Chelmer
Consultancy Services
'Groundbreaking Services'

Updated Independent Assessment of Basement Excavation Justification for Planning Application 2014/5939/P

Site	Flat 1, 41 Howitt Road London NW3 4LU
Client	London Borough of Camden
Date	July 2015
Our Ref	BIAREV/5079

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Report Status: **FINAL**		
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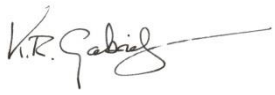
Lead author:	Keith Gabriel MSc DIC CGeol FGS UK Registered Ground Engineering Adviser	
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Foreword

This report has been prepared in accordance with the scope and terms agreed with the Client, and the resources available, using all reasonable professional skill and care. The report is for the exclusive use of the Client and **London Borough of Camden** and shall not be relied upon by any third party without explicit written agreement from Chelmer Site Investigations Laboratories Ltd.

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This assessment has involved consideration, using normal professional skill and care, of the findings of ground investigation data obtained from the Client and other sources. Ground investigations involve sampling a very small proportion of the ground of interest as a result of which it is inevitable that variations in ground conditions, including groundwater, will remain unrecorded around and between the exploratory hole locations; groundwater levels/pressures will also vary seasonally and with other man-induced influences; no liability can be accepted for any adverse consequences of such variations.

This report must be read in its entirety in order to obtain a full understanding of our recommendations andconclusions.

CONTENTS

1.0 INTRODUCTION

1.1 This up-dated independent assessment was commissioned by the London Borough of Camden (LBC) and concerns the revised Basement Impact Assessment submitted with planning application 2014/5939/P for enlargement of the existing basement beneath Flat 1, 41 Howitt Road, London, NW3 4LU.

1.2 The application describes the proposed works as "*Alteration and extension of a single (ground floor and basement) 2 bed flat, including rear and basement extensions*". The development description provided on LBC's Planning website states: "*Excavation of single storey basement extension including front and rear lightwells and erection of single storey ground floor rear extension*".

1.3 The scope for this assessment, as set out in LBC's letter of enquiry dated 20th January 2015, is to provide:

1) "an audit of the submission documents for compliance with the Basement Impact Assessment";
2) "a view on the technical sufficiency of the work carried out";
3) "assessment of the completeness of the submission";

all in relation primarily to compliance with Camden's LDF Development Policy DP27, and the Basement Impact Assessment requirements as set out in LBC's guidance document CPG4 'Basements and Lightwells' (2013) and the associated 'Camden, geological, hydrogeological and hydrological study – Guidance for subterranean development'' (Camden GHHS, Arup, November 2010).

1.4 Six specific requests were included within the scope; these are addressed in the Conclusions to this report. The final two (Nos 5 and 6) also included additions to the three aspects of the scope listed above; they were:

5. comment on whether the critiques submitted by the neighbours "raise any reasonable concerns about the technical content or considerations of the submission which should be addressed by the applicant by way of further submission, *prior* to planning permission being granted".
6. "Raise any relevant and reasonable considerations in respect of the structural integrity or condition of the road and the neighbouring properties which may be unknown or unaccounted for by the submission **or** which would benefit from particular construction measures or methodologies in respect of the development *following* a grant of permission for the development."

1.5 The over-riding aim of Camden's LDF Development Policy DP27 'Basements and Lightwells', as stated in its first paragraph, is: "The Council will only permit basement and other underground development that does not cause harm to the built and natural environment and local amenity, and does not result in flooding or instability". Detailed requirements are then presented for what developers must demonstrate and matters that the council will consider when assessing applications.

1.6 The professional organisations involved with the proposed basement are:

- Evan Ferguson Architects Architect
- David Dexter Associates Structural Engineers
- Albury SI Ltd Site Investigation contractor

1.7 This assessment has been prepared by Keith Gabriel, a Chartered Geologist with a MSc degree in Engineering Geology and Mike Summersgill, a Chartered Civil Engineer and Chartered Water and Environmental Manager with a MSc degree in Soil Mechanics. Both authors have over 30 years experience in ground engineering and have previously undertaken assessments of basements in several London Boroughs.

1.8 Comments on the technical aspects of each of the main submission documents are presented in Section 2, together with technical issues raised by the objectors, followed in Section 3 by a comparison against LBC's specific requirements as identified in the scope for this assessment. No comment is expressed here on the Design & Access Statement because a critique of the architectural aspects of the scheme is beyond the scope of this assessment. Similarly, the social and health aspects raised by some of the objectors are outside the scope of this review.

1.9 Drawings of the existing property and the proposed scheme were prepared by Evan Ferguson Architects. The following drawings were obtained from the LBC Planning website or were reproduced in the Basement Impact Assessment report:

- Drg 1308.10.A Location and Block Plan
- Drg 1308.14.A Existing Floor Plans
- Drg 1308.15.A Existing Sections AA and BB
- Drg 1308.16.A Existing Section CC and Garden Elevation
- Drg 1308.17.A Existing Street and Front Sectional Elevations
- Drg 1308.18.B Proposed Floor Plans
- Drg 1308.19.A Proposed Sections AA and BB
- Drg 1308.20.A Proposed Section CC and Garden Elevation
- Drg 1308.21.A Proposed Street and Front Sectional Elevations

These architectural drawings have been referred to primarily for factual information purposes.

1.10 Instructions to prepare this updated Independent Assessment were covered by purchase order No. PO/4253.

2.0 CONSIDERATION OF DOCUMENTS SUBMITTED

2.1 Construction Method Statement

2.1.1 The Construction Method Statement was prepared by Evan Ferguson Architects (EFA) rather than by the appointed structural engineer, as is more usual. This document provides a commentary on the anticipated sequence of construction. Un-substantiated claims are made including "This construction method is known to be suitable for this application and will lessen any impact on this or adjoining structures".

2.1.2 No consideration has been given to how they will maintain a clean and clear access for the occupiers of Flats 2 and 3. It would be preferable for all construction operatives to use a separate entrance (through the new lightwell/bay window) rather than through the communal hallway.

2.1.3 The Conclusion states, without justification, that the damage is likely to be no more than Burland Category 2.

2.2 Revised Basement Impact Assessment Report

2.2.1 The revised Basement Impact Assessment (BIA) was prepared by David Dexter Associates, (Project No.1343, Revision C, 17th April 2015). The BIA also includes a site investigation report by Albury SI Ltd. The comments below broadly follow the same order as the issues appear in the report.

2.2.2 This revised BIA was issued in April 2015, so it has been assessed against the revised (September 2013) version of CPG4.

2.2.3 The authors of the revised BIA report were Magdalini Christia and Rupert Clarke CEng MIStructE and the report was reviewed by Alan Gilbertson CEng FIStructE FICE. Groundwater flow aspects were reviewed by Ian Marychurch CEng CGeol MICE of Card Geotechnics Ltd (CGL), who also provided a review letter dated 17th April 2015. It remains unclear as to whether the authors meet the following specific requirements in CPG4 (Clause. 2.10):

- For the assessment of surface flow and flooding, is Alan Gilbertson "a Hydrologist or Civil Engineer specialising in flood risk management and surface water drainage"?
- For the assessment of land stability, does either Rupert Clarke or Alan Gilbertson comply with the underlined sections of the following:
  - *a Civil Engineer with the "CEng" (Chartered Engineer) qualification from the Engineering Council and specialising in ground engineering;* or
  - *a Member of the Institution of Civil Engineers ("MICE") and a Geotechnical Specialist as defined by the Site Investigation Steering Group; or*
  - *a Chartered Member of the Institute of Structural Engineers with some **proof** of expertise in engineering geology*?
- The assessment of land stability must be undertaken by one of the above engineers "*with demonstrable evidence that the assessments have been made by them in conjunction with an Engineering Geologist with the "CGeol" (Chartered Geologist) qualification…*". Ian Marychurch's letter was specifically limited to groundwater flow only, so this requirement still has not been met.

2.2.4 The overall layout of the BIA report follows the four Stages required by CPG4. The Introduction, Section 0.0, has eleven subsections which cover the existing and proposed structures, professional qualifications and collates relevant desk study information, which is a sensible approach, yet it also includes interpretive impact assessments. The description of the existing structure has been revised following an initial visual inspection of the property on 27th March 2015. Most of our other specific concerns regarding Section 0 have been resolved, though Section 0.3 still claims that use of underpinning "will minimize any potential earth movement or impact on existing structures". This ignores the fact that the adjoining No.39 will remain on shallow footings, leaving the potential for differential movement between No's 39 & 41 unless transition underpinning below No.39 is included within the scheme (subject to agreement under Party Wall Act protocols).

Screening:

2.2.5 The Stage 1 Screening requires responses to the questions identified in CPG4 and the Camden GHHS (Arup 2010); these responses are presented in Section 1.0 of the BIA report by David Dexter Associates (DDA). Three (previously five) questions were answered 'No' without giving any justification, albeit these 'No' answers all appeared to be appropriate.

2.2.6 All the other questions for which either the response or the justification was previously considered to be inappropriate, have now been revised to more appropriate responses/justifications. However, in the course of preparing this report we have discovered that the planning consent for the basement beneath No.43 concerned only the front half of the house. Thus, it would appear that approximately half of the 41/43 party wall will require underpinning, which means that Land Stability Q13 should have been answered 'Yes' for both party walls (and DDA's basement plan, Drg No.1343-010 P3, will need to be revised).

2.2.7 The Screening Summary (Section 1.4) states that the "water table is known to be below the intended excavation depth", which conflicts with the findings from Albury SI's groundwater monitoring, which recorded groundwater at 2.90/2.91m in July 2014. These levels are likely to rise, and CGL have recommended that rising head permeability tests should be undertaken in order to assess further the origin of that water.

Scoping:

2.2.8 Section 2.0 of DDA's BIA report presents the Scoping which forms Stage 2 of the BIA process. Inevitably this scoping did not consider the other screening issues which have been identified above as having inappropriate 'No' answers.

Subterranean (Groundwater) Flow Scoping:

2.2.9 **Q4 and *Q5*** have now been included in this Scoping. The anticipated increase in infiltration would be correct provided that a sufficient proportion of surface water from the rear garden does presently discharge to the mains sewer system (which remains unknown).

Stability Scoping:

2.2.10 The proposed actions in relation to ***Q12*** (labelled Q13 in the BIA) are considered to be appropriate.

2.2.11 The possible consequences and proposed actions in relation to ***Q13*** remain inadequate as they do not address the fundamental issue, which is the differential depth of the foundations to No.39 once the basement has been built. The implications of future shrinking/swelling of the clays beneath No.39's foundations in response to moisture changes caused by seasonal climatic or the action of tree roots should be addressed.

2.2.12 ***Q5, Q6, Q7 and Q14*** have now been included in this Scoping. We still have not seen the Arboricultural Impact Assessment (it was not available on the planning website on 16/07/2015) so cannot assess whether

the removal of the Category U tree (Q6) may cause heave beneath No.39. For Q14, the services survey should include all potentially relevant utility and railway companies, and especially communications companies (there are several communications tunnels beneath London), not just the utilities listed.

Surface Water Flow & Flooding Scoping:

2.2.13 ***Q3*** has now been included in this Scoping. The possible beneficial reduction in surface water discharge to the mains sewer system (from an increase in infiltration) has not been identified.

2.2.14 Ground Investigation (Stage 3):
Section 3.0 of DDA's BIA report presents the site-specific ground investigation which forms Stage 3 of the BIA process, with Albury SI's complete report on the investigation included in Appendix 3. This site investigation was limited to a single shallow borehole. The 4m depth of the borehole covers the likely depth of excavation of the proposed basement, but wasn't deep enough to consider the full depth of the soils which will be stressed by the underpins (or affected by the unloading). Ideally a second borehole should have been drilled in the front garden (which should have been easier than the one they did drill in the rear garden). Also, if hand dug trial pits had been excavated to identify the depths and nature of the foundations to the accessible external walls, then some of the assumptions in the BIA would not have been necessary.

2.2.15 The recommendations in the ground investigation report are broadly sound, with the notable exception of the effective cohesion values, c' = 5kPa for both Made Ground and the London Clay; these are far too high (because a small amount of cohesion makes a big difference to the stability analyses). For the weathered London Clay at the depths of excavation for this basement, the presence of fissures in the clays means that c' is usually taken as zero.

2.2.16 A few of the recommendations are not appropriate for the geology or the proposed works (eg: wells to lower the groundwater level in London Clay, where no granular partings or horizons have been recorded, and use of a strutted cofferdam for underpinning a terraced house). However, these do not appear to have affected the proposals by DDA.

Impact Assessment (Stage 4):

2.2.17 An expanded impact assessment is presented in Section 4.0 of DDA's revised BIA report. The importance of adequate temporary works and high quality workmanship is correctly emphasised. The assessment also includes some sweeping generalisations which are unsubstantiated and in some cases inappropriate (eg: "*underpinning the party wall will remove the risk of the movement to the adjacent property*", whereas inadequately controlled underpinning may actually increase the risk, and "*basement developments of this size do not adversely impact on the surrounding environment or properties*"; the latter statement suggests a lack of appreciation of the potential risks associated with all underpinning schemes for residential basements, as have been highlighted by recent failures of basement projects overseen by experienced firms of Structural Engineers). Accordingly, it is recommended that for a suitably experienced/ competent ground engineer should be appointed for the duration of the groundworks.

2.2.18 The impact assessment does not consider hydrology (surface water/flooding) which would be reasonable as long as surface water from the existing rear patio does discharge to the mains drainage system. Two paragraphs have been added regarding hydrogeological aspects of the proposed basement. The requirements to design for groundwater up to ground level and "floatation risk" are both appropriate. The recommendation from CGL for a rising head test to assess the origin of the water in the standpipe, does not appear to have been implemented or planned.

2.2.19 The impact assessment claims (near the top of page 31) that "the maximum level of cracking anticipated is very slight" (which is Burland Category 1), but then goes on to present movement calculations and a damage category assessment which predicts damage "likely to be within Burland Category 2". However, there is no evidence that a deflection ratio has been calculated and the analysis does not include any calculation of vertical heave/settlement in response to the vertical stress changes caused by the underpins and basement excavation, so the analysis is incomplete.

2.2.20 No specific summary of the recommended mitigation measures is given in the revised BIA report.

2.2.21 Monitoring proposals have been added towards the base of page 30; these proposals are very vague, with no identification of monitoring locations, frequency of readings, etc.

Preliminary Retaining Wall Design:

2.2.22 Appendix 4 of the BIA report includes retaining wall design calculations for the proposed basement, prepared in part using Tedds software. While some of our previous concerns have been resolved, other issues have been removed inappropriately from the analyses. From a brief inspection (NOT a full review or check) the following aspects of the calculations give cause for concern:

- The uplift analysis, which previously appeared to have considered only hydraulic pressure and had ignored heave from the unloaded clays, has been removed.
- The earth pressure at rest (K_0) was previously taken at 0.59, but has now been removed from the analysis. This is not appropriate, because London Clay is over-consolidated and where undisturbed can show K_0 values up to approximately 3.0 (varying with depth, typically less than half this figure once partially released by excavation of a basement or deep service trench). Thus, K_0 should be allowed for in the design of basements in London Clay.
- The K_a value has been increased slightly, to 0.447, but this does not compensate for the removal of K_0. For retaining walls which will support ground below the adjoining/adjacent properties, the lateral earth pressure should never be allowed to reduce to the active (K_a) value, because that would permit excessive ground movements and unacceptable damage in the neighbouring buildings. Thus, for the Tedds analyses, it may be necessary to set K_a equal to K_0 (with allowance for some reduction in response to excavation of the basement).
- No analysis has been undertaken of the temporary situation, when the underpins have been constructed but the centre of the basement slab has yet to be completed (ie: when there is no beneficial propping from the basement slab). However, the significance of the critical need for use of best practice, in supporting the excavation and the underpins until the permanent support has been completed, has been identified in the BIA report.

2.2.23 The preliminary structural engineering drawings by DDA are generally appropriate, although the labels still conflict as to whether the thickness of the stem of the retaining walls should match the width of the wall above or the width of the footing.

2.3 Technical evidence from objectors

2.3.1 Gail Brackett of 39B Howitt Road has noted that No.39, which is owned by LBC, has evidence of existing subsidence damage. This damage has apparently been inspected by a Council surveyor. This evidence, if verified, means that the response to stability screening Q7 is wrong and will need to be revised, and the issue should have been carried forward to Scoping.

3.0 COMPARISON AGAINST LONDON BOROUGH OF CAMDEN'S REQUIREMENTS

3.1 Compliance with requirements for Basement Impact Assessment

3.1.1 The Basement Impact Assessment (BIA) report is structured appropriately so that it covers Stages 1 to 4 of the requirements in LBC's CPG4 'Basements and Lightwells' and the associated Camden GHHS (Arup 2010). Summaries or conclusions were provided for all four Stages; these complied with CPG4's requirement for 'non-technical summaries' even though they were not called non-technical.

3.1.2 The ground investigation scope was limited to a single 4m deep borehole despite space being available for a more thorough (and deeper) investigation. Trial pits excavated alongside the front and rear walls to assess the depth and nature of the footings would have enabled an assessment of whether perched groundwater (if any) could flow through the Made Ground beneath the house, and would have allowed the BIA to be more specific on various issues.

3.1.3 A detailed commentary on matters arising from the BIA report is presented in Section 2.2. The main non-compliances include:

- The authors' qualifications are now given, though no information is provided on whether they meet the specific areas of expertise required by CPG4 for Chartered Engineers.
- There is no linkage to LBC's Development Policy DP27.
- Some aspects of the Screening which were answered "No" still have no justification, although the 'No' responses appear correct.
- The impact assessment did not consider surface water matters. This omission would only be appropriate if the existing rear patio does drain to the mains drainage system (via one or more gullies).
- The ground movement calculations are incomplete (see 2.2.19), so the damage category assessment may be wrong.

In addition, we have found that the planning permission for No.43's basement concerned a basement beneath only the front part of that house, so some underpinning will be required to the 41/43 party wall. Several aspects of the submitted scheme will therefore need to be revised, including, and various parts of the BIA text.

3.1.4 Thus, the scheme drawings (DDA's basement foundation plan and section AA) and the various aspects of the BIA report text will have be revised in order to correctly represent the work required, to comply with CPG4 and DP27, and adequately assess all the impacts which the proposed basement will have on the neighbouring properties, which is one of the most important requirements of CPG4 and DP27.

3.2 Technical sufficiency of the work carried out

3.2.1 While many aspects of the Basement Impact Assessment are sufficient, concerns remain about several important issues, as raised in Sections 2.2 and 3.1 above.

3.2.2 From the planning consent granted for No.43's basement, it is now known that underpinning will be required beneath the rear part of the 41/43 party wall, so details of the scheme, as well as various parts of the BIA, are now not appropriate. 3.2.3The ground investigation should have included trial pits and, preferably, a deeper borehole.

3.2.4 The Construction Method Statement states that there are no trees in No.41's rear garden, whereas the BIA report states that there are four trees, one of which will be removed (no arboricultural report has been seen, but one is referred to in the BIA). No consideration has been given to the potential for future differential movement between the basement and the adjoining No.39 which will remain in part on shallow footings. This is especially important given that one of the occupiers has noted that No.39 is already suffering from what sounds like typical subsidence damage (eg: seasonal cyclical movements and distortion of door frames). Without sight of the arboricultural report we are unable to assess whether the proposed removal of one tree will increase the potential for differential movement between No's 39 & 41.

3.2.5 Several other technical issues of concern are identified in paragraphs 2.2.12 to 2.2.16 above. All these matters should be addressed in a revised BIA report.

3.3 Completeness of the Submission

3.3.1 The submitted BIA report falls short of the matters required by CPG4, DP27 and the Camden GHHS in certain respects, as has already been identified. Recommendations for further submissions which should be obtained and reviewed prior to planning permission being granted are given in Section 3.4 below, so those aspects are not considered further in this section.

3.3.2 The following matters could sensibly be made the subject of planning conditions to be imposed on any consent granted:

- Submission prior to the start of the works of the appointed contractor's method statements which must have been approved by the appointed structural engineer and, if separate, the temporary works engineer. These method statements should include full details of the methods to be used to minimise ground movements, and for minimising noise and vibration during the works. Use of non-percussive techniques ought to be mandatory for all demolition and breaking-out, although use of hammer drills will be unavoidable.
- A requirement for an appropriately competent ground engineer, who complies with the relevant professional qualification requirements within CPG4 and/or is a member of the UK Register of Ground Engineering Professionals at Specialist or Adviser grade, to be retained by the applicant for the duration of the groundworks. The ground engineer's brief should be to review all scheme drawings, specifications, method statements and other relevant documents and to inspect the works and the ground exposed at appropriate stages, so that he/she is able to advise the applicant and his appointed structural engineer regarding the adequacy of all ground engineering aspects of the permanent and temporary works.

3.3.3 The planning conditions proposed above should require the applicant to submit the document(s) concerned to the Planning Authority for their review and approval in writing, prior to the start of basement construction works on site.

3.4 Requirement for further Submissions

3.4.1 Submission of revised engineering drawings which include underpinning to the rear part of the 41/43 party wall and a revised version of the BIA should be required prior to this application for planning permission being determined. This revised document should address all the issues identified in Sections 2.2, 3.1 and 3.2 above.

4.0 CONCLUSIONS

4.1 These conclusions consider only the six specific requests in the enquiry letter from London Borough of Camden (dated 30th January 2015). Each is considered in turn below. The whole report should be read to obtain a full understanding of the matters considered.

1. *The submission contains a Basement Impact Assessment, which has been prepared in accordance with the processes and procedures set out in CPG4.*
   Many aspects of the BIA have been improved, but it remains deficient in certain respects. A revised BIA is therefore required, as described in paragraph 3.4.1 above.

2. *The methodologies have been appropriate to the scale of the proposals and the nature of the site.*
   The original lack of any involvement by a hydrologist, a hydrogeologist and an engineering geologist, contrary to the requirements in CPG4, has resulted in a minimal ground investigation and the use of inappropriate input data into the design calculations. Some resultant deficiencies remain in the BIA must be resolved, by preparation of a revised version, before the appropriateness of the methodologies can be confirmed. The methodology has also failed to identify the extent of the existing basement beneath No.43, so the scheme itself needs to be modified.
3. *The conclusions have been arrived at based on all necessary and reasonable evidence and considerations, in a reliable, transparent manner, by suitably qualified professionals, with sufficient attention paid to risk assessment and use of conservative engineering values/estimates.*
   As mentioned above, the scope of the ground investigation was minimal which has resulted in various assumptions having to be made. Some of the engineering parameters used in the design are distinctly **not** conservative.
   As noted above, in some information is still missing about the competencies of the authors of the BIA, so we are unable to confirm that they do cover all the competencies required for compliance with the requirements of CPG4.
   The ground stability risks associated with heave below the basement and differential movement between No's 41 and 39 have not been adequately addressed.

4. *The conclusions are sufficiently robust and accurate and are accompanied by sufficiently detailed amelioration/mitigation measures to ensure that the grant of planning permission would accord with DP27, in respect of*

a. *maintaining the structural stability of the building and any neighbouring properties*
b. *avoiding adversely affecting drainage and run-off or causing other damage to the water environment and*
c. *avoiding cumulative impacts on structural stability or the water environment in the local area*

The evidence and conclusions are currently not sufficiently robust, as described under items 1-3 above, to ensure accordance with DP27 in respect of (a) above. In addition, no mitigation measures have been included, so they should be added.

5. *Raise any reasonable concerns about the technical content or considerations of the submission which should be addressed by the applicant by way of further submission, prior to planning permission being granted. In this case it would need to be apparent that the submission is so deficient in some respect that the three conclusions (points 4a-c above) cannot be guaranteed without the provision of further information at this stage. Please clearly denote the precise information (if any) that would be required to satisfy 4a-c*

See Sections 3.2 & 3.4 above.

6. *Raise any relevant and reasonable considerations in respect of the structural integrity or condition of the road and the neighbouring properties which may be unknown or unaccounted for by the submission, or which would benefit from particular construction measures or methodologies in respect of the development following a grant of permission for the development. Please clearly denote what such conditions should entail.*

We are not aware of any abnormal conditions affecting the road, though no site inspection was included in this review. The BIA states that there is no evidence of structural damage in the neighbouring properties which might be a cause for concern, though an occupier of No.39B has reported that the house is suffering from subsidence damage. The revised BIA should include a review of the evidence for that and recommendations on what actions should be taken. If planning consent is granted, the detailed condition of the adjoining properties should be established by condition surveys under the Party Wall Act processes.

Use of best practice methods of underpinning and temporary support will be essential to control adequately the ground movements and hence minimise structural damage in the neighbouring properties, although control of temporary works through the planning system is known to be difficult.

Items which could be made the subject of planning conditions, rather than being required prior to planning, are listed in paragraph 3.3.2.

References

Arup (November 2010) Camden geological, hydrogeological and hydrological study – Guidance for subterranean development. Issue 01. London.

BS EN 1997-1 (2004) Eurocode 7: Geotechnical Design – Part 1: General rules. British Standards Institution.

London Borough of Camden (2013) Camden Planning Guidance CPG4– Basements and lightwells.

NHBC (2013) NHBC Standards, Chapter 4.2, Building Near Trees.

a) This report has been prepared for the purpose of providing advice to the client pursuant to its appointment of Chelmer Site Investigation Laboratories Limited (CSI) to act as a consultant.
b) Save for the client no duty is undertaken or warranty or representation made to any party in respect of the opinions, advice, recommendations or conclusions herein set out.
c) All work carried out in preparing this report has used, and is based upon, our professional knowledge and understanding of the current relevant English and European Community standards, approved codes of practice, technology and legislation.
d) Changes in the above may cause the opinion, advice, recommendations or conclusions set out in this report to become inappropriate or incorrect. However, in giving its opinions, advice, recommendations and conclusions, CSI has considered pending changes to environmental legislation and regulations of which it is currently aware. Following delivery of this report, we will have no obligation to advise the client of any such changes, or of their repercussions.
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f) The content of this report represents the professional opinion of experienced environmental consultants.
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g) In the Summary and Recommendations sections of this report, CSI has set out our key findings and provided a summary and overview of our advice, opinions and recommendations. However, other parts of this report will often indicate the limitations of the information obtained by CSI and therefore any advice, opinions or recommendations set out in the Executive Summary, Summary and Recommendations sections ought not to be relied upon unless they are considered in the context of the whole report.
h) The assessments made in this report are based on the ground conditions as revealed by walkover survey and/or intrusive investigations, together with the results of any field or laboratory testing or chemical analysis undertaken and other relevant data, which may have been obtained including previous site investigations. In any event, ground contamination often exists as small discrete areas of contamination (hot spots) and there can be no certainty that any or all such areas have been located and/or sampled.
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o) These terms apply in addition to the CSI Standard Terms of Engagement (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms of Engagement the said Standard Terms of
Engagement shall prevail). In the absence of such a written contract the Standard Terms of Engagement will apply.
p) This report is issued on the condition that CSI will under no circumstances be liable for any loss arising directly or indirectly from subsequent information arising but not presented or discussed within the current Report.
q) In addition CSI will not be liable for any loss whatsoever arising directly or indirectly from any opinion within this report.