BASEMENT IMPACT ASSESSMENT – STAGE 1 SCREENING

for the site at

5 OVAL ROAD, CAMDEN, LONDON NW1 7EA

on behalf of

MS CHANTEL MAWBEY C/O LEVY REAL ESTATE LLP

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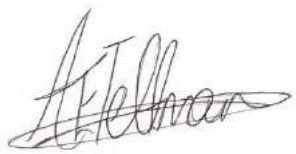
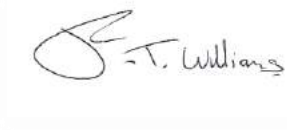
V2.01 JUNE 2018			TBC
	Alice Tettmar BSc. (Hons) Geotechnical and Geo-Environmental Engineer	Francis Williams M.Geol. (Hons) C.Geol FGS CEnv AGS Director	Michael Webster BEng CEng MIStructE
File Reference: Ground and Water/Project Files/ GWPR2409 5 Oval Road, London			

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1.0 INTRODUCTION

1.1 General

Ground and Water Limited were instructed by Ms Chantel Mawbey, c/o Levy Real Estate LLP, on the 21st December 2017, to undertake a Stage 1 Screening Basement Impact Assessment on a site at 5 Oval Road, Camden, London NW1 7EA. The scope of the investigation was detailed within the Ground and Water Limited fee proposal ref: GWQ3461, dated 11th September 2017.

Ground and Water Limited were instructed by Ms Chantel Mawbey, c/o Levy Real Estate LLP, on the 12th June 2018, to undertake a revised Stage 1 Screening Basement Impact Assessment on a site at 5 Oval Road, Camden, London NW1 7EA.

1.2 Aims of the Investigation

The aim of the investigation was understood to be to supply the client and their designers with information regarding the ground conditions underlying the site to assist them in preparing an appropriate scheme for development.

The requirements of the Camden Planning Guidance Basements and Lightwells (CPG4), July 2015, and London Borough of Camden, Camden Geological, Hydrogeological and Hydrological Study, Guidance for Subterranean Development (November 2010) was reviewed with respect to this report.

A Phase 1 Environmental Risk Assessment, intrusive investigation and full-scale contamination/geotechnical assessment were not part of the remit of this report.

The techniques adopted for the investigation were chosen considering the anticipated ground conditions and development proposals on-site, and bearing in mind the nature of the site, limitations to site access and other logistical limitations.

1.3 Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A.

This revision supersedes the previous Stage 1 Screening Assessment, issued January 2018 (GWPR2409/BIA/January 2018).

2.0 SITE SETTING/GEOTECHNICAL DESK STUDY

2.1 Site Location

The site comprised a 411m^2 rectangular shaped plot of land, orientated in a north-east to south-west direction, located on the south-western side of Oval Road. The site was located ~250m north-east of Regent's Park and ~290m west of Camden High Street. The site was located in central Camden, north-west London, within the London Borough of Camden.

The national grid reference for the centre of the site was approximately TQ 28569 83840. A site location plan is given within Figure 1. A plan showing the site area is given within Figure 2.

2.2 Site Description

The site comprised a four-storey brick built residential dwelling, including a lower ground floor semi-basement. A side forecourt used for parking was noted at the front of the dwelling, at the same level as Oval Road. Steps up to the Upper Ground Floor were noted, with the Private gardens were noted to the rear of the dwelling with the London Overground running directly west of the site, beyond the rear garden. The site was accessed from Oval Road and partitioned by a 1.5m high brick wall. It was understood that No. 3 Oval Road was similar to No. 5 with the ground floor comprising a lower ground floor semi-basement. Oval Road appeared to lie at 34.1m AOD. It was understood the front of site was ~1.5m higher than the rear garden level. It is likely that the neighbouring properties are likely to comprise lower ground floor semi-basements like that of the existing property.

An aerial view of the site is given within Figure 3. A section view and plan view of the existing development is given within Figure 4 and 5 respectively.

2.3 Proposed Development

At the time of reporting, June 2018, the proposed development was understood to comprise the construction of a single storey side extension at ground floor and basement level. The existing lightwell is to be enlarged and a concealed patio will be constructed at the rear of the side extension. The lower ground floor level was to be formed at 3.50m bfgl (below front garden level) and 1.50m brgl (below rear garden level). A sectional proposed development plan can be seen in Figure 6 and a plan view can be seen in Figure 7. The tree protection and removal methodology can be seen within Figure 8 of this report, with a comprehensive summary shown in Appendix B.

The proposed development fell within Geotechnical Design Category 2 in accordance with Eurocode 7. It was understood that the extension and basement foundations would be constructed using screw piling.

The proposed development was understood to not involve any re-profiling of the site and its immediate environs. However, 3No. trees are to be removed, with 1No. being replaced pre-construction of the basement along the northern boundary of the site.

2.4 Site History

The object of this search was to report on the history of the site and its environs from available County Series, Ordnance Survey and Aerial Photography Maps dating from the mid 19th Century to the present day and downloaded from Groundsure Environmental Insight. In the following sections dealing with individual maps, only features considered to have a potential impact on the site and usually within a notional 250 metre radius of the site boundaries are discussed. Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. The north point and approximate extent of the site are indicated on each figure. The historical maps

referred to are given within Appendix C. The implications of the map search are discussed later within this report. The historic map review can be seen tabulated below.

Table 1: Environmental Significance of Data From Historical Maps			
Date	**Scale**	**Site**	**Environs**
1870 – 1873	1:1,056	The site comprised a semi-detached dwelling with a garden area to the west/south-western portion of the site.	The surrounding environment was fully developed with semi-detached and terraced residential dwellings. Regents Park Terrace was noted ~40m north-east of site. The London and North-Western Railway was noted directly west, running in a north-west so south-east direction.
1870	1:1,056	As previous map.	As previous map.
1872 – 1873	1:1,056	As previous map.	As previous map.
1876 – 1879	1:2,500	As previous map.	A potato market and 2No. Pianoforte Manufacturer were constructed ~150m north of site. A timer yard was noted ~150m north-east. Regent's Canal was and associated cuttings/earthworks were noted ~230m south-west of site. Remainder as previous map.
1882	1:10,560	As previous map.	As previous map.
1894	1:10,560	As previous map.	As previous map.
1896	1:10,560 1:1,056 1:2,500	As previous map.	Potato market no longer noted and Pianoforte Manufacturer has been expanded. Remainder as previous map.
1916	1:2,500	As previous map.	Tunnels linking the London and North-Western Railway were noted ~230m north-east of site. Remainder as previous map.
1920	1:10,560	As previous map.	As previous map.
1938	1:10,560	As previous map.	As previous map.
1951	1:10,560	As previous map.	As previous map.
1952	1:2,500	As previous map.	An industrial development comprising an engineering works, printing works, warehouse, garage, spirits works and electricity sub-station was constructed ~200m - ~250m north. A ruin was noted ~230m north-east and a works constructed ~240m east. A chemical works, warehouse, planting works and factory was noted ~230m south-east. The cuttings and Regents Canal ~250m south had been infilled. Remainder as previous map.
1953	1:1,250	As previous map.	As previous map.
1953	1:2,500	As previous map.	As previous map.
1952 – 1954	1:1,250	As previous map.	As previous map.
1957 – 1958	1:10,560	As previous map.	As previous map.
1965 – 1968	1:10,560	As previous map.	As previous map.
1966 – 1969	1:1,250	As previous map.	A good yard had been established ~120m north-east. Remainder as previous map.
1968 – 1971	1:2,500	As previous map.	As previous map.
1970 – 1971	1:2,500	As previous map.	As previous map.
1973	1:1,250	As previous map.	As previous map.
1973 – 1974	1:10,000	As previous map.	As previous map.
1982 – 1987	1:1,250	As previous map.	As previous map.
1989	1:10,000	As previous map.	As previous map.
1991	1:1,250	As previous map.	Engineering works ~120m north no longer noted. Remainder as previous map.
1991 – 1995	1:1,250	As previous map.	As previous map.
2002	1:10,000	As previous map.	As previous map.
2010	1:10,000	As previous map.	As previous map.
2014	1:10,000	As previous map.	As previous map.

2.5 Geology

The geology map of the British Geological Survey of Great Britain of the Hampstead area (Sheet No. 256 North London) revealed the site to be situated on the London Clay Formation. No areas of Worked or Made Ground.

Both Figure 3 of the Camden Geological, Hydrogeological and Hydrological Study (see Figure 9 of this report) and the BGS geology maps indicated that no Made Ground or Worked Ground was noted within a close proximity of the site.

London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of Gypsum (Selenite) are often found within the weathered part of the London Clay Formation, and precautions against sulphate attack to concrete are sometimes required. The lowest part of the formation is a sandy bed with black rounded gravel and occasional layers of sandstone and is known as the Basement Bed.

A BGS borehole ~140m north-west revealed Made Ground to 1.70m bgl overlying a brown mottled clay with some partings of light brown silt for the remainder of the borehole, a depth of 2.81m bgl.

2.6 Slope Stability and Subterranean Developments

The site was situated within an area where natural or man-made slope of less than 7° were present ~10m east and ~15m north associated with the railway embankment along the western boundary of the site (Figure 16 Camden Geological, Hydrogeological and Hydrological Study, Figure 10 of this report).

Figure 17 of the Camden Geological, Hydrogeological and Hydrological Study indicated the site was not situated within an area prone to landslides (see Figure 11 of this report).

Figure 18 of the Camden Geological, Hydrogeological and Hydrological Study indicated that London Overground was located within close proximity (~10m west) to the site. The Northern Line was also situated ~300m north-west of site (see Figure 12 of this report).

2.7 Hydrogeology and Hydrology

A study of the aquifer maps on the Environment Agency website, and Figure 8 of the Camden Geological, Hydrogeological and Hydrological Study (see Figure 13 of this report), revealed the site to be located on an Unproductive Strata relating to the bedrock deposits of the London Clay Formation. No designation was given for any superficial deposits due to their likely absence.

Unproductive Strata are defined as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Superficial (Drift) deposits are permeable unconsolidated (loose) deposits, for example, sands and gravels. The bedrock is described as solid permeable formations e.g. sandstone, chalk and limestone.

Examination of the Environment Agency records and Figure 8 of the Camden Geological, Hydrogeological and Hydrological Study (see Figure 13 of this report) showed that the site did not fall within a Groundwater Source Protection Zone as classified in the Policy and Practice for the Protection of Groundwater.

In accordance with Figure 12 of the Camden Geological, Hydrogeological and Hydrological Study (see Figure 14 of this report), the Regents Canal was noted ~160m north of site.

Figure 14 of the Camden Geological, Hydrogeological and Hydrological Study revealed the site was not located within the catchment of Hampstead Ponds (see Figure 15 of this report).

From analysis of hydrogeological and topographical maps, groundwater was anticipated to be encountered at moderate depth (5 – 8m below existing ground level (bgl)) and it was considered that the groundwater was flowing in a south-easterly direction in accordance with the local topography.

Examination of the Environment Agency records showed that the site was not situated within a floodplain or flood warning area. Figure 15 the Camden Geological, Hydrogeological and Hydrological Study revealed that neither 5 Oval Road nor the immediately surrounding roads suffered surface water flooding in either 1975 or 2002 (see Figure 16 of this report).

A plan showing the location of the site with respect to Environment Agency Flood Maps can be seen in Figure 17.

Data from the Environment Agency website indicated 5 Oval Road was not at risk of surface water flooding; however, areas ~30m west were noted to have low to high risk due to the railway embankments. The back gardens of properties to the north were also at low to medium risk of surface water flooding. A plan showing the location of the site with respect to Environment Agency Surface Water Flooding Maps can be seen in Figure 18.

2.8 Radon

BRE 211 (2015) Map 5 of London, Sussex and West Kent revealed the site **was not** located within an area where mandatory protection measures against the ingress of Radon were required. The site **was not** located within an area where a risk assessment was required.

2.9 Geotechnical Conceptual Site Model

The following geotechnical concerns have been formulated by this desk based review and should be analysed by intrusive investigation:

- Soils with the potential for volume change potential are likely to be encountered under the site. Soils volume change potential to be determined along with depth of root penetration with reference to proximity of nearby trees;
- Removal of trees/protection of trees and impact on basement and proposed screw piles;
- Potential for Made Ground due to construction activities in site history;
- Potential for shallow groundwater to be encountered perched within shallow Made Ground;
- Temporary works whilst underpinning;
- Surface Water Run-off;
- Heave of soils following overburden pressure release.

3.0 BASEMENT IMPACT ASSESSMENT

This stage should identify any areas of concern and therefore focus efforts on further investigation.

3.1 Stage 1: Screening

3.1.1 Subterranean (Groundwater) Screening Flowchart

Question 1a. Is the site located directly above an aquifer?

No. A study of the aquifer maps on the Environment Agency website, and Figure 8 of the Camden Geological, Hydrogeological and Hydrological Study, revealed the site to be located on an Unproductive Strata relating to the bedrock deposits of the London Clay Formation (see Figure 13 of this report). **No further action.**

Question 1b. Will the proposed basement extend beneath the water table surface?

Unlikely. From analysis of hydrogeological and topographical maps, groundwater was anticipated to be encountered at moderate depth (5 – 8m below existing ground level (bgl)). A maximum dig depth of 3.50m bfgl (below front garden level) is being considered. Perched water may be encountered. **However, Ground Investigation could be considered. Take forward to scoping.**

Question 2. Is the site within 100m of a watercourse, well (used/disused) or potential spring line?

No. In accordance with Figure 12 of the Camden Geological, Hydrogeological and Hydrological Study there were no watercourses, wells (used/disused) or potential spring lines within 100m of the site (see Figure 14 of this report). **No further action.**

Question 3. Is the site within the catchment of the pond chains on Hampstead Heath?

No. Figure 14 of the Camden Geological, Hydrogeological and Hydrological Study revealed the site was not located within the catchment of Hampstead Ponds (see Figure 15 of this report). **No further action.**

Question 4. Will the proposed development result in a change in the proportion of hard surface/paved areas?

Marginally. The basement includes the enlargement of the existing lightwell at the front and the construction of an enclosed patio to the rear of the property. **Take forward to scoping.**

Question 5. As part of the 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)?

Marginally. At the time of reporting, June 2018, a slight increase in the amount of surface water discharged into the ground was anticipated. The proposed lightwell and enclosed patio should be drained appropriately. **Take forward to scoping.**

Question 6. 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. As the basement floor is proposed to be founded 3.50m bfgl (below front garden level), the lowest point of the proposed excavation will not be in close proximity or lower than the mean water level. **No further action.**

3.1.2 Land Stability Screening Flowchart

Question 1. Does the existing site include slopes, natural or manmade, greater than 7 degrees (approximately 1 in 8)?

No. The property is located at around 34.1m AOD. The rear garden level is understood to sit ~1.50m below Oval Road, accessed via steps from the rear of the property. Embanked land associated with the railway was noted ~25m west of the site; however, given the location and size of the basement, as well as the length of the back garden, the stability of the embankment was considered unlikely to be affected by proposals. **No further action.**

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. The proposed development does not involve the re-profiling of slopes onsite. **No further action.**

Question 3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7deg (approximately 1 in 8)?

Yes. The London Overground was noted directly west of the site, with areas showing slopes greater than 7deg. Embanked land associated with the railway ~25m west of the site; however, given the location and size of the basement, as well as the length of the back garden, the stability of the embankment was considered unlikely to be affected by proposals. **Take forward to scoping.**

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 site is not located within a wider hillside setting in which the general has slope angles are greater than 7 degrees (Figure 16 of the Camden Geological, Hydrogeological and Hydrological Study, shown in Figure 10 of this report). **No further action required.**

Question 5: Is the London Clay the shallowest strata at the site?

Yes, the geological map (Sheet 256) indicates that the site is underlain the London Clay Formation. **Take forward to scoping.**

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).

Yes. The proposed development requires the removal of the sycamore, T5, the two small cherry trees that form G4 and an insignificant laurel, T2. The effect of the removal of these trees on soil moisture must be taken into account in final design. The tree protection and removal methodology can be seen within Figure 8 of this report, with a comprehensive summary shown in Appendix B. **Take forward to scoping.**

The proposed development does not impact on the root protection zones of trees of tress along the western boundary. The enlargement of the lightwell at the front of the property is unlikely to impact T3 as it appears the proposed does not involved excavation further into the RPA. **No further actions with respect to RPZ and impact on trees that are to remain.**

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, the London Clay Formation is indicated as being present at the property, which has the potential for volume change. **Take forward to scoping.**

Question 8: Is the site within 100m of a watercourse or a potential spring line?
No, Figure 11 of the Camden Geological, Hydrogeological and Hydrological Study indicates no watercourses or potential spring lines are present in the vicinity of the site (see Figure 15 of this report). The nearest surface water feature is the Regents Canal, ~150m north. **No further action.**

Question 9: Is the site within an area of previously worked ground?
None known. There will be some Made Ground associated with past construction activities (see Geotechnical Desk Study). **Take forward to scoping.**

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 Formation is classified by the Environment Agency as an Unproductive Strata (rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow). **No further action.**

Question 11: Is the site within 50m of the Hampstead Heath ponds?
No. The ponds are 2.5km north-west. **No further action.**

Question 12: Is the site within 5m of a highway or pedestrian right of way?
No. Oval Road and the pedestrian pathway adjacent are over 5m from the nearest face of the proposed basement excavation. **No further action.**

Question 13: Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties? Considered unlikely. The majority of properties within a close proximity of the site (No. 1E, 3 and 7) have lower ground floors. Foundation for these are likely to extend at least 0.50m below the floor level of the lower ground floor, therefore ~2.00m below the front garden level. The proposed basement extends, at its deepest point, ~1.50m deeper. Therefore, the proposed development was not considered likely to form a significant differential depth between foundations.

Additionally, the use of screw piles as foundations is considered unlikely to cause significant movement that could damage the neighbouring properties.

Good practice in basement construction, including temporary works, should be adopted in final design. No other buildings were noted a close proximity of the site which were deemed to be at risk from the proposal. No further action considered necessary.

Question 14: Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?
No. The site is not located over (or within the exclusion zone of) any tunnels. It is noted in a previous question that the site is located adjacent to a railway embankment. **No further action required.**

3.1.3 Surface Water and Flooding Screening Flowchart

1. Is the site within the catchment of the pond chains of Hampstead Heath?
No. Figure 14 of the Camden Geological, Hydrogeological and Hydrological Study revealed

the site was not located within the catchment of Hampstead Ponds (see Figure 16 of this report).

2. As part of the of the proposed site drainage, will surface water flows be materially changed from the existing route?
No. The existing surface water routes will be not changed by the development. **No further action**.

3. Will the proposed basement development result in a change to the hard surfaces/paved external areas?
Yes. The basement includes the enlargement of the existing lightwell at the front and the construction of an enclosed patio to the rear of the property. **Take forward to scoping.**

4. Will the proposed basement result in changes to the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?
No. Surface water that is received by adjacent properties and downstream watercourses is not from the site. This will remain the case with the proposed development. **No further action required.**

5. Will the proposed basement result in a change to the surface water being received by adjacent properties or downstream watercourses?
No. Collected surface water will be from building roofs and paving, as before. The quality of the water received downstream will therefore not change. **No further action required.**

6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example, because the basement is below the static water level of a nearby surface water feature?
Please see overleaf.

Flood Risks Overview		
Potential Source	**Potential Flood Risk at Site?**	**Justification**
Fluvial Flooding	No	EA Flood Mapping shows site was not located within a Flood Zone. No surface water features within a close proximity of the site.
Tidal Flooding	No	EA Flood Mapping shows site was not located within a Flood Zone.
Flooding from Rising/High Groundwater	No	From analysis of hydrogeological and topographical maps groundwater was anticipated to be encountered at moderate depth (5 - 8m bgl).
Surface Water (Pluvial) Flooding	No	Data from the Environment Agency website indicated 5 Oval Road was not at risk of surface water flooding; however, areas ~30m west were noted to have low to high risk due to the railway embankments. The back gardens of properties to the north were also at low to medium risk of surface water flooding. A plan showing the location of the site with respect to Environment Agency Surface Water Flooding Maps can be seen in Figure 18.
Flooding From Infrastructure Failure	No	Figure 12 the Camden Geological, Hydrogeological and Hydrological Study revealed that the site was not subject to surface water flooding (See Figure 14 of this report).
Flooding from Reservoirs, Canals and other artificial sources	No	The Regents Canal was noted ~150m north of site creating a potential increased risk of flooding.

No further action required.

3.2 Stage 2: Scoping

3.2.1 Conceptual Site Model & Matters of Concern

There are nine areas of concerns that the Screening process have highlighted.

1. **Perched water within the Made Ground or the London Clay Formation** – the basement may encounter groundwater, associated with perched groundwater within any Made Ground or the London Clay Formation, during construction. This is to be taken forward for further assessment;

2. **Soil Moisture** – There is potential for soil moisture content to affect the development, including foundations, especially associated with removal of trees along the basements northern boundary. This is to be taken forward for further assessment;

3. **The London Clay Formation/Shrink and Swell** – The basement is anticipated to be founded in the London Clay Formation. The soils are likely to have medium to high plasticity and volume change potential. The concrete mix design should take appropriate account of sulphate levels (testing to BRE Special Digest). Heave on removal of overburden pressure may be a risk;

4. **Previous area of Worked Ground;** Suspected, to be taken forward for further assessment.

5. **Retaining Walls** should be appropriately designed**;**

6. **Surface Water/Drainage.** The basement includes the enlargement of the existing lightwell at the front and the construction of an enclosed patio to the rear of the property. The design should ensure both lightwell and patio are appropriately drained.

It is recommended a site-specific ground investigation should be undertaken to inform design of foundations and retaining walls.

A groundwater monitoring well should be installed, with return visit, to determine if groundwater/perched water will be encountered during basement construction

Careful note should be taken to soil moisture of the London Clay Formation and the impact on the structure/foundations of the moisture recovery following removal of Tree T5.

A Ground Movement Assessment is not considered likely to be required.