Independent Review
of
Basement Impact Assessment for planning application 2015/0233/P
at

19 Parliament Hill
London
NW3 2TA

for
London Borough of Camden

LBH4342

May 2015

LBH WEMBLEY

Geotechnical & Environmental

Project No: LBH4342

Report Ref: **LBH4342 Ver 1.0**

Date: 21st May 2015

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Foreword-Guidance Notes

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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 of basement to approximately 4m depth beneath part of the existing house and part of the rear garden of No.19 Parliament Hill.

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 Michael Alexander Consulting Engineers, dated December 2014, Ref: P2957/BIA/v 1.0
2. Ground Movement Analysis by Geotechnical & Environmental Associates, dated 16th December 2014, Ref: J14245/HD/02
3. Arboricultural Impact Assessment Report by Landmark Trees, dated 7th January 2014, Ref: FHA/19PH/AIA/01A
4. Design and Access Statement by Michael Burroughs Associates, dated January 2015, unreferenced.
5. Proposed and Existing plans and sections, by Finley Harrison Architectural, all dated January 2015, Refs: 034(P)003, 034(P)004, 034(P)300, 034(P)301, 034(P)302
6. Desk Study & Ground Investigation Report, By Geotechnical & Environmental Associates, dated 9th October 2014, Ref: J14245

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 may extend beneath the water table surface.**
- **The site is within 100m of a watercourse, well (used/disused) or potential spring line.**

3.1.1.2 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.**
- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**
- **The site is within 100m of a watercourse of a potential spring line.**
- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**
- **The site is over (or within the exclusion zone of) tunnels, e.g. railway lines.**

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:

- **The site is in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature.**

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).

Checklists have been provided in the BIA (Document 1) and there are scoping stages described in the BIA (Document 1).

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

- **The proposed basement may extend beneath the water table surface.**
  The guidance advises that 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 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 site is within 100m of a watercourse, well (used/disused) or potential spring line.**
  The guidance advises that flow from a spring, well or watercourse may increase or decrease if the groundwater flow regime which supports that water feature is affected by a proposed basement.
  If the flow is diverted, it may result in the groundwater flow finding another location to issue from with new springs forming or old springs being reactivated.
  A secondary impact is on the quality of the water issuing or abstracted from the spring or water well respectively.

- **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).

- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**
  The guidance advises that the soil moisture deficit associated with felled tree will gradually recover. In high plasticity clay soils (such as London Clay) this will lead to gradual swelling of the ground until it reaches a new value. This may reduce the soil strength which could affect the slope stability. Additionally the binding effect of tree roots can have a beneficial effect on stability and the loss of a tree may cause loss of stability.

- **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.

- **The site is over (or within the exclusion zone of) tunnels, e.g. railway lines.**
  The guidance advises that excavation for a basement may result in damage to the tunnel.

- **The site is in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature.**
  The guidance advises that the developer should undertake a Flood Risk Assessment (FRA).

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 three small diameter boreholes (two of which were within the proposed basement area) to a maximum depth of 8.45m alongside two hand-dug trial pits to inspect 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 submission includes an assessment of potential impacts and the following comments are made:

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

"…since the basement will be constructed wholly within the London Clay strata, it will not provide any form of cut off to groundwater flows and hence should not affect groundwater levels upstream of the development."

"*Significant groundwater inflows are not expected within the 4.00 m deep basement and it should be possible to adopt traditional reinforced concrete underpins beneath the existing house*".

- **The site is within 100m of a watercourse, well (used/disused) or potential spring line.**

"Whilst the River Fleet formerly ran close to the site, it is noted that it has now been culverted and hence will not affect the groundwater regime in the vicinity."

- **London Clay is the shallowest strata at the site.**

"The unloading of the ground due to the basement excavation may cause some heave of the underlying clay subsoils. Any heave forces acting on the basement under the building will be counteracted by the weight of the building over. For the basement under the rear garden the heave effects are expected to be less significant."

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

"The proposed basement is single storey and will be excavated through the made ground and then the well understood London Clay stratum. Provided appropriate construction methods are employed there should be no significant impact in terms of ground stability."

"…the building damage assessments for the adjacent structures of Nos 17 and 21 Parliament Hill, based on building a width of 8.00 m for both buildings, fall within Category 2 of the Building Damage Assessment, indicating a slight class of damage which could include, for example, cracks up to 5 mm in width. All estimates of movement may be expected to have a tolerance of + / - 20 %, but this would still fall within Category 2."

- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**

"*The new basement will not suffer from seasonal shrink swell subsidence as the depth of the proposed basement will be below the level of any tree root activity*".

- **The site is over (or within the exclusion zone of) tunnels, e.g. railway lines.**

"…there is a 2540mm diameter trunk storm overflow drain 36m beneath the grounds of number 17 Parliament Hill."

- **The site is in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature.**

"Since there is a low risk of flooding, specific measures to protect from flooding are not considered necessary."

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

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 report does not appear to meet the author requirements.

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

Land stability: The report meets the requirements.

3.2.2 BIA Scope

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

The scope appears appropriate.

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?

Yes.

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.

Yes.

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).

Yes.

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)

Yes.

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)

No. At present the only discussion of structural monitoring is "*Regular monitoring of the underpins should be undertaken during construction and compared with the predicted values"* (Document 2).

3.2.9 Residual Impacts after Mitigation

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

Yes.

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

The proposed construction methodology appears to be acceptable.

4.2 Soundness of Evidence Presented

The evidence presented appears sound.

4.3 Reasonableness of Assessments

The assessments made appear reasonable.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

The conclusions appear to be acceptably robust. The proposed mitigation measures should include a structural monitoring and contingency plan.

5. Conclusions

The submitted BIA does generally reflect the processes and procedures set out in DP27 and CPG4.

However, unfortunately it cannot be stated that the present submission wholly accords with DP27, in respect of two issues.

5.1 Further Information Required

It is considered that in order to meet the requirements of DP27:

- the surface flow and flooding aspects of the BIA should be reviewed countersigned by persons holding the required qualifications.
- a structural monitoring and contingency plan should be presented

It is envisaged that, at the discretion of the council, this further information and assessment might reasonably be sought by condition that it should be approved by Camden prior to the commencement of any work.