

79 Guilford Street
London, WC1N 1DF

Basement Impact Assessment
Audit

For
London Borough of Camden

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Campbell Reith Hill LLP
15 Bermondsey Square
London
SE1 3UN

T: +44 (0)20 7340 1700
E: london@campbellreith.com
W : www.campbellreith.com

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Last saved	26/02/2020 14:45
Author	K Barker, MSci FGS
Project Partner	E M Brown, BSc MSc CGeol FGS
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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 (BIA) submitted as part of the Planning Submission documentation for 79 Guildford Street (planning reference 2019/2546/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 audit instruction also confirmed that the proposal involves listed buildings.
- 1.5. The Basement Impact Assessment (BIA) has been undertaken by appropriately qualified authors.
- 1.6. No.79 Guilford Street is a five-storey (including basement) terraced house with a single-storey rear extension at ground floor level. It is a Grade II listed building.
- 1.7. It is proposed to extend the existing basement under the rear garden, including the formation of a new lightwell. In addition, the existing cellar slabs are to be removed and the floor levels to be lowered by approximately 0.80m.
- 1.8. The proposed basement will require a maximum excavation depth of c. 4.20m, (to approximately 18.85m AOD), and will be founded within the London Clay.
- 1.9. Interpretative geotechnical parameters are presented in the revised BIA. However, the BIA recommends that further site investigation is undertaken to confirm the ground conditions for design of the proposed piled raft foundation and this should be undertaken and presented within a Basement Construction Plan (BCP).
- 1.10. Outline permanent and temporary structural works proposals are presented. These should be confirmed within a BCP.
- 1.11. A Ground Movement Assessment (GMA) is presented in the revised BIA. It is accepted that the resulting ground movement will result in a maximum damage category of Burland Category 1, providing the piled raft foundation is adopted. This should be confirmed within a BCP once the additional site investigation is completed.

- 1.12. A movement monitoring proposal has been included in the BIA. This should be adopted during the works, with final proposals agreed during the Party Wall Act negotiations and confirmed in a BCP.
- 1.13. It is accepted the site is at very low risk of flooding. Flood mitigation measures are recommended in the BIA.
- 1.14. There will be no impact to the wider hydrogeological environment. The potential for encountering perched groundwater during construction has been considered. A dewatering methodology should be confirmed within a BCP.
- 1.15. Based on the information presented in the revised BIA and associated documents, and the requirement to confirm ground conditions, foundation design and ground movements within a BCP, the BIA is considered to meet the requirements of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 11 June 2019 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 79 Guildford Street, London WC1N 1DF (Reference: 2019/2546/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, 2018.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- 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;
- 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 a single-storey rear extension (following removal of existing); extension of existing basement with associated works."*

2.6. The audit instruction also confirmed that the proposal involve listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on 30 July 2019 and gained access to the following relevant documents for audit purposes in January 2020:

- Basement Impact Assessment and Engineering Method Statement (BIA) by Green Structural Engineering Ltd and Gabriel GeoConsulting Ltd (J001413, rev. 0) dated April 2019
- Outline Drainage Strategy by Green Structural Engineering Ltd, dated May 2019
- Structural Report on the Superstructure and Construction Management Plan, by Green Structural Engineering Ltd (J001413, rev. B), dated May 2019
- BÜF Architecture Planning Application drawings including proposed and existing plans and sections.
- Basement Impact Assessment (revised) by Gabriel Geo Consulting, reference GGC19750/R1.2, dated 20 January 2020.
- Mason Navarro Pledge drawings ref 217337-S-GA-100 and 101, 217337-S-S-200 to 201
- Mason Navarro Pledge Basement Structural Report, ref 217337 dated January 2020.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Authors' qualifications are presented.
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	Maps and plans are provided 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	Data sources are presented in Section 7 of the BIA. Justification is provided for 'No' answers.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	As above.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	As above.
Is a conceptual model presented?	Yes	See Section 4, 5 and 6 of the BIA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 8 of the BIA. Scoping is consistent with screening outcome.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	As above.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	As above.
Is factual ground investigation data provided?	Yes	Gabriel GeoConsulting Ground Investigation Report. Additional investigation data should be provided within a BCP.
Is monitoring data presented?	Yes	Section 9 of the BIA.
Is the ground investigation informed by a desk study?	Yes	Section 4, 5 and 6 of the BIA.
Has a site walkover been undertaken?	NA	Not specified.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Adjacent properties are confirmed to have a basement.
Is a geotechnical interpretation presented?	Yes	Section 10 of the BIA.
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	Structural Engineer report.
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.
Are estimates of ground movement and structural impact presented?	Yes	Section 10 of the BIA.

Item	Yes/No/NA	Comment
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	BIA and Structural Report. The additional site investigation, foundation design and ground movement impacts should be confirmed within a BCP.
Has the need for monitoring during construction been considered?	Yes	As above.
Have the residual (after mitigation) impacts been clearly identified?	Yes	The BIA states residual impacts to be negligible. To be confirmed with a BCP.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	A GMA has been provided in the revised BIA. The additional site investigation, foundation design and ground movement impacts should be confirmed within a BCP.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Section 10.8 of the BIA.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	The additional site investigation, foundation design and ground movement impacts should be confirmed within a BCP.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	The additional site investigation, foundation design and ground movement impacts should be confirmed within a BCP.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) was undertaken by Green Structural Engineering Ltd (GSE) and Gabriel GeoConsulting and the individuals concerned in its production hold suitable qualifications.
- 4.2. The property is part of a terrace of 23 houses, all constructed in the same period and of typical construction with timber floors and roof, supported off masonry walls. No.79 Guilford Street is a five-storey (including basement) terraced house with a single-storey rear extension at ground floor level. The basement extends at the front of the property with two separated vaulted rooms. The BIA confirmed properties from No. 75 to No. 82 located along the terrace to be Grade II listed.
- 4.3. The development will comprise an extension to the existing basement to the rear of the property, to provide additional living space for occupiers of the existing dwelling house, and an additional lightwell. In addition, the existing cellar slabs are to be removed and the floor levels to be lowered by approximately 0.8m.
- 4.4. A site investigation has been undertaken, proving Made Ground to a maximum depth of c. 1.30m (19.30m AOD) below the base of the existing basement. A limited thickness (typically less than 0.50m) of deposits of the Lynch Hill Gravel Formation were found below the Made Ground. The London Clay Formation is present below the Lynch Hill Gravel. Foundation inspection pits undertaken within the basement and at the ground floor indicate foundation depths to vary between 0.30 and 1.20m bgl and typically terminating on Made Ground comprising brick and concrete rubble.
- 4.5. The revised BIA recommends a number of dynamic probe holes to be undertaken in the rear garden to confirm ground conditions. A cable percussive borehole to 25m depth is also recommended to provide ground data to inform piled foundation (piled raft) design. The additional site investigation should be undertaken and presented within a Basement Construction Plan.
- 4.6. Groundwater was encountered during the site specific investigation in TP6 at 0.50m below existing basement level and in BH1 at 2.50m below existing basement level. During three monitoring visits after the investigation works, groundwater was monitored at a depth of approximately 1.50m below basement level (19.15m AOD) within the Lynch Hill Gravel Member, which is close to the proposed formation levels (c.18.85m AOD for the basement extension and c. 19.30mAOD for the front vaults works).
- 4.7. The BIA states that perched groundwater may locally occur at a shallow depth within the Made Ground and that groundwater entries/seepages into the excavations should be expected

Options for groundwater control are discussed. Dewatering arrangements should be confirmed within a BCP, which should confirm that the methodology and resultant local groundwater lowering will not impact neighbouring foundations.

- 4.8. The general groundwater flow is anticipated to be in a south-easterly direction which is approximately parallel to the line of the terrace. As only small volumes of groundwater are anticipated to flow within such a limited thickness of Lynch Gravel Member, and it can continue to flow either side of the terrace, it is accepted that there will be no impact to the wider hydrogeological environment.
- 4.9. Both the extension of the basement and the lowering of the floor levels within the front vaults will be constructed using a typical 'hit and miss' underpinning sequence. Both high and low level high stiffness temporary propping is proposed for the basement extension, whereas only low propping above the existing slab (due to the underpinning height being less than 1.00m) is proposed for the vaults.
- 4.10. The revised BIA includes proposals to install a piled raft for the rear basement extension. The piles will be used both in compression and tension and will be tied to the underpinned foundations to limit settlement / heave. Given that the effectiveness of this foundation solution is key to minimising impacts upon neighbouring properties, by maintaining ground / structural movements within the predicted limits (as 4.13 to 4.18), then the final design and assessment should be confirmed within a BCP. The proposals presented within the BIA are considered feasible.
- 4.11. As the excavation will occur in material which comprises granular layers (Made Ground and Lynch Hill Gravel Member), the temporary works proposal should include appropriate measures acting against the potential for instability in those layers. These should be confirmed within the BCP.
- 4.12. The 2019 submission presented a basement slab design assuming a bearing capacity of 100kPa, whereas the BIA recommended a net bearing pressure of 50kPa for the basement extension area and of 65kPa for the vaulted cellars area. The revised BIA presents an updated construction scheme assuming a 50kPa bearing pressure, and also relies upon a piled raft solution to limit ground / structural movements at the rear (as 4.10).
- 4.13. A Ground Movement Assessment (GMA) has been undertaken by Gabriel GeoConsulting Ltd to demonstrate ground movements occurring to the applicant's property and neighbouring properties are within the limits required. Analysis of the vertical ground movements caused by the settlement induced by the construction of the basement extension and by the heave of the clay due to the excavation has been undertaken using the software PDISP. Load takedown data,

which is the result of the new load setting provided in the structural design, has been included in the analysis.

- 4.14. Geotechnical parameters used for the PDISP analysis were provided in the 2019 BIA. However, interpretation given for the stiffness modulus of the Made Ground was considered too optimistic. The revised BIA provides more conservative parameters that are considered appropriate for the ground conditions.
- 4.15. The GMA focuses on the basement extension and on the No. 79/78 party wall and on No.78 main rear wall, which are considered the worst areas due to adjoining buildings geometry and magnitude of anticipated settlement. Both No. 78 and 80 Guildford Street have basements, such that the depth of excavation causing ground movements is taken from the existing basement level.
- 4.16. The GMA for main rear wall of No. 78 Guildford Street estimates a damage category of 1 according to the Burland Scale. Although we cannot agree in principle to some of the assumptions made to determine the category of damage (i.e. using the curve from CIRIA760 for retaining wall fully embedded in sand to estimate the propagation of vertical movement at the back of the wall), we consider the magnitude of movements determined and the logic of the analysis to be acceptable.
- 4.17. The revised BIA now considers the party walls between No. 78, 79 and 80, and includes detailed analysis and estimation of the potential damage category for the party wall between No.78 and 79, which is considered the most onerous case. As above, the magnitude of the ground movement and logic behind the analysis is accepted. This should be confirmed a BCP once the piled raft design is confirmed.
- 4.18. A movement monitoring proposal has been included in Section 10.7 of the Gabriel GeoConsulting report describing target locations and frequency of monitoring, with amber trigger levels suggested to be at 5mm in both the horizontal and the vertical direction. This should be adopted during the works, with a final proposals to be agreed during the Party Wall Act negotiations and presented within a BCP.
- 4.19. The BIA recommends an arboricultural report to be produced to assess the impact the proposed basement will have on the London Plane located in front of No. 78.
- 4.20. It is accepted the site is at very low risk of flooding from rivers, seas, groundwater and surface water. Minor flood mitigation measures are recommended in Section 10.8 of the Gabriel GeoConsulting report.
- 4.21. The proposed works could result in an increase in impermeable surfacing of around 8.5m². Although the BIA states that this is considered to not affect the discharge flow to the main

drainage system, the BIA recommends the inclusion of appropriate SuDs to be implemented. A final drainage design should be agreed with LBC and Thames Water.

- 4.22. It is accepted the proposed basement raises no concern in relation to slope stability.

5.0 CONCLUSIONS

- 5.1. The Basement Impact Assessment (BIA) has been undertaken by appropriately qualified authors.
- 5.2. Site investigation has been undertaken. The BIA recommends further site investigation is undertaken for the design of a piled raft at the rear of the property. This should be presented within a BCP.
- 5.3. Outline permanent and temporary structural works proposals are presented, which are considered to be feasible. The final scheme should be presented within a BCP, once the ground conditions and foundation solution have been confirmed.
- 5.4. The GMA has been revised to include appropriate geotechnical parameters, and the PDISP analysis has been updated accordingly. It is accepted that ground movement will not exceed Burland Damage Category 1, subject to confirmation within a BCP of the final foundation scheme.
- 5.5. A movement monitoring proposal has been included in the BIA. This should be adopted during the works, with a final proposal to be agreed during the Party Wall Act negotiations and presented within a BCP.
- 5.6. It is accepted the site is at very low risk of flooding. Minor flood mitigation measures are recommended in the BIA.
- 5.7. There will be no impact to the wider hydrogeological environment. The potential for encountering perched groundwater during construction should be considered, with suitable contingencies allowed for to ensure stability is maintained. Dewatering proposals should be confirmed within a BCP.
- 5.8. Subject to the provision of a BCP, the revised BIA meets the requirements of CPG Basements.

Appendix 1: Residents' Consultation Comment

None

Appendix 2: Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	Stability	The potential need for dewatering and proper mitigation measures to act against the potential for instability of loose granular soils during the excavation should be included in the temporary works proposal.	Closed – BCP recommended.	February 2020
2	Stability	The allowable bearing pressure assumed in the retaining wall design is not the one suggested in the BIA. Updating of the calculations is required.	Closed – BCP recommended.	February 2020
3	Stability	Geotechnical parameters assumed for the Made Ground in the PDISP analysis are not accepted and should be reviewed.	Closed – BCP recommended.	February 2020
4	Stability	Detailed analysis and damage category for the party walls (between No. 79 and 80 and between No.78 and 79) are not presented in the BIA and are required.	Closed – BCP recommended.	February 2020

Appendix 3: Supplementary Supporting Documents

None

London

15 Bermondsey Square
London
SE1 3UN

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Wessex House
Pixash Lane, Keynsham
Bristol BS31 1TP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

Campbell Reith Hill LLP. Registered in England & Wales. Limited Liability Partnership No OC300082
A list of Members is available at our Registered Office at: 15 Bermondsey Square, London, SE1 3UN
VAT No 974 8892 43