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76 Lawn Road
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NW3 2XB

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 13398-17
Revision: F1

November 2020

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Document Details

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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 76 Lawn Road, NW3 2XB (planning reference 2020/0348/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 currently occupied by a two storey property constructed during the 1930's and connected on one side to the garage of the neighbouring property. The rear section of the main building along with the single storey garage to the side of the main building appears to be a later addition.

1.5. The LBC Instruction to proceed with the audit identified that the applicant's property is not listed and that basement proposal does not involve neighbouring listed building.

1.6. The qualifications of the individuals involved in the preparation of the BIA are in accordance with LBC guidance.

1.7. Screening and scoping assessments are presented, supported by desk study information.

1.8. The BIA confirms that permission for a basement construction has been granted for the neighbouring No. 75 Lawn Road.

1.9. The site investigation indicates the proposed basement will be founded in the London Clay, which is considered a suitable bearing stratum.

1.10. The BIA confirms the cumulative impact on the hydrogeological environment caused by potentially having three basements (No. 75, 76 and 77) in a row to be negligible.

1.11. It is accepted that there are no impacts to surface water and that the site is at low risk of flooding from all the sources.

1.12. An outline construction scheme and structural information is presented.

1.13. Geotechnical parameters to inform settlement, retaining wall calculations and foundation design have been presented in the BIA and are considered reasonable.

1.14. A Ground Movement Assessment (GMA) has been undertaken to demonstrate that damage to neighbouring properties will not exceed Burland Category 1 (very slight).

1.15. An assessment following NHBC guidance has been presented in the BIA, confirming that the removal of the trees will not affect existing or proposed structures.

1.16. It is accepted that there are no slope stability concerns regarding the proposed development. The structural engineer confirmed the stability of the retaining wall proposed at the back of the property, considering the sloping profile of the ground in that area.

1.17. 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 9th April 2020 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 76 Lawn Road, London NW3 2XB, Camden Reference 2020/0348/P.

2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within:

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance (CPG) 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 *"Construction of a single storey basement with front and rear lightwells, erection of a two storey rear extension and first floor single storey side extension; installation of side and rear dormer windows and rooflights to create additional habitable accommodation within the existing roofspace, fenestration alterations; front railings, and associated landscaping works."*

2.6. The Audit Instruction confirmed applicant's property and neighbouring properties are not listed.

2.7. CampbellReith accessed LBC's Planning Portal on 28th April 2020 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (ref.: J19265, Issue 3), dated January 2020, by GEA Ltd;
- Structural Method Statement (ref.: R11438-MS1), dated 20 December 2019, by Jampel Davison & Bell Consulting Engineers;
- Loading and Retaining Calculations, dated November 2019, by Jampel Davison & Bell Consulting Engineers;
- Proposed structural drawings by Jampel Davison & Bell Consulting Engineers;
- Existing and proposed plans, elevations and sections by Architect Olympia Anesti;
- Arboricultural Impact Assessment (ref.: P3430.1.1), dated 13 January 2020, by agb Environmental Ltd.
- Residents' Consultation Comments.

2.8. CampbellReith issued in May 2020 the initial audit report (ref.: NSemb13398-17-140520-76 Lawn Road-D1) with comments on the above BIA documents.

2.9. In response to the initial audit report CampbellReith received in August 2020 from LBC, the following documents:

- Arboricultural Impact Assessment (ref.: P3430.1.2) by agb Environmenntal, dated July 2020;
- Updated Basement Impact Assessment (Desk Study and Ground Investigation Report ref.: J19265, Issue 5), dated July 2020, by GEA Ltd;
- Updated Structural Method Statement (ref.: R11438-MS1, rev. B), dated July 2020, by Jampel Davison & Bell Consulting Engineers;
- Proposed plans and sections by Cousins and Cousins architects.

2.10. CampbellReith issued an updated query tracker on 09 September 2020, where 3 queries were still outstanding.

2.11. CampbellReith received in November 2020 from LBC, the following document:

Updated Basement Impact Assessment (Desk Study and Ground Investigation Report ref.: J19265, Issue 7), dated November 2020, by GEA Ltd;

- Updated Structural Method Statement (ref.: R11438-MS1, rev. C), dated September 2020, by Jampel Davison & Bell Consulting Engineers.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Section 1.3.2 of the BIA
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 3 and 4 of the BIA.
Are suitable plan/maps included?	Yes	Architect's plans included. Envirocheck report included and reference to ARUP figures 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	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of the BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of the BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of the BIA.
Is a conceptual model presented?	Yes	Sections 2 and 7 of the BIA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of the BIA.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of the BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of the BIA.
Is factual ground investigation data provided?	Yes	Appendix of the BIA.
Is monitoring data presented?	Yes	
Is the ground investigation informed by a desk study?	Yes	Desktop study information is presented in Section 2.
Has a site walkover been undertaken?	Yes	In conjunction with the fieldwork.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	See Section 4.4. of this audit.
Is a geotechnical interpretation presented?	Yes	Clarification on bearing capacity and geotechnical parameters has been presented.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	Arboricultural survey.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	As above.
Is an Impact Assessment provided?	Yes	Section 10 of the BIA.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	Section 10 of the BIA.
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	An outline temporary and permanent works proposal including mitigation measures is presented.
Has the need for monitoring during construction been considered?	Yes	Section 9.5.2 of the BIA.
Have the residual (after mitigation) impacts been clearly identified?	Yes	The BIA considers the 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	
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Cumulative impact to the hydrogeological environment is considered to be negligible in 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	
Are non-technical summaries provided?	Yes	Section 10.3 of the BIA.

4.0 DISCUSSION

4.1. The BIA was undertaken by GEA Ltd and the qualifications of the authors are in accordance with LBC guidance.

4.2. The site is currently occupied by a two storey property constructed during the 1930's which is largely detached except for a short party wall with the garage to No 75 Lawn Road. The rear section of the main building along with the single storey garage to the side of the main building appears to be a later addition.

4.3. The proposed development comprises the refurbishment of the existing building through internal alterations and the construction of a single-storey basement beneath the footprint of the building with lightwells to the front and rear.

4.4. The LBC Instruction to proceed with the audit identified that the applicant's property is not listed and that basement proposal does not neighbour any listed buildings. The BIA states that although No. 75 Lawn Road does not have currently a basement, planning permission has been granted for the construction of a single storey basement. It is understood that No. 77 Lawn Road has a basement.

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

4.6. A site investigation has been undertaken comprising three boreholes and no foundation inspection pits. The ground investigation report indicates Made Ground to a maximum depth of 2.00m bgl. The London Clay Formation underlies the Made Ground and is proven to the bottom of the boreholes to a depth of 15.00m bgl. It is understood that the basement will extend to a maximum depth of approximately 3.75m bgl (59.75m AOD).

4.7. No water inflows were encountered within the boreholes which were found to be dry during a single subsequent monitoring visit, c. five weeks after site works. The BIA considers any potential groundwater ingress during construction to be controlled by sump pumping. Considering the site investigation findings and the London Clay being designated as unproductive strata, the BIA considers any cumulative impact of having three basements (No. 75, 76 and 77) in a row on the hydrogeological environment to be negligible and this is accepted.

4.8. The BIA confirmed the proposed basement scheme will not alter the amount of hardstanding and as such it will not have any adverse impact on the hydrology of the area.

4.9. It is accepted that the site is not located within any critical drainage area and that it is at low risk from surface water flooding with no risk from flooding from rivers, seas and reservoirs.

According to the BIA, the Structural Method Statement (SMS) and structural drawings presented, the sequence of works will comprise underpinning of all the walls to be retained through a traditional hit and miss approach, partial demolition of the superstructure and installation of contiguous piled wall and reinforced concrete capping beams to complete the basement excavation and construction. The BIA confirms the underpins will be adequately laterally propped and that the new retaining walls will not be cantilevered at any stage during construction.

4.10. Geotechnical parameters to inform settlement, retaining wall calculations and foundation design have been presented in the BIA. The BIA confirms a value of 150kPa for the bearing capacity of the London Clay can be assumed at formation level. The assumed bearing capacity should be considered in relation to the new loads anticipated and validated by the structural engineer during the detailed design stages.

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 horizontal and vertical ground movements has been undertaken utilising proprietary software (PDisp and XDisp) and analysed for underpinning, installation of contiguous piled retaining wall and basement excavation. The depth of the piled retaining wall has been set at 56.00m AOD (c. 7.50m bgl) in the analysis. In Section 9.4 the BIA states that the depth of the toe of the piles has been assumed on the basis of an embedment depth equal to the retained height and it has been agreed with the structural engineer. It is noted that the exact length of the pile will be decided during the detailed pile design by the contractor appointed and that a significant increase in the pile length may require the GMA to be revised.

4.12. From the BIA report and XDisp output, it is understood that ground movements due to underpinning and consequent excavation have been modelled by applying CIRIA C760 curves for excavation and, as such, settlement due to underpin workmanship has been estimated by using the C760 curves for embedded retaining wall installation.

4.13. Whilst the CIRIA approach is intended for embedded retaining walls, it is accepted that the predicted ground movements, which dictate the likely damage, can be within the range typically anticipated for underpinning techniques carried out with good control of workmanship.

4.14. A building damage assessment has been undertaken along the most critical sections, i.e. at No. 75 and 77 Lawn Road. The BIA states that damage is predicted to fall into Category 0 and 1 for the neighbouring properties. The assessment conservatively assumes the absence of basements to these properties. The GMA includes a qualitative assessment of the utilities/infrastructure present within the zone of influence of the basement (Lawn Road carriageway), confirming that any potential damage occurring on them will be negligible.

4.15. The BIA states that structural monitoring is likely to not be required. However, it is noted that Camden require Construction Management Plans to include provisions for monitoring of the surrounding structures in order to ensure that building damage will be within the limits determined in the GMA. An outline proposal for a monitoring strategy is presented in the BIA.

4.16. The Screening section of the BIA indicates the area to be prone to seasonal shrink-swell which can result in foundation movements. In addition, the applicant's property has been recently suffering cracking which has been assessed by other engineers as being likely caused by such a phenomenon. The Arboricultural Impact Assessment indicates two trees will be felled as part of the proposed development. An assessment following NHBC guidance has been presented in Section 8.3 of the BIA. The analysis confirmed that the removal of the trees will not affect any of the existing structure.

4.17. The property is built on a site that slopes from the rear to the front. The level difference between the rear garden and the pavement to Lawn Road is c. 1.90m and, although the overall slope angle within the site is c. 4°, the site includes slopes with a gradient in excess of 7° (between 8° and 13°). The BIA concludes that as the overall slope angle of the site is less than 7° slope stability is not an issue for the proposed development and neighbouring properties. The SMS confirmed the stability of the retaining wall proposed at the back of the property, noting the sloping profile of the ground in that area.

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 desk study information.

5.3. The BIA confirms that permission for a basement construction has been granted for the neighbouring No. 75 Lawn Road.

5.4. The site investigation indicates the proposed basement will be founded in the London Clay.

5.5. The BIA confirms the cumulative impact on the hydrogeological environment caused by potentially having three basements (No. 75, 76 and 77) in a row to be negligible.

5.6. It is accepted that there are no impacts to surface water and that the site is at low risk of flooding from all the sources.

5.7. An outline construction scheme and structural information is presented.

5.8. Geotechnical parameters to inform settlement, retaining wall calculations and foundation design have been presented in the BIA and are considered reasonable.

5.9. 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 (not worse than Burland Category 1 – very slight).

5.10. An assessment following NHBC guidance has been presented in the BIA, confirming that the removal of the trees will not affect any of the existing structures.

5.11. It is accepted that there are no slope stability concerns regarding the proposed development. The structural engineer confirmed the stability of the retaining wall proposed at the back of the property, considering the sloping profile of the ground in that area.

5.12. 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.

Appendix 1: Residents' Consultation Comments

Relevant Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Poole and Tomlinson	74 Lawn Road	28/03/2020	Structural Stability and cumulative impact	See Section 4.7 and 4.10 - 4.17

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	The BIA should indicate that permission for a basement construction has been granted for the neighbouring No. 75 Lawn Road.	Closed – See Section 4.4.	
2	BIA format	Value/line of undrained shear strength and clarification on the determination of the bearing capacity for the London Clay and comparison with anticipated structural loads should be presented.	Closed – See Section 4.10.	
3	BIA format	Utilities infrastructure survey to be provided. Confirmation that the proposed basement will not have any impact on nearby infrastructure should be included in the GMA.	Open – See Section 4.14.	
4	Hydrogeology	The BIA should assess the cumulative impact of having three basements (No. 75, 76 and 77) in a row on the hydrogeological environment.	Closed – See Section 4.7.	
5	Stability	The GMA should be reviewed according to paragraph 4.11. – 4.14. Clarification on the depth of the proposed embedded retaining wall is also required. Clarification on anticipated Cat. 3 for neighbouring properties is required.	Closed – See Section 4.11. – 4.14.	
6	Stability	Shrink/swell assessment due to tree removal for neighbouring properties should be presented.	Closed – See Section 4.16.	
7	Stability	The structural proposal should confirm the stability of the retaining wall proposed at the back of the property, noting the sloping profile of the ground in that area.	Closed – See Section 4.17.	

Appendix 3: Supplementary Supporting Documents

None

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