CampbellReith
consulting engineers

3 Aldred Road
NW6 1AN

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12066-60
Revision: D1

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Project Name	3 Aldred Road, London NW6 1AN
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Appendix

1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith has been instructed by the London Borough of Camden (LBC) to carry out an audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 3 Aldred Road, London NW6 1AN - Planning Reference 2015/3190/P.

1.2. The Audit has been carried out in accordance with the Terms of Reference set by the LBC. The Audit has reviewed the BIA for potential impacts on land stability and on local ground and surface water conditions arising from the proposed basement development.

1.3. CampbellReith has accessed LBC's Planning Portal and reviewed the latest revisions of submitted documentation against an agreed audit check list.

1.4. The BIA has not been taken beyond the screening stage as defined in the LBC Planning Guidance document 'Basements and Lightwells' (CPG4), dated July 2015.

1.5. The ground engineering/geotechnical qualifications of the author and checker of the BIA should be provided.

1.6. The qualifications of the author and checker of the GI report do not accord with the requirements of the LBC Planning Guidance Document 'Basements & Lightwells (CPG4)' i.e. there are no references to Chartered Geologist status. This matter requires resolution.

1.7. The BIA notes there to be no evidence or history of shrink-swell subsidence in the local area. However, given the shrink/swell potential of the London Clay, particularly in the vicinity of mature trees and given that the London Clay sub-formation has been shown in the GI report to be of 'high volume change potential', the depth to which seasonal effects are likely to be relevant should be established and compared with the depth of the new basement and the report conclusions verified.

1.8. The standpipe installed to the front of the property is reported to potentially have a defective upper bentonite seal. Groundwater levels have not been reliably determined. This has implications for construction and waterproofing.

1.9. The BIA states that the proposed basement will not significantly increase the differential depth of foundations relative to neighbouring properties - but see below concerning ground movement predictions.

1.10. The BIA states that the site is not within an area known to be at risk from surface flooding. However, the report 'Floods in Camden, Report of the Floods Scrutiny Panel, London Borough of

Camden 2003', indicates Aldred Road to have been flooded in 2002. This matter should be clarified.

1.11. The BIA states that the basement will not extend beneath the water table. However, there is some uncertainty as to groundwater levels at the site due to potential problems with the standpipe installed during the GI - see above. Groundwater level at the site remains to be demonstrated, since as noted above, it has impacts on construction and waterproofing.

1.12. Although not quantified in the BIA, consideration should be given to the proximity of the Works to Aldred Road and the temporary support requirements for the road and associated services.

1.13. Calculations for retaining wall/underpinning design should be provided and should cover stability i.e. sliding, overturning and bearing capacity in addition to the structural design of the walls/underpinning.

1.14. Basement construction will result in the new founding level of N^{o} 3 Aldred Road being some 1.3m lower than before thus resulting in a difference in level between the new basement formation level and the founding level of the immediately adjacent properties. An assessment of ground movements is required to determine the likely impact of basement construction on adjacent properties and the anticipated category of damage. This is required to be done before the BIA can be approved.

1.15. No works programme has been provided for basement construction in the BIA. This should be remedied.

1.16. It is essential, that once fully formulated, the designer's requirements regarding construction sequencing, ground movement monitoring, action trigger levels etc. are fully specified in the contract documents for the Works so that the contractor is made fully aware of the levels of compliance required. There should also be contingency provisions in place should on-going movements indicate the likely exceedance of predicted values

1.17. Queries and requests for clarification/further information are summarised in Appendix 2.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by the London Borough of Camden (LBC) on 29 September 2015 to carry out a Category 'A' Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 3 Aldred Road, London NW6 1AN - Planning Reference 2015/3109/P.

2.2. The above Audit has been carried out in accordance with the Terms of Reference set by the LBC. The Audit has reviewed the above BIA for potential impacts on land stability and on local ground and surface water conditions arising from the proposed basement development.

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

a) Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.

b) Camden Planning Guidance (CPG) 4: Basements and Lightwells.

c) Camden Development Policy (DP) 27: Basements and Lightwells.

d) 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.

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

2.5. The LBC Audit Instruction described the planning proposal as '*Single storey side and rear extension to lower ground floor; creation of habitable space within existing void below the main building and lowering of ground level; first floor rear extension; alterations to openings'.*

The Audit Instruction noted the following:

a) The basement proposals do not involve a listed building nor does the site neighbour any listed buildings.

b) The site is not in an area subject to slope stability constraints or subterranean (groundwater) flow constraints but is in an area subject to surface water flow and flooding.

c) It is unknown whether the application requires determination by the Development Control Committee (DCC).

d) The scope of the submitted BIA does not extend beyond the screening stage.

2.6. CampbellReith accessed the LBC Planning Portal on 21 October 2015 and has examined the following reports and drawings relevant to the audit:

a) A Ground Investigation (GI) Report prepared by Aviron Associates Ltd, dated 01 July 2015.

b) A separate Trial Pit Report prepared by Aviron Associates Ltd, dated 01 July 2015.

c) A 'Basement Impact Assessment Screening Summary' prepared by Price & Myers, Consulting Engineers, dated July 2015.

d) The following planning application drawings:

Site location plan.

Existing ground and basement (lower ground) plans.

Proposed ground and basement (lower ground) plans.

Existing front and rear elevations.

Proposed front and rear elevations.

Section A-A existing.

Section A-A proposed.

e) Comments received from the public on the planning application.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are the BIA author(s) credentials satisfactory?	No	The checker of the BIA is a chartered civil/structural engineer but there is no reference in the submitted document to any specific ground engineering or geotechnical specialism. The qualifications of the personnel involved in the preparation of the GI report do not accord with the requirements of the LBC Planning Guidance Document 'Basements & Lightwells (CPG4)'.
Is data required by Cl.233 of the GSD presented?	No	No works programme has been provided. No ground movement predictions have been made, hence, it is not possible to know the extent of any mitigation measures that may be required.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	Existing groundwater levels at the site have not been adequately proven.
Are suitable plans/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	
Slope and Ground Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	No information is supplied to substantiate the statement that there is no evidence of seasonal shrink-swell subsidence in the local area.

Item	Yes/No/NA	Comment
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	As noted above, existing groundwater levels at the site have not been adequately proven. Additionally, no information has been supplied on the presence or otherwise of adjacent basements. It is stated that the area is not at risk of surface water flooding. However, the report 'Floods in Camden, Report of the Floods Scrutiny Panel, London Borough of Camden 2003', indicates Aldred Road to have been flooded in 2002.
Hydrogeology (Groundwater Flow) Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Groundwater levels at the site have not been adequately proven.
Is a conceptual ground model presented?	Yes	
Slope and Ground Stability Scoping Provided? Is scoping consistent with screening outcome?	No	The BIA does not extend beyond the screening stage.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	The BIA does not extend beyond the screening stage.
Hydrogeology (Groundwater Flow) Scoping Provided? Is scoping consistent with screening outcome?	No	The BIA does not extend beyond the screening stage.
Is factual ground investigation data provided?	Yes	

Item	Yes/No/NA	Comment
Is monitoring data presented?	No	Very limited groundwater data (standpipe) is presented and is potentially suspect.
Is the ground investigation informed by a desk study?	Yes	However, a copy of the desk study is not available on the LBC Planning Portal and not available for audit.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	There is no discussion on nearby basements.
Is a geotechnical interpretation presented?	Yes	A limited geotechnical interpretation is provided within the GI report together with generalised engineering recommendations.
Does the geotechnical interpretation include information on retaining wall design?	No	
Are reports on other investigations required by screening and scoping presented?	No	No such reports were identified as being required.
Are baseline conditions described, based on the 'Guidance for Subterranean Development (GSD)'?	Yes	
Do the base line conditions consider adjacent or nearby basements?	No	No information is provided on the presence or otherwise of adjacent or nearby basements.
Is an Impact Assessment provided?	No	The BIA does not extend beyond the screening stage.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	No	No ground movement predictions have been made to assess the likely impact of basement construction on adjacent properties and the likely category of damage.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	The BIA does not extend beyond the screening stage and so no impact assessment has been provided.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	
Has the need for monitoring during construction been considered?	No	
Have the residual (after mitigation) impacts been clearly identified?	No	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	No ground movement predictions have been made to assess the likely impact of basement construction on adjacent properties and the likely category of damage.
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	No ground movement predictions have been made to assess the likely impact of basement construction on adjacent properties and the likely category of damage. The current groundwater regime has not been established.
Does the BIA report state that damage to surrounding buildings will be no worse than Burland Category 2?	No	No building damage assessment has been made.

Item	Yes/No/NA	Comment
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. The BIA has not been taken beyond the screening stage as defined in the LBC Planning Guidance document 'Basements and Light wells (CPG4)', dated July 2015.

4.2. The author of the BIA is a degree qualified engineer. The checker of the BIA is a chartered civil/structural engineer but there is no reference in the submitted document to any specific ground engineering or geotechnical specialism. This point should be clarified.

4.3. The GI report (upon which the BIA is partially based) has been authored by a degree qualified engineer and checked by a degree qualified chartered environmentalist and member of the Royal Institution of Chartered Surveyors. However, the qualifications of the above personnel do not accord with the requirements of the LBC Planning Guidance Document 'Basements & Lightwells (CPG4)' i.e. there are no references to qualifications having been gained from the Geological Society of London - Chartered Geologist status.

4.4. The property lies on the western side of Aldred Road, West Hampstead. The property forms part of an extended north-west/south-east trending terrace and is situated between N^{o} 2 Aldred Road and N^{o} 4 Aldred Road to the south and north respectively. The property has a rear courtyard garden and a small paved frontage.

4.5. The property comprises a two-storey, brick-built, terraced house with a lower ground floor. The lower ground floor is of variable height, providing liveable space in the rear half of the property where ground levels are lower, a restricted height cellar towards the middle and a limited height inaccessible void space towards the front. The top of existing lower ground floor slab level in the cellar area lies some 1.6m below front garden level.

4.6. A trial pit sunk adjacent to the party wall with N^{o} 4 Aldred Road in the front corner of the property beside the bay window, showed the party wall foundations to comprise corbelled brickwork bearing directly on a clay sub-stratum at a depth of 1.37m below ground floor level. The bay window brickwork at this location was again corbelled (probably at a similar level) but was in this case, founded on a 290mm thick concrete footing.

4.7. Trial pits sunk from within the accessible cellar area (with one exception) showed the building footings to be corbelled and founded on 200mm or so of lean mix concrete set below underside of basement floor level. The exception was a trial pit sunk in the front corner of the cellar adjacent to the party wall with N^{o} 4 Aldred Road where the footings were shown to be founded 275mm or so above underside of basement floor slab level i.e. indicating that the basement slab had been constructed below the level of the party wall footings at this location.

4.8. The proposed basement development comprises the deepening of the existing cellar area and front void by 1.315m to habitable space dimensions and the extension of this new basement beyond the front elevation of the house. The extended basement will be founded 3.5m or so below the level of the front garden and will be provided with roof lights extending up through the top soil and reinstated front paving.

4.9. Ground conditions are indicated by the BGS mapping for the area to comprise London Clay. A single borehole/dynamic probe hole sunk to the front of the property indicated soft, very soft and sandy reworked clay (Made Ground) to 3m below ground level (bgl), overlying firm and firm to stiff London Clay to 3.95m bgl, underlain by stiff becoming very stiff London Clay to the depth of exploration (15m bgl).

4.10. The BIA notes there to be no evidence or history of shrink-swell subsidence in the local area. However, the London Clay is known to be susceptible to shrinkage and swelling, particularly in the vicinity of mature trees and the London Clay sub-formation has been shown in the GI report to be of 'high volume change potential'. On this basis, the depth to which seasonal effects are likely to be relevant should be established and compared with the depth of the new basement and the report conclusions verified.

4.11. A standpipe installed in the above borehole to a depth of 5m bgl indicated a possible ground water depth of 2.6m bgl. However, the standpipe is reported to potentially have a defective upper bentonite seal and drainage local to the standpipe location is noted potentially to have been 'compromised'. Consequently, groundwater levels have not been reliably determined.

4.12. The BIA states that the site and general area do not slope more than 7^{o} (1:8) and that the proposed works will not alter this situation. The current ground slope along Aldred Road is stated to be about 1:20 as is the slope from the front to the back of the property.

4.13. The site is not in the vicinity of railway cuttings and the like, nor does it lie within the exclusion zones of any tunnels.

4.14. The BIA states in the context of slope stability (and also structural stability), that the proposed basement will not significantly increase the differential depth of foundations relative to neighbouring properties - but see below concerning ground movement predictions.

4.15. The BIA states that no trees will be felled as a result of constructing the basement.

4.16. The BIA notes that the property is not within the catchment area of the ponds on Hampstead Heath, nor within 50m of the ponds and hence not at risk of flooding due to the breach of the reservoir containment systems. Although not mentioned in the BIA, because of its high elevation, the site is also not within a fluvial or tidal flood plain.

4.17. The BIA states that the site is not within an area known to be at risk from surface flooding. However, the report 'Floods in Camden, Report of the Floods Scrutiny Panel, London Borough of Camden 2003', indicates Aldred Road to have been flooded in 2002. This matter should be clarified.

4.18. The BIA states that surface water flows due to rainfall will not be materially changed from the existing route(s) on the basis that the areas of hardstanding and the ground surface profile at the site will remain as at present and because the proposed basement lies beneath the existing building footprint and the fully paved front yard area. It is also confirmed that no more surface water than at present will be discharged into the ground e.g. via soakaways and/or SUDS. The London Clay below the site is not suitable for soakaways due to its low permeability.

4.19. Allied to the above, it is stated that the proposed basement will not result in changes to the profile of the inflows of surface water received by adjacent properties for the same reasons. Although the matter of adjacent basements has not been addressed in the BIA, it is agreed that there is not likely to be any additional impediment to rainwater flow through the ground towards adjacent properties arising from construction of the new basement.

4.20. The BIA confirms that there will be no change in the quality of surface water received by adjacent properties or downstream water courses.

4.21. The BIA notes again that the property is not within the catchment area of the ponds on Hampstead Heath, nor is it located within 100m of a watercourse, well (used or disused) or potential spring line. The property is also not within an area considered at risk of flooding due to the basement being lower than mean water level in any local pond or spring line.

4.22. The BIA states that the basement will not extend beneath the water table. However, there is some uncertainty as to groundwater levels at the site due to potential problems with the standpipe installed during the GI – see above. Groundwater level at the site remains to be demonstrated. This has implications for construction and waterproofing and should be confirmed.

4.23. The BIA notes that the site is not located directly above an aquifer. The London Clay formation is known to be of generally very low permeability and thus the site is not considered to be at risk of flooding due to rising groundwater. Nor are there significant subterranean flows which would be impacted by the basement proposals.

4.24. The load-bearing walls to the existing property are to be sequentially underpinned with mass concrete to permit basement excavation. Reinforced concrete (RC) walls tied in to a new RC basement slab are then to be incrementally constructed to provide permanent lateral support to

the underpins and original brickwork above. Temporary lateral support to the underpins is to be provided as required and the props removed as the permanent concrete works are completed. Equal consideration should be given to the proximity of the Works to Aldred Road and the temporary support requirements for the road and associated services.

4.25. No calculations have been provided for wall/underpinning design. This matter should be addressed. Calculations to be provided should cover stability i.e. sliding, overturning and bearing capacity, in addition to the structural design of the walls/underpinning.

4.26. Basement construction will result in the new founding level of N^{o} 3 Aldred Road being some 1.3m lower than before thus resulting in a difference in level between the new basement formation level and the founding level of the immediately adjacent properties. This difference in level is stated in the BIA to be modest and in line with standard practice, with little negative effects being anticipated.

4.27. However, it is considered that the above assurances should be demonstrated by an assessment of likely ground movements to determine the impact of basement construction on adjacent properties and the anticipated category of damage. This is required to be done before the BIA can be approved.

4.28. No works programme has been provided for basement construction in the BIA, although some information is given to show the need for construction sequencing and temporary propping of the underpinned walls prior to the completion of the permanent walls.

4.29. It is essential, that once fully formulated, the designer's requirements regarding construction sequencing, ground movement monitoring, action trigger levels etc. are fully specified in the contract documents for the Works so that the contractor is made fully aware of the levels of compliance required. There should also be contingency provisions in place should on-going movements indicate the likely exceedance of predicted values.

5.0 CONCLUSIONS

5.1. The BIA has not been taken beyond the screening stage as defined in the LBC Planning Guidance document 'Basements and Lightwells' (CPG4), dated July 2015.

5.2. The ground engineering/geotechnical qualifications of the author and checker of the BIA should be provided.

5.3. The qualifications of the author and checker of the GI report do not accord with the requirements of the LBC Planning Guidance Document 'Basements & Lightwells (CPG4)' i.e. there are no references to Chartered Geologist status. This matter requires resolution.

5.4. The BIA notes there to be no evidence or history of shrink-swell subsidence in the local area. However, given the shrink/swell potential of the London Clay, particularly in the vicinity of mature trees and given that the London Clay sub-formation has been shown in the GI report to be of 'high volume change potential', the depth to which seasonal effects are likely to be relevant should be established and compared with the depth of the new basement and the report conclusions verified.

5.5. The standpipe installed to the front of the property is reported to potentially have a defective upper bentonite seal. Groundwater levels have not been reliably determined. This has implications for construction and waterproofing.

5.6. The BIA states that the proposed basement will not significantly increase the differential depth of foundations relative to neighbouring properties - but see below concerning ground movement predictions.

5.7. The BIA states that the site is not within an area known to be at risk from surface flooding. However, the report 'Floods in Camden, Report of the Floods Scrutiny Panel, London Borough of Camden 2003', indicates Aldred Road to have been flooded in 2002. This matter should be clarified.

5.8. The BIA states that the basement will not extend beneath the water table. However, there is some uncertainty as to groundwater levels at the site due to potential problems with the standpipe installed during the GI - see above. Groundwater level at the site remains to be demonstrated, since as noted above, it has impacts on construction and waterproofing.

5.9. Although not quantified in the BIA, consideration should be given to the proximity of the Works to Aldred Road and the temporary support requirements for the road and associated services.

5.10. Calculations for retaining wall/underpinning design should be provided and should cover stability i.e. sliding, overturning and bearing capacity in addition to the structural design of the walls/underpinning.

5.11. Basement construction will result in the new founding level of N^{o} 3 Aldred Road being some 1.3m lower than before thus resulting in a difference in level between the new basement formation level and the founding level of the immediately adjacent properties. An assessment of ground movements is required to determine the likely impact of basement construction on adjacent properties and the anticipated category of damage. This is required to be done before the BIA can be approved.

5.12. No works programme has been provided for basement construction in the BIA. This should be remedied.

5.13. It is essential, that once fully formulated, the designer's requirements regarding construction sequencing, ground movement monitoring, action trigger levels etc. are fully specified in the contract documents for the Works so that the contractor is made fully aware of the levels of compliance required. There should also be contingency provisions in place should on-going movements indicate the likely exceedance of predicted values.

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	Hydrology	The standpipe in front of the property is reported to be defective. Groundwater levels remain to be confirmed.	Open.	
2	Hydrology	The history of flooding in the local area is to be researched and the situation clarified.	Open.	
3	Stability	Evidence or otherwise of history of shrink-swell subsidence in the local area to be substantiated.	Open.	
4	Stability	Consideration to be given to the proximity of the Works to Aldred Road and the temporary support requirements for the road and associated services.	Open.	
5	Stability	Calculations for retaining wall/underpinning design to be provided.	Open.	
6	Stability	Ground movement predictions to assess the likely structural impact of basement construction on adjacent properties and the likely category of damage to be undertaken.	Open.	
7	Stability	A programme of works is to be provided.	Open.	
8	Stability	The designer's requirements regarding construction sequencing, propping, ground movement monitoring, contingency	Open.	N/A – Party Wall.

		provisions etc. to be fully specified in the contract documents for the Works so that the contractor is made fully aware of the levels of compliance required.		

Appendix 3: Supplementary Supporting Documents

None

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