

Business Securities Pty Ltd
3/14 Esther Road
Mosman NSW 2088

Project 24750.02
19 July 2013
RKL:pc

Attention: Mrs E Cox

Dear Elaine

**Unit 16, 20 Narabang Way, Belrose
Development Application DA2013/0714
Preliminary Geotechnical Assessment and Report**

As requested the site was inspected to assess the requirement for a full geotechnical report, as required by the Warringah Local Environment Plan 2011 and the Warringah DCP for areas identified on the Landslip Risk Map – sheet LSR 001_012 and indicated in the letter from Warringah Council dated 28 June 2013. The above site is located in an area identified as Area B – Flanking Slopes 5° to 25°.

It is understood that, and inspection of the site confirms, the relevant works have already been carried out and comprised the construction of a hardstand car parking area at the south-eastern corner of Unit 16 on the above site.

The construction comprises an on-grade concrete pavement (refer to Figure 1 below) which is supported at the western side by a concrete block retaining wall of up to about 1.4 m height (refer to Figure 2).



Figure 1. 270° panorama of the hardstand area (distortion due to photo merging).



Figure 2. Panorama of the low, western side of the hardstand area.

In accordance with the "Checklist For Council's Assessment of Site Conditions ..." within Clause E10 the following information and observations are provided ;

- based upon inspection of the site and the area of the construction, there is no observed evidence or known history of significant slope instability;
- the completed works required less than 2 m of excavation or filling. Minor excavation/trimming of less than 2 m height may have been undertaken opposite the south-eastern corner of the building. Filling of average depth of about 1 m was placed against the new retaining wall at the western end of the area.
- the site is currently developed and there appears to be filling of up to about 1.8 m depth present at the northern end of the western retaining wall (refer to Figure 2). It is noted that the filling is retained by a well-constructed concrete block retaining wall, with no evidence of distress or cracking of the wall. The wall is founded on sandstone of at least medium to high strength which is more than adequate to support the wall.
- the western retaining wall is founded at the top of an excavation in sandstone bedrock which ranges from about 1.2 m to 2.6 m in height. The excavated rock face comprises medium and high strength sandstone with no adversely oriented defects observed. The excavation is considered to be stable and adequate to support the overlying wall.
- it is noted that the eastern side of the hardstand area comprises a natural cliff (refer to Figure 1), however the height is less than 3 m and, although some weathering of the lower part is likely, the exposed rock is considered to be of adequate stability.

On the basis of the above information it is considered that additional geotechnical assessment, with respect to Landslip Risk, is not required. It is also considered that the development has been completed in a geotechnically stable condition.

This assessment does not and is not intended to provide detailed geotechnical information for future design or construction purposes and specific investigation should be carried out as appropriate for the structural requirements for any future work.

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 20 Narabang Way Belrose, under DP's Conditions of Engagement. It is provided for the exclusive use of Business Securities Pty Ltd for the specific project and purpose as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other sites or by a third party. DP has necessarily relied upon information provided by the client and/or their agents.

This report must be read in conjunction with all the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

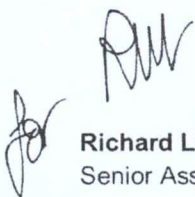
The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the geotechnical components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

We trust that these comments are sufficient for your present requirements.

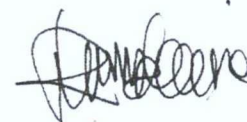
Yours faithfully

Douglas Partners Pty Ltd

Reviewed by



Richard Lloyd
Senior Associate/Senior Engineering Geologist



R W Lumsdaine
Principal

Attach: Notes About the Report

About this Report



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.

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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.