CampbellReith
consulting engineers

39a Priory Terrace, NW6 4DG

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13398-35
Revision: F2

February 2021

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	01.09.20	Comment	RNemb13398-35-010920 39a Priory Terrace_D1.doc	R Nair	E Brown	E Brown
F1	25.01.20	For planning	RNemb13398-35-250121 39a Priory Terrace_F1.doc	R Nair	E Brown	E Brown
F2	18.02.21	To address comments from resident consultations	RNemb13398-35-180221 39a Priory Terrace_F2.doc	R Nair	E Brown	E Brown

Document Details

Last saved	18/02/2021 14:33
Path	RNemb13398-35-180221 39a Priory Terrace_F2.doc
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Project Number	13398-35
Project Name	39a Priory Terrace, NW6 4DG
Planning Reference	2020/2839/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 39a Priory Terrace, NW6 4DG (planning reference 2020/2839/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 BIA is incorporated in the Desk Study and Ground Investigation Report and was prepared by Geotechnical and Environmental Associates Limited. A Structural Engineers Statement has been prepared by Engineers HRW and a Flood Risk Assessment by Infrastruct CS Ltd. The authors of the documents have provided evidence of suitable expertise as set by CPG.

1.5. The BIA (dated April 2020) proposed to demolish the existing garage and subsequently redevelop the site with a three-storey house with a single level basement extending to a depth of c.4.5m below ground level. From the revised BIA (dated September 2020) and revised proposed drawings (dated November 2020), it is understood that the excavation depth has been revised to c.4m bgl. Additional queries from resident consultants (dated February 2021) regarding revised excavation depths are addressed in Section 4.

1.6. The BIA has confirmed that the proposed basement will be founded within London Clay, with the structural loads bearing bored piled foundation. It is proposed to undertake the basement excavation following construction of retaining walls formed using the underpinning method and contiguous piling.

1.7. It is likely that perched ground water will be encountered during basement foundation excavation.

1.8. In the absence of an aquifer, it is accepted that the proposal will not impact the subterranean groundwater flows.

1.9. It is stated that the site is in an area with a very low to medium risk of flooding from different sources. Suitable mitigation measures in the form of SuDs is incorporated to deal with this and the increase in impermeable area, and hence it is accepted that the proposal will not impact the hydrology of the area.

1.10. It is stated that the site is located in an area prone to seasonal shrink-swell subsidence. However, it is accepted that the development is away from zone of influence of any tree.

1.11. It is accepted that the surrounding slopes to the development site are stable.

1.12. A ground movement analysis has been undertaken of horizontal and vertical ground movements. An updated damage assessment has been provided for neighbouring properties which predicts Category 0 damage and negligible impacts to the highway.

1.13. No proposals are provided for a movement monitoring strategy during excavation and construction, however it is stated that a monitoring strategy would be developed at later stages.

1.14. Queries and requests for further information have been addressed. The BIA meets the requirements of CPG: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 20 July 2020 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 39a Priory Terrace, NW6 4DG (Planning reference: 2020/2839/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

- 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 *"Demolition of a single garage and the erection of a 3-bedroom, detached dwelling house with basement, roof terrace and associated hard and soft landscaping works."*

2.6. CampbellReith accessed LBC's Planning Portal on 14th August 2020 and gained access to the following relevant documents for audit purposes:

- Desk Study and Ground Investigation report prepared by Geotechnical and Environmental Associated Ltd, dated April 2020;

- Design and Access Statement prepared by SHH Architects and Interior Design, dated June 2020;
- Structural Engineers Statement prepared by Engineers HRW, dated May 2020;
- Tree Statement prepared by Landmark Trees, dated March 2020;
- Flood Risk Assessment and Drainage Statement prepared by Infrastruct CS Ltd, dated February 2020;
- Planning Application Drawings prepared by Engineers HRW consisting of

  Existing and Demolition Plans: (919)001_PL01, (919)002_PL01, (919)010_PL01, (919)020_PL01;

  Proposed Basement Plan: 2015-HRW-XX-B1-DR-S-101;

  Proposed Section: (919)310_PL01, 2015-HRW-XX-XX-DR-S-200 (P2), 2015-HRW-XX-XX-DR-S-201 (P2).

- Groundwise Utilities Report, dated June 2019;
- Planning Comments and Responses.

2.7. Further information and updated documents were forwarded by email to CampbellReith between 14th December 2020 and 18th January 2021 and comprised the following:

- Desk Study and Ground Investigation report prepared by Geotechnical and Environmental Associated Ltd, dated 25th September 2020;
- Email from applicant's engineer (engineersHRW) dated 18th January 2021.

2.8. Following additional objections in February 2021, CampbellReith downloaded and reviewed revised planning documents. These are;

- Amended Planning Application (with revised proposed drawings) by SHH Architects and Interior Design, dated November 2020.

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	
Are suitable plan/maps included?	Yes	
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	
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	
Is a conceptual model presented?	Yes	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	

Item	Yes/No/NA	Comment
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	
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?	No	However, the assumptions used for assessments are considered to be conservative.
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	Arboricultural Statement
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Although the depth of foundation to 39 Priory Terrace and the presence /absence of basements in other structures are not confirmed, all assessments made with respect to them are conservative.
Is an Impact Assessment provided?	Yes	Ground movement/building damage assessment and flood risk assessment.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	
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	
Has the need for monitoring during construction been considered?	Yes	
Have the residual (after mitigation) impacts been clearly identified?	Yes	
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	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	The GMA indicates Category 0 to Category 1 damage for the neighbouring properties.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) is incorporated with the Desk Study and Ground Investigation Report and has been carried out by Geotechnical & Environmental Associates (GEA). The individuals concerned in its production have suitable qualifications as required by CPG.

4.2. The Structural Engineers Statement (SES) has been prepared by Engineers HRW and the Flood Risk Assessment and Drainage Statement by Infrastruct CS Ltd. The individuals concerned in the production of both documents have suitable qualifications as required by CPG.

4.3. It is proposed (as of September 2020) to demolish the existing garage on site, and construct a three-storey house with a single level basement extending to a depth of c.4m below ground level. The basement excavation shall be facilitated by the construction of CFA contiguous piled retaining wall (300mm diameter) along the south-western and south-eastern perimeters, 'hit and miss' underpinning along the north-western perimeter, and a reinforced concrete wall, formed using underpinning techniques, along the north-eastern perimeter.

4.4. Following concerns raised by resident consultants, the revised proposed drawings (dated November 2020) uploaded in the planning portal were reviewed. It is noted that the revision included changes to the layout/position and the height of basement rooms. Architectural changes include introduction of skylight, where previously open lightwells were indicated. The basement height has been slightly increased by raising the ground floor slab level. The basement excavation depth however reduces by 0.50m. The sequence and method of construction remains unchanged. The changes in levels are elaborated below;

Previous proposal

Existing Ground Level= +38.87m OD, Ground Floor Slab underside Level= +37.47m OD, Basement Slab Underside= +34.395m OD, Basement Height= 2.6m, Total Excavation= 4.475m bgl

Current Proposal

Existing Ground Level= +38.87m OD, Ground Floor Slab underside Level = +38.097m OD, Basement Slab Underside= +34.872m OD, Basement Height=2.75, Total Excavation= 4.00m bgl

4.5. The ground investigation has identified that the site is underlain by Made Ground to 1m bgl over London Clay proven to 15m bgl. Although groundwater was not encountered during drilling, perched water was recorded at c.2.50m bgl during monitoring.

4.6. An interpretation based on the ground investigation and appropriate soil parameters are provided, including the design parameters for retaining wall. This is accepted.

4.7. It is stated that the structural loads for the proposed development shall bear on bored piled foundations (450mm diameter), which will also assist in reducing the impact of heave/uplift beneath the structure.

4.8. Outline design calculations for the retaining wall are presented in the SES and are based on the soil parameters provided in the ground investigation report. Groundwater is conservatively assumed to be at 1m below ground level for the design. The calculations provided are accepted as being robust and moderately conservative.

4.9. A discussion regarding the construction methodology and temporary works sequence, along with supporting drawings, is included in the SES. These are also accepted as being robust and moderately conservative.

4.10. It is stated that there will be a significant increase in the proportion of hardstanding across site as a result of the proposed development. However, it is accepted that London Clay is a relatively impermeable stratum. Hence the change in permeable surface area will not impact subterranean groundwater flows. There are no other potential impacts to local or wider subterranean groundwater flows.

4.11. It is stated that the site has a low flooding risk from sewers, reservoirs and fluvial/tidal watercourses. However, a medium risk of flooding from rising groundwater levels is indicated in the flood risk assessment and drainage statement. As noted above, impermeable surfacing will increase. A preliminary SuDs proposal is presented, which includes living roofs and tanked storage systems, with excess discharged into combined sewers. It is hence accepted that appropriate mitigation measures are incorporated to reduce impact on surface water flow.

4.12. It is accepted that the existing site does not include slopes, natural or man-made greater than 7 degrees.

4.13. London Clay is prone to seasonal shrink and swell. Based on the 'Tree Statement' provided, it is accepted that the development is not within the root protection zone of any tree and will not impact nearby trees.

4.14. The proposed development is within 5m of the public footpath and roadways of both Abbey Road and Priory Terrace. 39 Priory Road lies c.1m to the south-west and the party wall to an adjacent garage lies on the north-west perimeter. Abbey Road is c.4m north-east and Priory Terrace c.5m south-east. Priory Lodge is located c.5m to the north-west.

4.15. It is stated that the proposal will significantly increase the differential depth of foundations relative to the neighbouring properties. It is stated that 39 Priory Terrace has a lower ground floor. The depth of the basement foundations has not been confirmed based on a survey.

4.16. Based on the above a ground movement assessment has been undertaken, assuming high stiffness for the retaining walls. Both horizontal and vertical movements have been estimated using geotechnical modelling software.

4.17. The analysis assumes that all neighbouring properties have their foundations at 1m below ground level. It is also assumed that the corners of the proposed excavation will be stiffened using cross-bracing and that the retaining walls will not be cantilevered during any stage of the construction.

4.18. It revised BIA states that the neighbouring structures will have damage limited to Category 0. The following additional information was provided to support the ground movement and damage assessment;

- The PDisp and XDisp input data were provided.
- A Category 2 damage was predicted for the neighbouring garage in the previous BIA. The revised BIA suggests Category 0 damage and is accepted. The reasoning behind this reduction in predicted damage was provided by email dated 18th January 2021, and is included in Appendix 3 of this report.
- A damage category of Category 0 has been predicted for the roads.
- It is confirmed that there are no other properties within the zone of influence of the basement proposals which would require assessment.

4.19. It is recommended that a preliminary structural movement monitoring strategy be developed during later stages.

5.0 CONCLUSIONS

5.1. The BIA and other relevant assessments have been carried out by individuals with suitable qualifications.

5.2. The BIA has confirmed that the proposed basement will be founded London Clay and that it will be founded on bored piles.

5.3. Retaining walls shall be constructed using both CFA contiguous piling and an underpinning methodology to facilitate excavation and basement construction. Calculations are based on the geotechnical interpretation and are accepted as being reasonably conservative.

5.4. It is likely that perched groundwater will be encountered during basement foundation excavation. However, in the absence of an aquifer, it is accepted that the proposal will not impact the hydrogeology of the area.

5.5. The impermeable area will increase and the property is in an area subject to flooding. Since appropriate mitigation measures are incorporated, it is accepted that the proposal will not impact the hydrology of the area.

5.6. A GMA indicates Category 0 damage for neighbouring structures based on recent BIA (dated September 2020). This is accepted, and the audit conclusions remains unchanged for proposed drawings dated November 2020.

5.7. It is accepted that there are no other impacts in relation to stability.

5.8. Queries and requests for further information have been addressed. It is accepted that the BIA meets the requirements of CPG: Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Moses, Jane	-	27.07.20	Land Instability, ground movements and structural damage due to basement excavation to properties across Abbey Road.	This is addressed by the applicant. Conservative assumptions have been made while making assessments. CampbellReith accepts that the basement construction and the methodology adopted will not adversely impact the land stability or structural integrity of the adjacent structures. The information presented by applicant conforms to CPG: Basements.
		03.02.21	Impact of revised depth of basement floor in proposed drawings (dated Nov 2020) and inclusion of additional objections.	Addressed in Section 4.4.
Antonioli Monia	-	03.08.20	Land Instability, ground movements and structural damage due to basement excavation to properties across Abbey Road.	This is addressed by the applicant. Conservative assumptions have been made while making assessments. CampbellReith accepts that the basement construction and the methodology adopted will not adversely impact the land stability or structural integrity of the adjacent structures. The information presented by applicant conforms to CPG: Basements.
		03.02.21	Impact of revised depth of basement floor in proposed drawings (dated Nov 2020) and inclusion of additional objections.	Addressed in Section 4.4.
Gallone, Luca	-	03.08.20	Land Instability, ground movements and structural damage due to basement excavation to properties across Abbey Road.	This is addressed by the applicant. Conservative assumptions have been made while making assessments. CampbellReith accepts that the basement construction and the methodology adopted will not adversely impact the land stability or structural integrity of the adjacent structures. The information presented by applicant conforms to CPG: Basements.
Kingshill Sophia	Flat 3, 132 Abbey Road, NW6 4SN	03.08.20	Subsidence damage and further damage caused by basement excavation.	As above

Pelekanos, Panayiotis	39 Priory Terrace, Ground Floor	06.08.20	Comments not relevant to the audit.	Comments not relevant to the audit.
Reidy, Kenneth	75 Priory Park Road	24.07.20	Comments supporting development.	Comments supporting development.
Claire, Marie	37a Priory Terrace	20.11.20	Comments not relevant to the audit.	Comments not relevant to the audit.
Cameron, Hayley	-	08.08.20	Comments not relevant to the audit.	Comments not relevant to the audit.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Depth of foundation to 39 Priory Terrace be confirmed.	Closed *Assessment accepted as being conservative.*	18.01.21
2	Stability	Further consideration of damage to adjacent garage required. Clarification required regarding the assumptions and conclusions made based on XDisp analysis.	Closed	18.01.21
3	Stability	Consideration to be given to the impact to the adjacent highway and properties across Abbey Road and Priory Terrace.	Closed	14.12.20

Appendix 3: Supplementary Supporting Documents

Email from applicant's engineer dated 18th January 2021

2015 Priory Terrace - 2020/2839/P Land and building lying on the south side of Abbey 39A Priory Terrace
Brett Scott to: RevathyNair@campbellreith.com 18/01/2021 09:27
Cc: "camdenaudit@campbellreith.com", "Graham Harris", "lizbrown@campbellreith.com", "Matthew Robinson", "Simon Robinson"
History:
This message has been replied to.

Revathy

Our geotechnical engineer has commented as follows:-

"In the interest of conservatism we had initially applied the maximum predicted movement to occur at the base of the foundations using the "if surface movement curves are selected..." option which applied the same movements that would occur at the surface, to any point below surface level as well. However, this will not be the case in reality as movements will reduce with depth due to the reduced depth of the excavation for points below the surface and therefore in the revision we changed this to provide an estimate of the actual movements predicted occurring at the level of the base of the foundations by removing the use of this function."

Regards

Brett

Brett Scott, Associate

engineersHRW

During the current restrictions engineersHRW are operating a fully functioning office with all employees working remotely. The main office number is on call divert to our office management team. Please contact me via e-mail or Direct Dial 0203 879 9766
London ● 0207 407 9575 ● Unit 10, Blue Lion Place, 237 Long Lane, London SE1 4PU
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From: RevathyNair@campbellreith.com <RevathyNair@campbellreith.com>
Sent: 15 January 2021 17:31
To: Brett Scott <BrettS@engineers-hrw.co.uk>
Cc: camdenaudit@campbellreith.com; Graham Harris <GrahamH@shh.co.uk>; lizbrown@campbellreith.com; Matthew Robinson <mrobinson@hghconsulting.com>; Simon Robinson <simon@engineers-hrw.co.uk>
Subject: Re: 2015 Priory Terrace - 2020/2839/P Land and building lying on the south side of Abbey 39A Priory Terrace

Hi Brett,

Since we haven't reviewed the initial software output/input, can you please confirm what were the changes made in the XDisp analysis which resulted in the Category 1 to Category 2 damages becoming Category 0?

Thanks,

Revathy Nair
Geotechnical Engineer

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From: "Brett Scott" <BrettS@engineers-hrw.co.uk>
To: "RevathyNair@campbellreith.com" < RevathyNair@campbellreith.com>
Cc: "Graham Harris" <GrahamH@shh.co.uk>, "lizbrown@campbellreith.com" <lizbrown@campbellreith.com>, "Simon Robinson" <simon@engineers-hrw.co.uk>, "camdenaudit@campbellreith.com" < camdenaudit@campbellreith.com>, "Matthew Robinson" <mrobinson@hghconsulting.com>
Date: 13/01/2021 15:19
Subject: 2015 Priory Terrace - 2020/2839/P Land and building lying on the south side of Abbey 39A Priory Terrace

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Revathy

The GMA has used the movement curves for an excavation in front of a stiff wall in stiff clay as detailed in CIRIA C760. This should be in the additional information provided in response to your original audit.

Regards

Brett

Brett Scott, Associate

engineersHRW

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