CampbellReith
consulting engineers

75 Lawn Road, London, NW3 2XB

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12727-93

Revision: F1

August 2019

Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

T:+44 (0)20 7340 1700
E:london@campbellreith.com
W:www.campbellreith.com

Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	August 2018	Comment	GKemb12727-93-240818-75 Lawn Road-D1.docx	HS	GK	GK
F1	August 2019	Planning	GKemb12727-93-140819-75 Lawn Road-F1.docx	GK	EMB	EMB

Document Details

Last saved	14/08/2019 12:46
Path	GKemb12727-93-140819-75 Lawn Road-F1.docx
Author	G Kite, BSc MSc DIC FGS
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	12727-93
Project Name	75 Lawn Road
Planning Reference	2018/2136/P

Contents

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 75 Lawn Road, London NW3 2XB (planning reference 2018/2136/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. Additional information was submitted to CampbellReth by email.

1.4. The proposed development involves the construction of a single storey basement beneath the footprint of the existing house, which will extend to approximately 3.5m below ground level and will include lightwells to the front and rear of the property.

1.5. The BIA has been prepared by Site Analytical Services Ltd with an addendum and supporting documents provided by Fairhurst and Engineers HGW. The author's qualifications are in accordance with LBC guidelines.

1.6. The accuracy of survey and drawings used as the basis for assessment has been disputed within the consultation responses. The BIA has been updated with amended dimensions. It is recommended that the Engineer inspects the disputed wall sections prior to any works and confirms the validity of the current assessments, or updates the assessments, as required.

1.7. The site investigation identified a varying thickness of Made Ground underlain by superficial Head Deposits overlying the London Clay Formation. The site investigation and BIA have been informed by a desk study broadly in accordance LBC guidance.

1.8. Groundwater was monitored on two occasions during February 2018. The BIA recommends that groundwater monitoring is continued to confirm groundwater control requirements before excavation of the basement. It is accepted there will be no impact to the local or wider hydrogeological environment.

1.9. Structural calculations and retaining wall design are provided for review along with sequencing and propping information. Additional information and clarification has been provided, as previously requested.

1.10. An outline construction programme has been provided in the revised submissions. It stated that the proposed works will not be undertaken simultaneously with the ongoing works at 77 Lawn Road.

1.11. A Ground Movement Assessment (GMA) is presented, which predicts a maximum impact of Category 1 (Very Slight) Damage to surrounding structures, in accordance with the Burland Scale. Whilst this was originally not accepted, the assessments have been revised and are considered appropriate, assuming that damaged adjacent structures are repaired and structurally sound prior to works commencing.

1.12. An outline strategy for structural monitoring is presented. Specific monitoring requirements should be agreed under the Party Wall Act.

1.13. It is reported that the site is at very low risk of surface water flooding. A SuDS strategy is provided which attenuates discharge flow rates. This should be agreed with LBC and Thames Water. It is accepted there will be no impact to the wider hydrological environment.

1.14. It is accepted that there are no slopes in the local or wider area that are affected by the proposals.

1.15. Queries and matters requiring further information or clarification are summarised in Appendix 2. Considering the revised information, the BIA meets the criteria of CPG: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 16 July 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 75 Lawn Road, London NW3 2XB, Camden Reference 2018/2136/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.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- The 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; 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 planning portal describes the proposal as: *"Formation of new basement level with front and rear lightwells, single storey rear infill extension, part single, part two storey side extension, front, side and rear dormer windows, front and rear landscaping, alterations to driveway and associated works."*

The site lies within Parkhill Conservation Area but the building and its neighbours are not listed.

2.6. CampbellReith accessed LBC's Planning Portal on 25 July 2018 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (ref 17/27722-2, rev 3) dated March 2018 by Site Analytical Services Ltd. This report included the following documents:
  - Factual report on a ground investigation (ref. 17/27722-1) dated March 2018 by Site Analytical Services Ltd.
  - Ground Movement Assessment (ref. 125183/R3) dated March 2018 by Fairhurst.
- Existing and proposed plans, sections and elevations dated July and December 2017 by Nash Baker Architects.
- Structural Engineers Design Statement for Planning (ref 1716) dated April 2018 by Engineers HRW.
- Flood Risk Assessment (ref 70402R1REV1) dated January 2018 by GeoSmart Information Ltd.
- SuDS report (ref 70402R1) dated January 2018 by GeoSmart Information Ltd.
- Arboricultural Impact Assessment (ref NBA/75LR/AIA/02) dated January 2018 by Landmark Trees.
- Design and Access Statement dated May 2018 by Nash Baker Architects.
- Construction Management Plan dated April 2018 by Kias Services Ltd.
- Consultation Responses.

2.7. Since August 2018, CampbellReith has been in discussion with LBC, the Applicant's representatives and immediate neighbours, and has received the following relevant documents for audit purposes (included within Appendix 3 for reference, with exception of reports provided by neighbours in respect to their own or adjacent properties ie 74, 76 and 77 Lawn Road):

- LBC Email 5 September 2018.
- Basement Impact Assessment (ref 17/27722-2, rev 4) dated October 2018 by Site Analytical Services Ltd. This report included the following documents:
  - Factual report on a ground investigation (ref. 17/27722-1) dated October 2018 by Site Analytical Services Ltd.

  - Ground Movement Assessment (ref. 125183/R4) dated October 2018 by Fairhurst

- D1 Tracker Return Comments 5 October 2018.
- Structural Engineers Design Statement for Planning (ref 1716) dated 5 October 2018 by Engineers HRW.
- Draft Construction Programme – 75 Lawn Road.
- Target Construction Programme – 77 Lawn Road.
- Monitoring Report, 77 Lawn Road (ref SES-10017-MR28) dated 22 August 2018.
- Monitoring Report, 77 Lawn Road (ref SES-10017-MR28) dated 18 October 2018.
- Report on Geostructural Assessment of Serviceability Defects at 76 Lawn Road (ref C8787) dated 3 September 2018 by Geobond.
- 76 Lawn Road Report on the Cracking and Movement of the Structure date (ref 1782/290/IT/bl) January 2019 by Alan Baxter.
- 75 Lawn Road Structural Survey dated March 2019 by Engineers HRW.
- BIA Addendum dated May 2019 by Engineers HRW.
- Email Correspondence 11 June and 11 July 2019 between CampbellReith and Engineers HRW.
- Ground Movement Assessment (ref. 125183/R5) dated July 2019 by Fairhurst.

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	The accuracy of survey of neighbouring structures to be confirmed prior to any works; programme provided in revised submissions.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	Updated in revised submissions.
Are suitable plans/maps included?	Yes	Updated in revised submissions. The accuracy of survey of neighbouring structures to be confirmed prior to any works.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Updated in revised submissions. The accuracy of survey of neighbouring structures to be confirmed prior to any works.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	

Item	Yes/No/NA	Comment
Is a conceptual model presented?	Yes	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	
Is monitoring data presented?	Yes	Recommended to be continued.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	Updated in revised submissions.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	A Flood Risk Assessment and a SuDS assessment have been provided.

Item	Yes/No/NA	Comment
Are baseline conditions described, based on the GSD?	Yes	Updated in revised submissions. The accuracy of survey of neighbouring structures to be confirmed prior to any works.
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	Updated in revised submissions.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Updated in revised submissions.
Has the need for monitoring during construction been considered?	Yes	To be agreed under the Party Wall Act.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Structural repairs of existing damage to be implemented prior to any works.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Updated in revised submissions.
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	Updated in revised submissions.

Item	Yes/No/NA	Comment
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Updated in revised submissions.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The BIA has been prepared by Site Analytical Services Ltd with an addendum and supporting documents provided by Fairhurst and Engineers HRW. The author's qualifications are in accordance with LBC guidance.

4.2. The proposed development comprises the construction of a single storey basement beneath the footprint of the current residential property. The footprint of the proposed basement is slightly larger than the existing building and therefore there will be a basement lightwell at the front and rear of the property. It is understood that the proposed basement is at a level of approximately 3.5m below ground level.

4.3. The accuracy of survey and drawings used as the basis for assessment has been disputed within the consultation responses. The BIA has been updated with amended dimensions. It is recommended that the Engineer inspects the disputed wall sections prior to the commencement of any works and confirms the validity of the current assessments, or updates the assessments, as required. It is noted that relevant inspections, survey and structural monitoring will need to be agreed under the Party Wall Act.

4.4. Ground conditions at the site have been identified as a varying thickness of Made Ground underlain by superficial Head Deposits overlying the London Clay Formation. The site investigation and BIA have been informed by a desk study broadly in accordance with the GSD Appendix G1.

4.5. In the original documentation, groundwater monitoring results from two occasions during February 2018 were presented. The highest groundwater level recorded was 1.06m below ground level (bgl) in BH1. The SAS Ltd report incorrectly states that the highest groundwater encountered was 1.20m bgl. In the revised submissions and correspondence, additional monitoring is reported. Notwithstanding the groundwater monitoring undertaken, the Ground Movement Assessment and Structural Engineer's Design Statement recommend continued monitoring be undertaken to determine equilibrium levels and the extent of any seasonal variations, plus trial excavations to confirm ground and groundwater conditions in advance of construction.

4.6. The proposed development will not impact the local or wider hydrogeological environment. As noted in the structural proposals, during construction, contingency groundwater control measures will be employed to maintain stability. The Structural Engineer's Design Statement states that pumping measures may be required during construction but in the permanent condition the reinforced concrete box will be designed to exclude water.

4.7. Interpretative geotechnical information broadly in accordance with the GSD Appendix G3 is presented. Based on the original submissions, it was noted that the bearing capacity of the London Clay was inconsistently presented between reports and the structural calculations, that

settlements of up to 23mm were calculated, and that the depth of the proposed contiguous piling was not confirmed. In the revised submissions: geotechnical parameters have been reviewed and updated; the settlement calculations are updated, based on actual structural loads; pile lengths have been confirmed. The calculations are considered appropriate and in line with relevant guidance. The geotechnical parameters are within the expected range, considering the ground profile and proposed construction methodologies.

4.8. The building has party walls to both sides. The construction methodology indicates the demolition of rear and internal walls and existing floor structures and temporary retention of the retained front façade and perimeter walls which will then be followed by the excavation and construction of a new basement box and the rebuilding of the structure. Basement retaining walls are proposed to be formed both by underpinning and by contiguous piling. It is noted that temporary props will be used during the excavation works to maintain the lateral stability of the walls retaining the perimeter of the excavation and these will only be removed once the permanent lateral propping action of the basement and ground floor reinforced concrete slabs are in place. It is stated that the contiguous piled wall retaining gardens will be unpropped in the temporary case; in the permanent case the geometry and use of liner walls in the lightwells stiffen the structure.

4.9. Outline structural calculations are provided for review along with outline sequencing and propping information for the basement. The updated Structural Engineer's Design Statement confirms the use of temporary propping to maintain stability to neighbouring structures throughout demolition and construction, with associated monitoring (see 4.13) to ensure damage impacts are within predicted limits and policy requirements.

4.10. In the updated submissions, an outline construction programme has been provided. It was noted from consultation responses that basement construction is also being undertaken at 77 Lawn Road. With reference to the 77 Lawn Road target programme, it has been confirmed that construction programmes will not overlap.

4.11. A Ground Movement Assessment (GMA) was originally presented that considered the movements relating to the proposed basement construction and the effect on the adjacent properties at 74 and 76 Lawn Road. For the structures assessed, a maximum Damage Impact of Category 1 (Very Slight) in accordance with the Burland Scale was indicated. However, the GMA was not accepted. The original queries have been closed out by the revised assessments presented and the feasibility of maintaining maximum damage impacts of Category 1 to neighbours has been demonstrated:

- The GMA calculations have been presented and predicted movements are within the expected range based on the form of construction and methodologies adopted.
- In respect to the existing damage to 76 Lawn Road, it proposed that mitigation in the form of underpinning the Party Wall and repairing another cracked wall within the zone

of influence will be undertaken, subject to agreements under the Party Wall Act. Notwithstanding the exact nature of the agreement / repairs, the revised submissions acknowledge that existing structural damage should be remediated prior to works commencing to maintain damage impacts within policy requirements.

- The length of contiguous piles have now been indicated and used as the basis of calculations.
- It is accepted that the retaining walls can be considered 'high stiffness' and have been appropriately accounted for.
- The structural proposals to prop and monitor neighbouring structures will limit horizontal movements during demolition.
- The heave and settlement assessment has been revised and is within the expected range, considering the structural loads and ground conditions.
- The survey drawings have been revised. As 4.3, the neighbouring structural details should be checked and agreed under the Party Wall Act.

4.12. The Structural Engineer's Design Statement indicates that there will be no impacts to utility assets. The revised GMA indicates very low movements at the site boundary with the highway. Notwithstanding these statements / calculations, consultation with asset owners should be undertaken and asset specific protection agreements entered into, where required.

4.13. An outline monitoring strategy including trigger levels is presented. The trigger values appear reasonable to control construction and maintain a maximum of Category 1 damage. Specific monitoring requirements should be agreed under the Party Wall Act.

4.14. The current Environment Agency and Camden SFRA data indicates that the site is at "very low" risk of flooding (less than 0.1%) from surface water. Lawn Road did not flood in 1975 or 2002.

4.15. The site is not within a Critical Drainage Area nor is it located within a Local Flood Risk Zone. The development will increase the impermeable site area and the SuDS Assessment proposes that surface water runoff from the patio feeds into aco-drains surrounding the patio which will feed into permeable substrate beneath the patio. A controlled surface water discharge is proposed to the combined sewer network at <2l/s. It is accepted there should be no hydrological impacts. Detailed drainage design will require the approval of LBC and Thames Water.

4.16. Queries and matters previously raised as requiring further information or clarification are summarised in Appendix 2.

5.0 CONCLUSIONS

5.1. The qualifications of the authors meet the LBC requirements.

5.2. A desk study and site investigation data broadly in accordance with the guidance is presented.

5.3. The accuracy of survey and drawings used as the basis for assessment has been disputed within the consultation responses. It is recommended that the Engineer inspects the disputed wall sections prior to any works commencing and confirms the validity of the current assessments, or updates the assessments, as required. It is noted that relevant inspections, survey and structural monitoring will need to be agreed under the Party Wall Act.

5.4. Perched groundwater has been encountered on site. Continued groundwater monitoring and trial excavations are recommended in the BIA to ensure appropriate groundwater control is employed during construction. There will be no impact on the wider hydrogeological environment.

5.5. In the revised submissions, an outline construction programme is provided. The works will not be concurrent with basement construction at 77 Lawn Road.

5.6. Geotechnical and structural information has been updated in the revised submissions to clarify previous queries.

5.7. The ground movement and damage assessment has been revised and is accepted, as discussed in Section 4. It is accepted that, assuming good workmanship and the repair of currently damaged walls, it should be possible to limit damage to Burland Category 1.

5.8. An outline strategy for structural monitoring is presented. Specific monitoring requirements should be agreed under the Party Wall Act.

5.9. It is accepted that the site is at very low risk of surface water flooding.

5.10. A SuDS strategy is provided. This should be agreed with LBC and Thames Water. There will be no impact to the wider hydrological environment.

5.11. There are no slopes in the local or wider area that are affected by the basement proposals.

5.12. Queries and matters requiring further information or clarification are summarised in Appendix 2. Considering the revised information, the BIA meets the criteria of CPG: Basements.

Appendix 1: Residents' Consultation Comments

CampbellReith
consulting engineers

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Poole, Tomlinson	74 Lawn Road	29/07/18	Survey drawings incorrect – the assessments are based on incorrect drawings. Concerns regarding cumulative impacts, considering the adjacent basement proposals at 77 Lawn Road. Concerns re structural stability and damage to their home, including during demolition and the requirement for temporary propping, and groundwater causing stability issues during construction. Survey position of rear garden wall and assessment of impact not provided. Does the GMA consider the effects of demolition, short term and long term movements? Has groundwater flow and cumulative affects been considered?	Queries resolved as discussed in Section 4.
Solomon	76 Lawn Road	29/07/2018	Cumulative impact of 2no adjacent basement projects (75 and 77 Lawn Road) on structural stability and damage. Concern that a withdrawn BIA (application for 77) indicated Category 2 damage from the works at 77 alone. 76 already suffers from subsidence –this has not been assessed or considered in regards to stability.	Queries resolved as discussed in Section 4.

Surname	Address	Date	Issue raised	Response
			Assessment has been completed based on inaccurate survey records. Concern re cumulative impacts to groundwater flow.	
Neill, Simpson-Orlebar	73 Lawn Road	29/07/2018	Cumulative impact of proposed basement, considering works at 77 Lawn Road.	Queries resolved as discussed in Section 4.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	Hydrogeology	In accordance with the BIA's own recommendations, further groundwater monitoring and trial excavations should be undertaken to inform temporary works contingency measures	Note Only – BIA recommends further works prior to construction.	NA
2	Stability	Foundation bearing capacities to be confirmed and consistently presented between reports / calculations. Depth of proposed contiguous piles to be confirmed.	Closed	August 2019
3	BIA	The survey / drawing dimensions and layouts of adjacent structures are disputed by neighbours. Survey and proposal drawings to be confirmed as accurate. If revisions are made, assessments should be confirmed as applicable or revised accordingly.	The BIA has been updated with amended dimensions. The Engineer should inspect the disputed wall sections prior to any works commencing and confirm the validity of the current assessments, or update the assessments, as required. Relevant inspections, survey and structural monitoring will need to be agreed under the Party Wall Act.	August 2019
4	BIA	Outline programme of works to be provided. It should be confirmed whether the basement works will be undertaken simultaneously with the construction works at 77 Lawn Road.	Closed	October 2018
5	Stability	Subject to the programme, if simultaneous construction with 77 Lawn Road is planned then the GMA to be updated to consider cumulative impact / damage to 76 Lawn Road.	Closed	October 2018
6	Stability	GMA to be reviewed considering comments in Section 4: confirm depth of piles used within assessment and stiffness (noting some walls un-propped in temporary case); provide calculation inputs; consider movements generated by demolition, installation of retaining walls, excavation and settlement of foundations.	Closed	August 2019

Appendix 3: Supplementary Supporting Documents

- LBC Email 5 September 2018.
- Basement Impact Assessment (ref 17/27722-2, rev 4) dated October 2018 by Site Analytical Services Ltd. This report included the following documents:
  - Factual report on a ground investigation (ref. 17/27722-1) dated October 2018 by Site Analytical Services Ltd.
  - Ground Movement Assessment (ref. 125183/R4) dated October 2018 by Fairhurst
- D1 Tracker Return Comments 5 October 2018.
- Structural Engineers Design Statement for Planning (ref 1716) dated 5 October 2018 by Engineers HRW.
- Draft Construction Programme – 75 Lawn Road.
- 75 Lawn Road Structural Survey dated March 2019 by Engineers HRW.
- BIA Addendum dated May 2019 by Engineers HRW.
- Email Correspondence 11 June and 11 July 2019 between CampbellReith and Engineers HRW.
- Ground Movement Assessment (ref. 125183/R5) dated July 2019 by Fairhurst.

London

Friars Bridge Court
41- 45 Blackfriars Road
London, SE1 8NZ

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Wessex House
Pixash Lane, Keynsham
Bristol BS31 1TP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

UAE

Office 705, Warsan Building
Hessa Street (East)
PO Box 28064, Dubai, UAE

T: +971 4 453 4735
E: uae@campbellreith.com