2016/5975/L and 2016/5974/P 26 Christchurch Hill, London NW3 1LG

Construction of a basement extension under the modern wing of GII listed dwelling house (C3) and garden incl. demolition and rebuild of detached garden studio (C3).

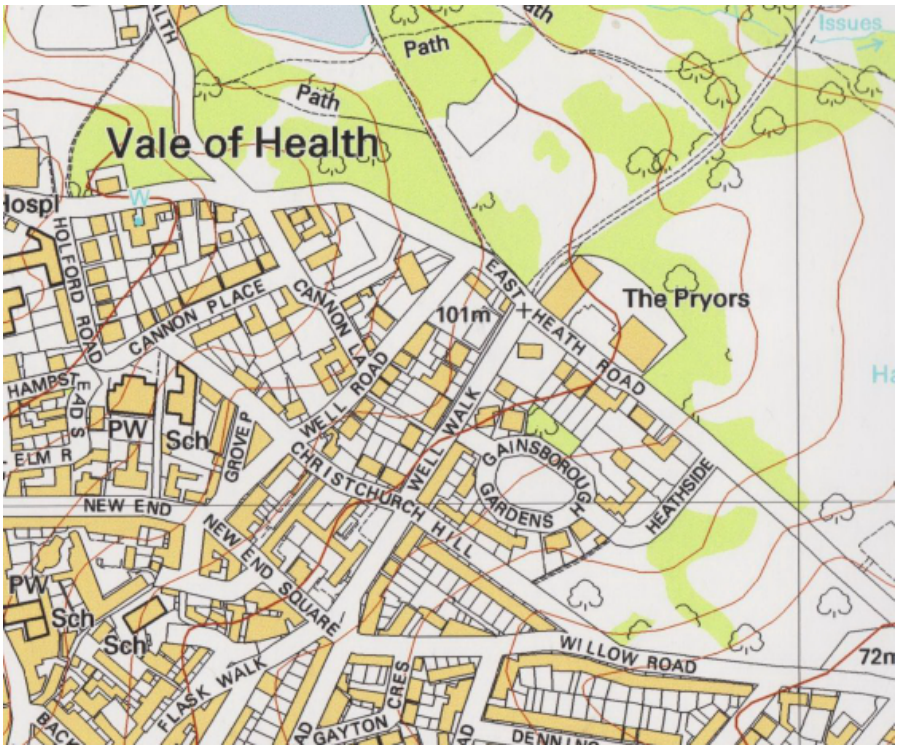
This is one of the most hydrogeologically challenging sites of Hampstead and in view of the listed buildings at risk in its vicinity, I am asking for refusal of this application. This is in my role as Tree Officer for Heath & Hampstead Society with an interest in the hydrogeology of the area and its potential effect on trees here.

GEA in their Basement Impact Assessment report went back to the 1879 OS map but the 1866 OS map also shows the house as present in 1866. Not only this, but many wells and springs plotted around the area:

The Redington Frognal and Hampstead Neighbourhood Forums have commissioned Arup to produce a map of water courses and features in our area. From their interim results (still far from fully inclusive) many features can be seen in the immediate vicinity:

The GEA BIA report acknowledges that: ' *The boundary between the Claygate Member and overlying Bagshot Formation is approximately 50 m to the northwest at a level of approximately 110 m OD, around 6.00 m above the level of the site.*' The report fails to state the relevance of the dotted line here on the British Geological Survey map, and that it is a spring line. It is almost unbelievable that the answer to the second question from 3.1.1 'Subterranean (groundwater) Screening Assessment': "*Is the site within 100 m of a watercourse, well (used/disused) or potential spring line?*" is '*No*'! This very partial desktop study completed by those who are unfamiliar with the conditions in Hampstead is completely inadequate.

The modern OS map shows that Christchurch Hill runs at exactly right angles to the contour lines, indicating that groundwater is likely to follow this course. The stream that runs beneath the passageway from Well Road to Well Walk and in the past fed the public well here before flowing to the pond previously on the site of the central gardens of Gainsborough Gardens (see 1866 OS map) follows this same course to the east.



Coupled with evidence from the 'Flood map for surface water', this shows that while 26 Christchurch Hill might not be at high risk of flooding, many roads very nearby are. Any construction that affects the surface run-off and groundwater to these roads as 26 Christchurch Hill does here is risky for them.

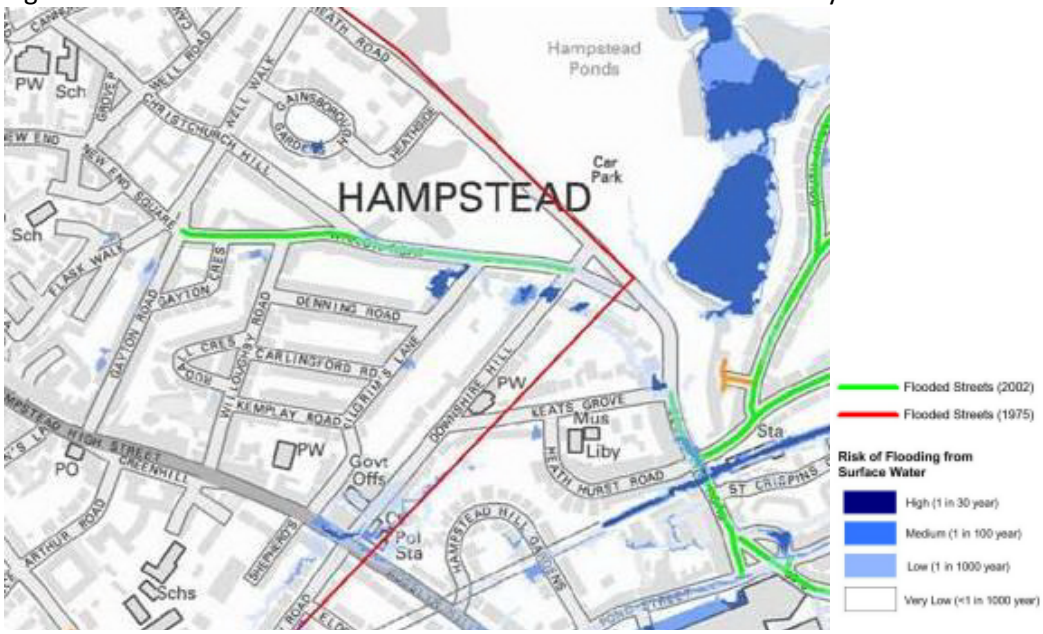
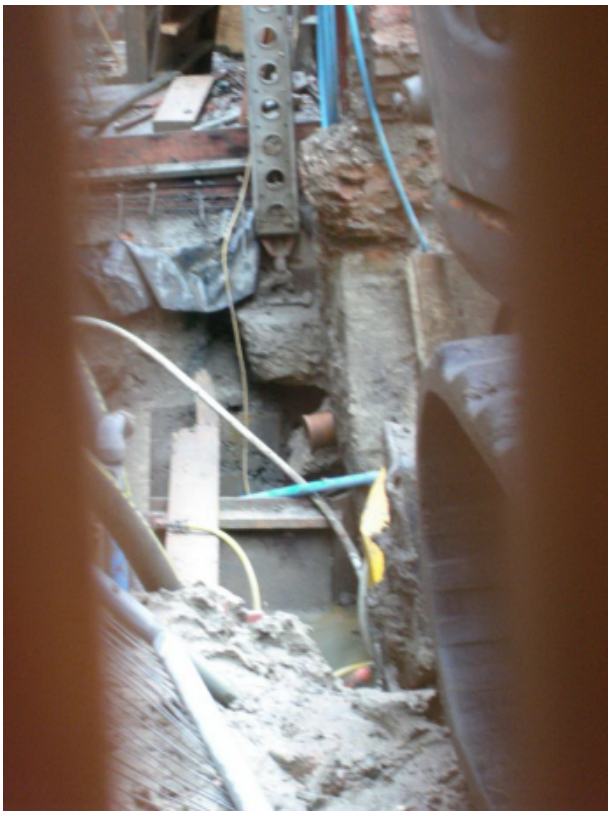


Figure 3iii) Environment Agency updated Flood Map for Surface Water from 'London Borough of Camden Strategic Flood Risk Assessment 2014'.

This whole area is prone to subsidence and roadway collapse from erosion of the silt from the underlying soil by ground water action. The crossroads of Well Road and Christchurch Hill here have a long history of very large (2 metre wide) pothole formation - often referred to by locals as sink holes. The pavements in this area are virtually never flat!

The key concern for this plot is that it is immediately 'up-stream' of its neighbour 22 Christchurch Hill that underwent a pretty catastrophic event during digging out of its basement. This event from 2007-9 is either unknown or ignored in this application.

The BIA report notes that: 'The neighbouring No 22 to the southeast of the site was granted planning permission for the excavation of a single level basement in June 2007.' However it fails to report that the basement dig here broached water under pressure in a sand parting, a lake rapidly formed under the house and there was immediate settlement of the building and its semi-detached neighbour requiring shoring up. The pictures below were taken some time after (December 2008) *while* 24 hour pumping was on-going.



It took the developers here 18 months to solve this problem and stop the water gushing, while neighbours had to tolerate the noise of 18 months of 24 hour pumping of this water. The erosion that this water caused and subsequent settling of the buildings' foundations - not to mention that of the roadway - would have been very rapid and very expensive to put right. The delay of 18 months alone must have been very expensive.

It would appear to be common sense to expect the path of this water under pressure in a sand parting to pass through 26 Christchurch Hill. This indicates that -

- a single borehole advanced to a depth of 15.45 m by means of a dismantlable cable percussion drilling rig;
- a series of three window sampler boreholes advanced to a depth of 6.00 m;
- two manually excavated trial pits to depths of between 1.00 m and 1.10 m;

- is totally inadequate, particularly as only TP2 is likely to have encountered this water course.

Considering the history of this site and the presence of a known water course, a rigorous survey right across its potential pathway should be undertaken until it is found. Such water-containing sand partings can be easily missed by conventional borehole separation distances and a form of scanning is suggested to avoid breaching it again, following discussion and guidance from the experts and construction team of 22 Christchurch Hill. This would be more likely to avert a crisis whereby local trees could be drowned and local buildings, local services and the roadway again have their foundations undermined. The large proportion of silt and sand within the clay here means it is very erodible, and from the experience of 22 Christchurch Hill and elsewhere in Hampstead, this can be very rapid.

It is unusual for planning permission to be given for a basement below a listed building, and particularly a building with such detrimental neighbouring hydrogeological and subsidence history. In order to protect this listed building and its listed near neighbours - up to 300 years old - it is requested that Camden refuse this application. If Camden is minded not to refuse this application despite the risk to listed buildings, it is requested that it still requires that planning permission is not given until

1) Appropriate groundwater exploratory measures are taken to establish the course of the water under pressure that inundated the 22 Christchurch Hill site and clearly likely to traverse the 26 Christchurch Hill site.

2) Appropriate measures are described that will be used to protect the trees and buildings on site and nearby from water inundation

3) It is known that effective measures will be available in the event of a sudden rapid unexpected breaching of the water course that is under pressure

4) Appropriate grouting and other engineering techniques are extensively used in order to prevent movement of this and neighbouring buildings, particularly those that are listed.

5) Appropriate insurance to cover the added risk to recompense neighbours and the tax payer for damage to property, private and public, by ground water inundation, soil erosion and building subsidence/collapse.

6) Thames Water is made aware of the risk and provides a report concerning the risk to nearby roads downstream that are presently a flood risk.

Since even testing, such as the penetration of boreholes, may breach the water course, I ask that Camden do not leave this to a section 106 but ensure that the appropriate experts demonstrate that they are fully aware of what is involved here prior to permission being granted.

The BIA states: "any interpretation is based upon GEA's engineering experience, ***local precedent where applicable*** etc." [my itialics]

This is most clearly not the case.

Tree Protection

While the Tree Protection proposed by the arboriculturalist may be thought appropriate for this application, I am still concerned that existing paving slabs are deemed sufficient protection for the lime tree T6, and *if this application is consented*, request additional protection is provided leaving a large margin for error regarding the weight of machinery that might be used, particularly in the event of rapid water inundation and the resultant need for extra shoring up of the sides of the dugout basement.

Pumping equipment should also be available in readiness for such an event to prevent drowning of the trees' roots on this site and of neighbouring and street trees.

Dr Vicki Harding

Tree Officer, Heath & Hampstead Society