

**Technical Note on the geology and groundwater at Kemplay Rd
with special reference to the application
2016/1313/P for 20 Kemplay Rd NW3 1SY**

Background

1. This note has been commissioned by Ms. Miranda Hall and Ms. Lynne Zilkha of 18 Kemplay Rd. I am a Chartered Geologist experienced in ground engineering and am an Adviser on the UK Register for Ground Engineering Professionals.
2. The application for 20 Kemplay Road is modest by many standards but not without potential problems arising from the ground; problems that should be addressed by the engineering design of the works.
3. Basically the properties in Kemplay Road are sitting on material that has been transported downhill and in doing that have acquired an ability to transmit shallow ground water. This water comes from rainfall whose recharge to the ground is augmented by soakaways, leaky utilities and the many sustainable urban drainage systems that have been granted permission uphill of the site in old Hampstead. As such groundwater from rainfall can come in pulses that are short lived, appearing soon after rainfall and vanishing thereafter.
4. There is anecdotal evidence from neighbours in Kemplay Road. that they have experienced dampness in their properties that has had exactly this character – “here today and gone tomorrow”. Thus it would be reasonable to ask that this be considered when interfering with the near surface paths of groundwater flow, which this proposal (2016/1313/P) intends to do.

Detail

5. Kemplay Road has an overall slope of between 3 to 4 degrees but sits on a slope that is slightly steeper overall and shown on the 1:25,000 scale map of the British Geological Survey (Map 256) to be in an area described as having a “propensity for Head”. Head is a rather loose technical term for material that has been transported downhill as a mixture of mudflows and hill wash. Much of the Head accumulated towards the end of the Ice Age when the climate was akin to that of modern day Tundra.
6. The Head itself is a mixture of clay, silt, sand and gravel derived from the strata immediately uphill, in this case from the Claygate Member of the London Clay and the Bagshot Beds. It tends to have poor stratification and be difficult to describe, and for this reason is usually described as Made Ground in borehole logs; i.e. deposited or reworked by man. Whilst that is undoubtedly true when anthropogenic debris is present (e.g. bricks, clinker and pipes) the

great majority of it is not. Stringers of sand and gravel within the Head provide it with the means to transmit water.

7. Being often no more than 1m to 2m thick it is a near surface shallow aquifer that is intercepted by basements and other sub-surface extensions. In the case of Kemplay Rd and those roads parallel to it, viz. Carlingford Rd, Denning Rd and Willow Road, the downhill flow of this shallow water will mainly be below their back gardens and the roads themselves, as the houses appear to have cellars in the order of 2.75m deep which would block such flows and divert them beneath the road and the back gardens.

8. This application actually requests the downward extension of the house, so exacerbating any such problems, and it is not clear whether the 20cm shown is to the formation level or the floor level required; if the latter then the excavation will be deeper. Given that this extends over a large section of the footprint of the house, further extensions into the back gardens, as are proposed here, are not without consequence, as these will provide obstacles to flow that is already being interrupted and cause water levels to rise.

9. It would therefore be appropriate for the design of application 2016/1313/P to accommodate this shallow ground water so that it is not impeding its progress. For this to be based on factual data some appropriate measure of groundwater on site would be needed. As explained in paragraphs 3 and 4 above, that would need catching the water when it comes – something that only continuous monitoring can do over a period of wet weather.

10. If factual data of ground water is not to be acquired then a conservative design for bypassing groundwater should be implemented, justified by calculation of likely fluxes. Discharge to the sewers should not be an option.

11. There is a secondary issue of stability of the excavation, shallow though it is. The downhill movement described in paragraph 5 is known to have involved downhill shearing that has imparted to the ground thin seams of material that has a very low shear strength; these are known as surfaces of residual shear strength. If exposed, and they are no thicker than sheets of paper and not easy to see, movement on them can occur into the excavation that exposed them. In the case of Kemplay Road this would permit ground uphill of No.20 to move downhill.

12. Thus, although shallow, the anticipated excavation is not without risk and the design should remove that risk both at the construction management stage and in the strength of the permanent works.

13. It is understood that ground investigations will be undertaken by structural engineers and so it should be noted that in accordance with Camden's requirements, matters geological should be dealt with by qualified geologists and that geological evidence presented by others should not be accepted.

Conclusions

14. The shallow excavations proposed in the application 2016/1313/P are not without implications for both groundwater and stability.

15. Groundwater naturally flows at a shallow level downhill under the back gardens of Kemplay Road and under the road itself, and the flows that would have been beneath the properties of Kemplay Road will be diverted into these paths also.

16. Thus extensions into the back gardens will interfere with these flows.

17. This shallow groundwater should either be investigated or accommodate in design at a conservative level before permission is approved, there being no policing of it after permission is approved.

18. Ground stability is also an issue that should be addressed before permission is approved, there being no policing of it after permission is approved.



MH de Freitas PhD, DIC, C.Geol, C.WEM
Director First Steps Ltd, and
Emeritus Reader in Engineering Geology
Imperial College London.
Ground Engineering Adviser,
UK Register of Ground Engineering Professionals (RoGEP) (68302453)