



Level 19 Tower B Citadel Towers
799 Pacific Highway
Chatswood NSW 2067
PO Box 5275
West Chatswood NSW 1515
Australia
t: +61 2 9406 1000
f: +61 2 9406 1002
coffey.com

Penrith Lakes Development Corporation
PO BOX 457
Cranebrook, NSW, 2749

21 October 2013

Attention: Robert Golaszewski

Dear Sir

**RE: LANDFORM APPRAISAL - CRANEBROOK WEST LAND PARCEL
PENRITH LAKES SCHEME**

1 INTRODUCTION

Coffey understands that Penrith Lakes Development Corporation Ltd (PLDC) may offer for sale a parcel of land known as "Cranebrook West". The Cranebrook West Parcel is shown on Drawing PLDC – 11542 (Rev C) attached. The land parcel comprises 7 proposed allotments occupying a total area of about 0.825 hectares that is a subdivision of part of Lot 102 in DP 1143931. The land parcel is bounded by residential development to the east, Castlereagh Road to the west and Farrell's Lane to the north.

The Penrith Lakes site is located to the west of Castlereagh Road over former quarries that have been filled and remediated. The Cranebrook West land parcel is located at the edge of the former quarried lands.

This report presents a summary of landform information available to Coffey regarding the Cranebrook West Land Parcel for the purpose of informing potential purchasers.

2 METHODOLOGY

Coffey's appraisal has been based on review of historical quarry information, geology maps, supplied aerial photographs, and site observations of the former quarried lands by a geotechnical engineer.

3 TERRAIN

The land parcel is located near the boundary of the Nepean River floodplain and gently undulating terrain to the east. The land parcel contains part of the Castlereagh Road embankment batter on the western sides (25m AHD to 21m AHD). The general elevation of the land surface is about 21m AHD. It has been shaped with a central "basin" with a low point below 20m AHD as shown on photograph 1. North Pond (an artificial lake) is located about 100m to the west of Castlereagh Road within the Penrith Lakes site.

Photograph 1 – Cranebrook West land parcel (looking north)



4 GEOLOGICAL SETTING

The Penrith Lakes site is located within Quaternary Age alluvial soils the Cranebrook Formation. Typically the natural soil profile comprised “overburden” comprising sand, silt and clay soils overlying sandy gravel. Large areas of the Penrith Lakes site have been excavated, quarried to remove the sandy gravel resource, and backfilled with the excavated overburden.

The Cranebrook West Land Parcel is located along the eastern perimeter of the quarried lands and is partially underlain by fill, and partially by natural ground. Drawing PLDC-11542 (Rev C) shows the location of the former quarry face. It is expected that the land to the east of the quarry face comprises relatively undisturbed alluvium, underlain by shale. Quarrying at the Penrith lakes site exposed shale bedrock level varying between about RL 6m and 10m AHD. This may also be indicative of the rock depth beneath the land parcel.

The typical ground level to the east of the Castlereagh Road embankment is about RL 21m AHD. Cranebrook Road is about 150m east of the Cranebrook West land parcel. To the east of this road, the land begins to rise at the geological boundary with Ashfield Shale.

5 HISTORICAL QUARRY INFORMATION

PLDC gathered historical information to develop a Fill History for the eastern portion of the Penrith Lakes site; however, the Cranebrook West Land Parcel is not included within a designated Fill History Area. The land parcel is immediately east of Fill History Area 17a, where it was reported that the resource was not quarried.

6 HISTORICAL PHOTOGRAPHS

Coffey has been provided with a series of aerial photographs taken at intervals between March 1978 and December 2010. The photographs show disturbance and local excavation within Lot 102, but not deep quarrying to extract the resource, as indicated in photograph 2.

Photograph 2: Aerial photograph from c.1987.



It is possible that the resource was extracted up to the indicated position of the high face on Drawing PLDC – 11542, but this is not evident in the supplied photographs.

7 CASTLEREAGH ROAD CONSTRUCTION

Castlereagh Road forms the western boundary of the Cranebrook West Land Parcel. Earthworks for the road construction occurred in 2005-06. Information from Coffey investigation and construction records suggests that the foundation for the road embankment was excavated to natural alluvial soil in the vicinity of the Cranebrook West land parcel. The constructed road embankment (which encroaches on to the Cranebrook West land parcel) was constructed of Engineered Fill.

8 GEOTECHNICAL COMMENTS

Proposed Lots 1 to 7 contain substantial areas that are assessed to be located on natural ground that has not been disturbed by quarrying activities. Development of those portions of the lots would need to consider the landform characteristics described and should be based on further geotechnical advice that is specific to the proposed development.

PLDC advises that the 1:100 year flood level in this locality is about RL 21m. Parts of this land parcel are below this level, so future development may require local filling to raise building footprints above major flood levels.

Those parts of proposed Lots 1 to 7 that are located west of the marked quarry high face are interpreted to be within former quarried lands, but may not be underlain by deep fill. Nevertheless, this land comprises part of the Castlereagh Road embankment and should not be disturbed or loaded without further geotechnical advice.

9 LIMITATIONS

This report should be read in conjunction with the attached document "Important Information about your Coffey Report".

Coffey's commission did not extend to consideration of potential environmental or contamination issues in respect to the suitability of the land for any proposed use.

The Cranebrook West land parcel forms part of the surface water drainage system associated with Castlereagh Road. Coffey was not involved in the civil engineering design of the drainage works and cannot comment on constraints on the landform with respect to the surface drainage function.

For and on behalf of Coffey Geotechnics Pty Ltd



Robert Turner

Principal Geotechnical Engineer

Attachments

Drawing PLDC – 11542 Rev C

Important Information about your Coffey Report



Rev	Date	Description	Drafted By	Designed By	Checked By	Approved By
C	25/05/2013	For Information - NOT FOR CONSTRUCTION	TPK	TPK		
B	09/04/2013	For Information - NOT FOR CONSTRUCTION	TPK	TPK		
A	04/02/2013	For Information - NOT FOR CONSTRUCTION	TPK	TPK		

Notes:
102 \\\ DP1143931 covers Lots 1-7

- Legend:
- RL 21.0 (100yr Flood Level)
 - ▨ Quarry High Face
 - Concrete Panel Fence - Noise Wall

Scale Bar:
0 10 20 30 40 50
Metres

Projection:
MGA Zone 56

Sheet Size: ISO A3
Print Scale: 1:1000

Title:
Cranebrook Lake West
Lot Disposal Layout

Drawing No:
PLDC - 11542

Revision:
C





Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.



Important information about your **Coffey Report**

Data should not be separated from the report*

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.