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Geotechnical & Environmental Associates

Tyttenhanger House
Coursers Road
St Albans
AL4 0PG

tel 01727 824666
fax 01727 824777
email mail@gea-ltd.co.uk
web www.gea-ltd.co.uk

Jennifer Walsh
Principal Planner
Regeneration and Planning
London Borough of Camden
Town Hall
Argyle Street
London WC1H 8ND

Dear Jennifer

Re: AUDIT OF BASEMENT IMPACT ASSESSMENT AND STRUCTURAL ASSESSMENT FOR THE CASTLE PUBLIC HOUSE 147 KENTISH TOWN ROAD NW1 8PB (2014/5900/P)

Further to your instruction, we have now completed our audit of the Basement Impact Assessment (BIA) and review of the structural assessment relating to the retention of the existing façade and proposed basement construction at the above site and this letter forms our report on the review.

1.0 INTRODUCTION

1.1 Brief

Geotechnical and Environmental Associates Limited (GEA) has been instructed by London Borough of Camden (LBC) to undertake an independent audit of a BIA for the above site and an assessment of the completeness of the submission in satisfying the requirements of Camden Planning Guidance 4.

Specifically LBC has requested that GEA provide an opinion on whether:

1. *The submission contains a Basement Impact Assessment, which has been prepared in accordance with the processes and procedures set out in Camden Planning Guidance 4 (2013).*

2. *The methodologies have been appropriate to the scale of the proposals and the nature of the site.*

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.*

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 (please see point 5 and 6)

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.

In addition, LBC have specified a review of structural aspects of the proposal so that they can be satisfied that:

5. *The Structural Appraisal includes a methodology that is appropriate to the scale of the proposals and the nature of the site.*

6. *The conclusions have been arrived at based on all necessary and reasonable evidence and considerations that the front façade can be retained throughout all of the associated works included within the application.*

1.2 Proposed Development

The site is located at the junction of Kentish Town Road and Castle Road which form the eastern and northern boundaries respectively. The proposed development comprises the construction of a four-storey steel framed building for commercial and residential use behind the retained three-storey façade. The existing basement will be extended to the full footprint of the site. Conventional reinforced concrete underpinning of existing walls is surmised to be the favoured construction method with what appears to be open cut excavations with some temporary trench sheeting.

1.3 Documentation

The BIA has been prepared by Site Analytical Services Limited (SAS), referenced 14/22463 Basement Impact Assessment at 147 Kentish Town Road, London NW1 8PB for Ringleys Limited, and dated August 2014. It includes reference to a ground investigation undertaken by SAS in August 2014 and to a previous ground investigation although these reports did not appear within the documentation sourced from the LBC on-line planning portal.

In addition to the BIA, Richard Watkins and Associates Limited have prepared a document entitled Structural Appraisal of Planning Scheme at 147 Kentish Town Road, London referenced 3396 and dated August 2014. This document considers the structural aspects of the proposed development including façade retention and the basement construction.

A number of reports and supporting documents are available on the LBC web-based portal. Many are not considered relevant for this review but Daria Wong Architect's drawings have been used as the basis of the proposals.

2.0 AUDIT OF THE BASEMENT IMPACT ASSESSMENT

2.1 Qualifications and Procedure

This audit has been undertaken by Martin Cooper, a Chartered Civil Engineer (CEng) and Member of the Institution of Civil Engineers (MICE) with over 25 years of experience in the geotechnical industry in conjunction with Steve Branch, a Chartered Geologist (CGeol) specialising in engineering geology and geotechnical engineering for over 28 years with specific extensive knowledge and experience of the ground and groundwater conditions in the London Borough of Camden.

The review has been carried out by reviewing the BIA in the light of the CPG4 flow chart processes and making additional comment on the sufficiency or inadequacy of information provided where necessary.

2.2 Overview

The BIA is considered to have, up to a point, followed the procedures and protocols of CPG4; however there are items that do not fulfil its requirements and a number of clarifications are required to address inadequacies in the information provided. These are discussed in more detail below and referenced by the section number in the BIA.

2.3 Author Qualification

The SAS BIA was written by Andrew Smith, a Fellow of the Geological Society in conjunction with Michael Davenport of RWA who is a Chartered Engineer (CEng) and a Member of the Institution of Civil Engineers (MICE).

Section 2.11 of CPG4 requires that the professionals undertaking a BIA have qualifications that are relevant to the matters being considered. In this respect there is no evidence that Michael Davenport, as the Chartered Civil Engineer required for the land stability assessment has a specialism in ground engineering. CPG4 also requires the input of a "hydrogeologist" who is CGeol and there is no evidence to indicate that this input has taken place.

In addition, the surface water and flooding part of the assessment should be undertaken by either a Chartered Civil Engineer or a Chartered Water and Environment manager (CWEM) as required in Section 2.45 of CPG4. There is no evidence of a person with such qualifications having provided input to this part of the assessment.

The assessments should be carried out in conjunction with an engineering geologist who should also be a chartered geologist and this requirement has also not been met.

2.4 Setting of the site

The topographical and geological settings are discussed in Section Nos 2.1 to 2.4 of the BIA although there is no specific reference to the hydrogeological setting. Reference is made to the site investigation findings although the detail is discussed later in the BIA.

2.5 Development Proposals

The development proposal is summarised in Section No 2.5 and shown on the series of architect's drawings sourced from the LBC planning Portal.

2.6 Basement Impact Assessment

The BIA is set out such that the screening stage is dealt with in Section 2.6, the site investigation findings are summarised in Section 3.0 and the scoping stages in Section Nos 4.0 and 5.0.

The screening stage flowcharts are included in full and where the answer is given as 'yes' then a forward reference to the scoping stage is provided. The review of each of these sections is set out below.

2.6.1 Groundwater Flow

Considerations in respect of subterranean groundwater flow are set out in Table 1 and the conclusions drawn seem appropriate in that the only 'yes' refers to the site being within 100 m of a watercourse, well (used / disused) or a potential spring line. This is carried forward to Section No 4 which forms the scoping assessment. Figure 11 of the LBC Guidance for Subterranean development study authored by Arup[1] shows that the River Fleet flows very close to the site but as the SAS BIA correctly states, the River Fleet flows within a culvert through the Kentish Town area.

On this basis the impacts on Subterranean (Groundwater) Flow are considered appropriate and reasonable.

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1 Arup (2010) *Camden geological, hydrogeological and hydrological study* London Borough of Camden Guidance for Subterranean Development

2.6.2 Ground Stability

Land stability considerations are set out in the second half of Table 1 and the answers to the 14 questions in the flowchart are considered appropriate with five of the responses having been taken forward to the scoping stage in Section 5.0

The issue of shrinking / swelling clays is considered in Section 5.2 and indicates that foundation design recommendations in line with NHBC requirements for building on such soils should be followed. This is considered acceptable and appropriate.

Heave of the soils within the proposed basement is considered in Section No 5.3 and the effects of the basement excavation on adjacent properties and the road are considered in Section Nos 5.6 and 5.7. In these regards the assessment is considered to be inadequate. The excavation to increase the size of the existing basement will significantly increase the differential depth of foundations to adjacent properties. No conceptual site model of the ground conditions has been provided; such a model taken along a section of the site would have been useful in demonstrating how the adjacent properties and ground conditions fit in with the proposed development.

Reference to the RWA Appraisal document provides additional information in respect of the structural aspects of the basement construction but this report is not referenced in the BIA. However from the standpoint of ensuring that sufficient consideration has been given to the adjacent properties and roads, the RWA report provides too many generalised comments that, despite being correct, do not demonstrate that the design and construction approach has been sufficiently developed. The absence of a construction methodology and any sort of outline design mean that the requirements of Paragraph 2.30 of CPG4 have not been met. That section refers to an engineering interpretation requiring "calculations of predicted ground movements and structural impact" to be provided. It is acknowledged that the existing basement will be largely retained as is and that if undertaken with care and attention by a reputable contactor ground movements arising from the underpinning of such party walls are likely to remain very small and cause damage that is within the limits acceptable to LBC. However the excavation of a basement such as this will also cause heave of the underlying London Clay and the BIA does not demonstrate a clear understanding of the heave mechanism or how it might be dealt with. The assessment of the effects of such heave should form part of the BIA.

2.6.3 Surface Flow and Flooding

The screening table for surface flow and flooding is included as the third part of Table 1 of the BIA and we are in agreement with the answers with no questions needing to be taken forward to the scoping stage.

2.6.4 Site Investigation

The site investigation information that is included within the BIA in Section No 3.0 is extremely limited; in effect comprising a single borehole log from a continuous flight auger borehole and monitoring of the borehole standpipe on a single subsequent occasion.

A number of shortcomings in the site investigation have been identified and these are as follows.

- No evidence of soil strength testing has been included and despite being shown on the site plan there is no information in respect of Borehole Nos 1 and 2 or Trial Pit Nos 1 and 2.
- The groundwater level was measured at 8.91 m but was only monitored on a single occasion after installation.
- The Arup study provides a framework for the methodology for assessing the impact of basements within the borough. Section 7.2.2 of the guidance recommends a minimum of three boreholes or trial pits to determine groundwater flow direction.
- It is unclear why the findings of the previous investigation have not been included. For this site, the trial pits would provide information essential to determine the effect

of the basement on the adjacent properties whilst the other boreholes could provide quantitative soil strength data that could be used in the calculation of heave movements and in the design of new foundations as well as providing groundwater level data.

3.0 REVIEW OF THE STRUCTURAL APPRAISAL

3.1 Demolition and Façade Retention

The proposals for this part of the construction appear to be generally satisfactory in principle but there are matters that are considered to warrant further consideration. A temporary steel structure is proposed to support the facades to Kentish Town Road and Castle Road. The steelwork is to be supported upon spread foundations bearing upon the London Clay. No detail has been provided as to the likely range of design bearing pressures to be adopted or the thickness of the foundation but it is thought that with some quantitative site investigation data this design should be relatively straightforward.

3.2 Basement Construction

Excavation of the basement has been discussed in Section 2.6.2 above and the same concerns remain in respect of the generalised nature of the proposals. Whilst the proposals seem reasonable and appear to follow good practice, further information is required to demonstrate that appropriate design has been undertaken.

3.3 Lightwell Construction

The construction proposals for the lightwell are very much outline and are considered to require further refinement. It is noted that interlocking trench sheeting is proposed to support the road but there appears to be very little room to install the sheets. The timing of the scaffold removal should be clarified - early removal would allow access for the sheet installation but that would expose the façade during the construction. However, the principal of trench support using flying shores is accepted practice and the section sketches seem reasonable. However a plan showing the position of the support to the trench sheets together with the façade retention steelwork is thought likely to show a very congested site area.

4.0 SUMMARY

Our review has found that the Basement Impact Assessment and Structural Appraisal for the proposed development do not provide an adequate assessment of the impact of its construction.

Whilst it has been undertaken generally in accordance with the processes of CPG4, in that the screening and scoping stages have been carried out, the assessment of the impact of the basement has not been adequately completed. Appendix F of the Arup document details the potential impacts that might result from the construction of such a basement.

The impacts on groundwater flow and surface waters are considered to have been satisfactorily addressed but the stability aspects require more detailed assessment. It is worth stating that the purpose of the BIA is to demonstrate how the potential impacts of constructing a basement may be mitigated through appropriate construction methodology. This BIA has not properly considered the impacts of the proposed basement and has not provided sufficient detail of the construction methodology that could mitigate the impacts and allow safe development. On that basis, it cannot be confirmed that the proposed construction will not adversely affect surrounding the built and natural environment.

It is recommended that the BIA is resubmitted in due course following the development of a construction methodology including detail of the temporary works proposals and an assessment of the potential ground movements. The resubmission should also provide evidence of the input of appropriately qualified persons, all in accordance with CPG4 and

the Arup document.

From an overview standpoint, it is recommended that the revised BIA should include all relevant site investigation data and that the Structural Appraisal should be cross referenced with drawings to provide a single cohesive document.

We trust that the foregoing comments are sufficient for your needs and we would be pleased to discuss the findings in more detail if required and to provide any additional assistance that may be necessary. We will be happy to discuss outstanding matters directly with SAS or RWA if you think that would assist the Council with the process.

Yours sincerely
GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES

Martin Cooper
BEng CEng MICE FGS

Steve Branch
BSc MSc CGeol FGS FRGS MIEnvSc