

**Independent Review  
of  
Basement Impact Assessment for  
planning application 2014/4726/P  
at**

**85 Camden Mews  
London  
NW1 9BU**

**for  
London Borough of Camden**

**LBH 4292  
December 2014**

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**WEMBLEY**



**Geotechnical &  
Environmental**

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## Foreword-Guidance Notes

### GENERAL

This report has been prepared for a specific client and to meet a specific brief. The preparation of this report may have been affected by limitations of scope, resources or time scale required by the client. Should any part of this report be relied on by a third party, that party does so wholly at its own risk and LBH WEMBLEY Geotechnical & Environmental disclaims any liability to such parties.

The observations and conclusions described in this report are based solely upon the agreed scope of work. LBH WEMBLEY Geotechnical & Environmental has not performed any observations, investigations, studies or testing not specifically set out in the agreed scope of work and cannot accept any liability for the existence of any condition, the discovery of which would require performance of services beyond the agreed scope of work.

### VALIDITY

Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances shall be at the client's sole and own risk. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should therefore not be relied upon in the future and any such reliance on the report in the future shall again be at the client's own and sole risk.

### THIRD PARTY INFORMATION

The report may present an opinion on the disposition, configuration and composition of soils, strata and any contamination within or near the site based upon information received from third parties. However, no liability can be accepted for any inaccuracies or omissions in that information.

## 1. Introduction

It is proposed to construct a single level basement beneath the footprint of an existing two storey mews building and extending rearwards into the garden area.

### 1.1 Brief

LBH WEMBLEY Geotechnical & Environmental have been commissioned to provide an Independent assessment of information submitted against the requirements of LDF policy DP27 (but also including CS5, CS14, CS15, CS17, CS18, DP23, DP24, DP25 and DP26 – as stated at paragraphs 1.5 and 1.6 of CPG4) and with reference to the procedures, processes and recommendations of the Arup Report and CPG4 2013.

### 1.2 Report Structure

This report commences with a description of the LDF policy requirements, and then considers and comments on the submission made and details any concerns in regards to:

1. The level of information provided (including the completeness of the submission and the technical sufficiency of the work carried out)
2. The proposed methodologies in the context of the site and the development proposals
3. The soundness of the evidence presented and the reasonableness of the assessments made.
4. The robustness of the conclusions drawn and the mitigation measures proposed in regard to:
  - 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

### 1.3 Information Provided

The information studied comprises the following:

1. Basement Impact Assessment by Southern Testing, dated September 2014, Ref: J11954
2. Basement Impact on Structural Stability by John Romer, undated, unreferenced
3. Construction Method Statement by West Design & Build, dated October 2014, unreferenced
4. Design and Access Statement by Cullinan Studio, dated 18<sup>th</sup> July 2014, Ref: 85\_CM\_RP01, Rev P01
5. Existing Drawings by Cullinan Studio, dated 18<sup>th</sup> July 2014, Refs: 85\_CM\_P01 rev P01, 85\_CM\_P02a rev P01, 85\_CM\_P04 rev P01, 85\_CM\_P06 rev P01, 85\_CM\_P07 rev P01,
6. Proposed Drawings by Cullinan Studio, dated 18<sup>th</sup> July 2014, Refs: 85\_CM\_P10 rev P01, 85\_CM\_P02b rev P01, 85\_CM\_P11 rev P01, 85\_CM\_P12 rev P02, 85\_CM\_P30 rev P01,

## 2. Policy DP27 – Basements and Lightwells

The CPG4 Planning Guidance on Basements and Lightwells refers primarily to Planning Policy DP27 on Basements and Lightwells.

The DP27 Policy reads as follows:

*In determining proposals for basement and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability, where appropriate. 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 ground instability. We will require developers to demonstrate by methodologies appropriate to the site that schemes:*

- a) maintain the structural stability of the building and neighbouring properties;*
- b) avoid adversely affecting drainage and run-off or causing other damage to the water environment;*
- c) avoid cumulative impacts upon structural stability or the water environment in the local area;*

*and we will consider whether schemes:*

- d) harm the amenity of neighbours;*
- e) lead to the loss of open space or trees of townscape or amenity value;*
- f) provide satisfactory landscaping, including adequate soil depth;*
- g) harm the appearance or setting of the property or the established character of the surrounding area; and*
- h) protect important archaeological remains.*

*The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding. In determining applications for lightwells, the Council will consider whether:*

- i) the architectural character of the building is protected;*
- j) the character and appearance of the surrounding area is harmed; and*
- k) the development results in the loss of more than 50% of the front garden or amenity area.*

In addition to DP27, the CPG4 Guidance on Basements and Lightwells also supports the following Local Development Framework policies:

Core Strategies:

- CS5 Managing the impact of growth and development
- CS14 Promoting high quality places and conserving our heritage
- CS15 Protecting and improving our parks and open spaces & encouraging biodiversity
- CS17 Making Camden a safer place
- CS18 Dealing with our waste and encouraging recycling

Development Policies:

- DP23 Water
- DP24 Securing high quality design
- DP25 Conserving Camden's heritage
- DP26 Managing the impact of development on occupiers and neighbours

This report makes some specific further reference to these policies but relies essentially upon the technical guidance provided by the Council in November 2010 to assist developers to ensure that they are meeting the requirements of DP27, which is known as the Camden Geological, Hydrogeological and Hydrological Study, Guidance for Subterranean Development (CGHHS), and was prepared by Arup.



### 3. Assessment of Adequacy of Information Provided

#### 3.1 Basement Impact Assessment Stages

The methodology described for assessing the impact of a proposed basement with regard to the matters described in DP27 takes the form of a staged approach.

##### 3.1.1 Stage 1: Screening

Screening uses checklists to identify whether there are matters of concern (with regard to hydrogeology, hydrology or ground stability) which should be investigated using a BIA (Section 6.2 and Appendix E of the CGHSS) and is the process for determining whether or not a BIA is required. There are three checklists as follows:

- subterranean (groundwater) flow
- slope stability
- surface flow and flooding

##### 3.1.1.1 Subterranean (Groundwater) Flow

A screening checklist for the impact of the proposed basement on groundwater is included in the BIA (Document 1).

This identifies the following potential issues of concern:

- **The proposed basement will extend beneath the water table surface.**
- **The proposed development will result in a change in the area of hard-surfaced/paved areas.**

##### 3.1.1.2 Slope Stability

A screening checklist for the impact of the proposed basement on land stability is included in the BIA (Document 1).

This identifies the following potential issues of concern:

- **London Clay is the shallowest strata at the site.**
- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**
- **The site is within 5m of a highway or pedestrian right of way.**
- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**

##### 3.1.1.3 Surface Flow and Flooding

A screening checklist for the impact of the proposed basement on surface water flow and flooding is included in the BIA (Document 1).

This identifies the following potential issues of concern:

- **As part of the site drainage, surface water flows (e.g. rainfall and run-off) will be materially changed from the existing route.**
- **The proposed basement development will result in a change in the proportion of hard-surfaced/paved areas.**
- **The proposed basement will result in changes to the profile of the inflows (instantaneous and long-term) of surface-water being received by adjacent properties or downstream watercourses.**

### 3.1.2 Stage 2: Scoping

Where the checklist is answered with a “yes” or “unknown” to any of the questions posed in the flowcharts, these matters are carried forward to the scoping stage of the BIA process.

The scoping produces a statement which defines further the matters of concern identified in the screening stage. This defining should be in terms of ground processes, in order that a site specific BIA can be designed and executed (Section 6.3 of the CGHSS).

No scoping stage has been described in the BIA and the screening concludes “*there is little that will need to be investigated further...aside from the impact of the basement construction on the foundation to adjoining structures, and consideration of the surface ware disposal design....*”:

Nevertheless, the potential issues of concern identified from the screening stage are as follows:

- **The proposed basement will extend beneath the water table surface.**  
*The guidance advises that dewatering can cause ground settlement. The zone of settlement will extend for the dewatering zone, and thus could extend beyond a site boundary and affect neighbouring structures. Conversely, an increase in water levels can have a detrimental effect on stability. The groundwater flow regime may be altered by the proposed basement. Changes in flow regime could potentially cause the groundwater level within the zone encompassed by the new flow route to increase or decrease locally. For existing nearby structures then the degree of dampness or seepage may potentially increase as a result of changes in groundwater level.*
- **The proposed development will result in a change in the area of hard-surfaced/paved areas.**  
*The guidance advises that a change in the in proportion of hard surfaced or paved areas of a property will affect the way in which rainfall and surface water are transmitted away from a property. This includes changes to the surface water received by the underlying aquifers, adjacent properties and nearby watercourses. Changes could result in decreased flow, which may affect ecosystems or reduce amenity, or increased flow which may additionally increase the risk of flooding. The sealing off of the ground surface by pavements and buildings to rainfall will result in decreased recharge to the underlying ground. In areas underlain by an aquifer, this may impact upon the groundwater flow or levels. In areas of non-aquifer (i.e. on the London Clay), this may mean changes in the degree of wetness which in turn may affect stability.*
- **London Clay is the shallowest strata at the site.**  
*The guidance advises that of the at-surface soil strata present in LB Camden, the London Clay is the most prone to seasonal shrink-swell (subsidence and heave).*

- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**

*The guidance advises that there are multiple potential impacts depending on the specific setting of the basement development. For example, in terraced properties, the implications of a deepened basement/foundation system on neighbouring properties should be considered.*

- **The site is within 5m of a highway or pedestrian right of way.**

*The guidance advises that excavation for a basement may result in damage to the road, pathway or any underground services buried in trenches beneath the road or pathway.*

- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**

*The guidance advises that excavation for a basement may result in structural damage to neighbouring properties if there is a significant differential depth between adjacent foundations.*

- **As part of the site drainage, surface water flows (e.g. rainfall and run-off) will be materially changed from the existing route.**

*The guidance advises that basement development may increase the load on the sewer and drainage systems if it leads to increased occupancy of dwellings. In turn this may increase the risk of flooding should the sewer and drainage systems become overwhelmed. Constructing a basement, either beneath or adjacent to an existing building will typically remove the permeable shallow ground that previously occupied the site footprint. This reduces the capacity of the ground to allow rainfall to be stored in the ground (which in essence acts as a natural SUDS, or sustainable urban drainage system). This runoff must then be managed by other means (eg through construction of SUDS), to ensure that it doesn't impact on adjoining properties or downstream watercourses. For sites in the catchments of the pond chains the potential impacts listed above under (1) apply if the resulting changes in drainage affect the flow to the ponds.*

- **The proposed basement will result in changes to the profile of the inflows (instantaneous and long-term) of surface-water being received by adjacent properties or downstream watercourses.**

*The guidance advises that changes could result in decreased volume, which may affect ecosystems or reduce amenity, or increased flow which may additionally increase the risk of flooding.*

### **3.1.3 Stage 3: Site Investigation and Study**

Site investigation and study is undertaken to establish the baseline conditions. This can be done by utilising existing information and/or by collecting new information (Section 6.4 of the CGHSS).

The site investigation submitted comprised two 6m light percussion window sampler boreholes and three hand dug trial pits to expose the existing foundations.

### **3.1.4 Stage 4: Impact Assessment**

Impact assessment is undertaken to determine the impact of the proposed basement on the baseline conditions, taking into account any mitigation measures proposed (Section 6.5 of the CGHSS).

The submitted BIA (Document 1) does not include an Impact Assessment stage, but there are comments relating to some of the issues within the site investigation section as follows:

- **The proposed basement will extend beneath the water table surface.**

*“... some groundwater ingress should be anticipated during construction and allowance should be made for dewatering. Flow rates may not be significant, in which case intermittent pumping from strategically placed collector sumps should be adequate”*

*“...bearing in mind the negligible permeability of the clay soils, there is minimal risk of the proposed basement construction causing a “damming effect” or mounding of water on the up-gradient side.”*

- **The proposed development will result in a change in the area of hard-surfaced/paved areas.**
- **London Clay is the shallowest strata at the site.**

*“Due to stress relief following the removal of the existing soils to form the basement structure both immediate (undrained) and long term (drained) heave displacements can be expected to occur in the underlying clay”*

*“...This is normally overcome by installing appropriate void forming materials beneath the basement elements.”*

- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**

*“.. The Engineer should...make sure that the design caters for the potential effects of lateral pressure/heave from the trees in the future.”*

- **The site is within 5m of a highway or pedestrian right of way.**
- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**

*“ It is anticipated that the basement will be formed by conventional underpinning techniques.”*

*“Given the presence of the existing adjacent foundations, close attention in design of temporary and permanent propping is required at all times to prevent settlement or excessive lateral yielding of the excavations/foundations.”*

- **As part of the site drainage, surface water flows (e.g. rainfall and run-off) will be materially changed from the existing route.**
- **The proposed basement will result in changes to the profile of the inflows (instantaneous and long-term) of surface-water being received by adjacent properties or downstream watercourses.**

### 3.2 The Audit Process

The audit process is based on reviewing the BIA against the criteria set out in Section 6 of the CGHSS and requires consideration of specific issues:

#### 3.2.1 Qualifications / Credentials of authors

Check qualifications / credentials of author(s):

##### Qualifications required for assessments

<b>Surface flow and flooding</b>	A Hydrologist or a Civil Engineer specialising in flood risk management and surface water drainage, with either: <ul style="list-style-type: none"> <li>• The “CEng” (Chartered Engineer) qualification from the Engineering Council; or a Member of the Institution of Civil Engineers (“MICE”); or</li> <li>• The “C.WEM” (Chartered Water and Environmental Manager) qualification from the Chartered Institution of Water and Environmental Management.</li> </ul>
<b>Subterranean (groundwater) flow</b>	A Hydrogeologist with the “CGeol” (Chartered Geologist) qualification from the Geological Society of London.
<b>Land stability</b>	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. With demonstrable evidence that the assessments have been made by them in conjunction with an Engineering Geologist with the “CGeol” (Chartered Geologist) qualification from the Geological Society of London.

**Surface flow and flooding:** The report does NOT meet the requirements.

**Subterranean (groundwater) flow:** The report does meet the requirements.

**Land stability:** The report does NOT meet the requirements.

#### 3.2.2 BIA Scope

Check BIA scope against flowcharts (Section 6.2.2 of the CGHSS).

The screening stage identified a number of potential issues of concern, but these have not been fully assessed.

### 3.2.3 Description of Works

Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?

A construction method statement (Document 3) has been provided but the contents relate more to construction management rather than providing any detailed methodology and sequence. Some details of a suggested methodology are contained in Document 2, but insufficient details are provided to conclude the impact assessment.

### 3.2.4 Investigation of Issues

Have the appropriate issues been investigated? This includes assessment of impacts with respect to DP27 including land stability, hydrology, hydrogeology.

There is important uncertainty regarding the extent and disposition of the water-bearing gravelly layer.

Insufficient groundwater monitoring has been undertaken to reach a conclusion about the groundwater regime beneath the site.

### 3.2.5 Mapping Detail

Is the scale of any included maps appropriate? That is, does the map show the whole of the relevant area of study and does it show sufficient detail?

Yes.

### 3.2.6 Assessment Methodology

Have the issues been investigated using appropriate assessment methodology? (Section 7.2 of the CGHSS).

No ground movement analysis appears to have been undertaken.

### 3.2.7 Mitigation

Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme? (Section 5 of the CGHSS)

Because the impact assessment has not been concluded it is unclear what mitigation will be required.

### 3.2.8 Monitoring

Has the need for monitoring been addressed and is the proposed monitoring sufficient and adequate? (Section 7.2.3 of the CGHSS)

It is stated within the BIA (Document 1) that *"Throughout the construction phase the party walls would be monitored for both movements and vibration as appropriate, to ensure these are within acceptable limits."* However, it is unclear as to what these acceptable limits are and how they have been determined. Furthermore no indication is provided as to what steps would be taken if unacceptable results were to result.

### **3.2.9 Residual Impacts after Mitigation**

Have the residual (after mitigation) impacts been clearly identified?

No.

## **4. Assessment of Acceptability of Residual Impacts**

### **4.1 Proposed Construction Methodology**

The new basement *"is anticipated to be constructed using conventional underpinning methods."* Such techniques are suited only where no or absolutely minimal groundwater ingress will occur. It is not appropriate to allow water ingress to occur and to then remove the accumulated water by pumping where clay soils are involved.

### **4.2 Soundness of Evidence Presented**

The evidence from the site investigation suggests that the excavation will be undertaken through superficial head deposits rather than through London Clay. While the latter may be expected to be reasonably uniform in nature, the overlying head deposits are likely to be significantly more variable. No sound conclusion can be drawn about the ground conditions in this case on the basis of the two existing boreholes. On the contrary, the BIA has suggested the possible presence of some form of geological anomaly beneath the site, which demands further investigation.

### **4.3 Reasonableness of Assessments**

Insufficient has been undertaken..

### **4.4 Robustness of Conclusions and Proposed Mitigation Measures**

Because the impact assessment has not been concluded it is unclear what mitigation will be required. No robust conclusions can therefore be drawn.



## 5. Conclusions

The submitted BIA does not wholly reflect the processes and procedures set out in DP27 and CPG4.

As a consequence it is considered that the present submission does not demonstrate sufficient detail and certainty to ensure accordance with DP27, in respect of:

- a. Maintaining the structural stability of the building and any neighbouring properties
- b. Avoiding adverse impact on drainage and run-off or causing other damage to the water environment
- c. Avoiding cumulative impacts on structural stability or the water environment.

It is suggested that the concerns about the submission that have been raised in sections 3 and 4 of this document can be addressed by the applicant by way of further submission.

### 5.1 Further Information Required

It is considered that in order to meet the requirements of DP27 further information is required as follows:

- Additional ground investigation, including further groundwater monitoring to establish the ground and groundwater conditions with greater certainty.
- Further details of proposed construction methodology and sequencing, including drawings and details of proposed temporary works and new foundations.
- Ground movement analysis and predicted neighbouring building damage assessment.

With the benefit of this further information, the BIA should then be revised and updated by persons holding the specified qualifications to include a detailed assessment of all potential impacts identified for groundwater flow, flooding and stability listed in section 3.1.2 above, together with a clear explanation of how these are to be mitigated. A detailed monitoring and contingency plan should also be presented that reflects the outcome of this further assessment.