

18A Frognal Gardens
London
NW3 6XA

Basement Impact Assessment
Audit

For
London Borough of Camden

Project Number: 12985-86
Revision: F1

November 2020

Campbell Reith Hill LLP
15 Bermondsey Square
London
SE1 3UN

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

Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	June 2020	Comment	NSgk12985-86-050620-18A Frognal Gardens-D1	NS	KB	GK
F1	November 2020	For Planning	KBemb12985-86-301120-18A Frognal Gardens-F1	KB		

This document has been prepared in accordance with the scope of Campbell Reith Hill LLP’s (CampbellReith) appointment with its client and is subject to the terms of the appointment. It is addressed to and for the sole use and reliance of CampbellReith’s client. CampbellReith accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of Campbell Reith Hill LLP. Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

© Campbell Reith Hill LLP 2020

Document Details

Last saved	30/11/2020 09:50
Author	K Barker MSci FGS
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	12985-86
Project Name	18A Frognal Gardens
Planning Reference	2019/5348/P

Contents

1.0	Non-technical summary	1
2.0	Introduction	2
3.0	Basement Impact Assessment Audit Check List.....	4
4.0	Discussion	7
5.0	Conclusions	10

Appendix

- Appendix 1: Residents' Consultation Comments
- Appendix 2: Audit Query Tracker
- Appendix 3: Supplementary Supporting Documents

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 18A Frognal Gardens, London NW3 6XA (planning reference 2019/5348/P). The basement is considered to fall within Category C 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 proposed development involves the demolition of the existing three-storey property and construction of a four-storey residential property including a basement, plus local deepening of the basement for inclusion of a plunge pool.
- 1.5. The Basement Impact Assessment (BIA) has been undertaken by appropriately qualified authors.
- 1.6. A site investigation identifies the underlying ground conditions to comprise Made Ground over Bagshot Formation and the Claygate Member. Groundwater is present above formation level of the plunge pool.
- 1.7. It is accepted that the proposed development will not impact the hydrology or hydrogeology or the area.
- 1.8. The revised submission has confirmed that the removal of 4 trees will not impact the neighbouring structures. It is accepted that the proposed development will not impact the slope stability of the area.
- 1.9. Based on the revised ground movement assessment, damage to adjacent structures as a result of the proposed development is indicated to not exceed Burland Category 1.
- 1.10. Based on the revised submission the BIA is considered to meet the criteria of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 08/11/2019 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 18A Frognal Gardens, London, NW3 6XA, Camden Reference 2019/5348/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 existing 3 storey dwellinghouse and replacement with 1 x 4 bed four storey single family dwellinghouse with basement excavation, landscaping and associated works."*

2.6. The property Moreton House, to the east, is a (Grade II*) listed building situated on Holly Walk.

2.7. CampbellReith accessed LBC's Planning Portal on 26/11/2019 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment dated October 2019 by Akera Engineers Ltd.

- Ground Movement Assessment dated October 2019 by A-Squared Studio.
- Flood Risk Assessment dated September 2019 by Evans – River and Coastal.
- Existing and proposed drawings by Alison Brooks Architects.
- Design and Access Statements dated October 2019 by Alison Brooks Architects.
- Archaeological Desk Based Assessment dated August 2019 by Archaeology Collective.
- Drainage Report dated September 2019 by Environmental Engineering Partnership.
- Tree Report (in accordance with BS) dated August 2019 by CSG Usher's Ltd.
- Consultation responses (none relevant to stability, hydrology or hydrogeology).

2.8. Following the initial audit, additional documents were submitted to CampbellReith in August and October 2020, in response to the queries summarised in Appendix 2, as follows:

- Basement Impact Assessment dated 28 July 2020 by Akera Engineers.
- Site Investigation Report dated 20 July 2020 by Soil Consultants.
- Ground Movement Assessment Report dated 17 July 2020 by A-Squared Studio.
- Akera Engineers Audit Query Responses.
- A-Squared Studio Technical Note Addendum to GMA, ref 1125-A2S-XX-XX-TN-Y-0001-00, dated 14 October 2020.
- Akera Engineers drawing 13, rev P2.
- E-mail correspondence, presented in Appendix 3.

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	Revised submission presents a consistent assessment.
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	Revised submissions are consistent

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?	Yes	
Is a geotechnical interpretation presented?	Yes	Geotechnical parameters within SI and GMA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Structural proposals have been clarified in the revised submission.
Are reports on other investigations required by screening and scoping presented?	Yes	FRA, drainage, GMA, hydrology, hydrogeology.
Are the baseline conditions described, based on the GSD?	Yes	Revised submission presents a consistent scheme.
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	

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 screen 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	
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been compiled by Akera Engineers with supporting information and assessments by Soil Consultants, Stephen Buss Environmental Consultants, Evans Rivers and Coastal, and A-Squared Studio. The assessments have been undertaken by appropriately qualified authors.
- 4.2. The site does not include a listed building, however Moreton House, adjacent to the east, is a Grade II Listed building situated on Holly Walk. The application site falls within the Hampstead Conservation Area.
- 4.3. The existing structure occupying the site is a semi-detached, two to three-storey residence with a lowest level that cuts into the natural topography. This structure will be demolished, and a two to four-storey residence will be constructed in its place. The proposed development involves several excavations over a large portion of the site footprint to create the lower ground floor and underlying pool area.
- 4.4. The revised BIA submission indicates that the north and east sides of the basement, which extend into the rear garden of the property, will be formed using a 375mm diameter secant pile wall. The west side of the basement, adjacent to the garden wall and party wall with No. 18B, will be underpinned. The revised BIA indicates the maximum excavation depth is 6.275m, which corresponds with the plunge pool at basement level, at the rear of the property.
- 4.5. A site investigation identifies the underlying ground conditions to comprise Made Ground over Bagshot Formation to 7m depth. Below this the Claygate Member was encountered with London Clay Formation below, extending to depth. Groundwater is present above formation level of the plunge pool.
- 4.6. Interpretative geotechnical information and outline structural information has been presented within the appendices of the revised BIA, along with an outline construction sequence and details of temporary propping.
- 4.7. The revised BIA indicates that the underpinning will be carried out as a single lift, in bays not exceeding 1m wide, using a 'hit and miss' sequence. It is also proposed to use sacrificial trench sheeting to support the ground around the plunge pool, which is within the basement at the rear of the property. The trench sheeting is indicated to extend to 'toe into the clay'. Clarification of the methods to be used to dewater excavations, should this be required, has been provided.
- 4.8. The proposals and assessments in regards to hydrology and hydrogeology presented in the Stephen Buss and Evans reports are considered to supersede any other submissions

commenting on these aspects. For instance, it is noted that the Stephen Buss report indicates the presence of wells and spring lines within the vicinity of the development whilst the Soils Consultants report states that none are present.

- 4.9. It is accepted that, even though the proposed basement will intercept the standing groundwater level, there will be no impact to the wider hydrogeological environment. The assessment presented considers the ground and groundwater model and the proximity of surrounding structures and basements.
- 4.10. There will be no impact to the wider hydrological environment. The assessment considers the existing and proposed site arrangements, including SUDS proposals. The final drainage design will need to be approved by LBC and Thames Water.
- 4.11. The site has been identified to be at very low risk of flooding. Flood risk mitigation measures are proposed in regards to impacts from surcharged sewers. As such, it is accepted that the proposed development will not increase the risk of flooding in the surrounding environment.
- 4.12. A tree survey has been undertaken for the property. The revised BIA submission indicates 4 trees are to be removed during the proposed development. Two of these are located within the footprint of the basement excavation at the rear, one is located at the front of the property and one is located at the rear of the garden c. 10m from the proposed development. The trees in the footprint of the building are identified as being low water-demand species.
- 4.13. Section 7.6 of the revised Site Investigation Report considers the impact of the removing these trees on the adjoining property and garden party walls. It is identified that, if the neighbouring properties have shallow spread foundations, these will be founded on the Bagshot Formation, a predominantly granular material, and would therefore not be affected by shrink/swell behaviour resulting from the removal of the trees. Two trial pits were undertaken along the party wall with No. 18B and identified the property foundation to be seated at 3m depth and the garden wall foundation to be seated at 2m depth. The Bagshot Formation has been identified as a medium volume change soil, and the minimum foundation depth (based on NHBC guidance) is identified as 1.25m. As such it is accepted that the removal of the trees will not significantly impact neighbouring structures.
- 4.14. It is accepted that the proposed development will not impact the slope stability of the area.
- 4.15. An updated Ground Movement Assessment (GMA) has been included as part of the revised BIA submission. The maximum excavation depth is identified as 6.275m, which relates to the plunge pool at basement level, at the rear of the property. The length of the piles forming the secant pile wall are given as 11m to 13m long. The GMA Addendum report includes input and output

data from a PDisp assessment, which was carried out for 5 stages of the proposed demolition and construction.

- 4.16. The results from the PDisp assessment have then been imported into XDisp to assess the damage category for the development. Appropriate ground movement curves have been used to assess the secant pile wall, and the west wall where sacrificial trench sheeting will be utilised has been approximated to a planar diaphragm wall. The GMA Addendum report includes input and output data from these analyses and confirms that the maximum anticipated damage category is Burland Category 1 (Very Slight), with the exception of two walls.
- 4.17. Further analysis of the XDisp results was carried out on the walls where a damage category greater than Category 1 was predicted. The exceedances were deemed to be caused by unrealistic spikes/deformations resulting from the simplified analysis methods adopted and a smoothing exercise was undertaken. In all cases, the predicated damage category, following the smoothing exercise, did not exceed Category 1 (Very Slight). Based on the justification provided (see Appendix 3), this approach is considered acceptable for this development.
- 4.18. Section 7.6 of the Soil Consultants Site Investigation report recommends an initial and final condition survey of all neighbouring buildings be carried out, and monitoring be carried out during construction. This should be agreed as part of any Party Wall Agreement.

5.0 CONCLUSIONS

- 5.1. The Basement Impact Assessment (BIA) has been undertaken by appropriately qualified authors.
- 5.2. A site investigation identifies the underlying ground conditions to comprise Made Ground over Bagshot Formation and the Claygate Member. Groundwater is present above formation level of the plunge pool.
- 5.3. It is accepted that there will be no impact to the wider hydrological or hydrogeological environments.
- 5.4. It is accepted the site is at very low risk of flooding. Flood risk mitigation measures are proposed in regards to impacts from surcharged sewers. The proposed development will not increase the risk of flooding in the surrounding environment.
- 5.5. The revised BIA submission identifies the location of the trees to be removed and considers the impact that their removal may have on the existing foundations of the neighbouring structures.
- 5.6. Interpretative geotechnical information and outline structural information has been presented. The structural proposals have been clarified and are now consistent between documents.
- 5.7. An updated Ground Movement Assessment has been provided to reflect the proposed scheme. The Building Damage Assessment indicates that damage to adjacent structures will not exceed Burland Category 1.
- 5.8. Based on the revised submission, the BIA is considered to meet the criteria of CPG Basements.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Land Stability	The tree survey identifies 4 trees to be removed (although on the plan provided in the Tree Report these tree locations are not identified) - the BIA should identify these trees, their proximity to neighbouring structures and assess whether their removal will impact upon the existing foundations of the neighbouring structures (ie will removal lead to swelling movements that may damage neighbouring foundations).	Closed	30/10/20
2	Land Stability	<p>The following should be confirmed:</p> <ul style="list-style-type: none"> - the proposed construction methodology; - if underpinning is being used, confirm that the GMA has made allowance for this to be undertaken in 2 stages. - if dewatering need to be employed (e.g. for underpinning), what form will this take and what impact will it have on ground movements; - pile depths and methodology to be adopted (e.g. secant or contiguous); - Sufficient calculations and assessment should be presented to indicate that the responses and potential impacts from the above queries have been addressed. 	Closed	26/11/20

Appendix 3: Supplementary Supporting Documents

Akera Engineers Audit Query Responses

Akera Engineers Drawing 13, rev P2

Extract from underpinning specification

E-mail correspondence x 2

Campbell Reith Consulting Engineers
Basement Impact Assessment Audit

Audit Query responses

1. Trees

There are 4 trees to be removed

T9 is at the front of the property in the flowerbed near the pavement

T7 and T8 are within the footprint to be excavated for the plunge pool

T9 is at the rear of the garden approximately 10 metres away from the pool structure

Soils Consultants have addressed it in their report

2. Construction methodology / sequence

A proposed construction sequence is included

3. Underpinning

There will be one stage of underpinning.

The second stage underpinning has been omitted.

Interlocking trench sheets will be inserted around the deeper excavation for the plunge pool.

4. Piles

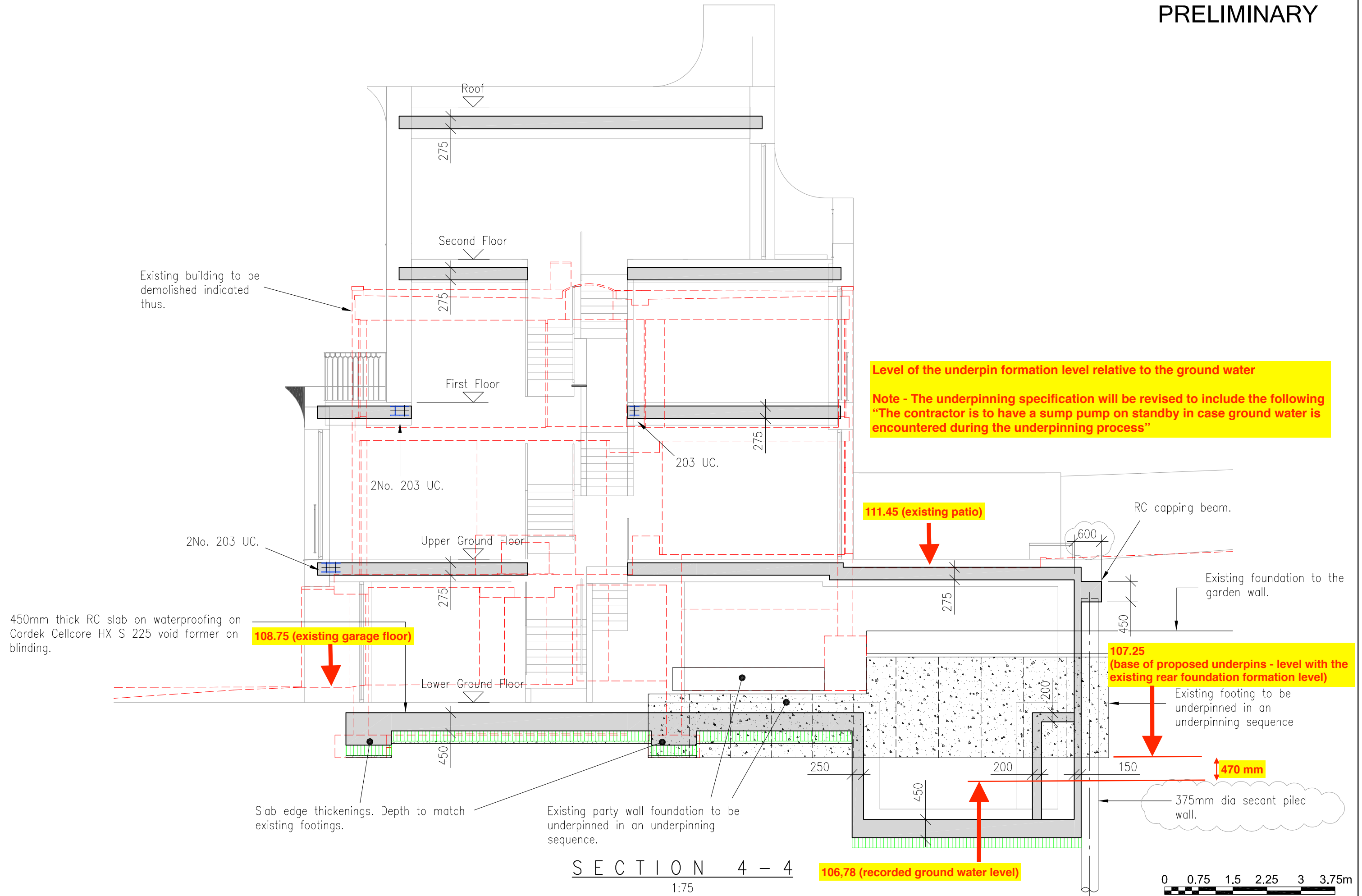
The piled wall will be a secant piled wall.

The pile calculations will be provided by the piling sub-contractor when they are appointed. We envisage that the secant piled wall will be 11 - 13 metres deep.

Revised Basement Impact Assessment document attached that includes the following revisions

- Soils consultants Limited Soils investigation report - revised levels and reference to the removed trees
- A Squared Studio Ground Movement Assessment Report - revised wording to coordinate with the other reports
- Akera Engineers drawings - revised construction sequence and proposed drawings to coordinate the piling type and omit two stage underpinning.

PRELIMINARY



33. Shutter and cast the RC upstand wall between the pile capping beam and the underside of the ground floor slab.
34. Shutter and cast the RC ground floor slab.
35. After the appropriate period of time, remove the ground floor props and shutters and steel props.
36. Install the temporary trench sheeting.
37. Excavate to formation level and cast the lower ground floor slab.
38. Cast the RC retaining wall.
39. Cast the RC columns.
40. Cast the upper ground floor slab.

Underpinning details and specification

- The underpinning is to be carried out in short sections of about 1 metre in length.
- The bottoms of the foundation shall be inspected and approved by the Engineer and the Building Inspector before concrete is poured.
- The underside of the footings are to be cleaned and hacked free of dirt, soil or loose materials before underpinning.
- The body of the underpinning is to be constructed in C40 concrete and is to be cast to the widths shown
- Excavation and concreting of any section of underpinning shall be carried out on the same day.
- The mass concrete is to be stopped off 75mm below the underside of the existing footing
- The final pinning up over the whole of the footing is to be carried out with dry pack mortar (1:3 mix cement to sharp sand)
Ram the dry pack into the 75mm gap 24 hours after the mass concrete underpin has been poured.
- Excavation to any section of underpinning shall not be started until at least 48 hours after completion of any adjacent sections of the work.
- The sides of the previous underpinning bays are to be roughened or keyed.
- Sequence of underpinning to be as shown on the plans
- All sections marked 1 to be excavated, cast and dry packed before starting excavation of section marked 2 and all sections marked 2 to be complete before excavation for sections marked 3 etc.
- A record of the sequence and dimensions of the underpinning carried out is to be kept.

Please note

The Contractor is to have a sump pump on standby in case ground water is encountered during the underpinning process.

When the concrete is delivered for the underpin pour, the groundwater in the base of the excavation is to be pumped out just before the underpin concrete is poured.

arisen as a result of email transmission. If verification is required, please request a hard-copy version. Any views or opinions presented are solely those of the author and do not necessarily represent those of the company.

From: Hamed Shariff <hamed.shariff@a2-studio.com>
Sent: 30 October 2020 16:18
To: Ayesha Khan <ayesha.khan@alisonbrooksarchitects.com>
Cc: alex.nikolic@a2-studio.com; John Bartley <John.B@soilconsultants.co.uk>
Subject: Re: 2019/5348/P_18aFG_Response to BIA comments

Hi Ayesha,

Good speaking to you earlier. Please find some expanded text below:

The results presented in the A-squared GMA report have not changed. The façades highlighted, showing exceedances in the base XdispB01 and B02 runs, were deemed to be caused by unrealistic spikes/deformations resulting from the simplified analysis methods adopted. A-squared carried out a smoothing exercise using polynomial fitting functions to remove the spikes/excessive deformations and reran the two assessments, now termed XdispB01_SM and XdispB02_SM. The fitted curves are shown in Appendix C and the results files are in Appendix B. I've attached the two SM results files for reference again.

Let me know if you need any more information. Happy to discuss further if required.

Thanks!

Hamed Shariff

Engineer



A-squared Studio

T: 020 7620 2868 | M: 07761 067 552

Click [here](#) to report this email as spam.



To: "KatharineBarker@campbellreith.com" <KatharineBarker@campbellreith.com>, "ABA 18A Frogna Gardens" <aba18afg@alisonbrooksarchitects.com>, "Farrant, Ben" <Ben.Farrant@camden.gov.uk>, "Tim Miles" <tim.miles@montagu-evans.co.uk>, "camdenaudit@campbellreith.com" <camdenaudit@campbellreith.com>,
Cc:
Bcc:
Subject: RE: FW: 2019/5348/P_18aFG_Response to BIA comments
From: "Ayesha Khan" <ayesha.khan@alisonbrooksarchitects.com> - Thursday 26/11/2020 09:40

Hi Katharine

Please find justification text from ASquared Studio below.

'Thank you for your comments and thoughts. We are happy to provide a justification for our smoothing efforts for the two façades.

Starting with 20FG.04, we consider the relatively sharp change in deflection a result of two different adjoining wall displacement curves (representing the installation of underpins at two different levels) is not realistic or representative of a soil mass/continuum. Xdisp applies the curves to the ground movement field without any redistributions effects (i.e. transitioning sharply from one curve type to another), which results in an abrupt step in the displacement curve. In reality the ground will not experience these abrupt shear deformations or sudden/sharp changes and we consider smoothing these anomalies appropriate and representative of a more realistic ground movement field.

Regarding 18B.03, we have opted to utilise a straight line due to the aspect ratio of the segment. The segment is approximately 2.5m long and 9m high, meaning that it's deformation shape will be linear. The large stiffness from its height means that a polynomial fit is unlikely to be applicable to this element, as it is unable to behave as a beam (i.e. we consider this façade element is unable to bend adopting a beam analogy due to a height to breadth ratio in excess of 4).'

I hope that this closes out your remaining queries. However if you would like to discuss the results further please call Hamad Shariff at ASquared Studio on:

T: 020 7620 2868 | **M:** 07761 067 552

Please let us know when we can expect to receive your final report, or if further information is required.

With kind regards
Ayesha

Ayesha Khan
Architect
ALISON BROOKS
ARCHITECTS

Alison Brooks Architects
Unit 610 Highgate Studios
53-79 Highgate Road
London NW5 1TL

T +44 (0)20 7267 9777

[WEBSITE](#) [FACEBOOK](#) [TWITTER](#) [LINKEDIN](#) [INSTAGRAM](#)

This message (and any associated files) is intended only for the use of the individual entity to which it is addressed and may contain information

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