

Our Ref: SP/lb/214071

Cliff Willis
Harrison Varma
98 Great North Rd
East Finchley
London
N2 0NL

31st March 2014

Dear Cliff

99A Frognal, Hampstead

Further to your email dated 25th March 2014 highlighting queries raised by Card Geotechnics against our damage assessment report, we are pleased to respond as follows. The questions raised are in italics with responses immediately below.

The report consists predominantly of visual inspection of the site and perimeter structures with reference to additional calculations that have been undertaken regarding the two areas of the site that fall into 'slight'. A substantial portion of the report is review of the work undertaken in the previous GEA analysis and we have noted this.

Correct. GEA have produced a detailed basement impact assessment. We have carried out a detailed structural survey of the adjacent structures to check for defects, apertures or structurally significant features that would affect the damage potential of the development. GEA's basement impact assessment is based on ground movements and damage potential generated from x-disp. Whilst this is the readily accepted method, x-disp idealises walls as stiff, regular planes taking no account of age related defects or apertures that could lead to stress concentrations or affect the strain calculation.

Our report develops their findings from a Structural Engineering viewpoint and identifies opportunities to limit damage potential. It also highlights that whilst the north and south boundary's are noted as category 2, the reality is the length of wall on each boundary that sits in category 2 are only a few metres long and only marginally exceed the upper bound of category 1. Our report draws together the geotechnical studies produced by GEA and Foundation Piling and looks at damage potential from a structural engineers viewpoint. These are subjective

at times but based on sound engineering reasoning to apply good and safe practice in key areas to drop the damage potential. This is a method we have used with London Borough of Camden, most notably at 9 Downshire Hill which was subjected to a major study of our work by Arup.

Section 4.5: GEA temporary prop levels: 121mOD & 117.3mOD, permanent prop levels 114.4mOD & 120mOD

Section 4.5 confirms the prop levels used by GEA for the western boundary and not the north and south boundary's. We have corrected this and attach the correct extract. The report suggested we have lifted the basement floor for the relevant boundaries which is not the case. The permanent prop positions for the north and south boundary's remain at 115.5m.

Section 6.1: Refers to 'correction parameters' in CIRIA, what are these?

MNP and GEA have consulted with Arup on development in the strata prevalent in Hampstead. The 'correction factor' is a refined movement curve for secant wall installation. Arups's comments were....*'It is noted that since the analysis is conservative, the ground surface movements predicted in Fig 2.8 of CIRIA 580 have been reduced by 50 %. This is because the data upon which the graphs are based is extremely limited and in these ground conditions, if care is taken pile during installation and sequencing then a lower value, closer to that of a contiguous wall, is more appropriate.'* It should be noted decisions over secant or contiguous have not been made and our report highlights that we have the ability to apply correction factors in that instance.

Section 6.3: Temporary prop levels are the same as GEA, permanent prop levels are at 115.5mOD & 120mOD. This is effectively revising the basement floor slab level in the final scheme, which would presumably constitute a significant redesign of the new basement. It is not clear if the revised analysis allows for a higher excavation level as well.

Please refer to our response under item 4.5

Section 6.4: Notwithstanding comment above, it is not clear how the revised construction sequence brings potential damage category into 'Category 1', no calculations of ground movement, deflection, or building damage assessment have been provided.

No sequence improvements have been made at this stage as no sequence has been defined. It is not a planning requirement in this instance to produce a Construction Method Statement. Therefore at this stage the sequence is defined as that laid down in the Wallap analysis which is a traditional sequence. The damage categories at the north and south boundary are marginally in to category 2 suggesting the crack width potential will be close to the lower bound.

It is important to note that any refinements to the Wallap runs will not generate more favourable results within x-disp. This is a limitation of the programme and why x-disp should be used to determine ground movements and flag areas of potential damage that require careful construction consideration from sequencing, active propping techniques etc. At 9 Downshire Hill

areas of category 2 damage were predicted and accepted as there is no legislative reason to preclude development with this damage potential. The assessment allowed MNP to set target positions and the movement monitoring trigger levels. Through a period of careful monitoring we have been able to track the movements under piling and report the actual against the predicted movements allowing the x-disp model to be refined. The active propping techniques specified incorporate flat jacks to allow the movements to be 'locked off' before damage occurs. Whilst category 2 damage was predicted we have experienced negligible damage to neighbouring properties. We highlight this project due to the significant parallels to Frogal Way which highlights the management of damage is initially based on estimated/idealised output from x-disp which can be mitigated and reined in with the correct structural engineering response. Our primary way of achieving this at Frogal is to limit the pile deflection by adopting the design methods laid down by Foundation Piling and to provide active propping measures in the zones of potential damage. Target positions for level monitoring are located in response to this

Section 9.3: What are the predicted WALLAP movements? Is it possible to modify the permanent prop (i.e. basement floor slab level)?

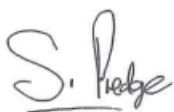
We didn't attach the revised Wallap runs as they are lengthy files. However, we attach to this letter the files that confirm the stated reductions in pile deflections.

We agree with the sentiment that revising the construction sequence/propping levels in these critical locations can potentially reduce damage categories to Category 1, however this is not conveyed in the information provided.

We trust our response provides the structural engineering overview necessary to accept that damage potential that currently sits in category 2 for 2 very localised lengths of wall can be mitigated and reduced to category 1.

If any further information is required then please contact us.

Yours sincerely



STUART PLEDGE
For Mason Navarro Pledge Ltd

+ enc (Wallp calcs by Foundation Piling, GEA extract of north wall props)