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**Your Ref:** 19 Well Road  
**Our Ref:** 1127/LJE160519

For the attention of: Angus Wilson

16<sup>th</sup> May 2019

## **Proposed Basement at 19 Well Road, London: BIA Review**

Dear Angus,

Further to your instruction to proceed on behalf your client (Walters Consultancy Limited) I have undertaken a review of the Basement Impact Assessment (BIA) prepared by Soiltechnics Ltd for the proposed basement development at 19 Well Road.

I have reviewed the design of the proposed basement development, together with the information presented within the above documents, against the requirements of the Camden BIA guidance set out within Policy A5 (Basements) of the Camden Local Plan (2017), Camden Planning Guidance on basements (adopted March 2018) and the Camden geological, hydrogeological and hydrological study report 'Guidance for subterranean development', produced by Arup (2011) on behalf of the London Borough of Camden.

Chord Environmental Ltd specialise in the provision of hydrogeological services with extensive experience in the UK supporting both private and public sector clients. I am a geologist and hydrogeologist and have a BSc. in geology from the University of Bristol, a MSc. in hydrogeology from the University of East Anglia and am also a Chartered Geologist and fellow of the Geological Society. I am Managing Director at Chord Environmental and was previously a Technical Director with Paulex Environmental Consulting and managed Hyder Consulting (UK) Ltd's groundwater team.

I have been a hydrogeologist for over 20 years. During that time I have advised on over 150 basement developments. Much of my career has been spent assessing the impact of development on the quality and quantity of groundwater resources. I have worked for both promoters and regulators of schemes and have acted as an expert witness for the Highways Agency and on BIA schemes.

## **Development proposal**

The property comprises a maisonette within a larger residential building, which was formally a Victorian mansion and extends to the north and west of the property. The property is of brick masonry construction and consists of a two-storey dwelling plus dormer roof accommodation, and a single level basement with front access via Well Road. A basement level walkway was present to the front of the property, accessed via external steps.

I understand the development will comprise an extension of the existing basement into a portion of the terraced rear garden to a depth of 4.2m below ground level. The footprint of the basement is in close proximity to neighbouring dwellings along the northern site boundary. As a result, a perimeter retaining wall will be constructed to facilitate excavation of the basement and minimise ground movement effects on neighbouring buildings. Once excavation of the basement is complete a new basement floor slab will be constructed together with a new reinforced concrete ground floor slab.

## **Environmental Site Setting**

The BIA screening assessment and site investigation interpretation has identified 19 Well Road to be underlain by the Eocene Claygate Member of the London Clay Group as shown on the British Geological Survey 1:50,000 scale map (Sheet 256 – North London) to a depth of c.10m where it is underlain by London Clay. Although the Claygate Member comprises predominantly silt and clay, is classified Secondary A Aquifer capable of supporting water supplies at a local rather than strategic level due to the presence of localised (or impersistent) sand layers. The London Clay is classified as Unproductive Strata by the Environment Agency, strata with low permeability that have negligible significance for water supply or base flow to rivers. The generally very low permeability of the Claygate Member (in the absence of sand layers) and London Clay results in very low rates of rainfall infiltration and correspondingly, very high rates of rainfall runoff. The London Clay Group, together with the clays of the Lambeth Group, acts as an effectively impermeable confining layer over the Cretaceous Chalk aquifer which lies at a depth of over 90m beneath the site.

A ground investigation undertaken on the property confirmed the presence of firm Claygate Member very sandy clay beneath a moderate covering of Made Ground. Groundwater was monitored between depths of 0.97m and 1.06m below ground level over a two month period within one monitoring borehole. Based on infiltration testing at the site, the Claygate Member soils are considered to be effectively impermeable. The well-known low permeability of the London Clay Group clay soils prevent it from transmitting groundwater flow or supporting a water table however localised pockets of perched groundwater may be encountered within impersistent relatively permeable horizons, such as the band of very clayey sand encountered.

There are no surface water features within 150m of the site on the Ordnance Survey 1:25,000 scale map however there is the Vale of Health pond 180m and across topographic gradient to the north of the site and the Hampstead Ponds 470m down topographic gradient to the east. The site lies outside of the Hampstead Heath chain of ponds catchment as shown on Figure 14 of the "Camden Geological,

Hydrogeological and Hydrological Study". The site is also remote from the mapped locations of former tributaries of the river Thames shown on Figure 11 of the same study.

19 Well Road does not lie within an area of fluvial or tidal flood risk as designated by the Environment Agency and is not identified as being one of the roads affected by the surface water flooding events of the area which occurred during 1975 and 2002.

Screening assessments have been undertaken to satisfy Stage 1 of Camden Planning Guidance – Basements

### **Subterranean (Groundwater) Flow Screening Assessment**

I have commented on the answer to each question below.

- **Question 1a: Is the site located directly above an aquifer?**

Yes. The Site is mapped as being underlain by the Claygate Member which is designated as Secondary A Aquifer by the Environment Agency. However, the site investigation has established the Claygate Member to comprise very low permeability clay strata with an absence of continuous sand beds.

- **Question 1b: Will the proposed basement extend beneath the water table surface?**

No. The hydraulic properties of the very low permeability and cohesive Claygate Member beneath the site do not allow it to support a continuous water table and transmit groundwater in any significant quantities under normal hydraulic gradients.

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

No mapped surface water features are present within 150m of the site and the underlying Claygate Member clays are not capable of providing groundwater baseflow to watercourses. Based on the results of the site investigation, the proposed basement would therefore not act to prevent groundwater flow to any watercourses, wells or spring lines.

- **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 shows the site to be located outside of the hydrological catchment area.

- **Question 4: Will the proposed development result in a change in the proportion of hard surfaced / paved area?**

Yes. There will be a marginal increase in hard standing area (3.6 m<sup>2</sup>) as a result of the proposals. This will not affect groundwater recharge as rainfall recharge to the Claygate Member clay strata is limited by its very low permeability.

- **Question 5: As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to ground (e.g. via soakaways and/or SUDS)?**

No. The lowly permeable and cohesive nature of the Claygate Member strata beneath the site is unsuitable for receiving surface water discharge to ground due to extremely low infiltration rates. There will be no change to the existing drainage arrangement.

- **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 (not just the pond chains on Hampstead Heath) or spring line?**

No - there are no mapped local groundwater dependent ponds or spring lines present within 100m of the Site. This is consistent with the geology and hydrogeology of the area.

### **Slope Stability Assessment**

The BIA screening, scoping and risk assessments have followed the Camden Planning Guidance - Basements criteria and screening questions. The potential ground movement issues raised by the screening and scoping exercises have been appropriately addressed and reviewed by Nigel Thornton (C.Eng) of Soiltechnics Ltd within the BIA report and no areas of concern relating to the proposed development were identified.

### **Surface Flow and Flooding Assessment**

The BIA screening, scoping and risk assessments have followed the Camden Planning Guidance - Basements criteria and screening questions. The potential surface flow and flooding issue raised by the screening and scoping exercises have been appropriately addressed by Soiltechnics within the report and no areas of concern relating to the proposed development were identified.

### **Conclusions**

The BIA report has appropriately characterised 19 Well Road with respect to its geological and groundwater site setting. As the site is underlain by low permeability, cohesive London Clay, the geological and hydrogeological setting of 19 Well Road is not sensitive with respect to groundwater resources or flow. Isolated pockets of groundwater may be encountered during excavation and some form of groundwater control may be required (e.g. sump pumping) however significant inflows of groundwater are not anticipated.

The purpose of the Basement Impact subterranean or groundwater flow assessment is to identify the potential for the proposed basement development to cause groundwater impacts and subsequently identify areas which require further investigation. The proposed development represents an extension of an existing basement, would be constructed within cohesive Claygate Member clays and no potential adverse groundwater impacts have been established by these assessments.

Yours sincerely,



**John Evans BSc MSc CGeol.**

Director

