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Basement Impact Assessment Audit

14A Keats Grove, London, NW3 2RS

For
London Borough of Camden

Project No.
14006-65

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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 14A Keats Grove, London, NW3 2RN (planning reference 2023/5162/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 qualifications of the individuals involved in the BIA are in accordance with LBC guidance.

1.5 The proposed development comprises the construction of a single level basement beneath the footprint of the existing building with new lightwells to the front and rear. Formation level for the proposed basement is approximately 3.20m below ground level (bgl), which will be formed by 'hit and miss' underpinning.

1.6 Screening and scoping assessments require further consideration.

1.7 A ground investigation was undertaken in July 2021 and indicates that the basement will be founded within the London Clay.

1.8 Local perched groundwater may be encountered during basement excavation. The BIA recommends conventional sump pumping to deal with any groundwater ingress during the basement excavation.

1.9 The non-technical summary of evidence in the BIA makes reference to a site-specific Flood Risk Assessment (FRA) in relation to questions regarding surface water flow and flooding screening. However, the FRA is not provided and is requested.

1.10 The BIA mentions that several construction methods are feasible, with the preferred approach being to construct the retaining wall through underpinning of existing foundations using a traditional hit-and-miss sequence. However, a structural method statement has not been provided and is therefore requested.

1.11 The construction sequence summarised in the BIA relies on drawings provided by consulting engineer which are not included in the appendix as stated and are requested.

1.12 Geotechnical design parameters are provided and are accepted.

1.13 The screening and scoping assessments indicate that the site includes slopes greater than 7°. The impact assessment highlights the need to ensure stability during construction. However, specific plans and measures for ensuring stability and addressing potential risks are not presented and are requested.

1.14 The Ground Movement Assessment (GMA) and Building Damage Assessment should be reviewed, and further information provided.

1.15 The BIA indicates that a movement monitoring scheme is to be adopted to ensure that movements generated are maintained within predicted limits.

1.16 As trees are proposed to be removed, consideration of the impact of their removal on neighbouring structures should be provided.

1.17 Queries and requests for information are summarised in Appendix 2. Until clarifications requested are presented, the BIA does not meet the requirements of Camden planning Guidance: Basements.

2.0 INTRODUCTION

2.1 CampbellReith was instructed by London Borough of Camden (LBC) on 22 March 2024 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 14A Keats Grove, London, NW3 2RN and Planning Reference 2023/5162/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 (CPG): Basements. January 2021.
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Hampstead - Neighbourhood Plan

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 "Excavation of basement with front lightwell and sunken terrace to rear; erection of two-storey rear extension, two-storey front infill extension, and single storey side infill extension; installation of air source heat pump to front lightwell; various external alterations including to fenestration; installation of entrance gates; erection of covering over existing parking space; and erection of bike and bin stores to front of site."

2.6 The Audit Instruction confirmed that 14A Keats Grove is adjacent to Grade I and Grade II listed buildings. Keats House is a Grade I listed building whilst, 17 and 18 Keats Grove, 12 Keats Grove, and Keats Community Library are Grade II listed buildings.

2.7 CampbellReith accessed LBC's Planning Portal on 27th March 2024 and gained access to the following relevant documents for audit purposes:

- Ground Investigation & Basement Impact Assessment Report by Geotechnical & Environmental Associates Limited (GEA), Ref.: J23301 Rev 0, dated December 2023.
- Tree Survey and Arboricultural Method Statement by Tretec, Ref.: 2307, dated November 2023.
- Existing Architectural drawings by PERRY + BELL LTD Architects:
  - Existing elevations, Ref.: 2307-SV-05, dated 27 February 2023
  - Existing ground and 1st floor plan, Ref.: 2307-SV-03, dated 27 February 2023
  - Existing 2nd floor and roof plan, Ref.: 2307-SV-04, dated 27 Feburary 2023
  - Existing site plan, Ref.: 2307-SV-02, dated 18 April 2023
- Proposed Architectural drawings by PERRY + BELL LTD Architects:
  - Proposed street elevation, Ref.: 2307-PL-02-05-A, dated 10 October 2023
  - Proposed basement floor, Ref.: 2307-PL-01-01-A, dated 02 May 2023
  - Proposed driveway elevations, Ref.: 2307-PL-02-07, dated 04 November 2023
  - Proposed first floor plan, Ref.: 2307-PL-01-03-A, dated 02 May 2023
  - Proposed front elevation, Ref.: 2307-PL-02-01-B, dated 02 May 2023
  - Proposed ground floor plan, Ref.: 2307-PL-01-02-A, dated 02 May 2023
  - OS location plan, Ref.: 2307-SV-01, no date.
  - Proposed rear elevations, Ref.: 2307-PL-02-03-B, dated 02 May 2023
  - Proposed roof plan, Ref.: 2307-PL-01-05-A, dated 02 May 2023
  - Proposed second floor plan, Ref.: 2307-PL-01-04-A, dated 02 May 2023
  - Proposed Sections 1, Ref.: 2307-PL-02-06-A, dated 26 March 2023
  - Proposed side Elevation to No 14, Ref.: 2307-PL-02-04-B, dated 02 May 2023
  - Proposed side Elevation to No 16, Ref.: 2307-PL-02-02-B, dated 02 May 2023
  - Proposed site plan, Ref.: 2307-PL-01-06-A, date 18 April 2023
  - Sketch view – street entrance, Rev.: 2307-02, dated 24 August 2023
  - Sketch visual front, Ref.: 2307-PL-03-01-A, dated 24 August 2023
- Planning Consultation Responses

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Section 1.3.2 of the BIA.
Is data required by Cl.233 of the GSD presented?	No	The construction sequence summarised in Section 9.2 of the BIA relies on drawings provided by the consulting engineer, which are not provided and are requested.
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?	No	Section 3.1.2 of the BIA. Question 6 indicates no tree felling, yet the Tree Survey and Arboricultural Assessment identify Tree T6 – Wild Cherry for removal. Clarification is requested.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Section 3.1.1 of the BIA. The proposed drawings show that the proposed development will increase the proportion of hard surfaces/paved areas. Clarification is requested.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Section 3.1.3 of the BIA. The proposed drawings show that the proposed development will increase the proportion of hard surfaces/paved areas. Clarification is requested.

Item	Yes/No/NA	Comment
Is a conceptual model presented?	Yes	Sections 7 and 10.2.1 of the BIA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.1 of the BIA. However, subject to revision of the Land Stability screening regarding tree felling.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	None were carried to scoping. However, the proposed drawings show that the proposed development will increase the proportion of hard surfaces/paved areas. Clarification is requested.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	None were carried to scoping. However, subject to revision of the Hydrology screening regarding increase in hardstanding areas.
Is factual ground investigation data provided?	Yes	Appendix A of the BIA.
Is monitoring data presented?	Yes	Section 5.4 of the BIA.
Is the ground investigation informed by a desk study?	Yes	Section 2.0 of the BIA.
Has a site walkover been undertaken?	Yes	Section 2.1 of the BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Section 2.1.1 of the BIA. The adjoining properties along Keats Grove, to the west and west of the site do not have basements.
Is a geotechnical interpretation presented?	Yes	Sections 8.1, 8.2, 8.3 and 10.2 of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 8.1 of the BIA.

Item	Yes/No/NA	Comment
Are reports on other investigations required by screening and scoping presented?	No	Tree survey and Arboricultural method statement are provided, however, the Flood Risk Assessment is not provided and is requested.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Section 9.1 of the BIA. The BIA assumes that neither neighbouring properties, 14 Keats Grove nor 35 Downshire Hill, have basements. Their foundations have been modelled to extend to a depth of 0.5mbgl.
Is an Impact Assessment provided?	Yes	Section 13 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	Sections 10 and 11 of the BIA. GMA provided; clarifications requested.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	Section 13 of the BIA. Subject to revision of screening and scoping assessments.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Movement monitoring is suggested. Further mitigation measures may be required as part of the revised impact assessment.
Has the need for monitoring during construction been considered?	Yes	Section 11.2 of the BIA.
Have the residual (after mitigation) impacts been clearly identified?	Yes	However, subject to impact assessment review.

Item	Yes/No/NA	Comment
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	GMA provided; clarifications requested.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	See above.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	No	Section 11 of the BIA. GMA provided; clarifications requested.
Are non-technical summaries provided?	Yes	Executive summary section of the BIA.

4.0 DISCUSSION

4.1 The Basement Impact Assessment (BIA) has been carried out by engineering consultants Geotechnical & Environmental Associates (GEA) and the individuals concerned in its production have suitable qualifications.

4.2 The Audit Instruction confirmed that 14A Keats Grove is adjacent to Grade I and Grade II listed buildings. Keats House is a Grade I listed building whilst, 17 and 18 Keats Grove, 12 Keats Grove, and Keats Community Library are Grade II listed buildings. Additionally the site is adjacent to Grade II listed garden walls, railings, gate piers and gate for numbers 36, 37, and 38 Downshire Hill these have not been considered as part of the BIA or Ground Movement Assessment.

4.3 The site fronts onto Keat Grove to the south and is bounded by three-storey properties to the north, east and west. The existing development comprises a three-storey detached house with a single storey extension opening onto a garden to the rear. The house is located at the northern end of the property, with a long narrow driveway and a footpath leading from Keats Grove. The rear extensions and garden are approximately at 0.50m below ground level (bgl) while the footpath steps down towards the driveway and road.

4.4 The proposed development comprises the construction of a single level basement beneath the footprint of the existing building with new lightwells to the front and rear. Formation level for the proposed basement is approximately at 3.20m bgl.

4.5 Screening and scoping assessments are presented and are informed by desk study information. Most relevant figures/maps from the ARUP GSD and other guidance documents are referenced within the BIA to support the screening questions. However, the following points require further consideration:

- Question 4 of the subterranean screening assessment and question 3 of the surface flow and flooding screening assessment require further justification as the proposed architectural drawings show that the proposed development will increase the proportion of hard surfaces/paved areas, and the scoping assessment updated subsequently.
- Question 6 of the Stability Screening Assessment indicates no tree felling, yet the Tree Survey and Arboricultural Assessment identify Tree T6 – Wild Cherry for removal. Clarification is requested, and the impact assessment updated accordingly.

4.6 A ground investigation was undertaken in July 2021 and identified the site to be underlain by a moderate thickness of Made Ground to a maximum depth of 1.30m bgl. Below the Made Ground, Head Deposits were found to a depth of 3.20m bgl. London Clay encountered to the full depth of the investigation (12.00m bgl). The BIA states that formation level for the proposed development is likely to be within London Clay.

4.7 The BIA states that groundwater was not encountered during drilling. Standpipes were installed in three boreholes and monitored on two occasions. Monitoring measures groundwater between 0.66m and 4.53m bgl, assumed to be associated with seepages from granular pockets within the Head Deposits.

4.8 The BIA states that significant inflows of groundwater are unlikely to be encountered within the basement excavation, such that it should be possible to form the basement without the need for groundwater protection measures. However, it recommends that trial pits are dug as close to the proposed basement depth as possible to confirm this and groundwater monitoring to be continued. It also adds that shallow seepages may be encountered within the Made Ground and granular layers of the Head Deposits, and any such inflows can be adequately controlled using sump pumping.

4.9 The Desk Study section of the BIA identifies the site as not being at risk from flooding, nor located within a Groundwater Source Protection Zone.

4.10 In Section 13.3.1 of the BIA, the non-technical summary of evidence makes reference to a site-specific Flood Risk Assessment (FRA) in relation to questions 2 to 5 regarding surface water flow and flooding screening. However, the FRA is not provided and is requested.

4.11 The BIA states that the simplest and most preferred construction method at this point is to form the retaining wall by underpinning the existing foundations using a traditional hit and miss sequence. However, no structural method statement has been provided and it is required. Additionally, information regarding the number of underpinning lifts required is missing. Confirmation of the construction methods is required, and if alternative methods are considered, the BIA and consequently the GMA should be updated to reflect the scheme.

4.12 Although the construction sequence is summarised in Section 9.2 of the BIA, it relies on drawings provided by the consulting engineer, which are not included in the appendix as stated. These drawings are requested.

4.13 According to the BIA, underpinning of the existing boundary walls will occur in a hit-and-miss sequence, with stages to be agreed upon with the temporary works engineer under the party wall agreement. Underpinning is to be taken in short sections not exceeding 1.0m in length. Additionally, no adjacent pin will be excavated until a minimum of 48 hours after the adjacent pin has been cast, dry-packed, and placed, with the sides of the excavation adequately shored and propped. The concrete will be cast and cured prior to excavation of the basement and removal of the formwork and supports. The new retaining walls will not be cantilevered at any stage during the construction process.

4.14 The Geotechnical parameters are presented in the BIA and are accepted.

4.15 The screening and scoping assessments indicate that the site includes slopes greater than 7°. The impact assessment highlights the need to ensure stability during construction. However, details on how this will be achieved and any planned measures for stability assurance are not provided. Clarification is required.

4.16 A GMA and Damage Assessment are provided to demonstrate that ground movements and consequential damage to neighbouring properties will be within the LBC's policy requirements. The analyses were carried out using the Oasys programme PDisp and XDisp.

4.17 The GMA has been undertaken for the proposed development and considers ground movements resulting from the underpinning and basement excavation. The following points require further clarification or revision:

- The effects of underpin installation have been modelled in XDisp using the CIRIA C760 curve "Installation of planar diaphragm wall in stiff clay", while the excavation effects have been assessed using the "Excavation in front of a high stiffness wall in stiff clay" curve. The BIA states that the vertical movements obtained from the corresponding PDisp analysis have also been imported into the corresponding XDisp models. However, this is not reflected in the XDisp input and output provided in Appendix D, no data is shown to be imported into the model. Clarifications are requested.
- The rigid boundary in the PDisp models is set at 12m bgl. However, considering the width of the basement, this placement of the rigid boundary is considered to be shallow. Clarification is requested.
- The XDisp contour plots of the combined excavation and underpinning movements show vertical displacement of approximately 2-3mm, except at the location of re-entrant corners (up to c. 8mm), with horizontal movements around 5mm. Industry experience indicates the range of ground movements experienced during a single lift of underpinning carried out with good control of workmanship are in the range of 5mm to 10mm vertically and horizontally per lift. The CIRIA approach is intended for embedded retaining walls, therefore further consideration of the movements occurring during underpinning is required.
- The site is adjacent to grade II listed boundary walls at 36, 37 and 38 Downshire Hill. These walls are not assessed in the GMA and should be included in the assessment.

4.18 The BIA reported damage to neighbouring buildings of Burland Category 1 (Very Slight). However, the results of the Building Damage Assessment of the XDisp model currently indicate that the damage to neighbouring properties will be Burland Category 2 (Slight). The GMA requires further consideration in line with the points raised above and the basement construction proposals must incorporate sufficient mitigation measures to ensure damage to neighbouring structures does not exceed Category 1 (Very Slight).

4.19 The BIA states that monitoring of ground movements should be undertaken, the structures to be monitored during the construction stages should include the existing property and the neighbouring buildings assessed in the GMA. With condition surveys carried out before and after the proposed works. The precise monitoring strategy will be developed at a later stage and will be subject to discussions and agreements with the owners of the adjacent properties and structures.

4.20 The Tree Survey and Arboricultural Impact Assessment indicates that Tree T6 – Wild Cherry, near 14 Keats Grove, will be felled during the redevelopment. Additionally, the BIA recognises the potential for soils with shrink-swell potential near the surface in the screening and scoping assessments. The BIA should confirm whether the neighbouring properties will be impacted by tree removal (i.e. due to potential for change in moisture content of the soil to cause shrink/swell movements) and, if so, an assessment should be provided along with recommendations for mitigation measures, if required.

5.0 CONCLUSIONS

5.1 The qualifications of the individuals involved in the BIA are in accordance with LBC guidance.

5.2 The proposed development comprises the construction of a single level basement beneath the footprint of the existing building with new lightwells to the front and rear. Formation level for the proposed basement is approximately at 3.20m bgl, which will be formed by 'hit and miss' underpinning.

5.3 Screening and scoping assessments required further consideration as detailed in Section 4.

5.4 A ground investigation was undertaken in July 2021 indicating that the basement will be founded within the London Clay.

5.5 Local perched groundwater may be encountered during basement excavation. The BIA recommends conventional sump pumping to deal with any groundwater ingress during the basement excavation.

5.6 The non-technical summary of evidence in the BIA makes reference to a site-specific Flood Risk Assessment (FRA) in relation to questions regarding surface water flow and flooding screening. However, the FRA is not provided and is requested.

5.7 The BIA mentions that several construction methods are feasible, with the preferred approach being to construct the retaining wall through underpinning of existing foundations using a traditional hit-and-miss sequence. However, a structural method statement has not been provided and is therefore requested.

5.8 The construction sequence summarised in the BIA relies on drawings provided by consulting engineer which are not included in the appendix as stated and are requested.

5.9 Geotechnical design parameters are provided and accepted.

5.10 The screening and scoping assessments indicate that the site includes slopes greater than 7°. The impact assessment highlights the need to ensure stability during construction. However, specific plans and measures for ensuring stability and addressing potential risks are not presented and are requested.

5.11 The Ground Movement Assessment (GMA) and Building Damage Assessment should be reviewed, and further information provided as described in Section 4.

5.12 The BIA indicates that a movement monitoring scheme is to be adopted to ensure that movements generated are maintained within predicted limits.

5.13 As trees are proposed to be removed, consideration of the impact of their removal on neighbouring structures should be provided.

5.14 Queries and requests for information are summarised in Appendix 2. Until clarifications requested are presented, the BIA does not meet the requirements of Camden planning Guidance: Basements.

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Appendix 1

Consultation Responses

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Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Rosenfeld	Unknown	16 March 2024	Concerns regarding excavation and land stability.	The impact of ground movements arising from the proposed basement have been queried in this audit.
Sinclair	36 Downshire Hill	27 March 2024	Concerns regarding Ground Movements at boundaries of listed buildings, 24, 25 and 26 Downshire Hill.	
			Land stability concerns	
			Groundwater regime concerns	The impact to the hydrogeological environment has been queried in this audit..
Steinberg	Unknown	28 March 2024	Flooding concerns	The impact to the hydrological environment has been queried in this audit.
Marple	Unknown	30 March 2024	Flooding Concerns	
			Concerns regarding damage to Grade II listed boundary walls	The impact to the listed walls has been queried in this audit.

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Appendix 2

Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Land Stability	Question 6 of the Stability Screening Assessment indicates no tree felling, yet the Tree Survey and Arboricultural Assessment identify Tree T6 – Wild Cherry for removal. Clarification is requested.	See Section 4.5	
2	Hydrogeology	The proposed architectural drawings show that the proposed development will increase the proportion of hard surfaces/paved areas, contrary to what is mentioned in the screening assessment. Clarification is requested.	See Section 4.5	
3	Hydrology/ Hydrogeology	The BIA makes reference to a site-specific Flood Risk Assessment (FRA) in relation to questions regarding surface water flow and flooding screening. However, the FRA is not provided and is requested.	See Section 4.10	
4	Land Stability	Structural method statement is not provided and is requested.	See Section 4.11	
5	Land Stability	Confirmation of the construction methods to be adopted and number of underpinning lifts is requested.	See Section 4.11	
6	Land Stability	The construction sequence outlined in the BIA references drawings from the consulting engineer, which are not included in the appendix as stated and are requested.	See Section 4.12	
7	Land Stability	The site has slopes exceeding 7 degrees, specific measures for ensuring stability are not outlined. Further clarification is requested.	See Section 4.15	
8	Land Stability	GMA to be reviewed and updated following the comments provided in Section 4.	See Sections 4.16 to 4.18	
9	Land Stability	Assessment of impact of tree removal on neighbouring properties is requested.	See Section 4.20	

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Appendix 3

Supplementary Supporting Documents

None

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