.	11/04/2019

Appendix 3: Supplementary Supporting Documents

None

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