CampbellReith
consulting engineers

20 Leighton Road, London NW5 2QE

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12985-75

Revision: D1

November 2019

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Document History and Status

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Project Name	20 Leighton Road
Planning Reference	2019/3051/P

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1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by the London Borough of Camden (LBC) to carry out an Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 20 Leighton Road, London NW5 2QE, LBC Reference 2019/3051/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 authors possess suitable qualifications in accordance with LBC guidance.

1.5. The subject property is semi-detached, residential and Grade II Listed. The proposed development comprises deepening and extending the existing basement to the rear of the property. Retaining walls are to be formed by underpinning.

1.6. Desk study information plus Screening and Scoping Assessments are presented.

1.7. A limited ground investigation indicates the site to be underlain by Made Ground overlying the London Clay Formation. Interpretative geotechnical design parameters are provided. It is recommended that the Contractor confirms the insitu shear strength of the London Clay meets the design requirements at formation level.

1.8. Perched water is anticipated to be encountered during construction, which should be considered in the temporary works strategy to ensure stability is maintained. There will be no impact to the wider hydrogeological environment.

1.9. A proposed construction methodology and sequence is presented.

1.10. A ground movement assessment (GMA) is presented which considers the movements and resultant impacts to the subject property and neighbouring building. A maximum of Category 2 (Slight) damage in accordance with the Burland Scale is predicted, which is in excess of policy requirements.

1.11. A railway cutting is present 30m to the south of the proposed basement works. The highway and underlying utilities are located >5m from the proposed works. No impacts to the cutting,

highway or utilities are predicted. Asset protection agreements should be entered into, as applicable.

1.12. An outline monitoring strategy has been provided. However, this should be reviewed once the structural scheme and / or GMA have been revised to demonstrate that a maximum of Category 1 (Very Slight) damage can feasibly be achieved.

1.13. The site is identified as being at low risk of flooding and is not within a Local Flood Risk Zone. Standard flood risk mitigation should be incorporated into the final design.

1.14. The site is within a critical drainage area. The impermeable site area will decrease as a result of the proposed development. Attenuation SUDs is stated to not be feasible at the site, although the increase in permeable site area may allow increased infiltration. The final drainage scheme design will need to be agreed with LBC and Thames Water.

1.15. Discussion and requests for further information are presented in Section 4 and summarised in Appendix 2. Until the information requested is presented, the BIA does not meet the criteria of CPG: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 8 August 2019 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 20 Leighton Road, London NW5 2QE, LBC Reference 2019/3051/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.
- 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: "*Extension of existing basement area into the rear garden to form a single storey rear extension with PV panels and green roof, new lead roof with PV panels and rooflight on existing side infill extension, new window to side elevation, alterations to rear garden, all to single family dwelling (Class C3)*".

The planning portal also confirmed the site is Grade II Listed.

2.6. CampbellReith accessed LBC's Planning Portal on 2nd September 2019 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (ref JWCD 3365) dated March 2019 by Ashton Bennett Consultancy.
- Location Plan, Demolition Plan, Existing and Proposed Plans and Sections (Rev 0) dated December 2018 to June 2019 by Gregori Chiarotti Architects.
- Structural Stability Assessment Report (ref DK/JD/2430) dated 30th March 2019 by Douglas Kenney Limited.
- Tree Survey / Arboricultural Statement (ref 1720-TSAS-0) dated October 2018 by Gregori Chiarotti Architects.

2.7. Following discussion and correspondence with the Applicant's engineering team, CampbellReith were provided with the following relevant documents for audit purposes on 12th September 2019:

- Outline Construction Programme.
- Monitoring Strategy.
- Email dated 12th September 2019 by Ashton Bennett Consultancy.

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 plans/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	

Item	Yes/No/NA	Comment
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	Perched water within Made Ground.
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	Adjacent No22 includes a basement.
Is a geotechnical interpretation presented?	Yes	Limited SI undertaken. Confirmation of insitu shear strength of London Clay at formation level is recommended; monitoring of groundwater is recommended to inform temporary works strategy.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	SI, GMA
Are baseline conditions described, based on the GSD?	Yes	

Item	Yes/No/NA	Comment
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	Category 2 damage predicted.
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?	No	Category 2 damage is in excess of allowable.
Has the need for monitoring during construction been considered?	Yes	Monitoring strategy should be revised once structural scheme and / or GMA has been revised to demonstrate that a maximum of Category 1 damage can be feasibly achieved.
Have the residual (after mitigation) impacts been clearly identified?	No	A maximum of Category 1 damage to structures is allowable.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	A maximum of Category 1 damage to structures is allowable.
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?	No	A maximum of Category 1 damage to structures is allowable.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	No	Category 2 damage is predicted.

Item	Yes/No/NA	Comment
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. A Basement Impact Assessment has been provided for review, prepared by Ashton Bennett Consultancy, with supporting documents by Douglas Kenney Limited and Gregori Chiarotti Architects.

4.2. The BIA authors possess suitable qualifications in accordance with LBC guidance.

4.3. The subject property is semi-detached, residential and Grade II Listed. The proposed development comprises deepening and extending the existing basement to the rear of the property. Retaining walls are to be formed by underpinning, with approximately 0.5m of underpinning to existing basement foundations, and up to approximately 1.8m deep underpinning to Party Walls / rear garden boundary walls.

4.4. Desk study information plus Screening and Scoping Assessments are presented.

4.5. A limited ground investigation, comprising a window sampler borehole to approximately 6.5m below ground level (bgl) and a foundation inspection pit, indicates the site to be underlain by Made Ground overlying the London Clay Formation. Insitu testing comprising standard penetration tests (SPTs) has been undertaken to derive interpretative geotechnical design parameters. Due to the limited scope of the investigation, it is recommended that the Contractor confirms the insitu shear strength of the London Clay meets the design requirements at formation level.

4.6. Perched water was monitored within the Made Ground and is anticipated to be encountered during construction, which should be considered in the temporary works strategy to ensure stability is maintained. The London Clay is designated unproductive strata and there will be no impact to the wider hydrogeological environment.

4.7. A proposed construction methodology and sequence is presented. Underpinning will be undertaken in a typical hit and miss sequence and propped in the temporary case. In the permanent case, the underpins will cantilever with an RC basement slab and the ground floor being of timber construction.

4.8. A ground movement assessment (GMA) is presented which considers the movements and resultant impacts to the neighbouring building. Following correspondence with the GMA authors, additional assessment of the subject property was provided. A maximum of Category 2 (Slight) damage in accordance with the Burland Scale is predicted, which is in excess of policy requirements. LBC Policy requires damage to be limited to a Category 1 (Very Slight), which is applicable to neighbouring structures and the Listed subject property. Further assessment and /

or changes to the structural strategy should be presented to demonstrate that a maximum of Category 1 damage can feasibly be achieved.

4.9. A railway cutting is present 30m to the south of the proposed basement works. The highway and underlying utilities are located >5m from the proposed works. No impacts to the cutting, highway or utilities are predicted. Asset protection agreements should be entered into, as applicable.

4.10. Following correspondence with the GMA author, an outline monitoring strategy has been provided (presented in Appendix 3). Whilst correspondence (Appendix 3) indicates that vertical and horizontal movements would need to be limited to a maximum of 3mm and 5mm respectively for damage to be within Category 1, the monitoring strategy would allow movements in excess of this to be realised. The strategy should be reviewed once the structural scheme and / or GMA have been revised to demonstrate that a maximum of Category 1 damage is feasible.

4.11. The site is identified as being at low risk of flooding and is not within a Local Flood Risk Zone. Standard flood risk mitigation should be incorporated into the final design.

4.12. The site is within a critical drainage area. The impermeable site area will decrease as a result of the proposed development. Attenuation SUDs is stated to not be feasible at the site, although the increase in permeable site area may allow increased infiltration. The final drainage scheme design will need to be agreed with LBC and Thames Water.

4.13. Following correspondence, an outline construction programme has been provided (Appendix 3).

5.0 CONCLUSIONS

5.1. The BIA authors possess suitable qualifications in accordance with LBC guidance.

5.2. Desk study information plus Screening and Scoping Assessments are presented.

5.3. A limited ground investigation has been undertaken. Interpretative geotechnical design parameters are provided. It is recommended that the Contractor confirms the insitu shear strength of the London Clay meets the design requirements at formation level.

5.4. Perched water should be considered in the temporary works strategy to ensure stability is maintained. There will be no impact to the wider hydrogeological environment.

5.5. A proposed construction methodology and sequence is presented.

5.6. A ground movement assessment (GMA) indicates a maximum of Category 2 (Slight) may be sustained to the subject property. A maximum of Category 1 (Very Slight) is allowable.

5.7. No impacts to the nearby railway cutting, highway or utilities are predicted. Asset protection agreements should be entered into, as applicable.

5.8. The outline monitoring strategy should be reviewed once the structural scheme and / or GMA have been revised to demonstrate that a maximum of Category 1 (Very Slight) damage can feasibly be achieved.

5.9. The site is identified as being at low risk of flooding and is not within a Local Flood Risk Zone. Standard flood risk mitigation should be incorporated into the final design.

5.10. The site is within a critical drainage area. The impermeable site area will decrease as a result of the proposed development. The final drainage scheme design will need to be agreed with LBC and Thames Water.

5.11. Requests for further information are summarised in Appendix 2. Until the information requested is presented, the BIA does not meet the criteria of CPG: Basements.

Appendix 1: Residents' Consultation Comments

None

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Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	Land Stability	A ground movement assessment (GMA) indicates a maximum of Category 2 (Slight) may be sustained to the subject property. A maximum of Category 1 (Very Slight) is allowable. The structural scheme and / or GMA should be revised to demonstrate that a maximum of Category 1 (Very Slight) damage can be feasibly achieved for the neighbouring as well as for the applicant property.	Open	
2	Land Stability	The outline monitoring strategy should be reviewed once the structural scheme and / or GMA have been revised to demonstrate that a maximum of Category 1 (Very Slight) damage can feasibly be achieved.	Open	
3	Land Stability	Additional groundwater monitoring is recommended to inform the temporary works strategy to ensure stability is maintained.	Note Only	N/A
4	Land Stability	The Contractor should confirm the insitu shear strength of the London Clay meets minimum design requirements at formation level.	Note Only	N/A

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Appendix 3: Supplementary Supporting Documents

Outline Construction Programme

Monitoring Strategy

Email dated 12th September 2019 by Ashton Bennett Consultancy

	Project:	20 Leighton Road																
	Date:	Sep-19																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Planning Approval																		
Detailed Design																		
Tender																		
Party Wall Approval																		
Monitoring																		
Enabling Works																		
Basement Construction																		
Superstrucutre Construction																		

Monitoring Strategy

Groundworks for construction of a basement pose a risk of movement and damage to adjacent properties. The construction at No 20 Leighton Road is for a basement extension and lightwell and ground floor extension. A basement already exists. Temporary works and the inclusion of a Party Wall Agreement in line with the Party Wall Act, including condition surveys of adjacent properties, will ensure that risks can be controlled.

The following mitigating measures are proposed to reduce the risk of damage to neighbouring properties.

- Record and monitor the neighbouring properties, by a condition survey under the Party Wall Act before and after the works are completed.
- Employ suitably qualified structural engineers.
- Provide detailed Method Statement to Contractors.
- Use Contractors experienced in construction of basements and lightwells.
- Allow for unforeseen ground conditions, including loose soil, ingress of groundwater following heavy rainfall and other considerations.
- Undertake Risk Assessment.
- Specify monitoring instrumentation.

Monitoring during the works should include:

- Inspection of party walls and foundations by Party Wall Surveyor during the work.
- Lateral and vertical monitoring if considered necessary by Party Wall Surveyor.
- If damage is recorded on a neighbouring property, install tell tale monitors to check movement.
- Stop work if movement is recorded on tell tales in excess of Party Wall Agreement or red risk in table below.

MOVEMENT			
Vertical	Lateral	Risk	Action
0mm to 3mm	0mm to 5mm	Green	No Action
3mm to 8mm	5mm to 10mm	Amber	Structural survey of Party walls
>8mm	>10mm	Red	Structural survey, cease works if necessary except for making site and party walls safe. Revise method of working.

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------ Forwarded Message
From: <fabennett@ashton-bennett.co.uk>
Date: Thu, 12 Sep 2019 15:34:03 +0100
To: 'Beatrice Zonta' <beatrice@gregori-chiarotti.com>
Cc: 'Nello Gregori' <nello@gregori-chiarotti.com>, 'JAY WAGNER' <jay.wagner@btinternet.com>, 'Catherine Dille' <cddille@yahoo.com>
Subject: RE: REF: 2019/3051/P and 2019/3938/L 20 Leighton Road

Beatrice,

Answers to queries below:

1. *The ground movement assessment and impact assessment to the neighbouring structures is noted. As the subject property is grade II listed, the impact assessment should be updated to explicitly assess potential damage to the subject property.*

The impact on the house is 2mm vertical and 3.80m horizontal movement predicted.
Provided construction is careful there should be no differential vertical settlement and 2mm vertical settlement falls within Burland Catogory 0.
The driver for damage is the horizontal movement which is predicted as 3.8mm for each wall, making 7.6mm compression over the 8m width of the house, or 0.095%, which falls within the lower end of Burland Category 2. This predicts cracks which are easily filled, redecoration probably required. Several slight fractures showing inside the building. Cracks externally may need repointing for water tightness. Doors and windows may stick slightly.
This is to be expected for a basement construction.

2. An outline monitoring strategy is proposed. The trigger values adopted are much higher than the values predicted within the GMA. Trigger values should be reviewed to ensure that damage impacts are maintained within predicted limits (ie Category 1).

We will amend the trigger values as attached. Calculations indicate 3mm Vert and 5mm Hor are the triggers for moving from Cat 1 to Cat 2 and 8mm Vert and 10mm Hor are the triggers at the top of Cat 2.

3. An outline construction programme should be provided.

An outline programme is attached but may be revised by the successful Contractor during detailed design.

We trust this answers Campbell Reiths queries and can amend our Report if you so wish,

Kind Regards,
Frances

Frances A Bennett
BSc(Hons), CGeol, FGS, FIMMM, C.WEM, MCIWEM, CEnv, AIEMA, MIEnvSci
Director

Dear Beatrice,

Thank you for your email.
Your client would be invoiced during the process of this application, but I am cannot advise of a precise date.

Campbell Reith (CR) have reviewed the BIA provided, and in regard to hydrology and hydrogeology the findings are accepted (although its noted that the BIA discounts the use of SUDS and we shall note that drainage design will need to be agreed with LBC and Thames Water, and that attenuation SUDS should be considered).
In addition they raised the following issues which could be addressed by your engineers:

1. The ground movement assessment and impact assessment to the neighbouring structures is noted. As the subject property is grade II listed, the impact assessment should be updated to explicitly assess potential damage to the subject property.

2. An outline monitoring strategy is proposed. The trigger values adopted are much higher than the values predicted within the GMA. Trigger values should be reviewed to ensure that damage impacts are maintained within predicted limits (ie Category 1).

3. An outline construction programme should be provided.

Please discuss these with your engineers and let me know if you could provide response to the above within the next few days so CR could include this in their audit. Otherwise CR will issue their audit by the end of the week with the outstanding issues to be addressed.
There is no pressure for you to respond in the next few days, if you need more time. My current email is only to speed-up the process slightly, if possible.

I am reviewing the proposals with Colette (Conservation officer) this week so should be able to provide you with feedback by the end of the week.

Best Regards,
Nora

------ End of Forwarded Message

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