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89-91 West End Lane
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NW6 4SY

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 13398-18
Revision: F1

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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 89-91 West End Lane, NW6 4SY (planning reference 2020/0928/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 site is currently occupied by a five storey student accommodation building with a single level basement, which partially occupies the site in the south-west corner. The proposed development comprises the demolition of the existing building and the construction of a new seven storey building over a single storey basement, which will approximately cover the entire building footprint.

1.5. The LBC Instruction to proceed with the audit identified that the applicant's property is not listed and that basement proposal does not neighbour any listed buildings.

1.6. According to Camden guidance for subterranean developments, a chartered geologist qualification is required for subterranean (groundwater) flow assessment. However, giving the geological setting of the site, the hydrogeological assessment presented in the BIA is considered valid in the context of the proposed development.

1.7. Screening and scoping assessments are presented, along with desktop study information.

1.8. The site investigation indicates the proposed basement will be founded in the London Clay, a suitable founding stratum.

1.9. The BIA confirmed that there will not be any adverse impact on the hydrogeological environment.

1.10. It is accepted that there are will be no impact to surface water.

1.11. An outline construction scheme and structural information are presented.

1.12. A ground movement assessment has been undertaken, including a shrink-swell assessment for neighbouring properties due to trees removal. A maximum damage category of 1 is anticipated for all the neighbouring buildings in accordance with Camden's Planning Guidance.

1.13. It is accepted that there will be no slope stability concerns regarding the proposed development.

1.14. Queries and requests for information are summarised in Appendix 2. Considering the additional information presented, the BIA meets the requirements of Camden Planning Guidance: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 21st April 2020 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 89-91 West End Lane, London NW6 4SY, Camden Reference 2020/0928/P.

2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within:

- Camden Local Plan 2017 - Policy A5 Basements.
- Camden Planning Guidance: Basements. March 2018.
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.

2.4. The BIA should demonstrate that schemes:

a) maintain the structural stability of the building and neighbouring properties;

b) avoid adversely affecting drainage and run off or causing other damage to the water environment;

c) avoid cumulative impacts upon structural stability or the water environment in the local area,

and evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Audit Instruction described the planning proposal as "*Demolition of existing student accommodation building (Sui Generis) and erection of a seven storey plus basement student accommodation building (Sui Generis) with associated external works*."

2.6. The Audit Instruction confirmed applicant's property and neighbouring properties are not listed.

2.7. CampbellReith accessed LBC's Planning Portal on 15th May 2020 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (ref.: 19366-JUBB-XX-B1-RP-S-001-BIA-01/Version 1), dated 14 February 2020, by Jubb Consulting Engineers Ltd;
- Proposed structural drawings by Jubb Consulting Engineers Ltd;
- Existing and proposed plans, elevations and sections by Susan Stephen Architects;
- Preliminary Arboricultural Assessment (ref.: RT-MME-151827-03 Rev A), dated February 2020, by Middlemarch Environmental.
- Residents' Consultation Comments.

2.8. CampbellReith issued on 11 June 2020 the initial audit report (ref.no. NSjap13398-18-110620-89 91 West End Lane-D1) with comments on the above BIA documents.

2.9. In response to the initial audit report CampbellReith received on 9 September 2020 from LBC, the following revised documents:

- Basement Impact Assessment (ref.: 19366-JUBB-XX-B1-RP-S-001-BIA-01/Version 3), dated 9 September 2020, by Jubb Consulting Engineers Ltd;
- Ground Investigation Phase 1 Desk Study Report (ref.: 19366-DTS-01), dated December 2019, by Jubb Consulting Engineers Ltd

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	See paragraph 4.1 of this audit.
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	See Sections 5 and 6 of the BIA.
Are suitable plan/maps included?	Yes	The assessment is supported by suitable plan/maps.
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	Section 6.1 of the BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 6.1 of the BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 6.1 of the BIA.
Is a conceptual model presented?	Yes	Section 6.4 of the BIA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 6.2 of the BIA.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 6.2 of the BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 6.2 of the BIA.
Is factual ground investigation data provided?	Yes	Appendix C of the BIA.
Is monitoring data presented?	Yes	
Is the ground investigation informed by a desk study?	Yes	Appendix B of the BIA.
Has a site walkover been undertaken?	Yes	On 06/02/2020.
Is the presence/absence of adjacent or nearby basements confirmed?	No	Assumptions are made in Section 6.4.9 of the BIA.
Is a geotechnical interpretation presented?	Yes	Section 6.4. and 7.1 of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	As above.
Are reports on other investigations required by screening and scoping presented?	Yes	Arboricultural report, FRA and Drainage Strategy.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	However, foundation details of neighbouring foundations are only assumed.
Is an Impact Assessment provided?	Yes	Sections 6 and 8 of the BIA.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	Section 6.4 of the BIA.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	An outline temporary and permanent works proposal including mitigation measures is presented.
Has the need for monitoring during construction been considered?	Yes	Section 8 of the BIA.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Residual impact are considered to be negligible in the BIA.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Refer to the GMA
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Refer to the FRA and Drainage Strategy attached in the BIA.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	As above.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	
Are non-technical summaries provided?	Yes	Section 2 of the BIA.

4.0 DISCUSSION

4.1. The BIA was undertaken by Jubb Consulting Engineers Ltd and the reported qualifications of the authors are CEng, MIStructE and MICE. According to Camden guidance for subterranean developments, a CGeol qualification is required for subterranean (groundwater) flow assessment. However, giving the geological setting of the site, the hydrogeological assessment presented in the BIA is considered valid in the context of the proposed development.

4.2. The site is currently occupied by a five-storey student accommodation building with a single level basement, which partially occupies the site in the south-west corner. The building covers the entire site footprint except for the front parking area and external paved areas to the west of the site. Exact basement extent and existing foundation setting and typology are unknown.

4.3. The proposed development comprises the demolition of the existing building and the construction of a new seven storey building over a single storey basement, which will approximately cover the entire building footprint.

4.4. The LBC Instruction to proceed with the audit identified that the applicant's property is not listed and that the basement proposal does not neighbour any listed buildings. The site is constrained on three sides by adjacent buildings. Details of neighbouring foundations have been assumed in the BIA but not confirmed.

4.5. Screening and scoping assessments are presented along with desktop study information. Most of the relevant figures/maps from the Arup GSD and other guidance documents are referenced within the BIA to support responses to the screening questions.

4.6. A site investigation has been undertaken comprising three boreholes and three trial pits for contamination purposes. No foundation inspection pits were undertaken as part of the investigation. The ground investigation report indicates Made Ground to a maximum depth of 0.80m bgl. The London Clay Formation underlies the Made Ground and is proven to the bottom of the boreholes to a depth of 30.00m bgl. It is understood that the proposed basement level will be at 44.05m AOD with a retained height of 3.35m.

4.7. No water inflows were encountered within the boreholes and trial pits during the ground investigation. The boreholes were installed with standpipes and two of them resulted dry during the subsequent monitoring visits, whereas the third recorded groundwater as shallow as 0.66m bgl, which the BIA attributes to an infiltration of water from surface and, as such, not considered an actual groundwater body. The BIA states that the London Clay is designated as unproductive strata, and as such, considering depth and extent of the proposed basement there will be no adverse impact on the hydrogeological environment and this is accepted.

4.8. The BIA confirmed the proposed basement scheme will not alter the amount of hardstanding areas. A proposed drainage strategy has been included in Appendix E of the BIA and confirms that surface waters will be discharged via a suitable drainage solution (attenuation method) and SUDS features (such as permeable paving) may be incorporated in the scheme.

4.9. It is accepted that the site is not located within any critical drainage area. It is accepted that the site is at low risk from surface water flooding and there is no risk from flooding from rivers, seas and reservoirs.

4.10. According to the BIA and structural drawings presented, the sequence of works will comprise the installation of a contiguous pile wall surrounding the basement structure. The proposed pile

wall will comprise 450mm diameter piles and a reinforced concrete capping beam. At this stage, a pile length of 10m has been assumed. It is understood that the current proposal includes an embedded retaining wall which will be cantilevered (un-propped) at all stages during construction. However, the BIA mentions that the use of a temporary support/propping may be required during the construction stage, following a detailed design by the contractor.

4.11. From the structural drawings, it is understood that the basement slab will be 250mm thick reinforced concrete, suspended on pile groups.

4.12. Geotechnical parameters to inform settlement, retaining wall calculations and foundation design have been presented in the BIA and are considered reasonable.

4.13. A Ground Movement Assessment (GMA) has been undertaken to demonstrate that ground movements and consequential damage to neighbouring properties will be within LBC's policy requirements. Analysis of horizontal and vertical ground movements has been undertaken utilising proprietary software (Plaxis) considering the basement excavation for both short and long term conditions. As discussed above, the depth of the pile retaining wall has been set at c. 10.00m bgl in the analysis. The BIA states that this preliminary assumption was made following a rule of thumb 2/3 embedment depth to retained height and it is accepted.

4.14. A building damage assessment has been undertaken to include neighbouring properties within the proposed basement zone of influence based on the Burland Scale. The BIA states that No. 93 West End Lane (adjacent to the north of the site) and Smyrna Mansions (adjacent to the west of the site) may have a basement and as such the damage category is likely be 0 ('Negligible') according to the Burland Scale. However, as the extent and depth of the basements are unknown, the assessment presented in the BIA is based assuming no basements exist beneath the neighbouring properties.

4.15. The BIA includes an assessment for all the critical walls within the zone of influence of the basement. A contour plan showing anticipated ground movements to visually assess ground movements occurring at all neighbouring properties is also presented. The GMA confirmed that the predicted damage to all the neighbouring properties within the zone of influence of the proposed basement will be within Category 1 of the Burland Scale.

4.16. The BIA indicates mitigation measures for ground movements control and states that ground movements monitoring should be undertaken both below and above ground to ensure that the expected displacements are not exceeded.

4.17. The Screening section of the BIA indicates the area to be prone to seasonal shrink-swell which can result in foundation movements. An Arboricultural Impact Assessment has been undertaken. It is understood that one tree will be removed as part of the development. After undertaking an assessment based on NHBC guidance the BIA concludes that there is no effect on existing neighbouring foundations due to removal of the tree.

5.0 CONCLUSIONS

5.1. According to Camden guidance for subterranean developments, a CGeol qualification is required for subterranean (groundwater) flow assessment. However, giving the geological setting of the site, the hydrogeological assessment presented in the BIA is considered valid in the context of the proposed development.

5.2. Screening and scoping assessments are presented, along with desk study information.

5.3. The site investigation indicates the proposed basement will be founded in the London Clay.

5.4. The BIA confirmed that there will be no adverse impact on the hydrogeological environment.

5.5. It is accepted that there will be no impact to surface water.

5.6. An outline construction scheme and structural information are presented.

5.7. The GMA and damage assessment include clarification on the assessment for some neighbouring properties and a shrink-swell assessment due to trees removal. A maximum damage category of 1 is anticipated for all the neighbouring buildings according to the Burland Scale.

5.8. It is accepted that there will be no slope stability concerns regarding the proposed development.

5.9. Previous queries and requests for information have been closed out as summarised in Appendix 2. Considering the additional information presented, the BIA meets the requirements of Camden Planning Guidance: Basements.

Appendix 1: Residents' Consultation Comments

Relevant Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Unknown (redacted)	Unknown (redacted)	Unknown	Structural integrity and damage due to ground movements (x 2)	See Sections 4.12 – 4.17 of this audit
Unknown (redacted)	Kings Gardens	22/04/2020	Structural stability and damage due to ground movements	
Unknown (redacted)	Kings Gardens	Unknown	Structural integrity and damages due to ground movements (x15)	
Unknown (redacted)	Kings Gardens	21/04/2020	Structural stability and damage due to ground movements	
Neil Barwick	Unknown	Unknown	Structural stability and damage due to ground movements	
Patricia and Michael Rose	Unknown	Unknown	Structural stability and damage due to ground movements	
Rothgiesser/Noack	Smyrna Mansions	04/04/2020	Structural stability and damage due to ground movements	
Unknown (redacted)	West End Lane	05/04/2020	Structural stability and damage due to ground movements	
David Lloyd	Unknown	03/04/2020	Structural stability and damage due to ground movements	
Mohsen Asadi	47A Kings Gardens	Unknown	Structural stability and damage due to ground movements	
Ayad Kazanji	17B Kings Gardens	Unknown	Structural stability and damage due to ground movements	

David	7 Kings Gardens	Unknown	Structural stability and damage due to ground movements	
Rebab Al-Karimi	47B Kings Gardens	Unknown	Structural stability and damage due to ground movements	
Kayee and Kirill Meck	Kings Gardens	27/04/2020	Structural stability and damage due to ground movements	
Dafydd Hughes	Kings Gardens	27/04/2020	Structural stability and damage due to ground movements	
O'Sullivan/Marzynska/Micha-Lesimple	Kings Gardens	Unknown	Structural stability and damage due to ground movements	
Gillespie/Currie	Kings Gardens	29/04/2020	Structural stability and damage due to ground movements	
Bibezic	Kings Gardens Freehold Director	Unknown	Structural stability and damage due to ground movements	

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	The qualifications of the individuals involved in the BIA are not in accordance with LBC guidance. The BIA should be prepared or reviewed by individuals holding the required qualifications.	Closed – See Section 4.1.	6/10/2020
2	BIA format	Desktop study information (Appendix B of the BIA) should be provided.	Closed – See Section 4.5	6/10/2020
3	Stability	The GMA should be revised according to paragraphs 4.13. – 4.16. Clarification on the depth of the proposed embedded retaining wall is required. Confirmation that ground movements due to retaining wall installation have been included in the analysis is required. A full assessment (including a ground movements contour plan) for all neighbouring properties should also be presented.	Closed – See Section 4.13. – 4.16.	6/10/2020
4	Stability	The BIA should clearly state which trees are going to be removed. A shrink/swell assessment due to tree removal for neighbouring properties should be presented.	Closed – See Section 4.17.	6/10/2020

Appendix 3: Supplementary Supporting Documents

None

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