

**Health Infrastructure**  
**c/- Johnstaff Projects (NSW) Pty Ltd**  
**Level 12 / 70 Pitt Street**  
**SYDNEY NSW 2000**

Project 38227.03  
12 April 2016  
R.001.docx  
AC:ac

Attention: Mr Matt Inch

Email: matt.inch@johnstaff.com.au

Dear Sirs

**Geotechnical Comment**  
**Proposed Aged Care Facility**  
**22 Hospital Road, Bulli**

As requested, Douglas Partners Pty Ltd (DP) has reviewed existing information and undertaken a site inspection in order to provide comment on the geotechnical aspects that will need to be considered for the construction of a proposed aged care facility at 22 Hospital Road, Bulli.

DP has previously undertaken a geotechnical investigation of the Bulli Hospital site (which includes 22 Hospital Road) with the results given in a report (Project 38227) dated 22 August 2003. The investigation comprised borehole drilling followed by laboratory testing of selected samples, engineering analysis and reporting. The report includes comments on stability assessment, site classification, site preparation measures, excavation and support, foundation options, site maintenance and drainage considerations and preliminary pavement thickness designs.

Preliminary sketches provided for geotechnical comment indicate that the proposed development comprises an aged care facility including two-storey structures on the upper western terrace (ie existing car park) and a four-storey structure on the lower eastern terrace. It is estimated that excavation to depths of up to 7 m will be required to achieve a ground floor level at RL 27.5 for the four-storey (eastern) structure. Maximum excavation depths of around 2 m are anticipated in the western section of the site to achieve a ground level of RL 36.0.

An inspection of the site by the writer on 4 April 2016 confirmed that surface conditions were virtually unchanged from those observed at the time of the DP August 2003 report. Accordingly, it is considered that the comments given in the 2003 report are still applicable. The following specific comments are also provided:

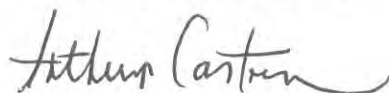
- The results of the 2003 investigation indicated the presence of an uncontrolled filling platform that was considered to have a *moderate to high* risk of damage to property occurring should development be undertaken on the platform in its present condition. Accordingly, the site preparation measures outlined in Section 5.4 of the DP August 2003 report included removal of all existing filling and treatment of weak natural subgrade followed by filling under controlled conditions.

- Due to the generally "wet-of-optimum" conditions encountered, allowance will need to be made for some over-excavation and replacement with a bridging layer of ripped rock, or equivalent together with the installation of subsurface drainage.
- Section 5.6 of the DP August 2003 report provides guidance on batter slopes. In summary, the report suggests maximum temporary sideslopes of 2:1 (horizontal:vertical) in existing uncontrolled filling and 1:1(H:V) in the stiff clays and extremely low to very low strength rock. Permanent batters should be no greater than 2.5:1(H:V) in controlled filling and stiff clay and should be topsoiled and vegetated as soon as possible after construction to minimise soil erosion.
- It is understood that comment is required on the geotechnical appropriateness of steeper temporary batters. In this regard, steeper slopes must only be considered at those locations where there is sufficient distance for slumped material (if the batter was to fail) to accumulate without causing damage to downslope structures. Notwithstanding this, an increase risk of slumping (particularly during and following inclement weather) must be acknowledged and accepted. Furthermore, additional vigilance will be required during construction to monitor the slopes to ensure personnel safety.
- Steeper batters (to no steeper than 1:1 in uncontrolled filling and 0.75:1 in stiff clays and extremely low to very low strength rock) could be feasible but limited to the eastern end of the existing fill platform (where there is a buffer to the neighbouring ambulance station). As a precaution to personnel safety, daily inspections of the batters must be undertaken by the site manager to assess changes in the batter profile and/or propagation of tension cracks that would be indicative of slope movement.
- All excavations must also be regularly inspected by either an experienced geotechnical engineer or engineering geologist who can advise on remedial requirements if adverse or variable conditions are encountered.
- Due to the close proximity of residential development, steeper batters than those previously nominated are not considered geotechnically appropriate for the northern and western extents of the fill platform.
- Where there is insufficient space for temporary batters, either temporary shoring or the construction of soldier pile or contiguous pile retaining structures will be required. The design of shoring and retaining structures will also need to take account of any lateral loads due to inclined surfaces, nearby structures or accessways.
- Whilst detailed review of foundation options can only be undertaken once footing loads become known, based on previous experience with similar developments, it is expected that a deep footing system founding on the underlying weathered bedrock will be required. Comments on deep foundations are given in Section 5.8.2 of the DP 2003 report. The main advantage of a footings-to-rock foundation system would be that settlements (both total and differential) would be minimal.

It is noted that additional assessment may be required as the planning and design of the development proceeds. Whilst it is considered that development of the site for the proposed development is geotechnically feasible, construction will be a challenge due to the variable ground conditions. Discussion of the geotechnical considerations are given in the DP 2003 report together with the specific comments given above.

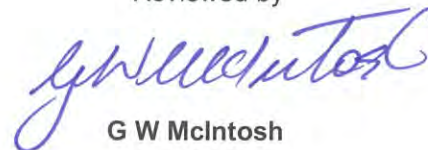
Please contact the undersigned if you have any questions on this matter.

Yours faithfully  
**Douglas Partners Pty Ltd**



**A Castrissios**  
Principal

Reviewed by



**G W McIntosh**  
Principal

Attachments:      [About this Report](#)

# About this Report

## Douglas Partners



### Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

### Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

### Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

### Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

### Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

# *About this Report*

## **Site Anomalies**

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

## **Information for Contractual Purposes**

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

## **Site Inspection**

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.