

## Memorandum

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<b>cc</b>			
<b>From</b>	Scott Easton	<b>Date</b>	18 December 2014
<b>Subject</b>	UNSW Biological Sciences Project SEARS Item 13	<b>Project No.</b>	73492.03

This memorandum provides comments in relation to Item 13 of the Secretary's Environmental Assessment Requirements (SEARS).

Based on drawings prepared by Woods Bagot Pty Ltd (Project 120277, Revision A) it is understood that the proposed development includes the construction of a new 9 storey building. The proposed lower ground floor level is RL53.47 m relative to Australia Height Datum (AHD), which is generally close to, or slightly above the existing surface level across most of the site, but is approximately 2 m to 3 m below the raised area on the north-eastern corner of the site. It is expected that the proposed building will require relatively minor excavation to depths of approximately 0.5 m to 1 m across most of the site for footings and services, with localised excavation to depths of approximately 2 m to 3 m on the north-eastern corner of the site.

The SEARS Item 13 requires three issues to be addressed as outlined below with a corresponding response:

### **Undertake a Geo-technical Investigation including an assessment on the impact of groundwater**

Douglas Partners Pty Ltd (DP) carried out a geotechnical investigation for the project and prepared a report dated 28 June 2013 (Project 73492). The investigation included the drilling of six boreholes (BH1 to BH6) to depths of between 8.0 m and 9.8 m. Groundwater observations were made during auger drilling of the boreholes and two groundwater monitoring wells were installed in BH1 and BH4. Groundwater levels within the monitoring wells were measured 14 days after drilling with collection of groundwater samples for environmental testing.

The geotechnical report provided comments and recommendations in relation to excavation, groundwater, vibrations, shoring, and footings. From a geotechnical point of view, the comments provided in the previous geotechnical report are considered to be applicable for the proposed development.

Groundwater was measured in the two monitoring wells at depths of 1.9 m to 3.7 m (RL51.3 m to RL49.4 m) following a night of heavy rainfall. Ongoing monitoring is suggested to assess likely fluctuations.

Section 9.2.4 of the geotechnical report indicated that *"the groundwater table is expected to be a transient, perched groundwater table, seeping over the top of the rock profile. Seepage flows should be expected to increase following periods of extended rainfall. The perched groundwater level is*

*likely to be below the bulk excavation level for the lower ground level but may be intersected within localised deeper excavations for structures such as lift pits and OSD tank(s)."*

During construction of deeper localised excavations, it is anticipated that groundwater seepage, where encountered, should be readily controlled by a "sump-and-pump" dewatering system. Permanent subfloor drainage below the lower ground floor slab may be connected to a sump and pump dewatering system or possibly gravity-feeding to a lower-lying discharge point.

It is expected that the proposed excavations will not have any significant impact on the groundwater table.

#### **Provide details of the volume of soil to be excavated and removed from the site**

As outlined above, it is expected that bulk excavation will generally require excavation to depths of approximately 0.5 m to 1 m over most of the site with localised deeper excavation to depths of 2 m to 3 m in the north-eastern corner of the site. The lower ground floor footprint covers an area of approximately 1500 m<sup>2</sup> and the localised raised area in the north-eastern corner of the site (where deeper excavation is required) covers an area of approximately 270 m<sup>2</sup>. As a guide, and for the purpose of providing an estimate of the volume of soil that may be removed, it is assumed that excavation to an average depth of 0.5 m will be required on 20% of the overall site and excavation to an average depth of 3 m will be required on the north-eastern corner of the site. Based on these assumptions it is estimated that approximately 1000 m<sup>3</sup> of soil may be removed from the site. This estimate is not provided for tendering or pricing purposes and will need to be confirmed once details of the bulk excavation are confirmed.

#### **Identify measures to ensure future construction works do not impact on the water quality**

The bulk excavation is expected to be above the groundwater table. Some localised deeper excavations for lift pits and on site detention tanks may encounter perched water flowing along the top of the rock. The proposed construction works are not expected to impact the groundwater quality.

The construction works must be carried out in accordance with an erosion and sediment control plan to be prepared by the civil engineering consultant.

Further, it is understood that some underground storage tanks on or close to the site will be either removed or decommissioned as part of the project works. Removal and decommissioning of underground tanks or any potentially hazardous structures must be undertaken in accordance with recommendations provided by an experienced environmental consultant and the works must also be validated by the environmental consultant.

We trust the above comments satisfy your present requirements. Please contact the undersigned if you have any further queries.

**Douglas Partners Pty Ltd**



**Scott Easton**  
Senior Associate

Reviewed by



**Michael J Thom**  
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.

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## 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.