

4B Hampstead Hill Gardens
London
NW3 2PL

Basement Impact Assessment
Audit

For
London Borough of Camden

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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 4B Hampstead Hill Gardens, NW3 2PL (planning reference 2019/5835/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 semi-detached property. The proposed development comprises the demolition of the existing building and construction of a new dwelling with a single-storey basement and three storeys above ground.
- 1.5. The LBC Instruction to proceed with the audit identified that the proposed basement may neighbour listed buildings. An independent check indicated those properties to be No. 1, 2, 3, 4, 5, 7, 9 and 11 Hampstead Hill Gardens.
- 1.6. The qualifications of the individuals involved in the BIA are in accordance with LBC guidance.
- 1.7. Screening and scoping assessments are presented, supported by desk study information.
- 1.8. The site investigation indicates the proposed basement will be founded in the London Clay.
- 1.9. An outline construction scheme and structural information is presented.
- 1.10. Ground parameters and capacity of the founding stratum are required.
- 1.11. A Ground Movement Assessment (GMA) has been presented and results indicate that any damage occurring at neighbouring properties will be within Category 1 of the Burland Scale. However the assessment may need to be reviewed as specified in Section 4 of this audit.
- 1.12. It is accepted there will be no impact to the wider hydrogeological and hydrological environments.
- 1.13. It is accepted that there are no slope stability concerns regarding the proposed development.
- 1.14. Queries and requests for information are summarised in Appendix 2. Until the additional information and further assessments requested are presented, the BIA does not meet the requirements of Camden Planning Guidance: Basements.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 1st April 2020 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 4B Hampstead Hill Gardens, London NW3 2PL, Camden Reference 2019/5835/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 *"Demolition of the existing 2-storey residential dwelling (Class C3), and construction of a new 3 storey residential dwelling with basement (Class C3)."*
- 2.6. The adjacent buildings, No. 1, 2, 3, 4, 5, 7, 9 and 11 Hampstead Hill Gardens, are listed.
- 2.7. CampbellReith accessed LBC's Planning Portal on 17th April 2020 and gained access to the following relevant documents for audit purposes:
- Basement Impact Assessment (ref.: JER1994), dated 16 May 2019, by RPS Group;
 - Letter including updates for amended scheme, dated 12 November 2019, by RPS Group;

- Proposed structural drawings by Studio Mason Navarro Pledge;
- Existing and proposed plans, elevations and sections by GRIS Architects;
- Arboricultural Impact Assessment (ref.: 18-2625), dated 18 February 2019.

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?	No	A utility survey has not been presented
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 2 of the BIA.
Are suitable plan/maps included?	Yes	BIA figures and 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 3 of the BIA and updated scheme letter.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of the BIA and updated scheme letter.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of the BIA and updated scheme letter.
Is a conceptual model presented?	Yes	Sections 5 and 6 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 C of the BIA.
Is monitoring data presented?	No	Groundwater was not struck during the site investigation. There is only reference to groundwater monitoring data for a nearby site in Section 5.2. of the BIA.
Is the ground investigation informed by a desk study?	Yes	Desktop study information is presented in Section 2.
Has a site walkover been undertaken?	Unknown	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	No 4A is understood to not have a basement, No.6 is understood to have a lower ground floor.
Is a geotechnical interpretation presented?	Yes	Section 6 of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	An indication of angle of shearing resistance and bearing capacity of the founding stratum is not provided.
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.

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	Sections 7-10 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	Section 8 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 has been presented in the structural drawings.
Has the need for monitoring during construction been considered?	Yes	Section 11 of the BIA. However, trigger values should be clearly stated.
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	Section 8 of the BIA.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	There is no change in impermeable site area.
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	Section 8.2 of the BIA.
Are non-technical summaries provided?	Yes	Section 12 of the BIA.

4.0 DISCUSSION

- 4.1. The BIA was undertaken by RPS Group and the qualifications of the authors are in accordance with LBC guidance.
- 4.2. The site is currently occupied by a two storey semi-detached property. The building was constructed in 1955 with a single storey garage flanking the eastern wall of 4A. In 1966 a two storey extension was constructed incorporating the original garage to form 4B.
- 4.3. The proposed development comprises the demolition of the existing building and construction of a new dwelling with a single-storey basement and three storeys above ground. The original proposal was to extend the basement to the rear of the property to form a courtyard by underpinning of the perimeter garden wall. However, this was rejected and the proposal has been updated to reduce the basement footprint to meet the CPG – Basements requirements.
- 4.4. The LBC Instruction to proceed with the audit identified that the proposed basement neighbours listed buildings. An independent check indicated those properties to be No. 1, 2, 3, 4, 5, 7, 9 and 11 Hampstead Hill Gardens. Only the closest listed property (No. 4, c. 20m south-west of the site) is considered in the BIA and included in the Ground Movement Assessment (GMA).
- 4.5. It is understood that the Finished Floor Level (FFL) of the proposed basement is 72.458m AOD, with a total basement dig of c. 3.40m bgl. It is understood that No. 4A Hampstead Hill Gardens does not have a basement and No. 4 has a lower ground floor.
- 4.6. 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. However, a utility survey has not been presented as indicated in Cl. 233 of the GSD and should be presented.
- 4.7. A site investigation has been undertaken, indicating Made Ground to a depth of approximately 1.00m bgl. The London Clay Formation underlies the Made Ground and is proven to the bottom of the boreholes at 3.00m bgl. Two foundation inspection pits were undertaken; one at the front and one at the eastern side of the property, revealing concrete foundation founded at 0.35m bgl and 0.98m bgl respectively.
- 4.8. No water inflows were encountered within the boreholes which were found to be dry on completion of the site works. Groundwater standing at c. 1.10m bgl was recorded during the excavation of one of the inspection pits and interpreted as perched groundwater in the Made Ground. Groundwater monitoring was not undertaken as part of the site investigation. The BIA considers any potential groundwater ingress during construction to be controlled by isolated sump and pump systems. The London Clay is designated unproductive strata. Considering the

ground investigation findings, it is accepted that there will be no impact to the wider hydrogeological environment.

- 4.9. The existing two-storey building on site will initially be demolished. According to the BIA and structural drawings presented, the basement will be mostly formed by underpinning in a typical hit-and-miss sequence, cast with a toe at the level of the new basement slab. The southern basement wall is to be formed using temporary trench sheeting with a concrete retaining wall within. The underpins will be head propped in the temporary condition by a waling beam and flying props and by the basement slab in the permanent case.
- 4.10. Reasonably conservative geotechnical parameters have been presented in the Ground Movement Assessment (GMA) and have been used in modelling settlement. However, the angle of shearing resistance and the bearing capacity of the founding stratum have not been presented and are requested. The assumed bearing capacity should be considered in relation to the new loads anticipated, which are up to 150kPa for the development.
- 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 vertical ground movements has been undertaken utilising proprietary software (PDisp) and analysed for each construction stage. Settlement due to underpin workmanship has been also included in the analysis and ground movements contours are presented in the BIA appendix.
- 4.12. A building damage assessment has been undertaken along the two most critical sections, i.e. at No. 4A and No.6 Hampstead Hill Gardens. Ground movements have also been reviewed along the Hampstead Gardens carriageway and the Thames Water sewer running beneath it. Predicted vertical movements have been used to determine limiting horizontal movements to ensure damages to neighbouring properties will be between Category 0 and Category 1 of the Burland Scale. Results indicate allowable maximum horizontal movements to be between 4.4 and 8.0mm. The BIA, referencing to CIRIA C760, indicates that horizontal movements due to basement construction can be contained within those limits. However, the method to derive the maximum deflection indicated in Figure 9 and 10 of the BIA does not consider a vertical distance as indicated in Fig 6.27 of CIRIA C760, but an oblique distance instead, which may underestimate the value of the deflection. The BIA should be amended accordingly and the impact on neighbouring properties and infrastructure reviewed, if needed.
- 4.13. The BIA estimates ground movements at the carriage way and associated sewer to be less than 5mm in both the vertical and the horizontal direction.
- 4.14. The BIA indicates that structural monitoring will be required during construction and that a project specific monitoring strategy will be written at a later stage, detailing lines of responsibility, monitoring trigger levels and appropriate potential mitigation measures. Given the horizontal limits stated in the GMA (see paragraph 4.12.), appropriate trigger levels should

be specified in Section 11 of the BIA to the contractor to ensure works are controlled, with movements and consequential impacts kept within the predicted limits.

- 4.15. It is noted that there is history of ground movements and consequent damage at the applicant's property, likely occurred due to clay shrinkage subsidence. Consequently, two different trees were removed in 2016. The 2019 arboricultural report states that none of the significant existing trees need to be removed as part of the proposed development and as such there will not be any adverse impact on neighbouring properties.
- 4.16. It is accepted that the site is not located within any critical drainage area. Thames Water submitted a response requesting the developer to take into account the minimum pressure indicated in the response in the design of the proposed development.
- 4.17. It is accepted that the site is at low risk from surface water flooding and no risk from flooding from rivers, seas and reservoirs.
- 4.18. The BIA 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 desk study information.
- 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. However, a utility survey has not been presented as indicated in Cl. 233 of the GSD and should be presented.
- 5.5. A value of the angle of shearing resistance and the bearing capacity for the founding stratum and comparison with anticipated structural loads is required.
- 5.6. A GMA has been presented and allowable maximum horizontal movements are indicated to ensure any damage occurring at neighbouring properties will be within Category 1 of the Burland Scale. However, determination of the maximum deflection should be reviewed along with damage assessment to neighbouring properties and, if necessary, infrastructure.
- 5.7. Given the horizontal limits stated in the GMA, appropriate trigger levels should be specified in Section 11 of 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. Until the additional information and further assessments requested are presented, the BIA does not meet the requirements of Camden Planning Guidance: Basements.

Appendix 1: Residents' Consultation Comments

Relevant Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Response redacted	Response redacted	30/01/2020	Structural Stability	See Section 4.11 - 4.15
Response redacted	Response redacted	23/02/2020	Structural Stability	See Section 4.11 - 4.15
Mrs Janna Williams	4b Hampstead Hill Gardens	01/02/2020	Water penetration, subsidence, structural stability	See Sections 4.8; 4.11 – 4.15
Audrey Mandela	2 Hampstead Hill Gardens	14/01/2020	Subsidence issues	See Sections 4.15
Anthea Williams	Unknown	19/01/2020	Structural Stability	See Section 4.11 - 4.15
Enabling Projects Town Planners	On behalf of Mrs Janna Williams	02/02/2020	Subsidence issues, structural stability	See Section 4.11 - 4.15

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	A utility survey has not been presented as indicated in Cl. 233 of the GSD and should be presented.	Open – See Section 4.6	
2	Land Stability	Value of angle of shearing resistance and bearing capacity for the founding stratum and comparison with anticipated structural loads should be presented.	Open – See Section 4.10	
3	Land stability	Maximum deflection indicated in Figure 9 and 10 should be based on a vertical distance rather than an oblique distance, as indicated in C760. If needed, impact on neighbouring properties and infrastructure should be reviewed.	Open – See Section 4.12	
4	Land Stability	Given the horizontal limits stated in the GMA, appropriate trigger levels should be specified in Section 11 of the BIA.	Open – See Section 4.14	

Appendix 3: Supplementary Supporting Documents

None

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