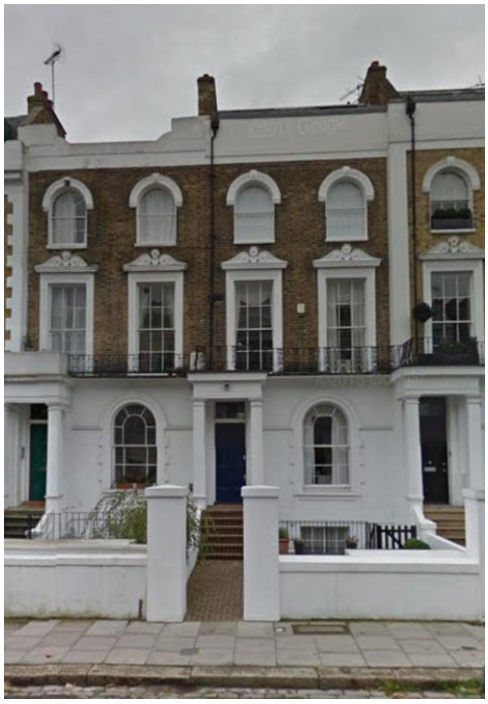
Ground and Project CONSULTANTS LTD

143A GLOUCESTER AVENUE, LONDON, NW1 8LA

Basement Impact Assessment:

Stage 1 and 2 Land Stability

May 2016



Client:

Ground and Water Ltd.,
2 The Long Barn
Norton Farm, Selborne Road
Alton
Hampshire GU34 3NB

This report has been prepared by Ground and Project Consultants Ltd, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client, and is provided by Ground and Project Consultants Ltd solely for the use of its client, Ground and Water Ltd.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to Ground and Project Consultants Ltd at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client, Ground and Water Ltd. Unless otherwise agreed in writing by Ground and Project Consultants Ltd, no other party may use, make use of or rely on the contents of the report. No liability is accepted by Ground and Project Consultants Ltd for any use of this report, other than for the purposes for which it was originally prepared and provided.

Contents

1 Introduction

Ground and Project Consultants Ltd have been instructed by Ground and Water Ltd (G&W) to undertake the Stages 1 and 2 (Screening and Scoping respectively) of the land stability element of a Basement Impact Assessment, for 143a Gloucester Avenue, London NW1 8LA. The property is located in the London Borough of Camden, London in the Camden Town with Primrose Hill ward, its location is indicated on Figure 1.

Figure 1: Site Location

2 Scope and Objective

The scope of this report and approach is as follows:

- A review of the existing data supplied by the client has been carried out, namely the proposal drawings produced to date, the background data available through London Borough of Camden's website and other freely available data such as BGS geological information.
- In line with the London Borough of Camden guidance, CPG4, latest revision:
- In line with the CPG4 guidance:
    - Screening Assessment
    - Scoping Assessment
- Recommendations for additional work have been provided.

The report has not considered contaminated land aspects of the site.

This report and the work to support it has been carried out by Jon Smithson who is a Director of Ground and Project Consultants Ltd and is a Chartered Geologist (CGeol) with over 30 years' experience.

3 BIA Screening for Slope/Land Stability

A screening exercise has been carried out as per the guidance in Camden's Guidance for Basements, CPG4 as follows:

Question	Answer	Action/ Comment
Question 1: Does the existing site include slopes, natural or manmade, greater than 7 degrees? (approximately 1 in 8)	No.	None
Question 2: Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7deg? (approximately 1 in 8)	No. It is understood that there will not be significant planned changes in surface profile.	None
Question 3: Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7deg? (approximately 1 in 8)	No. There are no railway cuttings in the immediate vicinity. The closest railway is behind the other side of Gloucester Avenue at around 60m distant and is approximately at grade.	None.
Question 4: Is the site within a wider hillside setting in which the general slope is greater than 7degrees? (approximately 1 in 8)	No, the slope in the area is generally flat, based on assessment of Ordnance Survey mapping and examination of Fig 16 in CPG4. The foot of Primrose Hill is around 300m to the West.	None
Question 5: Is the London Clay the shallowest strata at the site?	Yes: London Clay is indicated as the shallowest strata on the BGS maps	The presence of London Clay close to surface is further discussed in the Scoping Section
Question 6: Will any tree/s 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? (Note that consent is required from LB Camden to undertake work to any tree/s protected by a Tree Protection Order or to tree/s in a Conservation Area if the tree is over certain dimensions).	It is understood that there will not be a need to fell trees. There may a requirement to remove bushes.	Further discussed in the Scoping Section.
Question 7: Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	None known. However London Clay is close to surface.	Further discussed in the Scoping Section.
Question 8: Is the site within 100m of a watercourse or a potential spring line?	No	None

Question 9: Is the site within an area of previously worked ground?	None known or suspected.	None
Question 10: Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	No. The London Clay is classified by the Environment Agency as unproductive strata (rock layers with low permeability and negligible significance for water supply or river base flow). The site is not within a source protection zone of a public water supply. However the basement may extend into the water table.	Groundwater management is discussed in the Scoping Section.
Question 11: Is the site within 50m of the Hampstead Heath ponds?	No	None
Question 12: Is the site within 5m of a highway or pedestrian right of way?	Yes	This is further discussed in the. Health Safety and environmental measures will be required to be integrated into the building contractors methods of working
Question 13: Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	It is understood that shallow basements are present in the neighbouring properties.	This is further discussed in the Scoping Section.
Question 14: Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No: The presence of buried Utilities including sewers should be checked	None

4 Site Information

Existing Property and Basement Proposals

The property at 143 Gloucester Avenue is located on the south-west side of the road, about 40m form its junction with Fitzroy Road. The property is a 4 storey terraced property (including the basement, which 143a comprises), probably constructed in the mid 1800's. It is a brick and masonry built attached to no. 141 and 145.

The property is around 400m North of Regents Park and east of Primrose Hill. The Overground line is around 60m east of the property behind the houses on the other side of the road.

There is a small bush or bushes in the front garden.

The basement proposals comprise a single storey extension beneath the footprint of the front garden of the property. The basement depth will be around 3.0m below the existing garden level. The new basement footprint will be approximately 25m^2. The descriptions and dimensions above have been estimated from drawings provided by G&W.

The National Grid reference for the property is TQ 28110 84111. The location of the property is provided in Figure 1 above.

Topography

The OS map indicates the property is at around 34m AOD (below the 35m contour to the NW). The ground surface rises generally towards the West and Primrose Hill but the topography local to the property is subdued. There is no significant change in elevation at the property.

Geology

The available geological mapping (Ref 1.) indicates that the site lies on London Clay which typically comprises a stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. The geological map (North London 256) indicates that the property is relatively close (~300m) to an area of 'propensity' for Head Deposits, associated with the higher ground of Primrose Hill. Typically these deposits are thin (<2m) and consist of soft, ocherous brown silty clay with blue-grey mottling in places and angular, frost-shattered fragments of flint occur sporadically throughout. The base of the London Clay is likely to occur significant depth below the property. See figure 2 below.

Figure 2: Geology

Hydrology and Hydrogeology

The OS Map indicates that there are no surface water bodies in the vicinity of the site. The Hampstead Ponds are approximately 3km to the NNE. The Grand Union Canal runs around 300m to the SE. There are no springs shown on OS mapping. There is a 'lost river' indicated on CPG4 Figure approximately 500m to the east (River Fleet) and 1km to the West (River Tyburn).

The London Clay is classified by the Environment Agency as unproductive strata (rock layers with low permeability and negligible significance for water supply or river base flow). The site is not within a source protection zone of a public water supply (there is one some 400m away to the west). There is a groundwater abstraction borehole at Barrow Hill Reservoir, approximately 800m SW of the site.

5 Scoping Assessment

From the screening assessment a number of issues have been identified as requiring further assessment. The data reviewed above has provided some useful information to partially inform the assessment of impacts.

London Clay/Shrink and Swell:

The basement will probably be founded in London Clay. These soils at this site are of medium to high plasticity and high volume change potential. The basement will be founded at around 3.2m bgl, therefore below any seasonal shrink and swell (although see section on bushes below). There is a possibility that Head Deposits will be present at site. These are more variable by nature and can present lower shear strengths and more compressible soils than London Clay.

The London Clay soils are known for their high levels of soluble sulphate. The concrete mix design should take appropriate account of site specific sulphate levels in accordance with BRE Special Digest 1. The basement structure should be designed to account for swelling pressures. It will be important to account for the shallow nature of the existing foundations at the property and its neighbours. Any change in drainage or significant interruption/change to groundwater levels and flow patterns will need to be assessed for its implication on soil water content and consequential effect on soil volume change.

Trees and Bushes:

No trees are located in the garden although there are some bushes. Should bushes be removed there is potential for the soils to swell as a result which may affect this and neighbouring properties and this should be accounted for in design and further assessed as appropriate.

Groundwater/Aquifer:

Although London Clay is a low permeability strata, groundwater may be encountered during the works, particularly as seepages through sandy silty layers within London Clay/Head Deposits or at the base of any Made Ground. It is recommended that a design level of ground surface is used, this accounts for seasonal variations and leaks from water supply, etc. These should be managed carefully to prevent ground loss particularly through loss of fines. Softening of formation due to water ingress is a risk and softened soils should be excavated and replaced where practicable. Consideration should be given to limiting the size and time of face exposures during construction should significant flows be encountered during construction. Baseline and ongoing regular monitoring of the building and its immediate neighbours for settlement and movement/distress is highly recommended during building works and for a short period after completion. It is recommended that ongoing monitoring of groundwater levels is carried out during and up to the end of construction of the basement structure.

Basement Depth:

It is proposed to be construct the basement to a level of approximately 3.2m below the existing front garden level. The property adjoins neighbouring houses either side. The proposals to construct the basement is to be via underpinning. Underpinning proposals are understood to involve a 'hit and miss' approach in stages so each 'panel' is separated by 4 others from the next open one. It will be important that the building contractor is closely supervised and is experienced in this type of construction. It will be critical to prevent exposed faces from collapse or significant ground loss into the new excavation and temporary face support should be maintained at all times. It is understood the there are basements in the adjacent properties. Most ground movement should occur during wall installation, excavation of the basement and construction so the adequacy of temporary support will be critical in limiting ground movements. Heave movements will occur due to removal of soils.

A number of factors will assist in limiting ground movements:

- The speed of propping and support
- Good workmanship
- Ensuring that adequate propping is in place at all times during construction
- Installation of the first (stiff) support quickly and early in the construction sequence.
- Avoidance of ground loss through the gaps between the piles.
- Avoid leaving ground unsupported.
- Minimise deterioration of the central soil mass by the use of blinding/ covering with a waterproof membrane.
- Avoid overbreak
- Control dewatering to minimise fines removal and drawdown.

Construction near footpath and highway:

The very close proximity of the front of the property to the pavement and highway, means that works will be carried out in close proximity. A thorough assessment of risks to the public and the workforce will need to be developed and mitigation measures put in place where risks cannot be eliminated.

6 Conclusions and Recommendations

The methodology and approach of CPG4 has been followed in developing this Screening and Scoping BIA with respect to Land stability. It is concluded that with the construction of the new basement at 143a Gloucester Avenue should not have significant impacts on land stability provided that:

- Groundwater inflow, if encountered, is reduced to a minimum and properly controlled such that there is no significant wash out of fine material. Groundwater levels should be monitored before and during construction.

- The retaining wall should be appropriately designed.

- The construction of the basement is carried out by competent and experienced contractors and precautions are taken to maintain the stability of the excavations.

- Care should be taken to minimise the disturbance and damage to bushes and their roots. Should bushes be removed then an assessment of the potential for swelling of the London Clay/Head Deposit soils should be carried out.

- Concrete should be designed in accordance with BRE Special Digest 1 accounting for the sulphate conditions anticipated.

- Monitoring of the structures is carried out before and during construction. The exact nature of this monitoring should be determined by the structural engineer.

Recommended further work should include a borehole to a minimum of approximately 6m. This should include sampling of soils to enable laboratory testing to assist in engineering characterisation. The borehole should include ground water monitoring instrumentation in the form of a standpipe piezometer.

Once complete the results should be assessed and the impact assessment fully developed in line with CPG4.

7 References

1. BGS Geological Map Sheet 256.
2. Ordnance Survey Map, Explorer 173, London North
3. Arup: Camden Geological, Hydrogeological and Hydrological Study.
4. Design Drawings supplied by G&W