

46 Inverness St,
London,
NW3 4DB

Basement Impact Assessment
Audit

For
London Borough of Camden

Project Number: 12985-93
Revision: F1

October 2020

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	March 2020	Comment	NSjap12985-93-030320-46 Inverness St-D1	NS	GK	GK
F1	October 2020	Planning	NSemb12985-93-271020-46 Inverness St-F1.doc	NS	EMB	EMB

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Document Details

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Project Number	12985-93
Project Name	46 Inverness St
Planning Reference	2019/5075/P

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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 46 Inverness St, London NW1 7EG (planning reference 2019/5075/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 site is occupied by a single storey building with load-bearing masonry walls on shallow footings and a timber flat roof.
- 1.5. The proposed development comprises the demolition of the existing single-storey building and construction of a new dwelling with a single-storey basement and two storeys above ground.
- 1.6. The adjacent buildings are No. 44 Inverness Street to the east and No. 24 Gloucester Crescent to the north-West, both of which are listed buildings (Grade II).
- 1.7. The qualifications of the individuals involved in the BIA are in accordance with LBC guidance.
- 1.8. Screening and scoping assessments are presented, supported by a Desk Study.
- 1.9. The site investigation indicates the proposed basement will be founded in the London Clay.
- 1.10. An outline construction scheme and structural information are presented and a methodology for installing the proposed sheet piling is also presented.
- 1.11. Geotechnical parameters to derive bearing capacity for the founding stratum are presented.
- 1.12. A ground movement assessment has been presented and predicted impacts to neighbouring structures are within the limits set by LBC's policy. A Flood Risk Statement is presented in the BIA and confirms that the proposed development will not increase the flood risk at the site and surrounding areas.
- 1.13. There will be no impact to the wider hydrogeological and hydrological environments.
- 1.14. It is accepted that there are no slope stability concerns regarding the proposed development.
- 1.15. Queries and requests for information are summarised in Appendix 2. Considering the additional information submitted, the BIA meets the requirements of Camden Planning Guidance: Basements.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 20th December 2020 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 46 Inverness St, London NW1 7EG, Camden Reference 2019/5075/P.
- 2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.
- 2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
 - Camden Planning Guidance Basements. March 2018.
 - Camden Development Policy (DP) 27: Basements and Lightwells.
 - Camden Development Policy (DP) 23: Water.
 - Local Plan Policy A5 Basements.
- 2.4. The BIA should demonstrate that schemes:
- a) maintain the structural stability of the building and neighbouring properties;
 - b) avoid adversely affecting drainage and run off or causing other damage to the water environment;
 - c) avoid cumulative impacts upon structural stability or the water environment in the local area,
- and evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.
- 2.5. LBC's Audit Instruction described the planning proposal as *"Erection of two storey (plus basement) 2-bed dwelling house (Class C3) following demolition of existing single storey building (Class A3)."*
- 2.6. The adjacent buildings are No. 44 Inverness Street to the east and No. 24 Gloucester Crescent to the north-West, both of which are listed buildings (Grade II).

- 2.7. CampbellReith accessed LBC's Planning Portal on 23rd January 2020 and gained access to the following relevant documents for audit purposes:
- Basement Impact Assessment (ref 19029.R01.P2) dated 23 November 2019 by Structure Workshop including:
 - Basement Impact Assessment: Stage 1 (Screening) & Stage 2 (Scoping) Report dated 11 July 2018 by Southern Testing.
 - Basement Impact Assessment: Stage 4 (Ground Movement Analysis) dated 23 August 2018 by Southern Testing.
 - Factual Report dated October 2014 by Chelmer Site Investigations.
 - Existing and proposed drawings by Studio Mark Ruthven Architecture.
 - Consultation Responses.
- 2.8. CampbellReith issued on 3 March 2020 the initial audit report (ref.no.: NSjap12985-93-030320-46 Inverness St-D1) with comments on the above BIA documents.
- 2.9. In response to the initial audit report CampbellReith received on 28 April 2020 from LBC, the following documents:
- Interpretative Geotechnical (ref.:J13674) by Southern Testing, dated March 2020;
 - Flood Risk Statement (ref.:14159/AJP/SA/05.03.02.02) by Tully De' Ath Consultants, dated April 2020;
- 2.10. CampbellReith issued an updated query tracker on 20 May 2020, where 2 queries were still outstanding.
- 2.11. CampbellReith received on 16 June 2020 from LBC, the following documents:
- Proposed Sheet Piling Summary drawing (ref.: SK10) by Stand Consulting Engineers, dated June 2020;
 - Interpretative Geotechnical (ref.:J13674) by Southern Testing, dated March 2020;
 - Flood Risk Statement (ref.:14159/AJP/SA/05.03.02.02) by Tully De' Ath Consultants, dated April 2020;
 - Basement Impact Assessment Response to CampbellReith 2nd Round of Comments by Stand Consulting Engineers (ref.:619), dated 12 June 2020.
- 2.12. However, further clarification on the GMA was required by CampbellReith. In this regard, CampbellReith received on 21 September 2020 from LBC, the following documents:
- Basement Impact Assessment Response to CampbellReith Underpinning Installation Movements and CIRIA C760 by Stand Consulting Engineers (ref.:619), dated 17 September 2020;

- Ground Movement Assessment Report (ref.: JI3674-GMA-3), dated 17 September 2020, by Southern Testing.

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	See Section 7 of the BIA.
Are suitable plan/maps included?	Yes	Appendix A of the BIA.
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	Section 4 and Appendix D.2 of the BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 4 and Appendix D.3 of the BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 4 and Appendix D.1 of the BIA.
Is a conceptual model presented?	Yes	BIA report, Section 6 of Appendix E.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA report Section 5 and Southern Testing report, section D.14.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA report, Section 5 and Southern Testing report, section D.14.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA report, Section 5 and Southern Testing report, section D.14.
Is factual ground investigation data provided?	Yes	Chelmer Site Investigations factual report.
Is monitoring data presented?	Yes	Chelmer Site Investigations factual report.
Is the ground investigation informed by a desk study?	Yes	A desktop study is presented in Section 3.0 of the BIA.
Has a site walkover been undertaken?	Yes	A walkover survey was conducted on 27 th June 2018.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	The basement of No.44 Inverness Street is at a level of about 2.1m below street level and the lower ground floor of No.24 Gloucester Crescent is at a level of about 1.45m below street level.
Is a geotechnical interpretation presented?	Yes	BIA report, Appendix B and E.
Does the geotechnical interpretation include information on retaining wall design?	Yes	As above.
Are reports on other investigations required by screening and scoping presented?	Yes	A Flood Risk Statement has been 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 8 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	Appendix B and Appendix e of the BIA.
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	An outline temporary and permanent works proposal including mitigation measures has been presented in the BIA. The methodology of installing the sheet piling has been clarified.
Has the need for monitoring during construction been considered?	Yes	BIA report, Section 7.4.
Have the residual (after mitigation) impacts been clearly identified?	Yes	The BIA states residual impacts to be negligible.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	The BIA has been updated.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	There will be no change in the impermeable site area. Further discussion is provided within the Flood Risk Statement.
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	See Southern Testing updated GMA.
Are non-technical summaries provided?	Yes	BIA report, Section 1.0.

4.0 DISCUSSION

- 4.1. The BIA was undertaken by Stand Consulting Engineers with contribution from Southern Testing (ST Consult). The qualifications of the authors are in accordance with LBC guidance.
- 4.2. The site is occupied by a single storey building with load-bearing masonry walls on shallow footings and a timber flat roof. The proposed development comprises the demolition of the existing single-storey building and construction of a new dwelling with a single-storey basement and two storeys above ground. The structure above ground will be built in load-bearing masonry cavity walls with timber floors and roof. The basement is to cover the entire footprint of the site and be built in reinforced concrete.
- 4.3. The LBC Instruction to proceed with the audit identified that the basement proposal will involve neighbouring listed building (No. 24 Gloucester Terrace and No. 44 Inverness Street). It is understood the applicant's property share party walls with both these properties.
- 4.4. It is understood that the formation level of the proposed basement (approximately 3.1m below ground level (bgl)) is lower than those of the neighbouring properties; the foundations of No.24 Gloucester Crescent are at about -1.10m bgl with the foundations of No.44 Inverness Street at about -3.00m bgl (proven to be >2.50m bgl).
- 4.5. Screening and scoping assessments are presented, supported by a Desk Study. Most of the relevant figures/maps from the Arup GSD and other guidance documents are provided with the site location indicated to support responses to the screening questions.
- 4.6. A site investigation has been undertaken, indicating Made Ground to a depth of approximately 1.80m bgl. The London Clay Formation underlies the Made Ground and is proven to the bottom of the boreholes at 10.00m bgl. Three trial pits were undertaken alongside the adjoining buildings, indicating adjacent foundation depths, as 4.4.
- 4.7. No water inflows were encountered within the borehole which was found to be dry on completion of the site works and subsequent monitoring. The London Clay is designated as unproductive strata. Considering the ground investigation findings, it is accepted that there will be no impact to the wider hydrogeological environment.
- 4.8. The existing single-storey building on site will initially be demolished. According to structural drawings, steel sheet piled retaining walls will be installed to the 'open' sides of the site, whilst underpinning will be undertaken under the existing boundary walls of No. 24 Gloucester Crescent in a hit-and-miss sequence in short lengths (< 1.20m), cast with a toe at the level of the new basement slab. Based on the supplied drawings, propping and temporary works will be utilised to mitigate ground movements as a result of the excavations.
- 4.9. Sheet piling will be installed as a temporary works measure to allow front and rear basement walls to be cast in longer bays than would typically be achieved via traditional hit and miss

sequence. A methodology for the sheet piling installation has been presented and indicates the use of vibration-less method and propping in the temporary case. The BIA states that the basement floor structure will comprise a reinforced concrete slab.

- 4.10. Reasonably conservative geotechnical parameters have been presented in the Ground Movement Assessment (GMA) and have been used in modelling settlement. Undrained shear strength and associated bearing capacity of the founding stratum have been presented in a geotechnical interpretative report and are considered reasonable.
- 4.11. A Ground Movement Assessment (GMA) has been undertaken to demonstrate that ground movements and consequential damage to neighbouring properties will be within LBC's policy requirements. Analysis of both horizontal and vertical ground movements has been undertaken following CIRIA 760 guidance utilising industry standard software. The predicted movements are within the range accepted by LBC's policy (between Category 0 and Category 1 of the Burland Scale). The full input and output of the software used for the analysis has been presented.
- 4.12. Whilst the CIRIA approach is intended for embedded retaining walls, it is accepted that the predicted ground movements, which dictate the likely damage, are within the range typically anticipated for underpinning techniques carried out with good control of workmanship.
- 4.13. Although the ground movement assessment does not consider the depth of installation of the sheet piles in the areas where it is proposed, it is accepted that, with good control of workmanship, ground movements should not significantly exceed those predicted.
- 4.14. The BIA indicates that structural monitoring will be required during and after completion of the structural works, for horizontal and vertical displacements. Monitoring will be achieved by using attached targets fixed to neighbouring buildings and read from a fixed stationary point remote from the site. Appropriate trigger levels should be specified to the contractor to ensure works are controlled, with movements and consequential impacts kept within the predicted limits.
- 4.15. A Flood Risk Statement (FRS) has been presented in the BIA. The FRS confirms the site is located within a Critical Drainage area (Group3_003) and that the site appears to be subject to a low risk from all sources of flooding. No increase of hardstanding areas is proposed. The development is considered to not increase the flood risk at the site and surrounding areas. However, mitigation measures against flooding have been recommended in the FRS and should be applied to the proposed development.
- 4.16. The SSR references the Arup maps and correctly states the site is in an area where slopes have a gradient less than 7°. It is accepted that there are no slope stability impacts resulting from the proposed development.

5.0 CONCLUSIONS

- 5.1. The qualifications of the individuals involved in the BIA are in accordance with LBC guidance.
- 5.2. Screening and scoping assessments are presented, supported by a Desk Study.
- 5.3. The site investigation indicates the proposed basement will be founded in the London Clay.
- 5.4. An outline construction scheme and structural information is presented. A methodology for the sheet piling installation has been also presented.
- 5.5. Geotechnical parameters have been presented.
- 5.6. A GMA has been presented and the resultant predicted damage category is within the limits set by LBC's policy.
- 5.7. A Flood Risk Statement has been presented, as required by the BIA.
- 5.8. It is accepted there will be no impact to the wider hydrogeological and hydrological environments.
- 5.9. It is accepted that there are no slope stability concerns regarding the proposed development.
- 5.10. Queries and requests for information are summarised in Appendix 2. Considering the additional information presented, the BIA meets the requirements of Camden Planning Guidance: Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Bell Cornwell (Chartered Town Planners)	Meridian Office Park, Osborn Way, Hook, Hampshire RG27 9HY	20/11/2019	Structural Stability	See Section 4 .11 – 4.14

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Land Stability	Undrained shear strength for the London Clay should be presented in the BIA and allowable bearing capacity should be assessed.	Closed – See Section 4.10.	26/10/2020
2	Land Stability	The software input and output used in the Ground Movement Assessment are required to check the analysis assumptions.	Closed – See Section 4.11.	26/10/2020
3	Land Stability	The methodology for installing sheet piling should be clarified. Further impact assessment should be presented, as required (e.g. impact of vibration; review of GMA considering embedment of sheet piles).	Closed – See Section 4.9.	26/10/2020
3	Hydrology	A Flood Risk Assessment (FRA) is required as specified in the BIA.	Closed – See Section 4.13.	26/10/2020

Appendix 3: Supplementary Supporting Documents

None

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