LBH WEMBLEY

ENGINEERING

Independent Review
of
Basement Impact Assessment for planning application 2016/6816/P
at

22 Kings Mews
London
WC1N 2JB

for

London Borough of Camden

LBH 4288a

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Foreword-Guidance Notes

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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 basement at this property extending to approximately 3m depth below ground level.

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 and with reference to the procedures, processes and recommendations of the Arup Report and CPG4 2015.

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 Campbell Reith Hill, Ref: 11153 Revision F2 dated October 2014,
2. Basement Impact Assessment by Julian Maund, Ref: MGC/16/26-BIA-GMA dated 11th November 2016,
3. Basement Impact Assessment by Croft Structural Engineers, Ref:160812 Rev 1 dated 7th December 2016
4. Proposed Drawings by Buchanan Hartley Architects, dated 1st December 2016, Refs: 0645 L(--) 101 Rev C, 107 Rev C

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.

2. Assessment of Adequacy of Information Provided

2.1 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.

2.1.1 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

2.1.1.1 Subterranean (Groundwater) Flow

A screening checklist for the impact of the proposed basement on groundwater is included in the BIA (Document 2).

This identifies the following potential issues of concern:

- **The site is located directly above an aquifer.**
- **The proposed basement will extend beneath the water table surface.**

2.1.1.2 Slope Stability

A screening checklist for the impact of the proposed basement on land stability is included in the BIA (Document 2).

This identifies the following potential issues of concern:

- **The site is within an area of previously worked ground.**
- **The site is within an aquifer.**
- **The proposed basement will extend beneath the water table such that dewatering may be required during construction.**
- **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.**

2.1.1.3 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 no potential issues of concern.

2.1.2 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).

Checklists have been provided in the BIA and there is scoping stage described in the BIA.

The issues identified from the checklists as being of concern have been assigned bold text in the previous sections and are as follows:

- **The site is located directly above an aquifer.**
  The guidance advises that the basement may extend into the underlying aquifer and thus affect the groundwater flow regime.

- **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 site is within an area of previously worked ground.**
  The guidance advises that previously worked ground may be less homogenous than natural strata, and may include relatively uncontrolled backfill zones.

- **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.

2.1.3 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).

A ground investigation was undertaken in August 2015 and comprised two boreholes to depths of up to 8m with standpipes installed. In summary, the investigation indicates that made ground extends to a depth of 4.70 m, which overlies the Hackney Gravel Member to a depth of 7.60 m, overlying the London Clay Formation. Groundwater was encountered at 3.66 m, approximately 0.36 m below the proposed basement slab.

2.1.4 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).

Document 2 provides an assessment of the potential impacts that have been carried forward and the following comments are provided.

- **The site is located directly above an aquifer.**
- **The proposed basement will extend beneath the water table surface.**
  ".. monitoring indicates the basement level does not extend below the water table surface, however the level of groundwater could rise to above the basement level."
  "Design the basement to resist water ingression"
  "Design the basement to withstand groundwater forces"
  "As the groundwater level is only marginally below the basement level, the basement will need to be designed for a potential increase in groundwater level above the basement floor level. A groundwater design level of at least 19.50 m AOD is recommended which is approximately 2 m above existing groundwater."

- **The site is within an area of previously worked ground.**
  "Made ground is a loose material and will not form a founding stratum of the basement."
  "The basement floor slab will be suspended above the made ground"
  "Support the excavation by appropriate shoring and propping"
  "Due to the presence of made ground which may show variable bearing capacity and give rise to uneven settlement it is assumed the floor slab and retaining walls will be supported on the piled foundations. The piles foundations will be designed to safely accommodate the loading from the structure."

- **The site is within 5m of a highway or pedestrian right of way.**
  ".. the maximum movement on the highway (King's Mews) will be 4 mm at the property boundary decreasing to ~0.5 mm at 5 m from the boundary. The highway is of flexible tarmac pavement construction and will not be significantly affected by this order of movement."

- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**
  "The basement retaining walls and floor slab will be on a piled foundation which will reduce the impact of imposed loading on adjacent properties"
  "It is proposed that the basement retaining walls will be constructed using a hit and miss underpinning technique, with temporary propping supporting the excavation.."

"the estimated maximum damage category imposed on the neighbouring party walls due to the proposed basement underpin construction will be 'Category 1' corresponding to very slight damage."

A ground movement analysis has been provided.

2.2 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:

2.2.1 Qualifications / Credentials of authors

Check qualifications / credentials of author(s):

Qualifications required for assessments

Surface flow and flooding	A Hydrologist or a Civil Engineer specialising in flood risk management and surface water drainage, with either: • The "CEng" (Chartered Engineer) qualification from the Engineering Council; or a Member of the Institution of Civil Engineers ("MICE"); or • The "C.WEM" (Chartered Water and Environmental Manager) qualification from the Chartered Institution of Water and Environmental Management.
Subterranean (groundwater) flow	A Hydrogeologist with the "CGeol" (Chartered Geologist) qualification from the Geological Society of London.
Land stability	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 submission meets the requirements.

Subterranean (groundwater) flow: The submission meets the requirements.

Land stability: The submission meets the requirements.

2.2.2 BIA Scope

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

The BIA scope is considered appropriate.

2.2.3 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?

Yes.

2.2.4 Investigation of Issues

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

Yes

2.2.5 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.

2.2.6 Assessment Methodology

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

Some of the analysis used is not appropriate for the situation, but has been used in the absence of a more appropriate off-the-shelf methodology.

2.2.7 Mitigation

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

Yes.

2.2.8 Monitoring

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

Yes.

2.2.9 Residual Impacts after Mitigation

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

It is reasonably clear that no adverse residual impacts are expected and that no cumulative effects are envisaged.

3. Assessment of Acceptability of Residual Impacts

3.1 Proposed Construction Methodology

A proposed construction methodology is outlined in Document 3. It is not entirely clear how it is actually proposed to support each underpin upon the piles as each underpin in constructed.

3.2 Soundness of Evidence Presented

The evidence appears sound and the ground investigation information is consistent with that obtained from nearby sites.

3.3 Reasonableness of Assessments

Although the adopted ground model is arguably flawed in that measurable ground heave is probably not to be expected in this case, the overall conclusions regarding damage are credible for this proposal.

3.4 Robustness of Conclusions and Proposed Mitigation Measures

The BIA concludes that the maximum damage category to be expected is within Category 1 (very slight damage).

4. Conclusions

The submitted BIA generally accords with the guidance provided by CPG4 and concludes that the maximum damage category to be expected to neighbouring buildings is within Category 1 (very slight damage). Mitigation measures have been provided and a monitoring strategy has been provided.

However, a key aspect of the works is the underpinning will not reach natural soils and is intended is to be terminated within possible soft made ground. The BIA implies that the underpinning will instead be supported by the piles, but it is not clear how this is intended to be achieved in the temporary situation give the relative underpin and pile spacing.

The submission is considered to have provided sufficient detail and certainty to accord with DP27, in respect of:

a. avoiding adversely affecting drainage and run-off or causing other damage to the water environment and
b. avoiding cumulative impacts on structural stability or the water environment in the local area

However, it is considered that, prior to the commencement of construction, a more detailed temporary works construction methodology must be submitted for approval in order to sufficiently demonstrate

c. .maintaining the structural stability of the building and any neighbouring properties