

**Independent Review
of
Basement Impact Assessment for
planning application 2014/7556/P
at**

**4b Parkhill Road
London
NW3 2YN**

**for
London Borough of Camden**

**LBH 4306
February 2015**

LBH
WEMBLEY



**Geotechnical &
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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 demolish most of the existing property, whilst retaining the front façade, and to construct a basement extending to approximately 4m at the front of the property, and to approximately 5.5m at the rear. There will also be a small pump chamber below the deeper area of basement that will extend to approximately 7.5m depth.

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 Webb Yates Engineers and BRD Environmental, dated 27th November 2014, Ref: J2171-Doc-02-X2
2. Geo-Environmental Site Investigation by BRD (Appendix D of BIA), dated 17th November 2014, Ref: BRD2282-OR2-A
3. Design and Access Statement by Studio Architettura, dated December 2014, unreferenced
4. Aboricultural Impact Assessment by R. Howorth & Co. Ltd, dated 26th September 2014, unreferenced
5. Construction Sequences (Drawing) by Webb Yates Engineering Ltd, dated 27th November 2014, Ref: J2171-S-010 P1

6. General Arrangement (Drawings) by Webb Yates Engineering Ltd, dated 27th November 2014, Ref: J2171-S-009 P2, J2171-S-200 P1, J2171-S-202 P2
7. Drainage Layout (Drawings) by Webb Yates Engineering Ltd, dated 27th November 2014, Ref: J2171-C-099 P1, J2171-C-100 P1, J2171-C-200 P1
8. Drawings of Existing by Studio Architettura, dated 5th December 2014, Ref: 1.016.030, 1.016.040, 1.016.050, 1.016.060, 1.016.055, 1.016.070
9. Drawings of Proposed by Studio Architettura, dated 5th December 2014, Ref: 1.016.100, 1.016.110, 1.016.120, 1.016.200, 1.016.210, 1.016.300, 1.016.310, 1.016.311, 1.016.320

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 issue of concern:

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

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.**
- **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 issue of concern:

- **The site is in an area known to be at risk from surface water flooding, or is 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 and there is a 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 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.
- **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).
- **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.
- **The site is in an area known to be at risk from surface water flooding, or is 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 submitted site investigation comprised two boreholes extended to a maximum 9m in conjunction with five hand dug trial pits to expose existing foundations.

Groundwater monitoring standpipes were installed and a single round of monitoring has been recorded.

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 include an Impact Assessment stage.

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

Document 1 states that *“On the basis of the anticipated very low permeability of the cohesive Head and London Clay Formation deposits, and the lack of apparent groundwater level it is considered that the proposed basement will have minimal impact on groundwater flow.”*

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

“ in order to minimise the potential for differential movement the construction sequence will be carefully planned to ensure that any reduction in overburden will not impact on the existing structure.”

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

“...the site boundary is directly adjacent to the pedestrian right of way. However, the proposed works do not extend beyond the existing front wall of the building and therefore the pedestrian right of way is over 10m from the location where the works will be taking place. As a result the works can be considered to have no impact on either the highway or the pedestrian right of way.”

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

“Due to the depth of the proposed basement there is a large difference between the depths of the existing foundations to the buildings either side of the property and the proposed basement depth. The construction sequence for the basement therefore needs to be carefully considered to ensure that the existing buildings are suitably supported throughout.”

“... a detailed construction sequence will be developed to minimise the impact that the proposed construction works will have on the adjacent properties. As a result there will be no structural implications on the neighbours due to the demolition and construction works.”

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

“the basement will be designed to be appropriately flood resistant and resilient and will include safe access and escape routes”

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: <ul style="list-style-type: none"> • 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 meet the requirements.

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

Land stability: The report does meet the requirements.

3.2.2 BIA Scope

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

The provided 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?

The description of works has been given as “...hit and miss underpins cast in two lifts and propped in both the temporary and permanent condition.” No details of temporary support or propping appear to have been submitted.

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.

No ground movement assessment or damage category assessment appears to have been undertaken.

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 assessment or damage category assessment appears to have been undertaken. It is not clear what damage will be caused to the adjacent buildings.

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)

In the absence of a more specific assessment of stability impacts, the proposed mitigation methods cannot be satisfactorily assessed.

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.

3.2.9 Residual Impacts after Mitigation

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

Document 1 states *"it has been shown that the basement construction has no adverse effect on the surface and subterranean water regimes and has no impact on slope stability."* However, it is considered that the submission does not provide sufficient confidence in regard to the likely degree of damage that may be expected to affect the adjacent properties.

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

The assessment of the acceptability of the proposed two stage underpinning methodology cannot be satisfactorily concluded on the basis of the present submission. It is not clear how any perched water present within the near surface permeable soils would be excluded from the underpinning excavations. Allowing groundwater entry into the excavations and then pumping from sumps may not be acceptable in these ground conditions as, in addition to leading to possible local collapse of the excavations, groundwater entry would be expected to lead to deterioration and softening of the clay.

4.2 Soundness of Evidence Presented

There appears to be 1.5m to 2.5m depth of potentially permeable soil present above the London Clay. The extent to which groundwater is present in this zone is not clear and Document 2 makes a “*Key Recommendation*” that “*groundwater monitoring is undertaken to assess the variation in the perched water table with seasonal or short term weather effects.*”

4.3 Reasonableness of Assessments

Document 1 states “*it has been shown that the basement construction has no adverse effect on the surface and subterranean water regimes and has no impact on slope stability.*” However, it is considered that the submission does not provide sufficient confidence in regard to the likely degree of damage that may be expected to affect the adjacent properties.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

The present submission is considered to be insufficiently robust to meet the requirements of DP27.

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 and
- 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:

- Further exploration and monitoring to enable a better assessment for the possible presence of perched groundwater that may affect proposed underpinning excavations.
- Ground movement analysis and damage category assessment for the retained façade and the neighbouring properties.

With the benefit of this further information, the BIA should then be revised accordingly to include an updated assessment of any surface water or groundwater impacts. The revised BIA should provide a detailed assessment of the extent of the possible movements and damage to be expected during and after the works. A detailed monitoring and contingency plan should also be presented that reflects the outcome of this further assessment.

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.