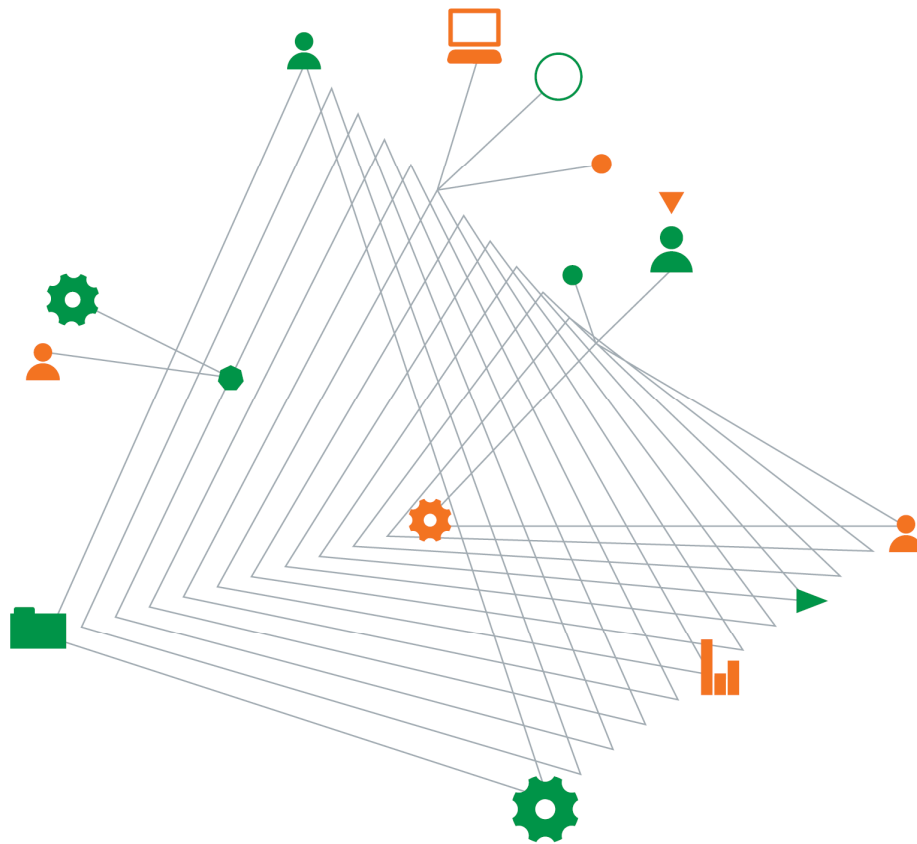


University of Newcastle

NewSpace City Campus - Laman Street Car Park

Preliminary Geotechnical and ASS Assessment

29 July 2014



Experience
comes to life
when it is
powered by
expertise

This page has been left intentionally blank

NewSpace City Campus - Laman Street Car Park

Prepared for
University of Newcastle

Prepared by
Coffey Geotechnics Pty Ltd
19 Warabrook Boulevard
Warabrook NSW 2304 Australia
t: +61 2 4016 2300 f: +61 2 4016 2380
ABN: 93 056 929 483

29 July 2014

Document authorisation

Our ref: GEOTWARA22093AC-AI

Please find enclosed our Preliminary Geotechnical and Acid Sulfate Soil Assessment Report for the proposed NewSpace City Campus Car Park on Laman Street, Newcastle, NSW

Guidance on the uses and limitations of this report is presented in the attached sheet, '*Important Information about your Coffey Report*', which should be read in conjunction with this report.

Quality information

Revision history

Revision	Description	Date	Author	Reviewer	Signatory
V1	Initial Issue	29 July 2014	S Board	R Kelly	S Board

Distribution

Report Status	No. of copies	Format	Distributed to	Date
V1	2	PDF	Damian Burke, Ethan Clark	29 July 2014

Table of contents

- 1. Introduction 1
- 2. Site Appreciation 1
- 3. Preliminary Ground Model..... 1
- 4. Geotechnical Considerations 2
 - 4.1. Retaining Structures and Footings..... 2
 - 4.2. Mine Subsidence..... 2
 - 4.3. Excavations 2
- 5. Acid Sulfate Soils..... 3
 - 5.1. Desk Study 3
 - 5.2. Aggressive Soil..... 3

Important information about your Coffey Report

1. Introduction

Coffey was commissioned by Ethan Clark of APP Corporation Pty Ltd to complete a preliminary geotechnical and acid sulphate soil (ASS) assessment for a proposed car park as part of the University of Newcastle NewSpace City Campus project.

The proposed car park is to be located on a block of land in Newcastle between Laman Street and Gibson Street adjacent to the Conservatorium of Music.

It is understood that the proposed car park is to comprise of two levels: a ground floor level to be accessed from Gibson Street; and a first floor level to be accessed from Laman Street.

The car park is anticipated to be constructed in general accordance with 'Conservatorium Car Park' Drawing DA-500 Rev 2, dated 23 June 2014 and 'Concept Sediment and Erosion Control and Stormwater Management Plan Drawings C01DA Rev B and C02DA Rev A, dated 24 June 2014 and 20 June 2014, respectively.

2. Site Appreciation

The site is currently utilised as an at grade car park. An existing retaining wall is located towards the northern site boundary and has been constructed to provide two level parking areas. The northern (smaller) parking area is accessed from Gibson Street and the southern (larger) parking area is currently accessed from Charles Street.

With reference to the 1:100,000 scale Newcastle Coalfield Series Geology Map, the site is anticipated to be underlain by Quaternary Alluvial (Aeolian and Estuarine) sand deposits. Bedrock in the area of the proposed car park is anticipated to comprise the Newcastle Coal Measures. Bedrock is expected to be encountered at shallower depths than at the City Campus site.

The topography of the site is relatively flat, low lying land that represents the southern bank of the Hunter River harbour area. The proposed Laman Street entrance is expected to be at an approximate Reduced Level (RL) of 9.0mAHD and the Gibson Street entrance at an approximate Reduced Level of 5.475mAHD. The ground level would have been expected to have inclined to the south at an angle of approximately 5°, prior to development of the existing car park.

3. Preliminary Ground Model

Coffey has completed numerous geotechnical assessments in the Newcastle CBD area. We have completed geotechnical investigation works on King Street, Queen Street, Dawson Street and Hunter Street (as well as others within the vicinity), including the current geotechnical assessment of the NewSpace City Campus site.

A superficial cover of fill is expected to be present associated with existing development of the site. Fill may be present to a depth of up to 5m thick behind the existing retaining (crib wall) structure and is expected to reduce in thickness towards the south. Fill will also be present at the northern extent of the site beneath existing pavements, which is not expected to be greater than 0.5m in thickness.

The site is expected to be underlain Quaternary sand deposits to a depth of approximately 11m. Aeolian sands are expected to be present in upper part of the Alluvium. These are expected to comprise very loose to medium dense, fine grained sand. Estuarine deposits may be present below the Aeolian deposits but are less likely to be encountered than at the Campus site.

Weathered bedrock comprising sandstone and siltstone is anticipated to be encountered from approximately 20m below existing ground level with a superficial cover of residual soil present above the weathered rock between 11m and 20m deep. Residual soils would be derived from the parent rock and are anticipated to comprise relatively loose clayey sand and stiff sandy clay.

4. Geotechnical Considerations

4.1. Retaining Structures and Footings

Piled or pad footings are expected to be appropriate for the site. Proximity of the conservatorium to the east and existing housing to the west may need to be considered during piling operations.

Driven piles may need to consider potential vibration during installation and the effect on local buildings, such as consolidation effects on sands, and people's perceptions.

Non-displacement pile excavations will need to be supported to prevent collapse. Continuous flight auger (CFA) piles or pile casing may be required.

A retaining structure is anticipated to be necessary for retention of fill or undisturbed soil between parking levels to the south of the proposed ground floor parking area. Options for the retaining structure may include gravity retaining walls (crib wall, gabion or concrete wall) similar to that currently existing on site or piled cantilever retaining structures. Piled walls may comprise either displacement (driven) or non-displacement (bored piles) types.

Depending on site working and space constraints, gravity retaining walls are expected to be suitable and may provide a lower cost option compared to piled alternatives.

4.2. Mine Subsidence

The proposed car park is located within a mine subsidence district. The structure is limited to a ground floor level parking area, which is to be constructed at the existing ground floor level of Gibson Street and a first floor level accessed from Laman Street. As the structure is limited to below three storeys, it is not expected that mine subsidence will present a significant hazard to design and construction of the car park.

4.3. Excavations

Excavation works are expected to be required during the construction works for the project. Excavation is expected to be predominantly of existing fill material and of Aeolian sand deposits. It is expected that standard excavation equipment will be suitable for use on site and there will be no requirement for ripping and/or blasting.

Effects on adjacent structures may need to be considered if excavations occur near the site boundaries.

5. Acid Sulfate Soils

5.1. Desk Study

Reference to the Lower Hunter 1:25,000 Acid Sulfate Soil Risk Map (Edition 3, 2008) indicates that the site is located in an area of Disturbed Terrain. The map states: *"Disturbed terrain may include filled areas, which often occur during reclamation of low lying swamps for urban development. Other disturbed terrain includes areas which have been mined or dredged, or have undergone heavy ground disturbance through general urban development or construction of dams or levees. Soil investigations are required to assess these areas for acid sulphate potential."*

The car park is located in an area where acid sulphate soils may be present. However, the proposed car park does not require excavation below RL 5.475m AHD. The majority of material expected to be excavated as part of the ground floor works is anticipated to be placed fill associated with the existing parking area. It is not expected that presence of acid sulphate soils will present a significant hazard to project construction unless excavation for non-displacement piles are proposed and designed to a depth below RL 5m AHD.

5.2. Aggressive Soil

Assessment of soils for aggressiveness may be appropriate, especially if piles are chosen as an option for the site. Specific aggressive soil testing should be completed in such a case. However a preliminary estimate may indicate that a moderate to severe classification given in Australian Standard AS2159-2009, *Piling Design and Installation* would be appropriate due to the proximity of the harbour and the predominately sandy soils.

Further advice on the uses and limitations of this report is presented in the attached document, 'Important Information about your Coffey Report'.

For and on behalf of Coffey



Stephen Board

Senior Engineering Geologist

This page has been left intentionally blank