

Land between Gondar House  
and South Mansions

Basement Impact Assessment  
Audit

For

London Borough of Camden

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## Document History and Status

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## Document Details

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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 the Land Between Gondar House and South Mansions, London NW6 1QD (planning reference 2020/3553/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 individuals who possess suitable qualifications.
- 1.5. It is noted that some sections of the BIA and supporting documents reference superseded LBC guidance.
- 1.6. The BIA has confirmed that the proposed basement will be founded within the London Clay Formation and will be constructed using a contiguous pile wall.
- 1.7. It is accepted that the proposed development will not impact the hydrogeology or slope stability of the area.
- 1.8. Surface water mitigation measures have been included in the proposals, therefore it is accepted that the basement will not impact the wider hydrological environment.
- 1.9. Further information regarding the proposed foundation scheme and temporary propping arrangements of the basement is required.
- 1.10. The ground movement assessment and building damage assessment should be revised in line with the comments in Section 4 of this report.
- 1.11. Further consideration of the impact of ground movements on the adjacent highway is required.
- 1.12. It cannot be confirmed that the BIA complies with the requirements of CPG: Basements until the queries raised in Section 4 and Appendix 2 are addressed.

## 2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 17 August 2020 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for the Land Between Gondar House and South Mansions, London NW6 1QD.
- 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 *"The construction of a new part three, part four storey plus basement residential building to deliver 6 x residential (Class C3) dwellings, together with associated landscape, cycle parking, refuse and recycling storage"*
- 2.6. The Audit Instruction confirmed the development neither involves, nor is a neighbour to, listed buildings.
- 2.7. CampbellReith accessed LBC's Planning Portal on 14 September 2020 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment by Card Geotechnics Ltd, ref. CG/28978B, rev 0, dated May 2020.
- Structures Stage 2 Report by SD Structures, ref. SD795, rev. P1, dated 14 May 2020.
- Planning Application Drawings consisting of an existing site layout, proposed plans and proposed sections.
- Flood Risk Assessment by Hydrock, ref. 14487-HYD-XX-XX-RP-FR-0001, rev. P04, dated 6 May 2020.
- Arboricultural Impact Assessment by Keen Consultants, ref. 1325-KC-XX-YTREE-Impact Assessment-Rev 0, dated May 2020.
- Planning Consultation Responses.

### 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?	No	Question 6 should be 'yes'. An arboricultural survey has been undertaken and indicates a number of trees are to be removed.
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?	No	The impact of removing trees should be considered.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	N/A	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	The increase in the proportion of hard surfaces is not carried forward to scoping however this is addressed in the separate Flood Risk Assessment and Drainage Strategy.
Is factual ground investigation data provided?	Yes	
Is monitoring data presented?	Yes	Three rounds of groundwater monitoring undertaken.
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?	No	It has been assumed that the neighbouring property to the south has a basement and other neighbouring properties do not.
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment, Drainage Strategy and Arboricultural Impact Assessment provided.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Although presence of basements has been assumed.
Is an Impact Assessment provided?	Yes	



Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	However, these are not accepted as being reasonably conservative.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	No	Consideration of the impact of removing trees required.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	The requirement for propping should be confirmed once the ground movement assessment is reviewed.
Has the need for monitoring during construction been considered?	Yes	
Have the residual (after mitigation) impacts been clearly identified?	No	The requirement for propping should be confirmed once the ground movement assessment is reviewed.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	The ground movement and structural impact assessment should be reviewed, as Section 4.
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	The ground movement and structural impact assessment should be reviewed, as Section 4.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	The ground movement and structural impact assessment should be reviewed, as Section 4.
Are non-technical summaries provided?	Yes	

## 4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried out by Card Geotechnics Ltd and the individuals involved in its production have suitable qualifications.
- 4.2. It is noted that some sections of the BIA and supporting documents reference superseded LBC guidance.
- 4.3. The LBC Instruction to proceed with the audit identified that the basement proposal neither involves, nor is adjacent to, any listed buildings.
- 4.4. It is proposed to construct a new 3- to 4-storey block of flats within a currently undeveloped parcel of land. The development will include a single basement level below the east side of the development. The BIA and associated drawings indicate the basement will be formed using a contiguous pile wall. Piles are indicated to be 9m long.
- 4.5. It is noted that the Basement Plan drawing SDS795-PL000 by SD Structures uses a graphic more commonly used to represent a secant pile wall to show the location of the contiguous pile wall. The retaining wall construction is referred to on the drawing and in associated documents as being a contiguous pile wall. However, if the type of retaining wall used to form the basement changes the BIA will require revision.
- 4.6. The BIA recommends the use of suspended floor slabs and the Structural Stage 2 Report (SSR) states in Section 3.4 that void formers will be used to accommodate the uplift forces anticipated from basement excavation. However, the BIA and SSR also indicate that the basement could be supported by either by a ground bearing raft foundation or on piled foundations.
- 4.7. The site is identified as sloping from 78m OD in the north to 76m OD in the south. Due to the slope of the site, the BIA identifies basement excavation as varying between 3.0m to 4.5m in depth.
- 4.8. A site investigation indicates that ground conditions generally comprise Made Ground over London Clay. A thin layer of possible Head Deposits were encountered in one location during the site investigation.
- 4.9. No groundwater was encountered during the site investigation. Three subsequent rounds of groundwater monitoring were undertaken indicating groundwater at 4.02m depth. The BIA states that this is considered to be representative of perched water within the London Clay as opposed to a continuous body of groundwater.

- 4.10. The site is underlain by the London Clay Formation, which is designated an unproductive aquifer. As such it is accepted that the development will not impact the hydrogeology of the area.
- 4.11. Section 2.4 of the BIA identifies the site as having a slope of approximately 1 in 10 (c. 5.7°). Steeper slopes have been identified south of the site, but these are c. 30m from the proposed development. As such it is accepted that the slope stability of the area will not be impacted by the development.
- 4.12. A Flood Risk Assessment (FRA) has been undertaken. The FRA identifies a very low risk of fluvial or tidal flooding. The risk of surface water flooding is identified as being low due to the presence of South Mansions directly north of the site and the gradient of the area. Proposals for surface water attenuated drainage are detailed in Section 4 of the SSR, comprising the use of below ground storage tanks and flow controls to limit off-site surface water flow to 5 l/s. On this basis, and recognising that the impermeable site area remains largely unchanged, it is accepted that the development will not impact the wider hydrological environment.
- 4.13. An Arboricultural Impact Assessment (AIA) has been carried out for the site that indicates a number of trees within the site will be removed. Section 7.4 of the BIA identifies the presence of desiccation within the London Clay to a depth of 5.5m. The impact of removing the identified trees from the site should be addressed in the BIA, specifically with reference to both the proposed development and foundations of neighbouring structures.
- 4.14. A bottom up type construction is indicated and the SSR states that temporary propping will be used to support ground “where required” during basement construction. Section 3.2 of the SSR indicates the pile wall will be *“generally designed as a free-standing cantilever apart from where the basement is close to adjacent buildings and temporary and permanent propping is provided at the top”*. This use of temporary propping ‘as required’ is also stated in Section 11.1 of the BIA, and the ground movements presented in Table 19 of the BIA are described as being “achievable with early installation of high-level propping”. Further information is required to show where temporary propping is to be used during construction.
- 4.15. A Ground Movement Assessment (GMA) has been undertaken for the basement development and is presented in Section 11 of the BIA. The assessment considers four critical sections (CS) around the site; CS1 - South Mansions in the north, CS2 - an outbuilding of No. 3 Hillfield Road in the east, CS3 - a proposed extension to No. 3 Hillfield Road in the east and CS4 - No. 1 Hillfield Road in the south.
- 4.16. The critical section for South Mansions, CS1, is not at the closest point to the proposed basement.

- 4.17. Critical section CS2 has been positioned on a section of retaining wall that is indicated to be propped. However, the unpropped lightwell retaining wall is present within 1m to the south. It should be demonstrated that the assessment of the outbuilding to 3 Hillfield Road is reasonably conservative when considering the 'low stiffness' of the lightwell wall.
- 4.18. Section 11.5.1 of the GMA presents ground movements resulting from installation of the contiguous pile wall, which is based on the guidance provided in CIRIA C760. The BIA applies a reduction of 50% to the calculated values based on a case study from 2014 which adopted a very specific construction methodology and consequently found the CIRIA C760 approach to be conservative. It is a requirement of LBC that the BIA adopt a moderately conservative approach. In the absence of specific construction methodology confirming comparable techniques will be used, this element of the GMA should be revised to reflect CIRIA C760.
- 4.19. Movement of the contiguous pile wall during excavation has been assessed using WALLAP software for the four critical sections. The WALLAP assessments all include the use of a single high-level prop and excavation depths are given as 4.05m for CS1 and CS2 in the north and 3.35m for CS3 and CS4 in the south. The resulting deflections are summarised in Plate 2 of the BIA. As noted in 4.17, the analysis of CS2 should be reviewed.
- 4.20. Section 11.5.3 of the BIA includes an assessment of vertical ground movements arising from basement excavation. PDisp software has been used to carry out the assessment, which assumes that imposed loads at basement level will be distributed across the basement floor as a raft foundation. The PDisp assessment does not consider the option of a pile foundation being used instead of a raft, therefore further clarification is required. Input and output data for the PDisp assessment should be provided.
- 4.21. Section 12 of the BIA presents a Building Damage Assessment (BDA) for the neighbouring properties. The results of the assessment indicate a maximum of Burland Category 0 (negligible) for the proposed development. The deflections used in the BDA have been measured from the ground movements shown in Plates 4 to 7. However, the approach taken is not considered to be reasonably conservative, using long term heave movements to off-set short term settlements. The deflections taken into consideration should reflect the C760 methodology i.e. short term movements due to installation and deflection of the pile wall. The lengths and heights of the buildings assessed should also be provided for clarity.
- 4.22. The BIA Section 11.4 makes a number of statements in regards the zone of influence of the proposed works based on the assumed load spread from the existing foundations. In order to be reasonably conservative, the zone of influence as defined by C760 should be adopted (i.e. the applicable multiple of pile length and excavation depth). Structural wall within this zone should be considered within the assessment.

- 4.23. Further assessment of the impact to the adjacent highway Gondar Gardens is required, considering points 4.15 to 4.22 and the deepest level of excavation adjacent to the highway. It is recommended that asset protection criteria is agreed with utility asset owners potentially impacted by the proposed works.
- 4.24. The SSR identifies the need for movement monitoring of the surrounding buildings. Trigger levels proposed for this monitoring have been presented in Section 6.3 of the SSR. These values should be revised once the GMA has been updated.

## 5.0 CONCLUSIONS

- 5.1. The BIA has been carried out by individuals who possess suitable qualifications.
- 5.2. The BIA has confirmed that the proposed basement will be founded within the London Clay Formation and will be constructed using a contiguous pile wall.
- 5.3. It is accepted that the proposed development will not impact the hydrogeology or slope stability of the area.
- 5.4. Surface water mitigation measures have been included in the proposals, therefore it is accepted that the basement will not impact the wider hydrological environment.
- 5.5. Further information regarding the proposed foundation scheme and temporary propping arrangements of the basement is required.
- 5.6. The ground movement assessment and building damage assessment should be revised in line with the comments in Section 4.
- 5.7. Further consideration of the impact of ground movements on the adjacent highway is required.
- 5.8. It cannot be confirmed that the BIA complies with the requirements of CPG: Basements until the queries raised in Section 4 and Appendix 2 are addressed.

## Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Shaw	Not given	08/09/2020	Basement excavation affecting neighbouring South Mansions.	This has been queried in the audit.
Gondar and Agamemnon Residents Association	N/A		Impact of neighbouring basements.	This will be assessed as part of the BIA.



## Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	The impact of removing trees within the site should be addressed.	Open	
2	Stability	Details of the proposed foundation scheme and temporary propping arrangement should be provided.	Open	
3	Stability	Input data for the PDisp assessment should be provided and consideration of the pile foundation options included in the appraisal.	Open	
4	Stability	The ground movement assessment and building damage assessment should be revised in line with the comments in Section 4.	Open	
5	Stability	Further consideration of the impact to the adjacent highway is required.	Open	

## Appendix 3: Supplementary Supporting Documents

None

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