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Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12985-61
Revision: F2

July 2020

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	August 2019	Comment	NSemb12985-61-010819-79 Guilford Street-D1.doc	NS	EMB	EMB
F1	February 2020	Comment	NSemb12985-61-210220-79 Guilford Street-F1.doc	KB	GK	GK
F2	July 2020	Planning	NSemb12985-61-070720-79 Guilford Street-F2.doc	NS	EMB	EMB

Document Details

Last saved	07/07/2020 12:25
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Project Number	12985-61
Project Name	79 Guilford Street
Planning Reference	2019/2546/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 (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 Basement Impact Assessment Addendum has been undertaken by appropriately qualified authors.

1.5. Further site investigation has been undertaken to refine the ground model.

1.6. Groundwater was not encountered during the second ground investigation. Temporary pumping will be used to manage any perched groundwater that may locally occur during the excavation. It is accepted that there will be no impact to the wider hydrogeological environment.

1.7. The revised structural proposal indicates that conventional underpinning and spread foundation solution will be appropriate for this development. Geotechnical parameters and bearing capacity values have been revised to inform the structural design.

1.8. The Ground Movement Assessment has been revised and it is accepted that ground movements will be within the limits required by the CPG.

1.9. 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.

1.10. It is accepted the site is at very low risk of flooding. Minor flood mitigation measures are recommended in the BIA.

1.11. The proposed works could result in an increase in impermeable surfacing. A final drainage design should be agreed with LBC and Thames Water.

1.12. Considering the additional information submitted, the revised BIA meets 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

- Camden Local Plan 2017: Policy A5 Basements.
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance: Basements. March 2018.

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.

2.8. Following the first audit by CampbellReith, dated August 2019, the BIA was revised in January 2020. A second audit in February 2020 found that the revision failed to comply with Camden policies and technical procedures and proposed the submission of a Basement Construction Plan (BCP).

2.9. The applicant submitted additional documents, including a revised BIA, which concludes that a BCP will not be required for this development. The additional information was submitted in June 2020 and includes the following documents:

- Addendum Basement Impact Assessment (Addendum) by LBHGEO Ltd (ref.:LBH4612, rev. 1.1) dated June 2020
- Revised Mason Navarro Pledge Basement Structural Report, ref 217337 dated May 2020.
- Revised Structural Drawings by Mason Navarro Pledge including plans and sections of the proposal
- Factual Site Investigation Report by ST Consult, dated May 2020 (ref.: JN1435)

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 original 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 original 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 2 of the Addendum.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 8 of the original 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 and ST Consult Factual Site Investigation Report.
Is monitoring data presented?	Yes	Section 9 of the original BIA.
Is the ground investigation informed by a desk study?	Yes	Section 4, 5 and 6 of the original 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 4.4 of the Addendum.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	Revised 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 original BIA and Section 4 of the Addendum.
Are estimates of ground movement and structural impact presented?	Yes	Section 4 of the Addendum.

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 Addendum (Section 3 and 4) and revised Structural Report.
Has the need for monitoring during construction been considered?	Yes	As above.
Have the residual (after mitigation) impacts been clearly identified?	Yes	The BIA Addendum 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	A revised GMA has been provided in the Addendum. Additional site investigation, structural proposal and outline foundation design have been also revised.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Section 10.8 of the original 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	Section 4 of the Addendum.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. This audit report considers the Basement Impact Assessment Addendum (Addendum) prepared by LBHGEO Ltd. 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 was undertaken in February 2019, 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 was found below the Made Ground. The London Clay Formation is present below the Lynch Hill Gravel. Foundation inspection pits undertaken within the basement and the ground floor level indicate foundation depths to vary between 0.30 and 1.20m bgl and typically terminate on Made Ground comprising brick and concrete rubble. As recommended in the previous audit, additional site investigation comprising three boreholes, was undertaken in May 2020 and allowed the ground model to be refined as detailed in Section 2.3 of the Addendum.

4.5. Groundwater was encountered during the first 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).

4.6. Groundwater was not encountered during the second ground investigation. The Addendum considers the groundwater level recorded at 19.15m AOD likely to be a seepage of water deriving from a claystone layer at around 2.4m bgl (below proposed formation level) and trapped within the borehole standpipe during backfilling and installation operations. As such a groundwater body is not expected to be encountered during excavation and, groundwater lowering or dewatering will not be required.

4.7. The Addendum states that perched groundwater may locally occur at a shallow depth during wet periods which would be managed with temporary pumping. Considering the findings of the Addendum, it is accepted that there will be no impact to the wider hydrogeological environment.

4.8. 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.

4.9. The previous BIA included proposals to install a piled raft for the rear basement extension due to the presence of soft clay at the rear of the property. However, the Addendum states that the additional boreholes have not found unusually weak or disturbed London Clay as was noted in the original BIA (see discussion in Section 2.2 of the Addendum). The Addendum states that the reported strength of the clay has been affected by the interception of a groundwater bearing claystone layer within the London Clay and does not reflect the in situ stiffness of the material. As the drilling technique did not allow the installation of temporary casing, water and claystone fragments were allowed to accumulate at the bottom of the hole adversely affecting quality of samples and in-situ testing. The interpretation is accepted and, as such, it is considered that conventional underpinning and spread foundation solution will be appropriate for this development.

4.10. As the excavation will occur in material which comprises granular layers (Made Ground and Lynch Hill Gravel Member), the temporary works proposal indicated in the revised Structural Report includes the provision for temporary trench sheeting to be installed through those layers.

4.11. The revised Structural Report assumes 65kPa and 100kPa as bearing capacity for the rear and the front bearing stratum respectively. The Addendum confirms that the parameters adopted in the retaining wall design are in line with the geotechnical interpretation and this is accepted.

4.12. A Ground Movement Assessment (GMA) has been undertaken by LBHGEO 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. Load takedown data, which is the result of the new load setting provided in the structural design, has been included in the analysis.

4.13. 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, with a relative excavation depth of 1.2m. The GMA estimates a maximum damage category of 1 according to the Burland Scale

for neighbouring properties within the zone of influence of the proposed basement. The magnitude of movements determined and the logic of the analysis are considered acceptable.

4.14. An outline 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.

4.15. 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. This should be undertaken prior construction and the absence of any impact confirmed.

4.16. 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.

4.17. The proposed works could result in an increase in impermeable surfacing of around 8.5m^2. 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.

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

5.0 CONCLUSIONS

5.1. The Basement Impact Assessment Addendum has been undertaken by appropriately qualified authors.

5.2. Further site investigation has been undertaken to refine the ground model.

5.3. Groundwater was not encountered during the second ground investigation. Temporary pumping will be used to manage any perched groundwater that may locally occur during the excavation. It is accepted that there will be no impact to the wider hydrogeological environment.

5.4. The revised structural proposal indicates that conventional underpinning and spread foundation solution will be appropriate for this development. Geotechnical parameters and bearing capacity values have been revised to inform the structural design.

5.5. The GMA has been revised and it is accepted that ground movement will not exceed Burland Damage Category 1.

5.6. 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.

5.7. It is accepted the site is at very low risk of flooding. Minor flood mitigation measures are recommended in the BIA.

5.8. The proposed works could result in an increase in impermeable surfacing of around 8.5m2. A final drainage design should be agreed with LBC and Thames Water.

5.9. 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. This should be undertaken prior construction and the absence of any impact confirmed.

5.10. Considering the additional information submitted, 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 – See Sections 4.5. – 4.6. and 4.10.	July 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 – See Section 4.11.	July 2020
3	Stability	Geotechnical parameters assumed for the Made Ground in the PDISP analysis are not accepted and should be reviewed.	Closed – See Section 4.12.	July 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 – See Section 4.13.	July 2020

Appendix 3: Supplementary Supporting Documents

None

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