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Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-37
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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 19-37 Highgate Road & 19 Greenwood Place (planning reference 2016/5372/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 BIA has been carried out by a well-known firm of consultants who possess relevant qualifications and experience.

1.5. A double storey basement is proposed within the redevelopment scheme, which utilises secant piled retaining walls installed from existing ground level.

1.6. The ground conditions described in the BIA are based on investigations from nearby developments. No site specific ground investigation has been undertaken to determine the sequence and depth of strata or the groundwater conditions.

1.7. The BIA indicates that a historic tributary of the River Fleet ran through the site and as such Alluvial deposits are likely to be encountered. The potential stability and hydrogeological impacts related to these deposits require assessment, including in the temporary case.

1.8. As stated in the BIA, the proposed basement excavation is expected to encounter groundwater. A ground investigation with an appropriate period of subsequent groundwater monitoring is required to inform both the temporary and permanent works design, including waterproofing and flood risk protection measures.

1.9. The BIA states that the site is not within a flood risk zone. However, The Hilson Moran Flood Risk Assessment (FRA) and Environment Agency Data indicates the site and surrounding streets to be at medium to high risk of surface water flooding and at risk from reservoir flooding. The BIA should be updated to include the FRA, including proposed mitigation measures.

1.10. The proposed development is located within a Critical Drainage Area (Group 3_003). The BIA has not presented appropriate attenuation SUDS proposals, in accordance with CPG4 Section 3.51. However, an outline drainage assessment is presented in the Hilson Moran report with attenuation proposals in accordance with the requirements of Thames Water and LBC. The BIA

should be updated to include the drainage assessment. It is noted that discussions with Thames Water have commenced.

1.11. Assumptions have been made in the BIA on the retaining wall design, construction sequences and temporary support systems required to safely excavate and construct the two storey basement. Outline retaining wall designs are required. An indicative temporary works scheme to validate assumptions made in the GMA should be provided, including sequencing and propping information, and relevant control measures (including groundwater control), and an outline construction programme.

1.12. The ground movement and building damage assessment predicts damage no greater than Burland Category 1 (Very Slight) to neighbouring buildings. These assessments should be reconsidered once the site specific ground conditions and temporary works scheme are clarified and neighbouring foundation depths have been confirmed. An impact assessment of the nearby Thames Water assets should also be undertaken, in consultation with Thames Water, and impact to the highways and pavements, in consultation with the relevant authority (The Highways Agency, TFL and LBC).

1.13. An outline monitoring strategy should be proposed for all structures and assets within the development's zone of influence, to include appropriate trigger values and contingency action plans.

1.14. It is accepted that there are no slope stability concerns associated with the proposed development.

1.15. Until the outstanding information required has been provided, the BIA does not meet the criteria of CPG4.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 15 December 2016 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 19-37 Highgate Road & 19 Greenwood Place, NW5 1JY, Camden Reference 2016/5372/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;

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 buildings (D1, B1a and B8 uses) and redevelopment of the site to provide two buildings containing a 2 storey basement (Building 1: 7 storeys and Building 2: 6 storeys) with 4,312m² of self-storage (B8); 1,803m² of office (B1a) and 60 self-contained residential flats (C3) including 52 market units (16x1 bed, 29x2 bed, 7x3 bed) and 8 social rented units (8x1 bed) along with the creation of a pedestrian walkway running east to west linking Highgate Road with Greenwood Place; the creation of a vehicular access from Greenwood Place and loading bay; provision of green/brown roofs and plant equipment; roof terraces and balconies and other associated works"*

The Audit Instruction also confirmed 19-37 Highgate Road & 19 Greenwood Place is a neighbour to a grade II listed building, Christ Apostolic Church.

2.6. CampbellReith accessed LBC's Planning Portal on 19 January 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) – Revision 2, May 2016 by Card Geotechnics Limited (CGL)
- Basement Impact Assessment

  Appendix A: Proposed development plans

  Appendix B: Historical Maps

  Appendix C: BGS Borehole Logs

  Appendix D: Groundsure Report

  Appendix E: Camden Planning Guidance Screening Flowchart

  Appendix F: Wallap Output
- Civil & Structural Concept Report – Issue P2, September 2016 by Meinhardt
- Flood Risk Assessment – Revision 3, Final, September 2016 by Hilson Moran.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	See page 1 Issue Sheet of BIA.
Is data required by Cl.233 of the GSD presented?	No	Impacts and mitigation proposals, construction programme.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	See BIA Section 2.
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	Various maps and plans throughout BIA and appendices.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 7.2.3
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 7.2.2
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	See BIA Section 7.2.4. No reference to flood risk or FRA. No reference to drainage requirements or assessments.
Is a conceptual model presented?	Yes	See BIA Section 9 and Figures 2 and 3.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	See BIA Section 9. Assessment based on assumptions and should be confirmed based on investigation data and drainage / mitigation proposals.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	See BIA Section 9. No reference to flood risk or FRA. No reference to drainage requirements or assessments. Mitigation measure required.
Is factual ground investigation data provided?	No	Data of the previous site investigation is provided (see BIA Section 4.4). A site specific ground investigation is required.
Is monitoring data presented?	No	See BIA Section 4.4. Site specific information is required.
Is the ground investigation informed by a desk study?	N/A	No SI presented
Has a site walkover been undertaken?	Unknown	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	See BIA Figure 2. However, assumptions of basement / foundation depths should be confirmed in order to assess cumulative hydrogeological impacts and ground movement / damage impacts.
Is a geotechnical interpretation presented?	Yes	See BIA Section 9.2. Requires updating following site investigation.
Does the geotechnical interpretation include information on retaining wall design?	No	Outline retaining wall design required, including pile diameter and depth.
Are reports on other investigations required by screening and scoping presented?	No	FRA and drainage assessment available but not referenced in BIA.
Are the baseline conditions described, based on the GSD?	No	Ground and groundwater conditions to be prove by site investigation.

Item	Yes/No/NA	Comment
Do the base line conditions consider adjacent or nearby basements?	No	Assumptions of basement / foundation depths should be confirmed in order to assess cumulative hydrogeological impacts and ground movement / damage impacts.
Is an Impact Assessment provided?	Yes	Incomplete. See BIA Section 10. Requires updating.
Are estimates of ground movement and structural impact presented?	Yes	See BIA Section 10 and Figure 5,6,7,8. Requires updating following site investigation and confirmation of retaining wall design and temporary works proposals.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	See BIA section 10.2. Incomplete and does not consider hydrological and hydrogeological impacts.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	See BIA section 12. Incomplete and does not consider mitigation proposed in FRA / drainage assessment.
Has the need for monitoring during construction been considered?	Yes	See BIA section 14. Insufficient detail.
Have the residual (after mitigation) impacts been clearly identified?	No	See BIA section 12. Incomplete and does not consider hydrological and hydrogeological impacts.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	See BIA section 10 and Appendix F. Requires updating following site investigation and confirmation of retaining wall design and temporary works proposals.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	Requires updating to accommodate drainage assessment.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Confirmation on damage impact assessment following site investigation / temporary works / retaining wall details and appropriate assessment and mitigation proposals.

Item	Yes/No/NA	Comment
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Requires updating.
Are non-technical summaries provided?	Yes	See BIA section 15

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been produced by a well-known firm of consultants, Card Geotechnics Limited (CGL) and has been reviewed and approved for issue by individuals who possess relevant qualifications and experience.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal either involved a listed building or was adjacent to listed buildings but gave no details. The Design & Access Statement identified that 19-37 Highgate Road & 19 Greenwood Place is adjacent to a Grade II listed property, Christ Apostolic Church.

4.3. The proposed basement comprises a two storey construction formed after the demolition of the existing Highgate Day Centre and Lensham House, utilising secant piled retaining walls installed from existing ground level. A temporary works scheme, involving a single level of temporary props has been assumed in the BIA.

4.4. The ground conditions described in the BIA are based on investigations from nearby developments. No site specific ground investigation has been undertaken to determine the sequence and depth of strata and the groundwater level.

4.5. The BIA indicates that a historic tributary of the River Fleet ran through the site and as such Alluvial deposits are likely to be encountered. These deposits are likely to be more permeable than the underlying London Clay and therefore present the potential for hydrogeological impacts, instability during construction and long term groundwater issues that need to be assessed. Alluvial deposits are likely to be softer than the underlying London Clay and may present stability impacts, especially in the temporary case.

4.6. A site specific ground investigation is required. The BIA states that the proposed basement is expected to be founded within the London Clay Formation with between 1.2 metres and 2.25 metres of Made Ground above it, based on a ground investigation from a nearby site. The soil stiffness values used in the assessments are considered to be relatively high given the absence of a site specific ground investigation. The soils investigation should be tailored to obtain suitable geotechnical design parameters, including consideration of potential heave movements below the basement slab.

4.7. As stated in the BIA, the proposed basement excavation is expected to encounter groundwater. A ground investigation with an appropriate period of subsequent groundwater monitoring is required to inform both the temporary and permanent works design, including waterproofing and flood risk protection measures. Assessment of potential hydrogeological impacts should be updated once the site conditions are established, including proposed mitigation measures, if applicable.

4.8. Insufficient structural information has been provided. Assumptions have been made in the BIA on the retaining wall design, construction sequences and temporary support systems required to safely excavate and construct the two storey basement. Outline retaining wall designs are required. An indicative temporary works scheme to validate assumptions made in the GMA should be provided, including sequencing and propping information, and relevant control measures (including groundwater control), and an outline construction programme.

4.9. A Ground Movement Assessment (GMA) was undertaken using geotechnical modelling software, adopting the assumed ground properties and temporary works construction sequence. The ground movement and building damage assessment predicts damage no greater than Burland Category 1 (Very Slight) to neighbouring buildings. These assessments should be reconsidered once the site specific ground conditions and temporary works scheme are clarified and neighbouring foundation depths have been confirmed. An impact assessment of the nearby Thames Water assets should also be undertaken, in consultation with Thames Water, and impact to the highways and pavements assessed, in consultation with the relevant authority (The Highways Agency, TFL and LBC).

4.10. An outline monitoring strategy should be proposed for all structures and assets within the development's zone of influence, to include appropriate trigger values and contingency action plans. These should be in accordance with the asset owners requirements. Monitoring proposals for buildings should ensure movements are controlled to create no greater than Category 1 damage impacts.

4.11. The BIA states that the site is not within a flood risk zone. However, The Hilson Moran Flood Risk Assessment (FRA) and Environment Agency Data indicates the site and surrounding streets to be at medium to high risk of surface water flooding and at risk from reservoir flooding. The BIA should be updated to include the FRA, including proposed mitigation measures.

4.12. The proposed development is located within a Critical Drainage Area (Group 3_003). The BIA has not presented appropriate attenuation SUDS proposals, in accordance with CPG4 Section 3.51. However, an outline drainage assessment is presented in the Hilson Moran report with attenuation proposals in accordance with the requirements of Thames Water and LBC. The BIA should be updated to include the drainage assessment. It is noted that discussions with Thames Water have commenced.

4.13. Assessment of potential surface flow and flooding impacts should be updated once the Hilson Moran report has been taken into consideration, including proposed mitigation measures, if applicable.

4.14. It is accepted that there are no slope stability concerns regarding the proposed development.

5.0 CONCLUSIONS

5.1. The BIA has been carried out by a well-known firm of consultants who possess relevant qualifications and experience.

5.2. The proposed two storey basement utilises secant piled retaining walls installed from existing ground level.

5.3. The development site is surrounded by potentially sensitive structural receivers, including buildings, utility assets and highways.

5.4. The BIA does not currently address surface water flood risk or potential hydrological impacts. This should be addressed with reference to the Hilson Moran report.

5.5. A site specific ground investigation is required to establish the ground and groundwater conditions. The potential for Alluvial deposits on site should be considered and assessed in regards to stability and hydrogeological impacts.

5.6. Outline retaining wall designs are required, in addition to an indicative temporary works scheme including sequencing and propping information, relevant control measures (including groundwater control), and an outline construction programme.

5.7. The ground movement and damage impact assessment should be updated to reflect the site specific conditions and construction proposed. Impacts to utility and infrastructure assets should be discussed with asset owners and mitigation / protection measures agreed.

5.8. An outline monitoring strategy should be proposed for all structures and assets within the development's zone of influence, to include appropriate trigger values and contingency action plans.

5.9. It is accepted that there are no slope stability concerns with respect to the development proposals.

5.10. Until the outstanding information required has been provided, the BIA does not meet the criteria of CPG4.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	BIA	Site Investigation / Geotechnical Interpretation	Open – to be provided as 4.4 to 4.7, in accordance with GSD G2 and G3. Update Screening and Scoping.	
2	BIA	Impact Assessments and mitigation proposals – Stability, Hydrology, Hydrogeology	Open – to be provided as 4.5, 4.7, 4.11 to 4.13	
4	Surface Water Flow	Flood risk mitigation and drainage proposals	Open – to be provided as 4.11 and 4.12.	
5	Stability	Construction methodology and programme, retaining wall design, temporary works	Open – to be provided as 4.8.	
6	Stability	Ground movement and damage impact assessments, structural monitoring	Open – to be provided as 4.9 and 4.10.	

Appendix 3: Supplementary Supporting Documents

None

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