

Date: 8 September 2021

Ref: 33177PN3 let1

Richard Crookes Constructions
Level 3, 4 Broadcast Way
ARTARMON NSW 2064

Attention: Joe Hanna
via Aconex

GEOTECHNICAL OPINION
PROPOSED SCHOOL IN MULGOA RISE
1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

From an Aconex communication dated 7 September 2021 and discussions with Mr Joe Hanna of Richard Crookes Constructions, we understand that Penrith City Council are aware of houses in the subdivision surrounding the proposed school being bought back by a developer due to 'significant damage', and that the damage is suspected to be associated with subsidence of the deep fill present below those houses, which also extends onto the site.

This letter must be read in conjunction with our previous report Ref: 33177PN2rpt Rev1 dated 29 July 2021 which reports the results of a geotechnical investigation completed for the proposed school.

Our previous investigation disclosed the presence of deep fill on this site, associated with the backfilling of a previous quarry.

We further understand that the proposed school buildings, including ground floor level slabs, are to be supported on either piles or controlled modulus columns, with both of these options transferring structural loads to the underlying siltstone bedrock profile. Subject to appropriate design, such foundation options will result in the proposed buildings being effectively isolated from possible settlement of the fill profile.

Due to the possibility of settlement of the fill, we recommend the following with regards to services for the proposed school:

- All services to structures supported on piles must incorporate flexible connections to allow for possible differential movement of the fill and structures.
- The sewer and stormwater be constructed with exaggerated falls so that negative gradients do not result if differential settlement of the fill profile occurs.

We note that the design of the piles and/controlled modulus columns will need to allow for negative skin friction loads arising from settlement of the fill.



Further to the above, the pavements and landscaping surrounding the proposed buildings will also be subject to possible settlement of the fill, which could result in settlement relative to the buildings, differential movement of the pavements, or cracking. Given the light weight nature of the majority of the pavements, we consider that if differential movement were to occur, remediation would be relatively straightforward. In that regard, consideration should be given to the use of segmental block pavements which can be lifted and relayed as necessary. We note that if controlled modulus columns are adopted to support the proposed buildings, the pavement surrounding the buildings would most likely also be supported by the controlled modulus columns and would therefore not be subject to differential movements. For landscaped areas, we consider that any settlement would be able to be readily addressed by topping of garden beds, top dressing, and the like.

Provided the design recommendations with regards to the structures and services discussed above are adopted, we consider the residual risks to the project will be relatively low, and predominantly related to possible movement of pavements, as also discussed above.

We note that the design of controlled modulus columns is a specialised activity, and so the design and construction should be completed by experts in that field, and they must be required to provide certification on the performance following the construction of the columns.

Should you require any further information regarding the above, please do not hesitate to contact the undersigned.

Yours faithfully
For and on behalf of
JK GEOTECHNICS



Nicholas Smith
Senior Associate | Geotechnical Engineer