CampbellReith
consulting engineers

70 Elsworthy Road
NW3 3BP

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12066-63
Revision: D1

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Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

T:+44 (0)20 7340 1700
F:+44 (0)20 7340 1777
E:london@campbellreith.com
W:www.campbellreith.com

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Author	P C Daniels BSc MSc CEng MICE
Project Partner	E M Brown, BSc MSc CGeol FGS
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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 70 Elsworthy Road, London NW3 3BP - Planning Reference 2015/4684/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 groundwater 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 includes screening, scoping, site investigation and impact assessment stages as defined and required in the LBC Planning Guidance document 'Basements and Lightwells (CPG4)', dated July 2015.

1.5. The authorship, checking and approval of the main BIA report and the 'Structural Engineering and Construction Method Statement' report are in compliance with the requirements of CPG4.

1.6. The qualifications of the author of the GMA report require confirmation as it is not clear from the information given whether or not these are in accordance with the requirements of CPG4.

1.7. Maps and plans have not been included in the screening section of the BIA and references are not always given for data sources. Justification is often not given for 'No' answers. These matters should be addressed.

1.8. There are variations in the soil descriptions given in the executive summary to the BIA from those within the main body of the report. These discrepancies should be resolved.

1.9. There are variations in the groundwater levels reported in different sections of the BIA. These discrepancies should be resolved.

1.10. Existing groundwater information for the site is very limited and long-term groundwater monitoring should be undertaken to establish a design groundwater level and determine the rate at which groundwater would be likely to enter excavations.

1.11. The BIA confirms that the proposed basement will result in a differential in foundation depths relative to neighbouring properties.

1.12. The protection zones of trees to remain e.g. the large chestnut tree in the garden to 68 Elsworthy Road (see Appendix 1) should be verified before basement proposals and wall locations are finalised.

1.13. The site has been identified in the Camden Surface Water Management Plan (SWMP) as being located within Critical Drainage Area N^{o} GROUP3-005. On this basis, a flood risk assessment may be required.

1.14. The BIA confirms that the profile of surface water inflows received by adjacent properties will not be changed, nor will the quality of water received be changed.

1.15. Although provision for major dewatering of the excavation is unlikely to be necessary, higher permeability sand lenses or fissures may exist within the London Clay and provision should be made to deal with potential inflows from this source e.g. by sump pumping.

1.16. The BIA does not make direct reference to the 'Structural Engineering and Subterranean Construction Method Statement' report, resulting in areas of conflict and ambiguity. This matter should be resolved.

1.17. It is not clear whether a void former will be adopted beneath the basement floor slab to reduce heave pressures. This matter should be clarified.

1.18. No preliminary calculations have been provided for the design of the basement walls nor for the underpinning to the mews building. Calculations to be provided should cover stability i.e. sliding, overturning and bearing capacity, in addition to the structural design of the walls/underpinning. The above omissions should be remedied.

1.19. The GMA results indicate that damage to neighbouring structures would generally be Category 0 (negligible) with some buildings subject to Category 1 damage (very slight).

1.20. However, there are a number of issues with the GMA and building damage category assessments which are considered to be mis-leading and incomplete. On this basis, the current damage categories should be treated as preliminary only and the GMA and damage assessments resubmitted together with computer input geometry, soil parameters and detailed computer outputs so that a full audit may be undertaken.

1.21. No outline works programme has been provided for basement construction in the BIA or associated documents. This matter should be remedied.

1.22. 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 08 October 2015 to carry out a Category 'C' Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 70 Elsworthy Road, London NW3 3BP - Planning Reference 2015/4684/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 groundwater 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 '*Erection of a 2 storey, 7 bed dwelling house with basement and accommodation in the roof space, following the demolition of the existing main dwelling house; extension of new basement under existing mews dwelling; alterations to fenestration and rear elevation of mews dwelling; associated landscaping works'.*

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 in an area subject to stability constraints (underground development) but is not in an area subject to surface water flow and flooding constraints or subterranean (groundwater) flow constraints.

c) It is not known whether the application requires determination by the Development Control Committee (DCC).

d) The scope of the submitted BIA extends beyond the screening stage.

2.6. CampbellReith accessed the LBC Planning Portal on 30 October 2015 and has examined the following reports and drawings relevant to the audit:

a) A 'Camden Construction Management Plan (CMP)', dated 31 July 2015.

b) A 'Planning Statement' prepared by Savills, dated August 2015.

c) A 'Design & Access Statement' prepared by Wolff Architects, submitted August 2015.

d) A 'Ground Movement Assessment Report (GMA)', prepared by Geotechnical & Environmental Associates (GEA), dated 14 August 2015.

e) A 'Site Investigation & Basement Impact Assessment Report (BIA)', prepared by GEA, dated 17 August 2015.

f) A 'Structural Engineering Report & Subterranean Construction Method Statement', prepared by Elliot Wood Partnership (EWP), consulting engineers, dated August 2015.

g) A ' Below Ground Drainage/SUDS Assessment', prepared by EWP, dated 06 August 2015.

h) The following planning application drawings:

Existing Location Plan.

Existing House Floor Plans (x2).

Existing House & Mews Elevations.

Proposed Site Plan.

Proposed Basement Floor Plan.

Proposed Ground Floor Plan.

Proposed Mezzanine Floor Plan.

Proposed Section A-A.

Proposed Section B-B.

i) 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 qualifications of the author of the GMA report should be confirmed.
Is data required by Cl.233 of the GSD presented?	No	No outline works programme has been provided. Possible mitigation measures have not been discussed, although probably deemed unnecessary.
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 plans/maps included?	No	Maps and plans have not been included in the screening sections of the BIA.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	As above.
Slope and Ground Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	References are not always given for data sources. Justification is not generally given for 'No' answers.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	

Item	Yes/No/NA	Comment
Hydrogeology (Groundwater Flow) Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	No references are given for data sources. However, justification is generally given for 'No' answers.
Is a conceptual ground model presented?	Yes	
Slope and Ground Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Four issues identified.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	One issue identified.
Hydrogeology (Groundwater Flow) Scoping Provided? Is scoping consistent with screening outcome?	Yes	No issues identified.
Is factual ground investigation data provided?	Yes	However, there are discrepancies between the various submitted reports.
Is monitoring data presented?	Yes	However, only very limited monitoring of groundwater levels has been 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?	Yes	However, no details are provided for these.

Item	Yes/No/NA	Comment
Is a geotechnical interpretation presented?	Yes	However, basic only.
Does the geotechnical interpretation include information on retaining wall design?	Yes	However, very generalised only.
Are reports on other investigations required by screening and scoping presented?	No	It has been identified that that a flood risk assessment (FRA) may be 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	Details of adjacent basements have not been obtained/provided.
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	However, the GMA and damage assessments should be resubmitted together with computer input geometry, soil parameters and detailed computer outputs so that a full audit may be undertaken.
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?	No	Mitigation measures have not been discussed but are probably deemed unnecessary.
Has the need for monitoring during construction been considered?	Yes	

Item	Yes/No/NA	Comment
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	The GMA and damage assessments should be resubmitted together with computer input geometry, soil parameters and detailed computer outputs so that a full audit may be undertaken.
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?	Yes	
Does the BIA report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	However, damage categories should be treated as preliminary only and the GMA and damage assessments resubmitted together with computer input geometry, soil parameters and detailed computer outputs so that a full audit may be undertaken.
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. The BIA includes screening, scoping, site investigation and impact assessment stages as defined and required in the LBC Planning Guidance document 'Basements and Lightwells (CPG4)', dated July 2015.

4.2. The authorship, checking and approval of the main BIA report and the 'Structural Engineering and Construction Method Statement' report are in compliance with the requirements of CPG4.

4.3. The qualifications of the author of the GMA report require confirmation as it is not clear from the information given whether or not these are in accordance with the requirements of CPG4.

4.4. 70 Elsworthy Road is a six bedroomed dwelling house of conventional masonry construction with a single-storey extension to one side, housing a swimming pool. The building and extension were constructed in 1990/2000. The property lies south of Swiss Cottage and immediately north-west of Primrose Hill. The area surrounding the property is residential in nature and made up of large stand-alone dwelling houses.

4.5. The house is set towards the rear of a 75m long by 20m wide garden laid largely to lawn with boundary trees and shrubs. A brick-faced mews building at the front of the garden immediately adjacent to Elsworthy Road forms part of the property. The mews building forms one half of a semi-detached pair and provides a double garage and upper floor accommodation. The adjacent mews building belongs to 56, Avenue Road.

4.6. 70 Elsworthy Road is not of historic or heritage status and is not listed, but does lie adjacent to Elsworthy Conservation Area to the east. There are no listed buildings within the vicinity of the site.

4.7. It is proposed to demolish the main dwelling house and erect in its place a two-storey seven bedroomed dwelling with a single level basement and additional roof space accommodation. Basement depth will generally be 6m or so bgl but will be locally deepened to 7.5m bgl to accommodate a swimming pool. A lift shaft will also be constructed within the main building.

4.8. The proposed basement will extend below the main house, the garden and the ancillary mews building. A partial mezzanine level will be formed under the main building to house a plant room. The basement will not occupy the full width of the garden but will be set in slightly from the boundaries. No lightwells or roof lights will be provided. The mews building is to include a car stacker to provide an additional below-ground parking space.

4.9. The Planning Statement notes that the new proposal will result in a reduction in the area of hard landscaping and a commensurate increase in soft landscaping relative to the existing condition. It is stated that the depth of soil above the basement will be greater than the

minimum of 0.5m required by LBC policy. A limited number of poor quality trees will be removed to facilitate construction but this will be mitigated by the planting of a significant number of new trees. Mature trees are present in adjacent gardens and it is understood that this includes a very large chestnut tree in the garden of 68 Elsworthy Road – see Appendix 1.

4.10. A number of one and two-storey basements have been constructed at nearby properties in Elsworthy Road, Avenue Road, Wadham Gardens and Radlett Place in recent years. The locations of these basements are shown within the Design and Access Statement.

4.11. A ground investigation (GI) was undertaken at the site by GEA and included the sinking of a single borehole to a depth of 15m below ground level (bgl) and two window sampler holes to depths of 5m and 8m bgl respectively. Standard Penetration Tests (SPTs) were undertaken at regular intervals in all holes.

4.12. Ground conditions were shown to comprise Made Ground consisting of silty sand or clay with fragments of brick etc. to depths of between 0.75m and 1.2m bgl, underlain by soft to firm, becoming stiff, London Clay to 5m bgl or so, overlying stiff, becoming very stiff, London Clay to the depth of boring (15m bgl). There are variations in the soil descriptions given in the executive summary to the BIA from those within the main body of the report. These discrepancies should be resolved.

4.13. A standpipe was installed in each of the above exploratory holes. Groundwater monitoring (single visit) recorded individual water depths of 1.7m and 4.1m bgl in the London Clay in the upper part of the site. A standpipe towards the Elsworth Road end of the site was dry. Groundwater seepages were encountered during boring within the Made Ground at 0.3m bgl towards the Elsworth Road end of the site (believed to be a perched water table arising from surface run-off) and within the London Clay at 3.7m bgl at the upper end of the site (associated with claystones). There are variations in the groundwater levels reported in different sections of the BIA. These discrepancies should be resolved.

4.14. Existing groundwater information for the site is very limited and long-term groundwater monitoring should be undertaken to establish a design groundwater level and determine the rate at which groundwater would be likely to enter excavations.

4.15. Regarding topography, and issues of slope and ground instability, the BIA confirms that the site does not slope at more than 7^{o} (1:8) - the actual slope is approximately 1:40, and that the proposed works will not alter this situation. It is also confirmed that the site does not lie within a wider hillside setting in which the general slope is greater than 7^{o}.

4.16. Additionally, it is confirmed that the site does not neighbour land, including railway cuttings and the like with a slope greater than 7^{o}, nor does it lie over or within the exclusion zone of any

tunnels. The site does in fact lie some 80m to the south of three east-west running Network Rail tunnels (Euston to Willesden Junction) which comprise the Primrose Hill tunnel network. However, Network Rail has confirmed that the site lies outside its exclusion zone. The site is not within 50m of any London Underground Limited (LUL) services. The site does not lie within 5m of a highway or pedestrian right of way.

4.17. The BIA confirms (based on published data) that the site is not within an area of previously worked ground and that no operational or historic landfills, waste transfer, treatment or disposal sites are recorded within 1km of the site.

4.18. The BIA notes that the property is not located within 100m of a watercourse or potential spring line nor is it within 50m of Hampstead Heath ponds, with the result that the proposed basement is not at risk of ground instability due to lying in the vicinity of such features. The site does lie within 100m or so (between) two mapped tributaries of the former River Tyburn. However, this former river will have been culverted many years ago to form part of the local sewer network and thus cannot contribute to current above ground or subterranean groundwater flows - see below. The BIA records that the GI did not identify any alluvial deposits which could indicate potential continuity with the former River.

4.19. The proposed basement will not be constructed within an aquifer but will sit largely within the London Clay – see below regarding possible subterranean flows.

4.20. The BIA confirms that the proposed basement will result in a differential in foundation depths relative to neighbouring properties.

4.21. The London Clay has been shown to be the shallowest natural stratum at the site and laboratory plasticity test results indicate the material to be of high volume change potential. No comment is made in the BIA to indicate whether or not there is a history of seasonal shrink-swell subsidence in the local area or evidence of such effects at the site. However, it was recorded in the BIA that soil desiccation had not been observed during the GI fieldworks although it may nevertheless be present within close proximity to existing trees at the site. However, the proposed basement depths would be expected to lie below any such desiccation zones and shrink-swell issues should therefore not be a problem for the basement.

4.22. The BIA records that no trees will be felled as a result of constructing the basement and that the Works do not infringe any tree protection zones. However, some small trees will in fact be felled as a result of the Works. The protection zones of trees to remain e.g. the large chestnut tree in the garden to 68 Elsworthy Road should be verified before basement proposals and wall locations are finalised.

4.23. In the context of surface water flow and flooding, the BIA notes that the property is not within the catchment area of the ponds on Hampstead Heath.

4.24. Additionally, although the BIA states in the main text that the site is not within an area indicated by the Environment Agency (EA) to be at risk of flooding it is stated in the surface flow and flooding screening table that the site is in EA Zone 1 and is therefore at low risk of flooding from reservoirs and other artificial sources. It is also noted that the site has been identified in the Camden Surface Water Management Plan (SWMP) as being located within Critical Drainage Area N^{o} GROUP3-005. On this basis, a flood risk assessment may be required.

4.25. Regarding the new surface water drainage routes as compared with the current system, the BIA screening table states that there will be no material change and that SUDs attenuation will be adopted where necessary to allow for any reduction in permeable ground thickness in the basement areas. However, although the former statement is true in the broadest sense, the submitted EWP 'Below Ground Drainage/SUDS Assessment' says that the existing surface water and foul drainage systems towards the combined sewer in Elsworthy Road will have to be abandoned/removed, with surface and foul water from ground level and above being drained by gravity towards the sewer and all basement level drainage being pumped.

4.26. With respect to attenuation, the EWP report notes that although the future area of impermeable surfacing will be similar to that at present, in order to fulfil the desired aim of achieving greenfield discharge rates, some form of attenuation will be required and this is likely to comprise the adoption of geo-cellular crates located in front of the mews building at Elsworthy Road and connecting directly into the Elsworthy Road sewer. A further option is to adopt permeable paving in the hardstanding areas with storage being achieved within the sub-base layers. Soakaways are not appropriate for the impermeable London Clay and large open-water features such as ponds or swales are not appropriate given the size of the site.

4.27. Because of the above, the BIA confirms that the profile of surface water inflows received by adjacent properties will not be changed, nor will the quality of water received be changed.

4.28. With regard to subterranean (groundwater) flows, the BIA notes that the basement will be constructed largely within the relatively impermeable London Clay (see above) as opposed to an aquifer and thus will not extend beneath a defined water table. Although groundwater was recorded in the standpipes, the water will not be free flowing due to the generally low permeability of the clay and so provision for major dewatering of the excavation is unlikely to be necessary. However, it is possible that there may be areas of ground at the site which include higher permeability sand lenses or fissures which may have been missed due to the limited scope of the GI. On this basis, the possibility of groundwater flow into the excavation cannot be excluded and provision should be made to deal with potential inflows from this source, e.g. by sump pumping.

4.29. As noted above under slope stability, the property is not located within 100m of a watercourse, well, local pond or potential spring line and so in the context of groundwater related flooding, the basement is not at risk due to lying below any such water features. The presence of the Former River Tyburn has been discussed, but this also will not be the cause of any subterranean flow towards the basement as it has been culverted.

4.30. Regarding the question of whether or not more surface water than at present from rainfall will be discharged into the ground (e.g. via soakaways or SUDS), as stated earlier, soakaways are not appropriate in London Clay. The attenuation schemes discussed above should not result in any increased discharge into the ground over and above the present situation.

4.31. A preliminary method statement and sequence of construction for the new basement are set out in some detail within the 'Structural Engineering and Subterranean Construction Method Statement' report. A bottom-up construction sequence is currently envisaged. However, it is made clear in the report that the stability and structural integrity of the works will be the responsibility of the contractor who will be required to produce detailed method statements and calculations for all enabling and temporary works and to liaise with the Party Wall Surveyor on all relevant matters. It should be noted that the BIA does not make direct reference to the above structural report, resulting in areas of conflict and ambiguity. This matter should be resolved.

4.32. The basement perimeter walling is to generally comprise reinforced concrete (RC) contiguous bored piles with internal RC walls plus a cavity drainage system to provide waterproofing. The contiguous bored piled walls will support lateral ground pressures in the temporary and permanent condition and also contribute to the support of vertical building loads via structural connections to the floor slabs. The basement floor slab will be piled. The function of the piles will be to support downward vertical loads from internal walls as well as resist any residual uplift forces arising from heave of the London Clay sub-formation, plus hydrostatic uplift forces.

4.33. Heave pressures across the basement footprint will vary due to the different depths of excavation beneath the existing building (following demolition), the garden area and the mews building and the different building loads existing prior to commencement of the works. It is not clear whether a void former will be adopted beneath the basement floor slab to reduce heave pressures. This matter should be clarified.

4.34. The section of basement below the existing mews building will be formed using sequentially constructed 'L-shaped' RC underpins designed to resist lateral forces in the temporary and permanent cases and the vertical loads from the building. Transitional underpins will be constructed with stepped founding depths along the front and rear walls to the mews building to accommodate the change in depth from basement level to ground floor level. A temporary grillage of steel beams/needles supported on temporary piles will be required to support vertical

loads from the mews building prior to completion of the basement structure. The temporary piles will be cut down to basement floor slab level when the basement has been completed.

4.35. Temporary propping will be provided to the capping beam constructed on top of the basement wall piles prior to the commencement of basement excavation, to limit wall movements. Low level propping will also be provided to the basement walls until such time as the basement floor slab is in place and able to take load.

4.36. No preliminary calculations have been provided for the design of the basement walls nor for the underpinning to the mews building. Calculations to be provided should cover stability i.e. sliding, overturning and bearing capacity, in addition to the structural design of the walls/underpinning. The above omissions should be remedied.

4.37. An assessment of the vertical and horizontal ground movements within and beyond the basement areas arising from wall installation and basement excavation has been undertaken using the OASYS computer programmes X-disp and P-disp. The programme X-disp has been used to predict the combined vertical and combined horizontal ground movements arising from pile installation and basement excavation. P-disp has been used to predict the heave movements arising from the basement excavation only.

4.38. Damage assessments have been undertaken in accordance with CIRIA C580 for selected 'sensitive' neighbouring properties, including the existing mews building. The distances to neighbouring properties were noted to be approximate only. The condition, form of construction and founding details for the adjacent properties are also currently unknown. It was generally assumed that neighbouring properties do not have basements and are founded at 1.5m bgl. This is likely to be either representative or conservative. However one property known to have a swimming pool was assumed to be founded at 2.5m bgl. In order to be able to model the stabilising effect of the underpinning to the mews building, a founding depth of 5.4m bgl was assumed.

4.39. In order to accommodate the different excavation shapes for the main basement area (existing building and garden areas) and that beneath the mews building, two distinct models were created for the X-disp analyses (one for each area) and building damage assessments undertaken separately for these two areas. Lateral propping in all X-disp runs has been assumed to be of a high support stiffness category as defined in CIRIA C580. The undertaking of separate models and damage assessments as noted is un-conservative as there will be a summation of vertical movements and a summation of horizontal movements from each of the two areas. Added to this, the re-entrant corner where the two areas combine has also not been modelled. This is of particular significance to the assessment of damage to the mews building which will have been underestimated.

4.40. The P-disp analyses have been undertaken to evaluate the immediate heave following basement excavation and the total heave taking account of the compensating loads arising from construction of the new building i.e. the net total heave. The difference between these two results is the net long-term, post construction heave. The plotted output for the total heave analyses appears to have the incorrect sign convention - a positive result in P-disp represents settlement. However, it is noted that the numbers are reported correctly in the GMA summary table provided.

4.41. The above P-disp results should have been combined with those from the X-disp analyses to give the total movements and a cumulative damage assessment made based on this. However, this has not been done. This together with the above issues regarding the use of two models in the X-disp analyses and the re-entrant corner issue mean that the ground movement and damage assessments are invalid.

4.42. The current analyses indicate that damage to neighbouring structures would generally be Category 0 (negligible) with some buildings subject to Category 1 damage (very slight).

4.43. However, given the above issues, the current damage categories should be treated as preliminary only and the GMA and damage assessments resubmitted together with the input geometry, soil parameters and detailed outputs from the above two programmes so that a full audit may be undertaken.

4.44. The structural report states that monitoring of all structures and infrastructure adjacent to the basement works is to be implemented with trigger levels set for action as appropriate. Monitoring principles and typical trigger values and required responses to be confirmed between EWP, the contractor and adjoining owners' surveyors were outlined.

4.45. The GMA report notes that condition surveys should be undertaken of nearby properties likely to be affected by the works before and after construction and that contingency measures will be implemented should movements exceed the pre-defined trigger levels.

4.46. No outline works programme has been provided for basement construction in the BIA or associated documents. This matter should be remedied.

5.0 CONCLUSIONS

5.1. The BIA includes screening, scoping, site investigation and impact assessment stages as defined and required in the LBC Planning Guidance document 'Basements and Lightwells (CPG4)', dated July 2015.

5.2. The authorship, checking and approval of the main BIA report and the 'Structural Engineering and Construction Method Statement' report are in compliance with the requirements of CPG4.

5.3. The qualifications of the author of the GMA report require confirmation as it is not clear from the information given whether or not these are in accordance with the requirements of CPG4.

5.4. Maps and plans have not been included in the screening section of the BIA and references are not always given for data sources. Justification is often not given for 'No' answers. These matters should be addressed.

5.5. There are variations in the soil descriptions given in the executive summary to the BIA from those within the main body of the report. These discrepancies should be resolved.

5.6. There are variations in the groundwater levels reported in different sections of the BIA. These discrepancies should be resolved.

5.7. Existing groundwater information for the site is very limited and long-term groundwater monitoring should be undertaken to establish a design groundwater level and determine the rate at which groundwater would be likely to enter excavations.

5.8. The BIA confirms that the proposed basement will result in a differential in foundation depths relative to neighbouring properties.

5.9. The protection zones of trees to remain e.g. the large chestnut tree in the garden to 68 Elsworthy Road (see Appendix 1) should be verified before basement proposals and wall locations are finalised.

5.10. The site has been identified in the Camden Surface Water Management Plan (SWMP) as being located within Critical Drainage Area N^{o} GROUP3-005. On this basis, a flood risk assessment may be required.

5.11. The BIA confirms that the profile of surface water inflows received by adjacent properties will not be changed, nor will the quality of water received be changed.

5.12. Although provision for major dewatering of the excavation is unlikely to be necessary, higher permeability sand lenses or fissures may exist within the London Clay and provision should be made to deal with potential inflows from this source e.g. by sump pumping.

5.13. The BIA does not make direct reference to the 'Structural Engineering and Subterranean Construction Method Statement' report, resulting in areas of conflict and ambiguity. This matter should be resolved.

5.14. It is not clear whether a void former will be adopted beneath the basement floor slab to reduce heave pressures. This matter should be clarified.

5.15. No preliminary calculations have been provided for the design of the basement walls nor for the underpinning to the mews building. Calculations to be provided should cover stability i.e. sliding, overturning and bearing capacity, in addition to the structural design of the walls/underpinning. The above omissions should be remedied.

5.16. The GMA results indicate that damage to neighbouring structures would generally be Category 0 (negligible) with some buildings subject to Category 1 damage (very slight).

5.17. However, there are a number of issues with the GMA and building damage category assessments which are considered to be mis-leading and incomplete. On this basis, the current damage categories should be treated as preliminary only and the GMA and damage assessments resubmitted together with computer input geometry, soil parameters and detailed computer outputs so that a full audit may be undertaken.

5.18. No outline works programme has been provided for basement construction in the BIA or associated documents. This matter should be remedied.

Appendix 1: Resident's Consultation Comments

Surname	Address	Date	Issue raised	Response
Spencer (Murray)	Charmondel Services UK Ltd, 23 Berkeley Square, Mayfair, London W1J 6HE on behalf of Warden Property Ltd, 64, Avenue Road, London NW8 6HT.	01/10/15	Concern expressed that the existing building at 70 Elsworthy Road has been constructed on top of a previous boundary wall and that demolition and construction will affect 64 Avenue Road and land in that area.	No comment.
Meir (Elias)	68, Elsworthy Road, NW3 3BP.	05/10/15	a) That the proposed basement extends far beyond the footprint of the original dwelling beneath the front and rear garden areas in contravention of the LBC planning guidelines on basement extent. b) That the depth of the proposed two-storey basement and lift shaft at more than 5m to 6m bgl is greater than the LBC preferred single-storey basement depth of 3m or so. c) That the project tree consultant has not made an on-site assessment of the root protection zone required for a very large chestnut tree within the property gardens. The root protection radius shown on drawings is believed to be approximately half the actual radius.	a) LBC to respond. b) LBC to respond. c) See Section 5.9.

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	The qualifications of the author of the GMA to be confirmed.	Open.	
2	BIA	Maps and plans, references for data sources and justification for 'No' answers to be included in the screening section of the BIA.	Open.	
3	BIA	Soil description and groundwater level inconsistencies in the BIA to be resolved.	Open.	
4	Stability, hydrology and hydrogeology	Long-term groundwater monitoring to be undertaken.	Open.	
5	Stability and hydrology	The protection zones of all significant trees to be established and the basement boundaries adjusted if necessary.	Open.	
6	Hydrology	Need for a FRA to be confirmed.	Open.	
7	Stability	Provision to be made for sump pumping of basement excavations.	Open.	
8	BIA	Conflicts between the BIA and structural report to be resolved.	Open.	
9	Stability	Use of void basement slab formers to be confirmed.	Open.	

10	Stability	Calculations for retaining walls/underpinning to be provided.	Open.	
11	Stability	The GMA and damage assessments should be resubmitted together with full computer input and outputs.	Open.	
12	BIA	Outline works programme to be provided.	Open.	

Appendix 3: Supplementary Supporting Documents

None

London

Friars Bridge Court
41- 45 Blackfriars Road
London, SE1 8NZ

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Wessex House
Pixash Lane, Keynsham
Bristol BS31 1TP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

UAE

Office 705, Warsan Building
Hessa Street (East)
PO Box 28064, Dubai, UAE

T: +971 4 453 4735
E: uae@campbellreith.com