



**Geotechnical – Geoenvironmental**  
**Structural - Civil**

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Our ref. G2105-RP-01

Your ref.

26th March 2021

Peter Corner & Susan Wyatt  
6 Well Walk  
Hampstead  
NW3 1LD

Dear Peter, Susan,

**P. A. 2020/5836/P; 8 Well Walk NW3 1LD - Basement Extension**

I refer to your instruction of 8th February to advise you impartially of the risk to your property associated with the scheme proposed by this application and have now reviewed the Basement Impact Assessment following publication of the full document earlier this month.

My conclusion is that although, with adequate and properly interpreted ground and structural investigation, it may eventually be possible to design and execute the proposed basement extension successfully and without significant risk of damage to your house, the current BIA fails to demonstrate that possibility.

At present, the information provided is not adequate for that purpose and in ignoring some potential hazards and attempting to resolve others unrealistically, the BIA fails to demonstrate that the risk to your house is insignificant in accordance with industry standards of good practice [1] and to the more particular requirements of Camden LPA.

**Setting & intent of application**

1. No. 8 Well Walk is a four-storey property, 5m wide and 8m from front to back with a 2 storey back extension, which is situated within a terrace of seven broadly similar c.19 houses. The terrace was built on the site of a former military barracks. Facing the terrace from the road, ground in this part of Hampstead slopes down from front to rear and less steeply down to the right. No.8 is fourth from the left end of the terrace and Nos 6 and 10 are respectively to its right and left. Whilst Nos.8 and 10 are at the same level, your property at No.6 is set down slightly relative to No.8.
2. Your house has a basement and you informed me that it was installed by some previous owner, that it has a normal habitable height, is both fitted for and has residential use, and is free from damp.
3. No.8 has a narrow cellar next to the party wall with No.10 which extends for the length of the four-storey building with a depth of 1.5 m and width varying from 1 m to 1.7 m.

4. The applicant proposes to extend the cellar to provide basement accommodation over the full footprint area of the four-storey building and anticipates that excavation will extend to approximately 2.6m below ground level at the front of the property and 2.0m at the rear.

**Significance of geology and hydrogeology not considered.**

5. The BIA provides much consideration of geo-environmental risk associated with solid fluid and gaseous ground pollution arising from the former use of the land, and less of the risk associated with ground movement arising from the proposed basement extension.
6. Within the initial desk study, the BIA correctly identifies the shallowest naturally deposited stratum below the made ground as the Claygate member of the London Clay formation but offers little consideration of its geotechnical properties affecting construction risk for this project.
7. The Claygate member consists of layers of clay containing differing amounts of silt and sand, and randomly intervening layers of sand. In undisturbed state it is well known for its propensity to allow precipitation and spring water to drain through the permeable layers to cause groundwater and instability difficulties for excavations before accumulating as a perched water table on the impermeable London Clay below.
8. The possibility of the site being affected by springs must therefore be considered. There is a continuous spring line 85m from the front of the property and more than 10m higher than the excavation proposed. The line is evident on geological maps, in reference [1] and is marked on the maps used for the BIA as a spring better known as the Chalybeate Well. These are ignored by the BIA.

**Significance of made ground not considered.**

9. Two boreholes made in the rear garden of the site extended respectively to 6m and 4.45m below ground level, the deeper of the two apparently being close to the rear wall of the house. They each encountered nearly 2.5m of rubbly made ground above the Claygate member. The investigation did not extend to a trial pit investigation of existing footing depths and the material in which they are founded.
10. Neither the BIA nor its structural engineering addendum consider the possibility that the made ground might continue below the property or that made ground so close to the house and extending below the proposed basement depth might impact upon the ease and safety of construction. The type of made ground described is usually unstable in excavations and readily allows groundwater entry.

**Perched water table depth not demonstrated.**

11. According to the borehole record, free groundwater was not encountered during excavation but material deeper than 1.5m was notably damp. Subsequent measurement found water at a depth of 5.05m. Due to the nature of the Claygate member, water draining through the more permeable layers often, if it appears at all during drilling, appears in boreholes at unexpected depths and at depths

which vary between closely spaced boreholes. Equally, the period required for water to reach its true standing level may (and locally has) varied from days to months.

12. The investigation was reportedly supervised by an engineer but no meaningful engineering report of the work and no indication of monitoring information, dates of water level measurement or indication of the period over which monitoring was undertaken are provided.
13. The boreholes were excavated on May 1st 2019. The preceding month had been largely dry and the Centre for Ecology and Hydrology reported falling groundwater levels nationwide. An automated weather station in Hampstead reported the month's rainfall as 12.4mm which was 28% of the average for April. The situation did not really recover until July.
14. Without better information the reported groundwater depth in the site cannot be accepted as the norm. It follows that it is not possible to conclude from the BIA that the excavations proposed would be above the perched water table.

**Damage risk assessment is unrealistic.**

15. Nothing is known of the age, and construction, including waterproofing of the No.6 basement.
16. The BIA anticipates that the party wall with No.10 and both front and rear walls of No.8 will be underpinned but assumes that the existing basement of No.6 extends below the depth of the proposed excavation and that no underpinning or other stabilisation of No.6 will be required. It is proposed to make further investigation to test this assumption and apply any necessary adjustments before construction.
17. Pending that, the structural engineering addendum proposes to connect new and existing basements by dowels drilled into the existing basement party wall and cast into the new basement floor. A handwritten calculation sheet bearing upon this is included in the structural addendum but is illegible.
18. When considering risk of damage to No.10, the BIA seeks to assess the risk using the approximations of ground movement suggested by CIRIA Report C760 for installation of and excavation in front of embedded retaining walls in conjunction with the Burland method of risk assessment. Some dimensions used for the assessment conflict with the principles of the method and appear to have been introduced as a means of securing the required result.
19. Also, ground movement caused by installing embedded retaining walls bears no resemblance to movement caused by constructing retaining walls by the underpinning method. There is no rational method of calculating the latter and in lieu Camden LPA requires a notional allowance of 5mm lateral and vertical movement to be incorporated in risk assessment calculations.

20. By the same token, ground settlement profiles behind the wall caused by the process of excavating in front of underpins differ from those caused by excavation in front of embedded walls. However, such movements behind underpinned walls are usually small by comparison to those resulting from wall installation. Perhaps consequently, it seems customary for Camden to accept software estimates of C760 excavation movement.
21. Applying these provisions in accordance with the theory of Burland's conceptual elastic beam model places the damage risk for No.10 in damage category 2 rather than within the category 1 limit set by Camden LPA.
22. Whilst this is important, it is of more importance for this report that settlement of the Nos.8/10 party wall has some potential to impact upon the basement of your house.
23. Settlement of the Nos.8/10 party wall would transfer additional load through the structure of No.8 to the Nos.6/8 party wall and, despite the possibility that the wall is supported by the existing basement floor, the additional load would tend to cause the existing basement wall to settle. The tendency would be increased by removal of the existing lateral soil pressure from the existing basement wall as the new basement was excavated.
24. Since it would take place before any potentially relieving ground heave occurred, movement due to this redistribution of load would present some risk of damage to the basement and its waterproofing system. Determining the consequence of damage to that system requires reliable information about groundwater levels. Determining the probability of damage requires knowledge of the basement construction and waterproofing method.
25. The risk has not been considered and nothing is reliably known about any of these matters. Until this lack of knowledge is remedied, risk assessment protocol requires that the risk of damage be considered high.

Yours sincerely



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Eldred Geotechnics Ltd

[1] Arup 2010. Camden geological, hydrogeological and hydrological study.