CampbellReith
consulting engineers

77 Lawn Road, NW3 2XB

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13398-71
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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 77 Lawn Road (planning reference 2020/2014/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. Permission was granted for a basement at No. 77 Lawn Road in 2017 and the basement was constructed in 2019. The basement constructed differs from the proposed scheme so a retrospective BIA was submitted.

1.5. A single storey basement is indicated to have been constructed, c 4m deep beneath the entire extent of the above ground development with a light well to the rear of the property. The BIA text describes the construction as underpinning whilst drawings and calculations show a part piled basement.

1.6. A desk study and ground investigation has been undertaken which presents factual and interpretative information.

1.7. The BIA reports include screening, scoping, site investigation and impact assessment stages as required by CPG Basements.

1.8. It is accepted that the development will not impact upon the hydrological conditions of the site.

1.9. A tree has been removed as part of the development proposal which is not considered likely to impact neighbouring foundations.

1.10. Southern Testing have estimated long term heave to be negligible which is accepted.

1.11. The description of the basement construction has been clarified by Momentum Engineering's BIA supplemental information and calculations to support them have been provided.

1.12. The soil parameters used in the design of the have been clarified by the supplemental information provided, as discussed in Section 4. The basis of the design is generally accepted.

1.13. It is accepted that the development will not impact upon the hydrogeological conditions of the site.

1.14. Considering the supplemental 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 12th December 2020 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 77 Lawn Road, NW3 2XB (planning reference 2020/2014/P). The planning application is retrospective, with the basement having been constructed in 2019.

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:

- 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 *"Variation of Condition 3 (approved plans) of planning permission ref 2016/1737/P dated 05/06/2017 for creation of basement and other alterations; changes to include replacement of the rear dormer instead of refurbishment; alterations to openings on side and rear elevations; alterations to rooflights above side extension; new rooflights on main rear roof; addition of 2x solar panels; changes to skylights in rear and front gardens; changes to landscaping; changes basement layout (Retrospective) (Amended description)."*

The Audit Instruction confirmed 77 Lawn Road does not involve, and is not neighbour to, listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 8th January 2021 and gained access to the following relevant documents for audit purposes:

- 77 Lawn Road Basement Impact Assessment (Momentum Structural Engineers), Ref 2716 RPT, August 2020, including:

  Southern Testing Desk Study and Ground Investigation Report (2016) and Ground Movement Assessment (2020)

  Proposed Plans by Symmetrys Ltd, ref 17304 drawing No 01 – 05, March 2018

  Underpinning Construction Sequence, by Abtech Basement Design/Phillip Banks Design & Build Limited, ref A1282-01 to A1282-08;

  Proposed Plans, Torner Architects, ref 010-GAB1-C7, April 2020, 010-GA00-C5, 010-GA01-C6, 010-GA02-C3, September 2020 and 010-GARF-C2 July 2018;

- Planning Application Drawings consisting of:

  Location Plan, ref LWN_L-P1, March 2016

- Planning Consultation Responses.

2.7. Basement Impact Assessment Supplementary information was provided by Momentum Structural Engineers to CampbellReith on 12th May 2021 in order to close out the CRH BIA queries:

- 77 Lawn Road Basement Impact Assessment Supplementary Information (Momentum Structural Engineers), Ref 2716_MOM_LRD_RPT_BIA Supplementary Information_00, April 2021, including:

  Surface water drainage proposals (JDH Consulting), ref 120-03 C3, dated May 2018

  Tree survey and cross section (AGB Environmental) ref P2468.1.001, dated October 2015

  Additional calculations basement slab and walls, (Symmetrys Ltd) ref 17304 A, dated February 2021

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Page 2 Momentum Engineering (ME) Basement Impact Assessment (BIA) report.
Is data required by Cl.233 of the GSD presented?	No	Programme has not been provided. However, it is noted that the basement has already been constructed.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	BIA Audit Section 4.6.
Are suitable plan/maps included?	Yes	Tree survey provided ME BIA supplementary information.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	BIA and BIA supplemental information.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Page 7 ME BIA report.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Page 7 ME BIA report.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Page 8 ME BIA report.
Is a conceptual model presented?	Yes	Section I and Appendix A of Southern Testing (ST) BIA/Ground Investigation Report.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Page 9 ME BIA report.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Page 9 ME BIA report.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Page 9 ME BIA report.
Is factual ground investigation data provided?	Yes	Appendix B ST BIA/Ground Investigation Report.
Is monitoring data presented?	Yes	Section J-18 ST BIA/Ground Investigation Report.
Is the ground investigation informed by a desk study?	Yes	Section E ST BIA/Ground Investigation Report.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	
Is a geotechnical interpretation presented?	Yes	Section J ST BIA/Ground Investigation Report.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section J-21 ST BIA/Ground Investigation Report.
Are reports on other investigations required by screening and scoping presented?	No	Utilities search not provided.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	In respect of ground movement only – Section M ST BIA/Ground Investigation Report.

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	ME BIA report.
Are estimates of ground movement and structural impact presented?	Yes	Section M-28.5 ST BIA/Ground Investigation Report.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	Supplemental information.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Supplemental information.
Has the need for monitoring during construction been considered?	Yes	Page 16 of the ME BIA describes monitoring required and trigger levels with required actions.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Supplemental information.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Supplemental information.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Refer to surface water drainage proposals in the ME BIA supplemental information.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Supplemental information.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Supplemental information.
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. The Basement Impact Assessment alongside the Site Investigation and Ground Movement Assessment (BIA) Report, has been carried out by engineering consultants Momentum Engineering (ME). The individuals concerned in its production have suitable qualifications.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal does not involve a listed building, nor is it adjacent to listed buildings.

4.3. No. 77 Lawn Road prior to development comprised a semi-detached 2 storey house which shared a party wall with No. 78 to the South. No. 76 is located to the North with the closest wall of the house situated approximately 1.2m away. The BIA indicates the site slopes steeply from the west at 64.70m AOD to the east at 62.60m AOD.

4.4. Permission was granted for a basement in 2017 and the basement was constructed in 2019. However, the basement differs from the consented scheme, hence the need to submit a revised BIA retrospectively. It is understood that the current basement is shown in the Torner Architects (TA) drawings. These show a single storey basement, c 4m deep, beneath the entire extent of the above ground development with a light well to the rear of the property.

4.5. A ground investigation (GI) was undertaken by Southern Testing in 2016. The ground investigation identified Made Ground to 1.60m bgl. London Clay was encountered to 5.70m bgl. Ground water was not encountered during the ground investigation but a standing water level was encountered during monitoring at around 2.0m bgl. The BIA describes the London Clay as firm to stiff clay. An allowable bearing capacity in the London Clay of 125kPa is proposed.

4.6. Screening and scoping assessments are presented, supported by desk study information. The relevant figures/maps from the Arup GSD and other guidance documents are referenced within the BIA to support responses to the screening questions.

4.7. With respect to surface water, the screening and scoping noted the development is not in an area prone to flooding, however the area of new basement will increase the extent of impermeable surfacing. The ME BIA supplemental information provides ground drainage plans in Appendix A that include four 0.8m diameter GRP chambers. Surface water flow is proposed to be attenuated to a maximum of 5 l/s via a flow control device. It is accepted that there are no significant impacts to surface water flows. The final drainage design will require approval from LBC and Thames Water.

4.8. The development is remote from the Hampstead Heath Pond chain or other pond catchment areas. The site is not close to any “lost” rivers or spring lines. The basement will be founding within the London Clay Member which is not classified as an aquifer and no infiltration drainage

has been installed. Though the BIA indicates groundwater encountered during monitoring is likely to be perched, the structural design by Geobond has assumed a ground water of 1m bgl. As such it is accepted that the basement will not impact on groundwater flows.

4.9. With respect to stability, the screening and scoping noted potential impacts in relation to tree removal, slope stability and the impact of the basement excavation on neighbouring structures. These are audited below alongside a review of the structural information presented.

4.10. A tree has been removed as part of the development proposal. The location of the removed tree is shown on the tree survey included in Appendix B of the ME BIA supplemental information. No significant impact of their removal on neighbouring foundations is anticipated.

4.11. With respect to ground movement and impact on neighbouring foundations, most movement occurs during construction so this audit has considered long term movements and stability. ST have estimated long term heave to be negligible which is accepted.

4.12. The basement construction is described on pages 12 and 14 of ME's BIA which refers to L-shaped reinforced concrete underpins. However, it is noted that drawings prepared by Torner Architects and the construction sequence prepared by Abtech (both in BIA Appendix A) show underpinning beneath the party wall and piled retaining walls, with a concrete liner wall, elsewhere. The ME BIA supplemental information clarifies that the basement has been constructed with a combination of underpinning and piling as shown in Symmetry's basement plan drawing no. 17304 01 provided as part of the original BIA application.

4.13. Pile design and installation records, prepared by Geobond, are presented in Appendix A of the BIA. Additional calculations are provided in Appendix C of the ME BIA supplemental information.

4.14. The soil parameters used in the structural design are not consistent with those recommended in the geotechnical interpretative report. The contiguous pile wall has conservatively been designed to support long term hydrostatic pressure associated with a water head of 1m bgl. Made Ground has been assumed to be present to a depth of 3m bgl and the shear strength (Cu) of the London clay is assumed to be 60kPa at this level, increasing by 5kPa/m, which is accepted to be conservative. The drained friction angle of the London clay is assumed to be 25°. A stiffness relationship of 800Cu for the London Clay has been assumed. This is not generally considered suitably conservative for a structure of this nature; however, given the conservative nature of the Cu profile adopted it is accepted on that basis.

4.15. Surcharge loads associated with neighbouring foundations, light traffic loads and the sloping site are considered in the updated calculations provided.

4.16. Symmetrys construction drawings show the basement plan and associated building loadings. It is understood that these have been used in the design of the piled retaining walls.

4.17. The temporary propping arrangement is indicated in the Abtech drawings in Appendix A of the BIA based on calculations prepared by Geobond (also presented).

4.18. ME's BIA notes that the basement will have a reinforced concrete ground bearing slab that will be designed to resist heave and hydrostatic pressures. Details of the slab design, including a check against flotation are provided in the ME BIA supplemental information.

4.19. Structural calculations are provided by Abtech Basement Systems/Geobond UK for the temporary works and piled retaining wall. Calculations for the underpinning and concrete liner wall are provided in the ME BIA supplemental information.

5.0 CONCLUSIONS

5.1. The Basement Impact Assessment (BIA) and the Ground Movement Assessment (GMA) have been carried out by individuals who possess suitable qualifications.

5.2. Supplemental BIA information was provided by Momentum Engineering in response to the previous (D1) BIA audit.

5.3. A desk study and ground investigation has been undertaken which presents factual and interpretative information.

5.4. The BIA reports include screening, scoping, site investigation and impact assessment stages as required by CPG Basements.

5.5. The BIA identified potential impacts to surface water and proposed mitigation. It is accepted that the development will not impact on the wider hydrology of the area.

5.6. A tree has been removed as part of the development proposal and it is accepted that this would be unlikely to impact the neighbouring properties.

5.7. As most movement occurs during construction, and Southern Testing have estimated long term heave to be negligible, the focus of the audit has been on long term stability.

5.8. The description of the basement construction is clarified in the BIA supplemental information, which is to comprise a combination of reinforced concrete walls (underpinning) and a perimeter piled wall.

5.9. Calculations are provided in the BIA and BIA supplemental information. Surcharge loads associated with the sloping site have been considered as recommended in the BIA.

5.10. The soil parameters used in the design of the piles have been accepted.

5.11. It is accepted that the development will not impact upon the hydrogeological conditions or the slope stability of the site.

5.12. Considering the supplemental information, the BIA meets the requirements of CPG: Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Tomlinson	-	5/10/2020	The basement construction was completed before both the 2nd or 3rd BIA reports. No works were carried out on the basement in between the two BIAs. The predicted damage to the neighbouring properties (Nos. 78 and 76) was already known before the two BIAs were written. How therefore is it possible for the damage scale prediction for No.76 to have been changed from Burland Scale 2 to Burland Scale 1 between the 2nd BIA and the 3rd BIA?	As the development proposal has been built the long term stability will be illustrated through the structural calculations.
Solomon	Formerly of 76 Lawn Road	04/10/2020	The big question raised by the latest BIA is why have the damage predictions for my former house (No.76) been reduced from Burland scale 2 to Burland scale 1 despite the basement description in the two BIAs being essentially identical? These predictions are being made after the event so why doesn't the BIA incorporate the scale of the damage that actually took place at the two neighbouring properties (Nos. 76 and 78)? There is no need to predict what is already known.	As the development proposal has been built the long term stability will be illustrated through the structural calculations.
Symes	-	04/10/2020	After the work has been completed this current application now predicts Burland Scale 1 damage, no reason has been given to support the change in predicted damage in the current application.	As the development proposal has been built the long term stability will be illustrated through the structural calculations.
Noakes	-	08/08/2020	Raises concerns over the audit process being carried out retrospectively and highlights the original BIA predictions of Category 2 damage.	Since no damage to neighbouring properties has been reported from the construction, the audit process has focussed on ensuring the basement causes no long term stability issues.

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Surface water	The BIA notes that increased surface water flows will be attenuated by on site storage but no information has been submitted to confirm whether this was take into account in the design of the basement.	Closed	June 2021
2	BIA	BIA refers to the basement being constructed using underpinning whilst drawings and calculations show a combination of underpinning and piling.	Closed	June 2021
3	Stability	The location of any trees that have been removed should clearly be indicated and the impact of tree removal on nearby properties should be clearly assessed.	Closed	June 2021
4	Stability	The BIA advises that retaining walls are designed for a surcharge to reflect the sloping site. It is not clear where this has been taken into account.	Closed	June 2021
5	Stability	The soil parameters used in the design of the piles differ from those recommended in the site investigation report. Relationship of 800Cu in the London Clay is not considered sufficiently conservative.	Closed	June 2021
6	Stability	The BIA noted that the basement slab should be designed to accommodate heave and hydrostatic pressures and that a check against flotation was required. These are not presented.	Closed	June 2021
7	Stability	Calculations for the underpinning and concrete liner wall should be provided.	Closed	June 2021

Appendix 3: Supplementary Supporting Documents

None

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