Desk Study and Basement Impact Assessment

Wheatsheaf Public House
25 Rathbone Place
London W1

Client	Shaftesbury Charlotte Street Limited
Engineer	Fresson and Tee

J13340

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GEA Geotechnical & Environmental Associates

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EXECUTIVE SUMMARY

This executive summary contains an overview of the key findings and conclusions. No reliance should be placed on any part of the executive summary until the whole of the report has been read. Other sections of the report may contain information that puts into context the findings that are summarised in the executive summary.

BRIEF

This report describes the findings of a desk study carried out by Geotechnical and Environmental Associates Limited (GEA), on the instructions of Fresson and Tee, on behalf of Shaftesbury Charlotte Street Ltd, to determine the history of the site, to assess the potential for contamination, and to provide preliminary information on geological, hydrological and hydrogeological conditions of the site, with respect to the proposed redevelopment, which comprises a deepening of the existing basement by about 600 mm to 700 mm and refurbishment of the building. This report includes information that follows the London Borough of Camden (LBC) Planning Guidance CPG4, relating to the requirement for a Basement Impact Assessment (BIA).

DESK STUDY FINDINGS

The earliest map studied, Greenwood's Map of London dated 1827, shows the site and the surrounding area to have been developed by this time. Rathbone Place and what appears to be Percy Mews is shown to have been established. The earliest Ordnance Survey map studied, dated 1872, shows the site to be occupied by a Public House. The immediately surrounding area was occupied by relatively small sized buildings which were presumably small shops or houses. Some time between 1916 and 1948 buildings approximately 60 m to the southwest and 50 m to the east of the site had been damaged, destroyed or demolished, presumably due to World War II bombings. The 1953 map labels some of these damaged areas as ruins and a car park is shown to the southwest; the houses to the southeast of the site had also changed layout during this time. Between 1954 and 1961 the previously damaged area to the southwest, and other adjacent buildings are shown to have been demolished, and the 1984 map labels a building in this area as the Western Division Sorting office for the Post Office. The maps show no significant change to have occurred to the site since 1872.

CONTAMINATION RISK ASSESSMENT

The desk study has indicated the site to have not had a potentially contaminative history, by virtue of the presence of the continued use of the site for commercial and residential purposes. There is, therefore, assessed to be a LOW risk of contamination at this site. It would be prudent to carry out contamination testing.

FOUNDATIONS

It should be possible to form new foundations bearing in the Lynch Hill Gravel by underpinning assuming that groundwater inflows can be controlled. It would be prudent to confirm the ground conditions by a suitable ground investigation which should include determination of the existing foundations and groundwater regime.

Based upon nearby information, groundwater is unlikely to be encountered in the proposed deepened basement and therefore there should not be a detrimental effect on groundwater flow. Additionally, some gravel will probably remain below the proposed basement and groundwater will therefore be able to flow below the basement, as well as around it, under Percy Mews.

1.0 INTRODUCTION

Geotechnical and Environmental Associates Limited (GEA) has been commissioned by Fresson and Tee, on behalf of Shaftesbury Charlotte Street Ltd, to carry out a desk study at the Wheatsheaf Public House, 25 Rathbone Street, London, W1T 1JB. This report also includes the screening and scoping sections of a Basement Impact Assessment (BIA), which has been carried out in support of a planning application.

1.1 Proposed Development

It is understood that consideration is being given to the lowering of the existing basement by approximately 600 mm to provide additional headroom and to redevelop the upper floors into residential flats.

This report is specific to the proposed development and the advice herein should be reviewed if the development proposals are amended.

1.2 Purpose of Work

The principal technical objectives of the work carried out were as follows:

- to determine the history of the site and surrounding area, particularly with respect to any previous or present potentially contaminative uses;
- to research the geology and hydrogeology of the site;
- to check records of data on groundwater, surface water and other publicly available environmental data; and
- to use the information obtained in the above searches to carry out a qualitative risk assessment with respect to subsurface contamination.

1.3 Scope of Work

In order to meet the above objectives, a desk study was carried out, comprising, in summary, the following activities:

- a review of readily available geological maps;
- a review of publicly available environmental data sourced from Envirocheck;
- a review of historical Ordnance Survey (OS) maps supplied by Envirocheck;
- a review of archive information held by GEA and a review of online borehole records held by the British Geological Survey (BGS); and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

A site walkover was not included within the scope of the work.

The report includes a contaminated land assessment which has been undertaken in accordance with the methodology presented in Contaminated Land Report (CLR) 11[1] and involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the United Kingdom. The risk assessment is thus divided into three stages comprising Preliminary Risk Assessment, Generic Quantitative Risk Assessment, and Site-Specific Risk Assessment.

1.3.1 Basement Impact Assessment (BIA)

The work carried out also includes a Hydrological and Hydrogeological Assessment and Land Stability Assessment (also referred to as Slope Stability Assessment), all of which form part of the BIA procedure specified in the London Borough of Camden (LBC) Planning Guidance CPG4[2] and their Guidance for Subterranean Development[3] prepared by Arup. The aim of the work is to provide information on land stability and in particular to assess whether the development will affect the stability of neighbouring properties and whether any identified impacts can be appropriately mitigated by the design of the development.

The BIA elements of the work have been carried out by Martin Cooper, a BEng in Civil Engineering, a chartered engineer (CEng) and member of the Institution of Civil Engineers (MICE), who has over 20 years specialist experience in ground engineering. The assessment has been made in conjunction with Steve Branch, a BSc in Engineering Geology and Geotechnics, MSc in Geotechnical Engineering, a chartered geologist (CGeol) and Fellow of the Geological Society (FGS) with 25 years experience in geotechnical engineering, engineering geology and hydrogeology. Both assessors meet the Geotechnical Adviser criteria of the Site Investigation Steering Group and satisfy the qualification requirements of the Council guidance.

The surface water and flooding element of this BIA is provided for guidance only and should be confirmed by a suitably qualified engineer experienced in carrying out surface water assessments.

1.4 Limitations

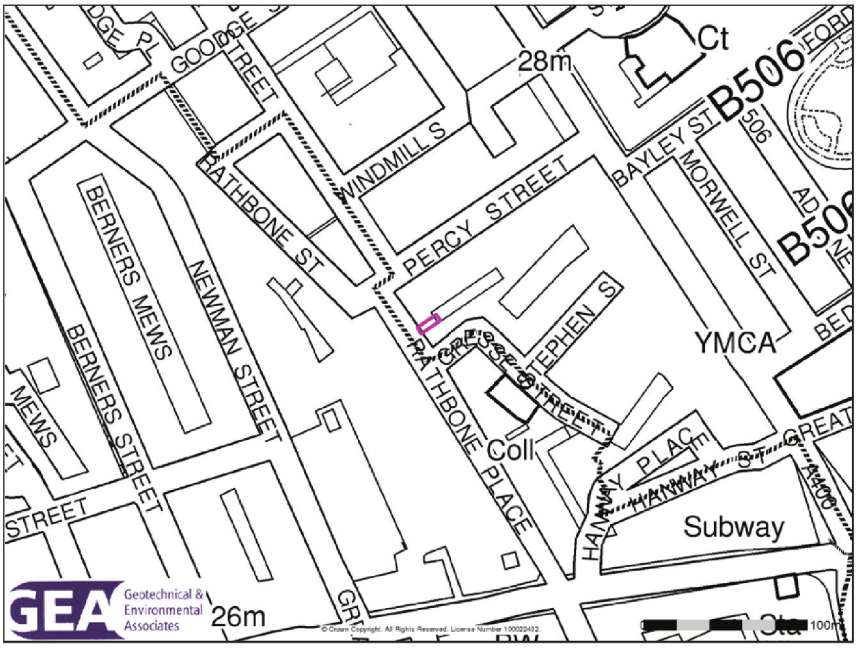
The conclusions and recommendations made in this report are limited to those that can be made on the basis of the research carried out. The results of the research should be viewed in the context of the work that has been carried out and no liability can be accepted for matters outside the stated scope of the research. Any comments made on the basis of information obtained from third parties are given in good faith on the assumption that the information is accurate. No independent validation of third party information has been made by GEA.

1 *Model Procedures for the Management of Land Contamination* issued jointly by the Environment Agency and the Department for Environment, Food and Rural Affairs (DEFRA) Sept 2004
2 London Borough of Camden Planning Guidance CPG4 *Basements and lightwells*
3 Ove Arup & Partners (2010) *Camden geological, hydrogeological and hydrological study. Guidance for Subterranean Development.* For London Borough of Camden November 2010

2.0 THE SITE

2.1 Site Description

The site is located roughly 200 m northwest of Tottenham Court Road London Underground Station and fronts onto Rathbone Place to the west. It is bordered by mixed use commercial and residential buildings to the north, south and by Percy Mews to the east. The site is occupied by the Wheatsheaf Public House and may additionally be located by National Grid Reference 529567, 181521, as shown on the location map below.



The site measures approximately 12 m by 8 m and is roughly rectangular in shape. It is currently occupied by a five-storey building occupied by a public house, with a 1.55 m deep cellar in the southern half of the site; the northern half of the building extends over Percy Mews. The cellar and ground floor are used for the public house and the upper floors are used as accommodation.

The site and surrounding areas appear to be relatively flat and the building occupies the entire site, as such there is no vegetation or soft landscaping.

2.2 Site History

The site history has been researched by reference to internet sources and historical Ordnance Survey (OS) maps obtained from the Envirocheck database.

The earliest map studied, Greenwood's Map of London dated 1827 shows the site and the surrounding area to have been developed by this time. Rathbone Place and what appears to be Percy Mews is shown to have been established.

The earliest Ordnance Survey map studied, dated 1872 shows the site to be occupied by a Public House. The immediately surrounding area was occupied by relatively small sized buildings which were presumably small shops or houses. Some time between 1916 and 1948 buildings approximately 60 m to the southwest and 50 m to the east of the site had been damaged, destroyed or demolished, presumably due to World War II bombings.

The 1953 map labels some of these damaged areas as ruins and a car park is shown to the southwest; the houses to the southeast of the site had also changed layout during this time. Between 1954 and 1961 the previously damaged area to the southwest; and other adjacent buildings are shown to have been demolished, and the 1984 map labels a building in this area as the Western Division Sorting office for the Post Office.

The maps show no significant change to have occurred to the site since 1872.

2.3 Other Information

A search of public registers and databases has been made via the Envirocheck database and relevant extracts from the search are appended. Full results of the search can be provided if required.

The desk study research has indicated that there are no registered landfills, historic landfills, waste management facilities or waste transfer sites within 1 km of the site.

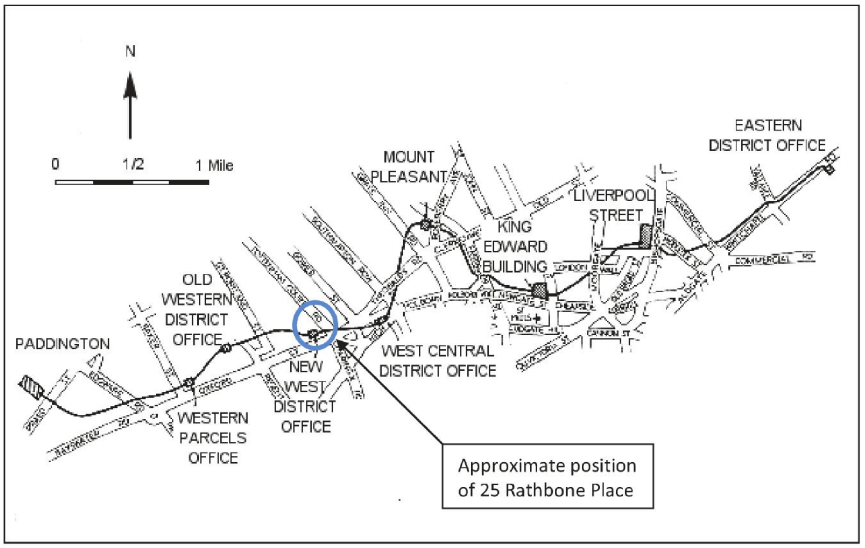
There have been no pollution incidents to controlled waters within 250 m of the site.

Reference to records compiled by the Health Protection Agency (formerly the National Radiological Protection Board) indicates that the site falls within an area where less than 1% of homes are affected by radon emissions and therefore radon protective measures will not be necessary.

The site is not listed as being within a nitrate vulnerable zone or any other area of sensitive land use.

The Post Office Railway passed through the West Division Sorting Office, and is now disused. The sketch plan below shows the approximate position of the tunnel which, in proximity to Rathbone Place, appears to be adjacent to Oxford Road, about 100 m south of the site. The tunnels are typically 2.13 m in diameter[4] and the section of track near Rathbone Place was opened in 1965.

4 http://www.postalheritage.org.uk/page/mailrail



3.0 GROUND CONDITIONS

3.1 Soil Conditions

The British Geological Survey map of the area indicates the site to be underlain by the Lynch Hill Gravel Member which overlies the London Clay Formation.

British Geological Society borehole information indicates that about 50 m to the west of the site made ground extends to a depth of 5.00 m whereupon sand and gravel of the Lynch Hill Gravel was encountered and extends to a depth of 8.80 m, below which the London Clay Formation was encountered. Groundwater was noted in this borehole at a depth of 7.70 m.

Another borehole about 100 m to the east of the site indicated made ground to a depth of 1.60 m, below which sand and gravel was encountered and extended to a depth of 5.11 m whereupon the London Clay was encountered. Groundwater was not encountered in this borehole.

3.2 Groundwater Conditions

The Lynch Hill Gravel is classified by the Environment Agency (EA) as a Secondary 'A' Aquifer and the London Clay Formation is classified as an Unproductive Strata. The EA defines Secondary 'A' Aquifers as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Similarly, the EA defines Unproductive Strata as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

There are no listed water abstractions within 250 m of the site and the site is not located within a Groundwater Source Protection Zone, as defined by the EA.

The nearest surface water feature to the site is what appears to be a pond in Hanover Square, about 789 m southwest of the site. The River Thames is approximately 2.75 km to the southeast and flows in an easterly direction.

Groundwater is likely to be present in the Lynch Hill Gravel. The direction of groundwater flow is likely to be controlled by the local topography and therefore is likely to be in a southerly and southeasterly direction.

The EA does not indicate the site to be within an area at risk from flooding.

4.0 PRELIMINARY RISK ASSESSMENT

Part IIA of the Environmental Protection Act 1990, which was inserted into that Act by Section 57 of the Environment Act 1995, provides the main regulatory regime for the identification and remediation of contaminated land. The determination of contaminated sites is based on a "suitable for use" approach, which involves managing the risks posed by contaminated land by making risk-based decisions. This risk assessment is carried out on the basis of a source-pathway-receptor approach.

4.1 Source

The findings of the desk study indicate that the site has not had a contaminative past land use by virtue of the continued use of the site for commercial and residential purposes throughout its developed history. The surrounding area land uses are predominantly thought to comprise shops and residential buildings.

No landfills or waste transfer stations have been identified within 1 km of the site and on this basis there are no potential sources of soil gas.

4.2 Receptor

The proposed redevelopment of the site for a continued mixed commercial and residential purpose will result in the end users representing relatively high sensitivity receptors.

The Secondary 'A' Aquifer is considered to be a moderately sensitive target. Buried services are likely to come into contact with any contaminants present within the soils through which they pass and site workers are likely to come into contact with any contaminants present in the soils during construction works.

4.3 Pathway

Within the site, end users will be isolated from direct contact with any contaminants present within the made ground by the presence of the building, there will be no soft landscaping area.

Hardstanding and the building will prevent infiltration, thus limiting the potential for soluble contaminants within the made ground or underlying soils to migrate onto adjacent sites. The presence of the underlying negligibly permeable clay of the London Clay Formation will limit the potential for infiltration to a Principal Aquifer at depth.

Buried services will be exposed to any contaminants present within the soil through direct contact and site workers will come into contact with the soils during demolition and construction works.

There is thus considered to be a low potential for a contaminant pathway to be present between any potential contaminant source and a target for the particular contaminant.

4.4 Preliminary Risk Appraisal

In the absence of any sources of contamination and on the basis of the above, it is considered that there is a LOW risk of there being a significant contaminant linkage at this site which would result in a requirement for major remediation work.

4.5 Development Issues

The site is currently covered by the existing building. It should be possible to underpin the existing foundations, to form new spread foundations bearing in the soils of the Lynch Hill Gravel, assuming that groundwater inflows are not encountered or significant. The development proposals will not result in a change in the proportion of hard surface / paved areas, and thus an increase in surface water run-off is not expected.

A ground investigation would be prudent to confirm the geology and engineering parameters of the underlying soils and this should include groundwater monitoring.

5.0 BASEMENT IMPACT ASSESSMENT

5.1 Screening Assessment

The LBC guidance suggests that any development proposal that includes a subterranean basement should be screened to determine whether or not a full BIA is required.

A number of screening tools are included in the Arup document and for the purposes of this report reference has been made to Appendix E which includes a series of questions within a screening flowchart for three categories; groundwater flow, land stability, and surface water flow. Responses to the questions are tabulated below.

5.1.1 Subterranean (groundwater) Screening Assessment

Question	Response for 25 Rathbone Place
1a. Is the site located directly above an aquifer?	Yes, a Secondary A Aquifer.
1b. Will the proposed basement extend beneath the water table surface?	Not known.
2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	No. There are no surface water features in the vicinity of the site.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No. The existing basement will only be deepened.

Question	Response for 25 Rathbone Place
4. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	No.
5. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than, the mean water level in any local pond or spring line?	No. There are no local ponds or spring lines present within 100 m of the Site.

The screening exercise has identified the following potential issues which should be assessed:

Q1a and b The basement may extend below the groundwater level.

5.1.2 Stability Screening Assessment

Question	Response for 25 Rathbone Place
1. Does the existing site include slopes, natural or manmade, greater than 7°?	No.
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°?	No.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	No.
4. Is the site within a wider hillside setting in which the general slope is greater than 7°?	No.
5. Is the London Clay the shallowest strata at the site?	No.
6. Will any trees be felled as part of the proposed development and / or are any works proposed within any tree protection zones where trees are to be retained?	No.
7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	No.
8. Is the site within 100 m of a watercourse or potential spring line?	No.
9. Is the site within an area of previously worked ground?	No.
10. Is the site within an aquifer?	Yes, the Lynch Hill Gravel is located below the site.
11. Is the site within 50 m of Hampstead Heath ponds?	No.
12. Is the site within 5 m of a highway or pedestrian right of way?	Yes. The site fronts onto Rathbone place and bridges Percy Mews.
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Possibly. The neighbouring foundations are not known.
14. Is the site over (or within the exclusion zone of) any tunnels, eg railway lines?	Unlikely, a tunnel is known to be associated with the nearby Post Office, but considered to be about 100 m away.

The above assessment has identified the following potential issues that need to be assessed:

Q10 The site is underlain by the Lynch Hill Gravel, a Secondary A Aquifer.
Q12 The site is within 5 m of public highways.
Q13 Foundation depths of neighbouring properties are not known

5.1.3 Surface Flow and Flooding Screening Assessment

This element of the BIA is provided for guidance only and should be confirmed by a suitably qualified engineer experienced in carrying out surface water assessments.

Question	Response for 25 Rathbone Place
1. Is the site within the catchment of the pond chains on Hampstead Heath?	No.
2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	No.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No.
4. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	No.
5. Will the proposed basement result in changes to the quantity of surface water being received by adjacent properties or downstream watercourses?	No.
6. Is the site in an area known to be at risk from surface water flooding such as South Hampstead, West Hampstead, Gospel Oak and Kings Cross, or is it at risk of flooding because the proposed basement is below the static water level of a nearby surface water feature?	No.

The above assessment has not identified any potential issues.

5.2 Scoping Assessment

The purpose of scoping is to assess in more detail the factors to be investigated in the impact assessment. Potential impacts are assessed for each of the identified potential impact factors.

5.2.1 Potential Impacts

The following potential impacts have been identified:

Potential Impact	Possible Consequence
The proposed basement may extend beneath the water table surface.	This may affect the groundwater flow regime.
Site within 5 m of a highway or pedestrian right of way	Excavation of a basement could lead to damage
Foundations may be constructed below neighbouring foundations	A differential depth of foundations may result in structural damage

6.0 CONCLUSIONS

It is understood that the proposed redevelopment of the site will include lowering the basement by about 600 mm to 700 mm to provide about 2.20 m of headroom in the basement; the lowering of the floor will likely require the existing foundations to be underpinned. It is therefore assumed that foundations will be placed at a depth of no more than 3 m below ground level.

Formation level will probably be within the Lynch Hill Gravel, which extends to depths of between 8.80 m and 5.11 m in proximity to the site. Groundwater is likely to be present near the base of the Lynch Hill Gravel, possibly at a depth below 3.0 m, but this would need to be confirmed and it is recommended that groundwater monitoring is carried out to determine an appropriate design groundwater level.

On the basis of the desk study findings, it is considered that the proposed basement would not penetrate the London Clay and thus would not prevent groundwater flow beneath the basement. Groundwater flow would also be possible around the basement, under Percy Mews and possibly under the southerly adjacent property but clarification in this matter is required.

The screening identified a number of potential impacts and an investigation would be required to determine the ground conditions, groundwater level, depth of existing and adjacent foundations, and it would be prudent to carry out some contamination testing.