CampbellReith
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32 Ferncroft Avenue, NW3 7PE

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12066-45

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1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for 32 Ferncroft Avenue, NW3 7PE (planning reference 2015/2460/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 has been prepared by an established firm of engineering consultants using individuals who possess suitable accreditation for the ground stability, ground flows, and surface water aspects of the report.

1.5. The BIA is informed by a ground investigation report produced in January 2016, which details a site investigation consisting of boreholes and water level monitoring. No trial pits have been carried out, however knowledge that the adjoining building contains a basement indicates that no party structure will need to be underpinned.

1.6. Significant ground water flows are not anticipated, however a strategy of dealing with ground water flows has been indicated should water be encountered during the works.

1.7. The attached neighbouring property has a similar basement; other basements in the vicinity are not confirmed or otherwise. Despite the absence of significant flows, a pathway for ground water is to be provided beneath the basement to minimise any impacts on ground water flows.

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

1.9. It is accepted that the area is not subject to surface water flooding. However, proposals to drain the additional surface water flows will have to be agreed with Thames Water.

1.10. Due to the neighbouring property containing a basement, the basement level party wall already exists. It is understood the majority of the neighbouring properties original shallow foundations have been underpinned to form the basement walls. Therefore the attached properties susceptibility to ground movements during the construction phase is greatly diminished. The next nearest property is some 15m away. Due to this and the above point, it is accepted that a

ground movement and damage assessment are not required. There is a proposal of a movement monitoring strategy during excavation and construction and this should be adopted.

1.11. Appropriate measures to counter clay heave have been detailed.

1.12. A sequence of works and indication of temporary works has been provided. The sequence of works details sequential underpinning following best practice methods. Development of the proposed temporary works is required by the contractor along with effective application in order to prevent ground movements and to ensure stability of the existing structure at all times.

1.13. Details of previous requests for further information are summarised in Appendix 2, all of which are now closed. It is accepted that the revised BIA and supporting documents adequately identify potential impacts from the basement proposals and propose sufficient mitigation.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 30/07/2015 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 32 Ferncroft Avenue, NW3 7PE (2015/2460/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) 4: Basements and Lightwells.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.

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 Audit Instruction described the planning proposal as *"Various external alterations including a rear extension at ground and lower ground floor levels and excavation work to increase the size of the existing basement"*

The Audit Instruction also confirmed that neither 32 Ferncroft Avenue nor any of the neighbouring buildings are listed.

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

- Basement Impact Assessment Report (BIA), Price & Myers. Including appended drawings and reports.
- Architectural drawings, Mobile Studio
    - Existing Plans, Elevations, and Sections
    - Proposed Plans, Elevations, and Sections
    - Site Location Plan
- Site photographs, Mobile Studio.

2.7. Following the D1 issue of this audit report the following information was received from the applicant:

- Basement Impact Assessment Report (BIA) version 2, Price & Myers 2016. Including newly appended temporary works drawings, and newly appended ground investigations report produced by GEA.
- Structural drawings of renovation and extension works that were carried out for 32 Ferncroft Avenue in 2002.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Persons holding the accreditations required under the CPG4 have been involved with the production of the BIA.
Is data required by Cl.233 of the GSD presented?	No	No works programme has been provided.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	Permanent and temporary works drawings are provided in the appendices of the BIA along with written description of the works in section 3 of the BIA.
Are suitable plan/maps included?	Yes	The Flood Risk Assessment in the BIA contains annotated maps indicating the position of the site relative to the numerous hydrological features that are being checked against. Structural and architectural plans are provided of the proposal itself.
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	Between the BIA and the 2012 report by Vincent and Rymill land stability screening has been carried out with justification provided for no answers.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Between the BIA and the 2012 report by Vincent and Rymill hydrogeology screening has been carried out with justification provided for no answers.
Hydrology Screening:	Yes	Between the BIA and the 2012 report by Vincent and Rymill

Item	Yes/No/NA	Comment
Have appropriate data sources been consulted? Is justification provided for 'No' answers?		hydrology screening has been carried out with justification provided for no answers.
Is a conceptual model presented?	Yes	2012 Report on Ground Investigation.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	A scoping statement is provided for each yes question from the screening stage in the BIA.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	A scoping statement is provided for each yes question from the screening stage in the BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	A scoping statement is provided for each yes question from the screening stage in the BIA.
Is factual ground investigation data provided?	Yes	2012 Report on Ground Investigation.
Is monitoring data presented?	Yes	Water level monitoring was carried out with two sets of data presented.
Is the ground investigation informed by a desk study?	Yes	2012 Report on Ground Investigation section 2.
Has a site walkover been undertaken?	Unclear	It is not clear if a site walk over has been carried out by the authors of the current BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	It is confirmed that the attached property contains a basement. It is not confirmed if other neighbouring properties contain basements, however the next closest property is located some 15m away.

Item	Yes/No/NA	Comment
Is a geotechnical interpretation presented?	Yes	2012 Report on Ground Investigation section 5.
Does the geotechnical interpretation include information on retaining wall design?	Yes	2012 Report on Ground Investigation section 5.
Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment.
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Only the attached neighbouring basement is discussed.
Is an Impact Assessment provided?	Yes	Impacts have been discussed in the scoping stage for most questions. Only questions relating to flooding and drainage have been carried through to a formal impact assessment stage where a Flood Risk Assessment has been provided.
Are estimates of ground movement and structural impact presented?	Partially	The 2012 Report on Ground Investigation determines that heave will likely be small in magnitude. It is also discussed that the damage potential to the neighbouring property is thought to be very slight, however no formal movement/damage assessment is carried out.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	The impacts for many of the points raised by screening are discussed in the scoping stage rather than a formal impact assessment discussion. A number of points regarding surface water, ground water, and drainage have been carried through to a formal impact assessment discussion.

Item	Yes/No/NA	Comment
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Temporary works have been outlined, and a ground water drainage pathway has been proposed.
Has the need for monitoring during construction been considered?	Yes	Section 5 in the BIA details proposals to carry out movement monitoring during and after the basement formation works.
Have the residual (after mitigation) impacts been clearly identified?	No	Clarification required with respect to construction design and sequencing.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Due to the neighbouring attached property having an existing basement many of the risks associated with stability of this property have been avoided.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	The drained area of hard standing into the sewer system has been increased by $30m^2$. Connection will have to be agreed with Thames Water.
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 2?	N/A	A damage assessment was not deemed necessary.
Are non-technical summaries provided?	Partially	An executive summary is provided at the start of the BIA only. However the BIA is written in an easy to understand way without the use of excessive technical terms.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by a well-known firm of engineering consultants, Price & Myers, and the individuals concerned in its production have suitable accreditation for covering the surface flow and flooding, Subterranean flow, and the land stability aspects of the report.

4.2. The LBC Instruction to proceed with the audit confirmed that neither the site in question nor any of the neighbouring sites contain a listed building.

4.3. The BIA appends a previous BIA report that was produced by Vincent & Rymill, and a geotechnical report produced by K F Geotechnical both for a previous planning application in 2012 that proposed a similar basement scheme. Despite planning permission being granted for this application it is apparent that construction of this basement proposal never materialised.

4.4. Following the D1 issue of this report a further geotechnical report by GEA has been submitted. This report was produced in January 2016 and details site investigations that have been carried out in the recent past.

4.5. The BIA primarily uses data from the 2016 ground investigation report to carry out the screening, scoping, and impact assessment exercises. This is a change from the first issue BIA where the 2012 geotechnical report was relied upon.

4.6. The proposal consists of expanding an existing single storey basement that currently covers less than half the footprint of the property. The proposed basement will cover the entire footprint of the property as well as forming a lightwell adjacent to the front bay window, a light well to the flank wall, and a proposed courtyard to the rear.

4.7. The attached neighbouring property contains an existing basement of a similar size as is proposed. Therefore the party wall has been underpinned previously and no further underpinning is proposed along the party wall line.

4.8. Due to the existing neighbouring basement, and the existing partial basement to the property, a number of different construction methods are proposed to form the basement walls. The basement wall along the party wall line is to be retained, the perimeter walls to the existing basements areas are to be retained, reinforced concrete retaining walls are to form the lightwells, and reinforced concrete L shaped underpinning is proposed to the remaining perimeter that is below the existing building. A reinforced concrete ground bearing slab is proposed at basement level.

4.9. The existing single storey rear extension to the property has been indicated as being constructed on 4 piles with ground beams spanning between piles supporting the walls and a

suspended concrete floor slab. The temporary works drawings indicate that the side wall of this extension is to be retained with a new RC wall built below the ground beam and between the piles, with this wall being propped in the temporary case. It is important that bending moments are not allowed to develop within the existing piles during the construction phase, which they will likely not have been designed to resist. Therefore it is vital that a detail temporary works method is developed by the contractor based on the proposed outline method.

4.10. The L shaped underpinned walls have been designed as vertical cantilevers that do not require a permanent prop to their head in order to resist horizontal forces. It has been confirmed that the existing timber ground floor will remain in place throughout the original property and will act as a prop to the masonry walls that will in some areas be relied upon to resist increased lateral forces where excavation has occurred on one side. It has been indicated that the timber ground floor will be strengthened or replaced as necessary to be able to provide this prop to the masonry walls.

4.11. The temporary works drawing indicates that the underpinning will be excavated in bays with two stage underpinning possibly required to avoid excessively deep excavations. A brief outline temporary works requirement has been shown, which is indicated as to be developed further by the contractor.

4.12. The BIA mentions that the basement floor slab will be detailed to allow for a predicted long term heave movement. A calculation has been produced that indicates the anticipated heave uplift pressures and a slab specification that can resist these forces, along with an indication that the self-weight of the building can counter any uplift forces via the underpinning that is tied into the ground slab.

4.13. Due to the neighbouring attached property containing an existing and similar basement to that which is proposed, it has been deemed that the likelihood of damage to this property is low due to its foundation depth being lower. This conclusion can be generally accepted, however it may be that some areas of the neighbouring structure are still founded at a shallow depth. This should be confirmed prior to construction and methods to mitigate potential damage agreed as part of the Party Wall Award. Care should still be taken both in design and construction to minimise movements as much as possible.

4.14. The sections drawings show the basement floor level being lowered from the existing level by approximately 700mm. It has been confirmed that local underpinning will be carried out as required to the existing basement walls should this be required.

4.15. The basement will be founded within Clay, identified potentially as clay head deposits. Underlying this from a depth of 5m is the London Clay.

4.16. Water level monitoring indicated that ground water may be present within the excavation depth. An outline strategy has been presented should water be found during the excavation. This includes the use of faceboards to the excavation, along with a sump and pumps in order to remove water from the excavation. It is accepted that ground water flows are not likely to be significant, however the proposed method of dealing with ground water inflows is welcomed.

4.17. A 150mm layer of gravel has been proposed below the basement slab in order to allow a pathway for any ground water flows to route through. Whilst a significant body of water is unlikely to exist, this is accepted as a mitigation measure.

4.18. The proposal involves the creation of 30m^2 of additional hardstanding area which is proposed to be discharged into the existing sewer system. It is noted that a soakaway and other forms of SUDs is not possible. The connection to the network will need to be agreed with Thames Water.

4.19. It is accepted that there are no slope stability concerns regarding the proposed development and that despite the road flooding in 1975 the road is now considered at low risk of surface water flooding.

5.0 CONCLUSIONS

5.1. The BIA has been produced by an established firm of engineers, and the authors involved with its production how the required accreditation.

5.2. The BIA relies is informed by a recent ground investigations report in which boreholes and water monitoring were carried out.

5.3. The proposal consists of extending an existing partial single storey basement to a basement covering the full plan of the property including new lightwells and courtyard at the front and rear.

5.4. The basement will be founded in clay, possibly identified as clay head. Due to bands of impermeable material within the clay ground water flows may be possible, with evidence of ground water flows supported by the monitoring data. An outline strategy should ground water inflows be encountered has been presented and is welcomed.

5.5. The attached neighbouring property has a similar basement; other basements in the vicinity are not confirmed or otherwise. A drainage path beneath the proposed basement has been incorporated into the design to prevent the cumulative presence of the basements from impacting any ground water flows.

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

5.7. It is accepted that the area is not subject to surface water flooding. However, proposals to drain the additional surface water flows will have to be agreed with Thames Water.

5.8. Due to the neighbouring property containing a basement, the basement level party wall already exists. It is understood the majority of the neighbouring properties original shallow foundations have been underpinned to form the basement walls. Therefore the attached properties susceptibility to ground movements during the construction phase is greatly diminished. The next nearest property is some 15m away. Due to this and the above point, it is accepted that a ground movement and damage assessment are not required. There is a proposal of a movement monitoring strategy during excavation and construction and this should be adopted.

5.9. The basement floor slab is proposed to be lowered by approximately 700mm. It has been confirmed that local underpinning will be carried out to existing basement walls should their formation level mean that they become undermined.

5.10. Calculation of the anticipated uplift forces and a design for a ground bearing slab capable of resisting these forces have been provided, in order to prevent damage to the building from heave of the London Clay.

5.11. A sequence of works has been provided along with an outline of the required temporary works. This has indicated that underpinning is to be carried out using generally accepted best practise methods, while the temporary works scheme is to be developed by the contractor. Temporary works are particularly important due to the existing rear extension being supported on piles which could become undermined should a detailed specification of temporary works not be adhered to.

5.12. The underpins have been designed as vertical cantilevers that do not require permanent propping at their head. However the existing ground floor structure is to be retained and strengthened as necessary in order to provide propping to the existing masonry walls that will have their retained height increased by a small amount due to the formation of the basement.

Appendix 1: Resident's Consultation Comments

None

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Suitability of reuse of reports from 2012 planning application	It should be confirmed whether the applicant has permission to reuse the information submitted in the 2012 reports that have been resubmitted to support this application. The authors would not usually provide permission for third parties to rely on the contents of their reports.	Closed – 2012 report no longer relied upon	30/03/2015
2	Stability	Clarification is required as to whether the retaining walls are required to be propped in the permanent condition at ground floor level, and confirmation of the construction of the existing ground floor and how this will provide a propping force to the walls if this is required.	Closed	30/03/2015
3	Stability	Sequence of construction and temporary works requirements are not clear. To be submitted again clearly indicating the sequence that the basement is to be constructed in, the sequence of underpinning, and the temporary works requirements.	Closed	30/04/2015
4	Stability	Clarification of the construction of the basement walls that are to be retained and confirmation that lowering the basement slab does not undermine these walls without additional structural works being required.	Closed	30/03/2015
5	Stability	Clarification of design of basement floor slabs to accommodate heave.	Closed	30/03/2015
6	Surface Water	Connection to sewer network to be agreed with Thames Water.	N/A	
7	BIA	Qualifications of author of hydrogeological screening and scoping to be confirmed. Programme required.	Closed	30/03/2015

Appendix 3: Supplementary Supporting Documents

None

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