MR & MRS PLANT

62 ELSWORTHY ROAD, CAMDEN

Hydrogeological Review

December 2010

Rev 2

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Introduction

The proposed redevelopment of the site at 62 Elsworthy Road includes the construction of a new basement beneath the existing building footprint and the rear garden. There will also be a lightwell at the front of the building and a sub basement to accommodate the pool, pool plant and utility room.

GCG has been instructed to investigate the impact of the proposed redevelopment on the local hydrogeology and to advise on the land drainage design requirements, where required, in order to minimise the risk of adverse effects on superficial groundwater conditions for the site and for neighbouring land. They have been provided with details of the proposed redevelopment by Elliott Wood Partnership LLP.

GCG have been involved with a number of projects in this area and have data from both the adjoining property (no 64) and a nearby property (no 41) and are familiar with the local ground conditions.

This report has been prepared for the owners of 62 Elsworthy Road, Mr and Mrs Plant, in connection with the 62 Elsworthy Road project for the purposes of submission with a planning application. It is not intended for, and should not be relied upon by, any third party for any other purpose.

The property and the proposed re-development

The existing property comprises a detached three storey house with a single storey rear extension and a swimming pool in the back garden as shown in Figure 1. The existing building occupies an area with maximum dimensions of approximately 15m by 20m. The proposed construction comprises a new basement beneath the entire footprint of the existing building and the rear garden. There will also be a sub basement to accommodate the pool, pool plant and utility room. An outline of the footprint of the existing building and the proposed basement construction is shown in Figures 2 and 3, respectively.

Topography and geology

The site is located on the north side of a shallow valley which slopes downwards towards Regents Park. The ground rises steadily towards the north and falls gently towards the south at a slope of 1.4^{o}. Towards the east the ground is relatively flat before rising steadily towards Primrose Hill. Moving westwards from the site the ground is relatively level for approximately 200m before gently rising towards Finchley Road.

A map of the Lost River of London (Ref. [1]) shows that the site is located between the original

course of the Tyburn River and its eastern tributary as shown in Figure 4. The 1920 British Geological Survey map (Ref. [2]) shows that the eastern tributary runs along the edge of Primrose Hill south of the property before connecting with the main Tyburn River (Figure 5). This river is probably now culverted and runs underground.

The 1920, 1982 and 1993 geological survey maps (Refs. [2], [3] & [5]) show that the site is located in an area where the London Clay outcrops (see Figures 5 & 6). Based on GCG's experience with basement construction in this area and the boreholes local to the site there is likely to be a covering of clay head material (derived from the London Clay) to the surface of the London Clay. This comprises clay with some gravel embedded in it. It is possible that the superficial materials may extend to depths of up to 4m below ground level, but are likely to be shallower. There may also be some made ground at the surface.

A cross section through Primrose Hill from the 1993 geological survey map (Ref [3]) is shown in Figure 7. The figure shows that the thickness of the London Clay at the site is approximately 50 metres and reduces southwards. The London Clay is underlain by about 10 metres of Lambeth Group overlying 10-15 metres of Thanet Sand. Chalk is thought to be present at about -45mOD. The thickness of the London Clay suggests that most of the lithological units of the London Clay are present at the site. It is expected that these units would be siltier and sandier than the deeper lithological units generally encountered in Central London at similar shallow depths. Sandy lenses and layers may also be encountered in these units.

Hydrogeological conditions and Geohazards

Apart from some perched water that might be present in made ground over the clay head, it is unlikely that there will be any significant water at the site. As the site is located on a very shallow slope and the flow of any groundwater that may be present is not likely to be significant. There may be some perched water within the clay head, but this material is unlikely to have sufficiently high permeability or uniformity to facilitate horizontal flow.

Below the top of the insitu London Clay, there may be localised siltier and sandier layers, particularly in the upper lithological units, through which horizontal water flow can occur. However, such flow is likely to be minimal. Water infiltrating the London Clay stratum will generally tend to flow vertically downwards at a very slow rate towards the deep aquifer (the Chalk).

The existing house is most likely founded on the surface of the clay head although this will be confirmed by the site-specific ground investigation. It is understood that the adjacent property at No 64 Elsworthy Road has been refurbished three years ago to include a new single storey basement, probably extending into the London Clay. Given this, any natural groundwater flow within the superficial soils will have been altered to some extent. It is therefore unlikely that the limited size of the proposed new basement will have a significant effect on the existing groundwater conditions.

Flood Risk.

The Environment Agency flood risk maps show that the site is not located in a food risk zone and planning guidance documentation (Ref [6]) shows that there are no records of particular surface water problems in this area.

Land Drainage design requirements

It is probable that any groundwater flows present at the site will be small and the size of the proposed new basement construction is not likely to adversely change the current groundwater conditions. This is supported by local ground conditions, the topography of the area and also by the fact that no groundwater problems were encountered during construction of the adjacent basement at No. 64 (Ref. [4]).

During construction, provision should be made to accommodate any superficial groundwater flows that may be encountered during excavation of the basement. Assuming that there is very little groundwater present within the site then a sump may be sufficient. However, if the ground investigation indicates a significant volume of water to be present at the site then a hard soft secant pile wall can be constructed, with the piles extending sufficiently far to restrict the flow of water into the excavation.

Provision should be made for a long term groundwater control system around the new basement walls and beneath the basement floor slab. This drainage system should be adequate to keep the property drained, ensure water flow downslope and to reduce water pressures and uplift. It is recommended that part of this system comprises a drainage system installed along the outer rear piled wall and the piled wall adjacent to No. 60. An engineered drainage layer should be placed on top the basement, underneath the rear garden. The piles should be constructed to accommodate water flow and the top of the piles should be cut down to facilitate groundwater flow from the drain to the rear garden. A schematic of this drainage system is shown in Figures 8 and 9. This solution should effectively direct any shallow groundwater present away from adjoining basements or buildings and towards the basement soil cover, thereby providing a sustainable way of watering the rear garden. Any excess water can be collected and reused. Alternatively, the drainage system can extend to the front of the property where the water can be distributed to the front garden or collected and reused. The final solution would be dependent on the groundwater levels established during the site-specific investigation.

It is probable that any groundwater within the London Clay will be minimal and flow within this stratum will probably be vertical towards the deep aquifer in the Chalk.

The retaining walls of the new basement will have to be designed to account for water pressures and adequate waterproof measures should be adopted. Water entering the basements could be pumped into the subsurface drainage system.

Conclusions

Local knowledge suggests that it is possible that there may be some perched water in made ground at the site. However, any groundwater flows within these or any superficial materials is unlikely to be significant given the local geological conditions and the general topography of the area.

Currently, any possible flow of groundwater near the surface would be restricted to some extent by the foundation of the existing house, including the pool in the rear garden, and the adjacent basement at No. 64 Elsworthy Road. The proposed new basement construction is unlikely to cause adverse changes to the superficial groundwater conditions.

Provision of a long term drainage system is recommended to ensure that the property remains well drained and to ensure that there is downhill groundwater flow.

References :

[1] Barton N. (1962): The Lost Rivers of London. Historical Publications Ltd

[2] British Geological Survey. 1920. London Sheet IV-N.E. 1:10 560

[3] British Geological Survey. 1993. North London, England & Wales Sheet 256. Solid and Drift Geology. 1:50 000

[4] Elliott Wood Partnership LLP (2010). 62 Elsworthy Road London NW3 3BU, Structural Engineering Notes to Wolff Architects' Planning Application

[5] Geological Survey of Great Britain (England and Wales). 1982. Sheet TQ28SE. 1:10 560

[6] London Borough of Camden (2010). Camden Planning Guidance 1 Design. *Consultation Draft.*

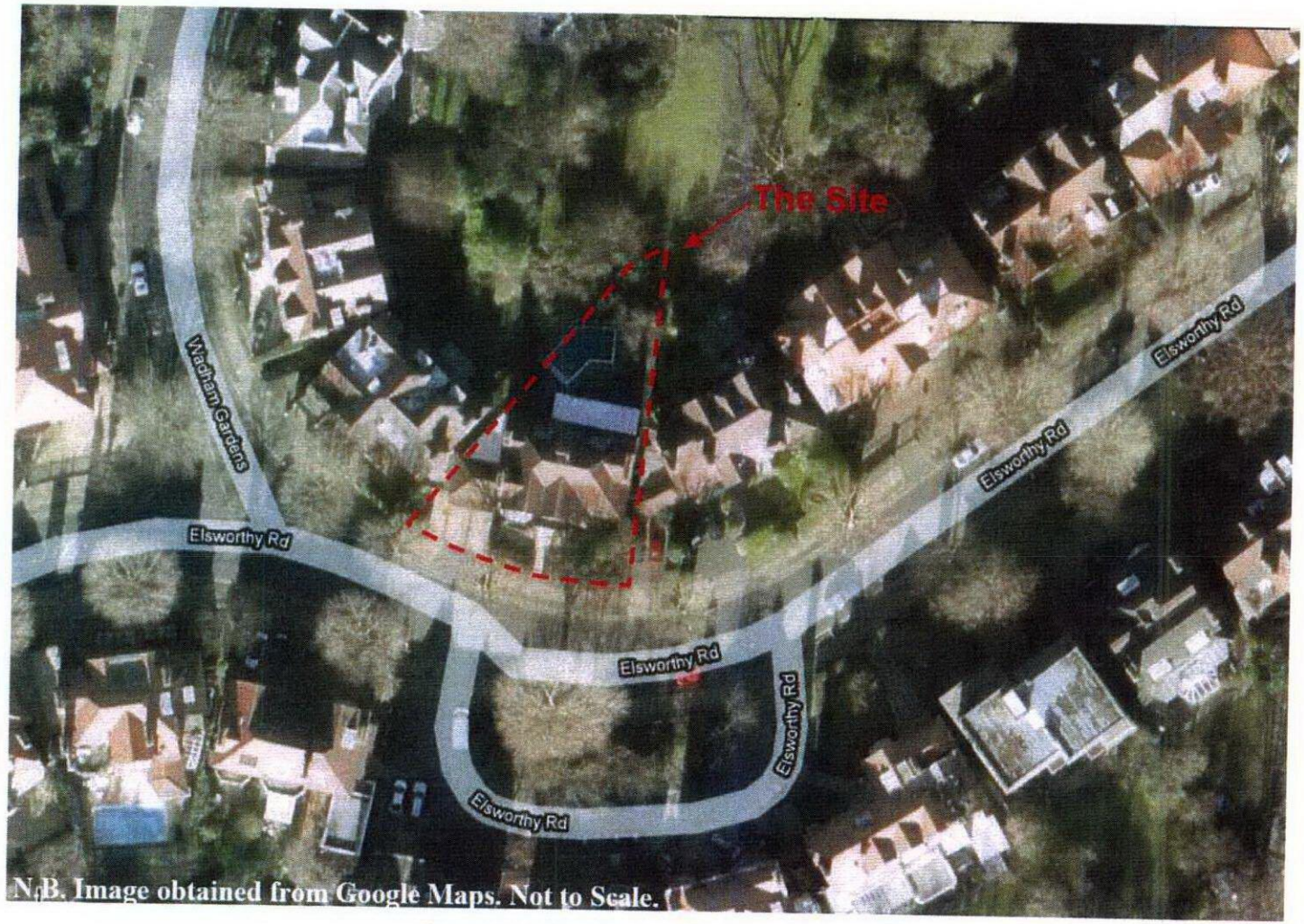
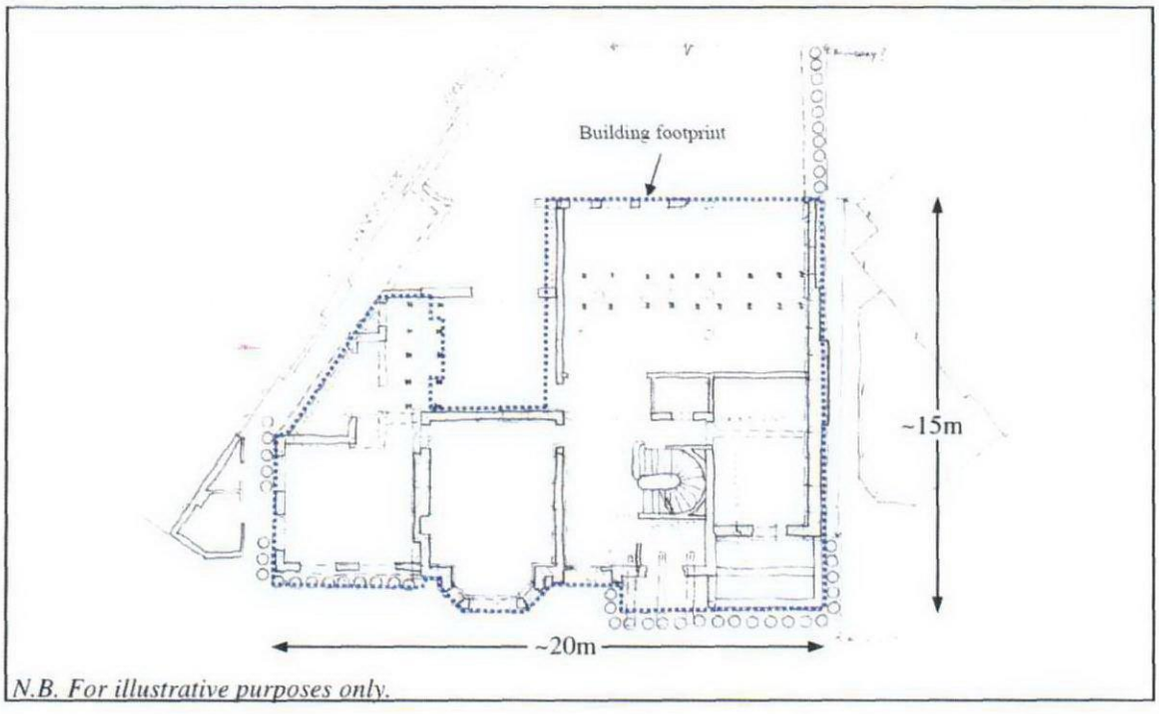
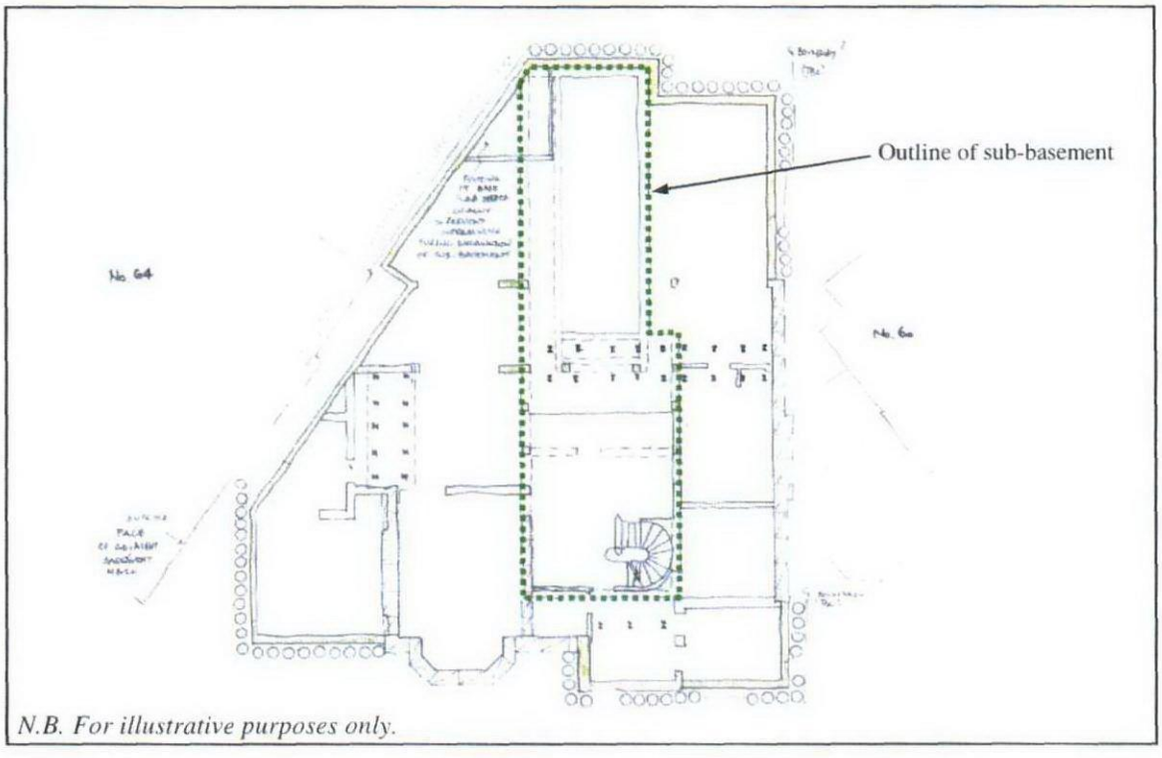


Figure 1 Aerial view of #.62 Elsworthy Road



N.B. For illustrative purposes only.

Figure 2 Footprint outline of the existing building



N.B. For illustrative purposes only.

Figure 3 Proposed basement construction (Lower Ground Floor)

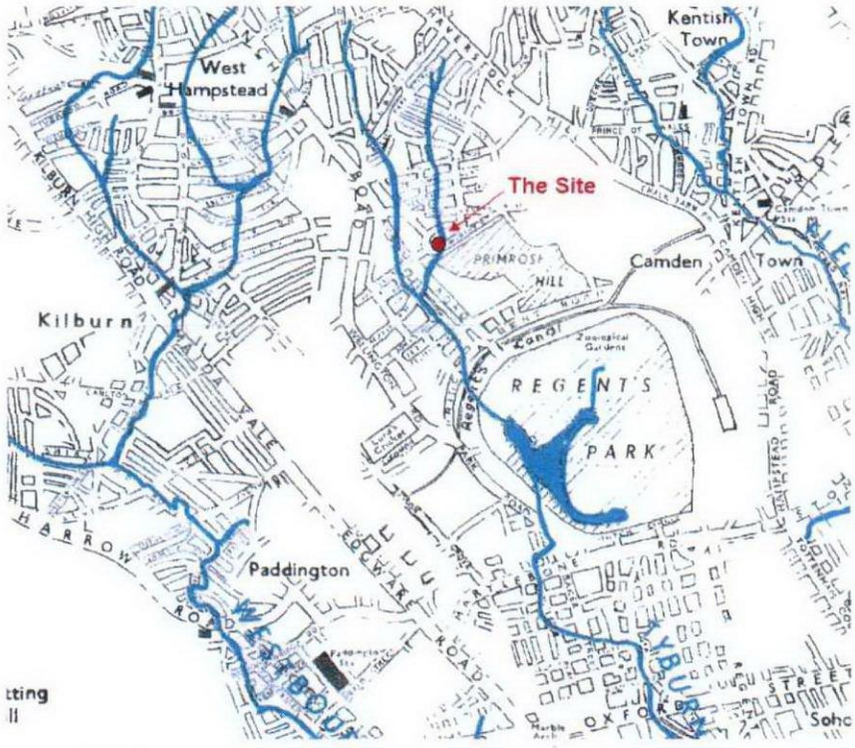


Figure 4 Extract from The Lost Rivers of London Map (Ref.[1])

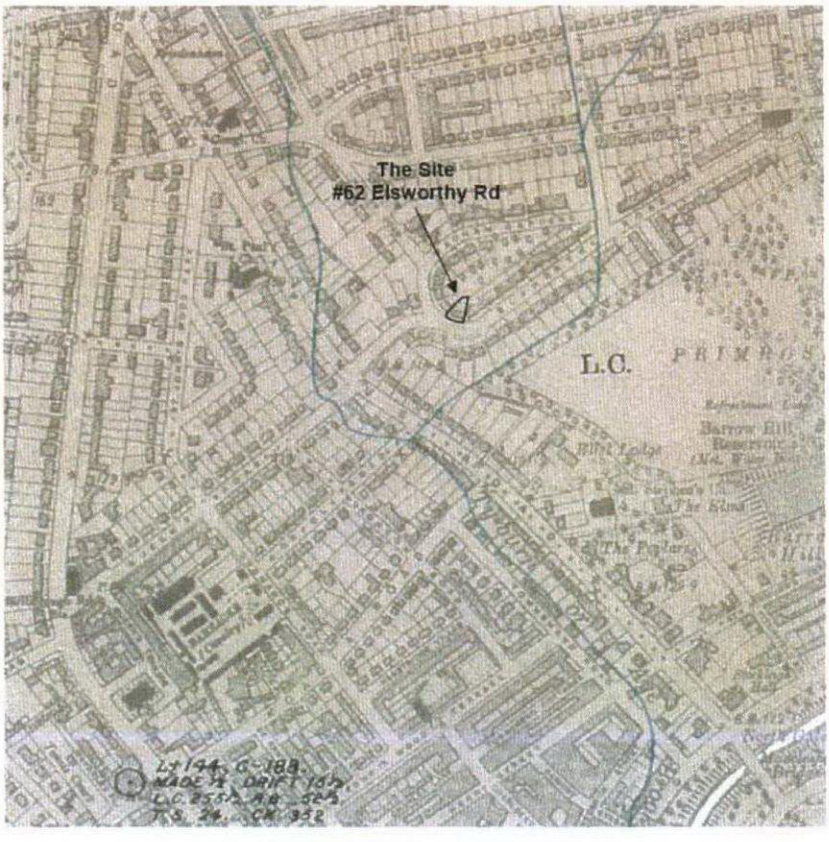


Figure 5 Geology of the site
Extract from the 1920 BGS Map [Ref.[2])

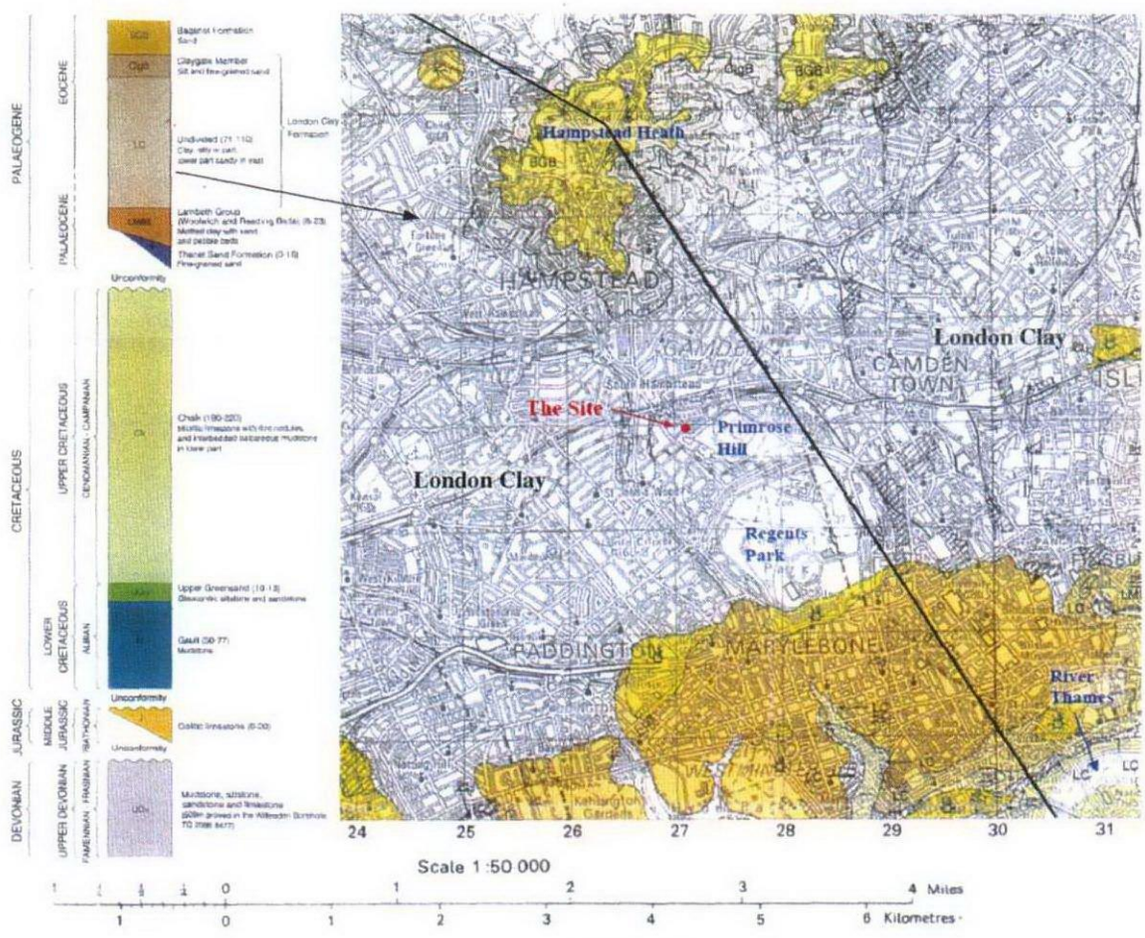


Figure 6 BGS Geological Mapping
Extract from the 1993 BGS Map (Ref. [3])

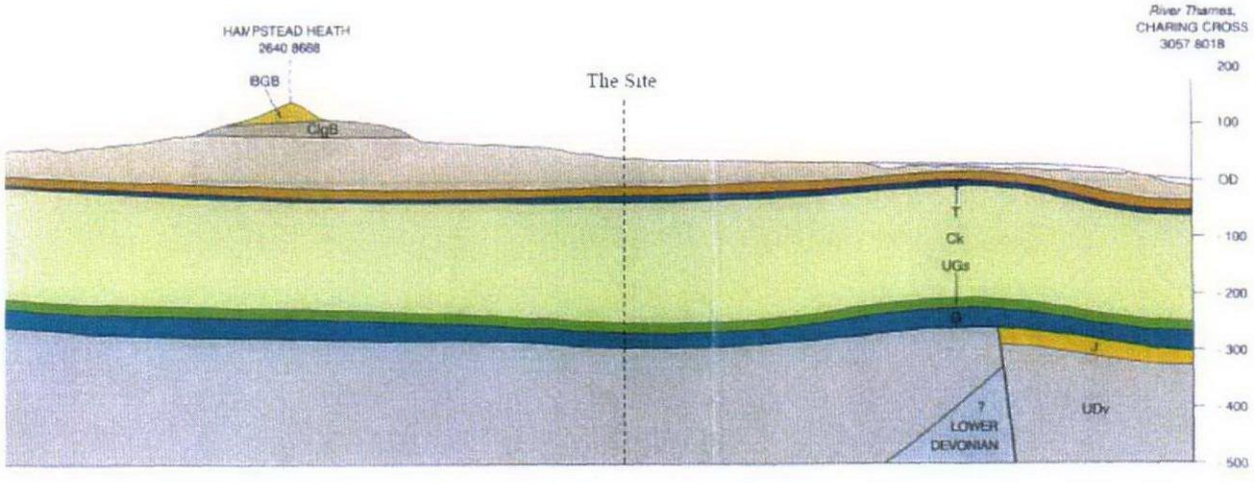


Figure 7 Geological Cross Section
Extract from the 1993 BGS Map (Ref. [3])

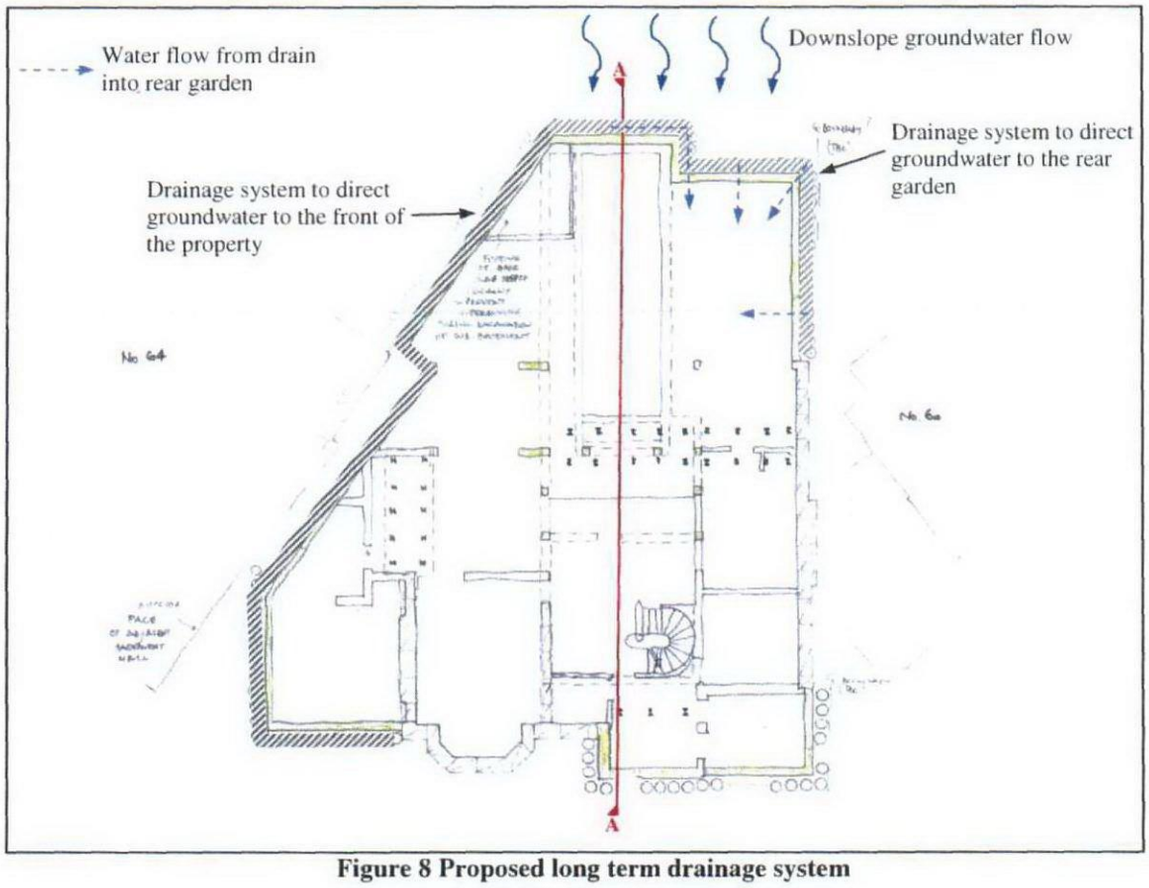


Figure 8 Proposed long term drainage system

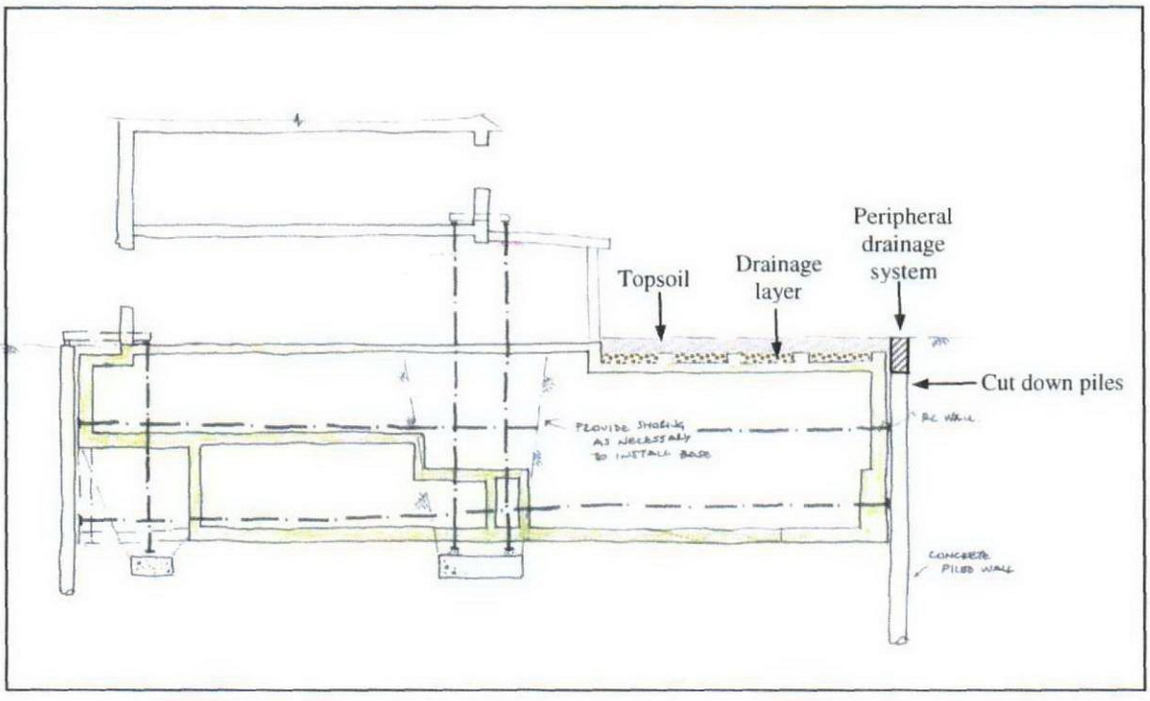


Figure 9 Section A-A