IAN R BROWN ASSOCIATES LTD
geological engineering consultants

Tiffin Hill, Carterton District

Geotechnical engineering assessment for proposed Schaef subdivision

November 2007

Report for
Tomlinson & Carruthers Surveyors Ltd

Project Number 963

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1. Introduction

On July 31 2007, Tomlinson & Carruthers Surveyors Ltd (Mr Grant McLachlan) requested Ian R Brown Associates Ltd to undertake a geotechnical engineering assessment of a proposed 16 lot subdivision of land at Tiffin Hill, Woodlands Road, Carterton. The land is owned by Mr Schaef.

This report has been prepared under the supervision of Dr Ian Brown, who is a Chartered Professional Engineer with qualifications and experience in geotechnical engineering.

2. Methods of investigation

We carried out a review of relevant available information for the area, including the most detailed published geological map (Begg and Johnston, 2000) and reproduced in Figure 1. We also referred to the New Zealand Land Resource Inventory Survey map of the area (Noble, 1979).

Detailed topographic survey information was provided by Tomlinson & Carruthers, and this was used to construct a slope angle map of the proposed subdivision.

On September 20, 2007 Ian Brown visited the site and inspected *in situ* materials exposed in shallow excavations along the access road, as well as behind the house located in the middle of the proposed subdivision.

3. Geological setting

The geological map reproduced as Figure 1 shows that the rocks underlying the site are some of the older units in the Wairarapa area. As observed in exposure (Photograph 1) they are variably weathered, and comprise interbedded sediments ranging from silts to sands, with some cherty units. The rocks have been deformed, and are steeply dipping.

The rocks have been exposed to a long period of weathering which has chemically altered the original rock material to predominantly clay minerals. As part of this process, there has been continuous erosion resulting in low to moderate natural slope angles (Figure 2).

4. Site conditions

As part of the site inspection carried out on September 20, we supervised the excavation of two test pits. Their location is shown on Figure 3. The objective of the test pits was to determine the soil profile at one of the flatter parts of the subdivision, near the crest of Tiffin

Hill (test pit 1), and to determine the soil profile at one of the proposed house sites on the flank of Tiffin Hill (test pit 2).

Each test pit was excavated using a mechanical digger (Photograph 2).

At test pit 1:

0 – 0.3m	organic topsoil
0.3m – 0.65m	clay
0.65m – 1.45m	clay, increasing stiffness with depth with occasional clast of weathered siltstone

The excavated test pit is shown on Photograph 3.

At test pit 2:

0 – 0.25m	organic topsoil
0.25 – 1.05m	clay, moist and slightly plastic
1.05m – 1.10m	stiff clay

The excavated test pit is shown on Photograph 4.

The soils exposed by the test pits were undisturbed, with no indication of downslope movement. There was no groundwater encountered in the test pits.

5. Discussion

The area is judged to have favourable geological conditions for the development of the proposed subdivision. The lots are generally large, with various locations on each lot that could be used for a house site.

Natural slopes appear to be stable, as are the cut slopes we observed. Excavated slopes along the access road (Photograph 1) and at the house site located in the middle of the proposed subdivision (Photograph 5), are also stable. These slopes have been cut to expose *in situ* rock, and have not required any stabilisation measures.

The extent of earthworks that is going to be required for each house site, and access to each site, is difficult to judge at this stage. However the ground conditions would not provide any particular constraint on earthworks.

6. Conclusions and recommendations

The geotechnical engineering matters that need to be considered as part of the proposed subdivision development relate to earthworks that will be required for development of house sites, and access to these sites.

We recommend that compliance with the New Zealand Standard Code of practice for earth fill for residential development (NZS 4431:1989) is required.

However NZS 4431:1989 does not cover cut slopes. Where these might be required for development of a house site, or for access, we recommend that appropriate geotechnical engineering advice is obtained where the cut slope exceeds a height of 1.5m.

References

Begg, J.G., Johnston, M.R. (compilers) 2000: Geology of the Wellington area. Institute of Geological and Nuclear Sciences 1:250,000 geological map 10. 1 sheet + 64p. Lower Hutt, New Zealand: Institute of Geological & Nuclear Sciences Limited.

Noble, K.E. 1979: New Zealand Land Resource Inventory Southern Hawke's Bay – Wairarapa Region: land use capability extended legend (1st ed. With limited revision, 1988). National Water and Soil Conservation Authority, Wellington, New Zealand.

PHOTOGRAPHS

Photograph 1. Rock exposure on track adjacent to proposed Lot 9.

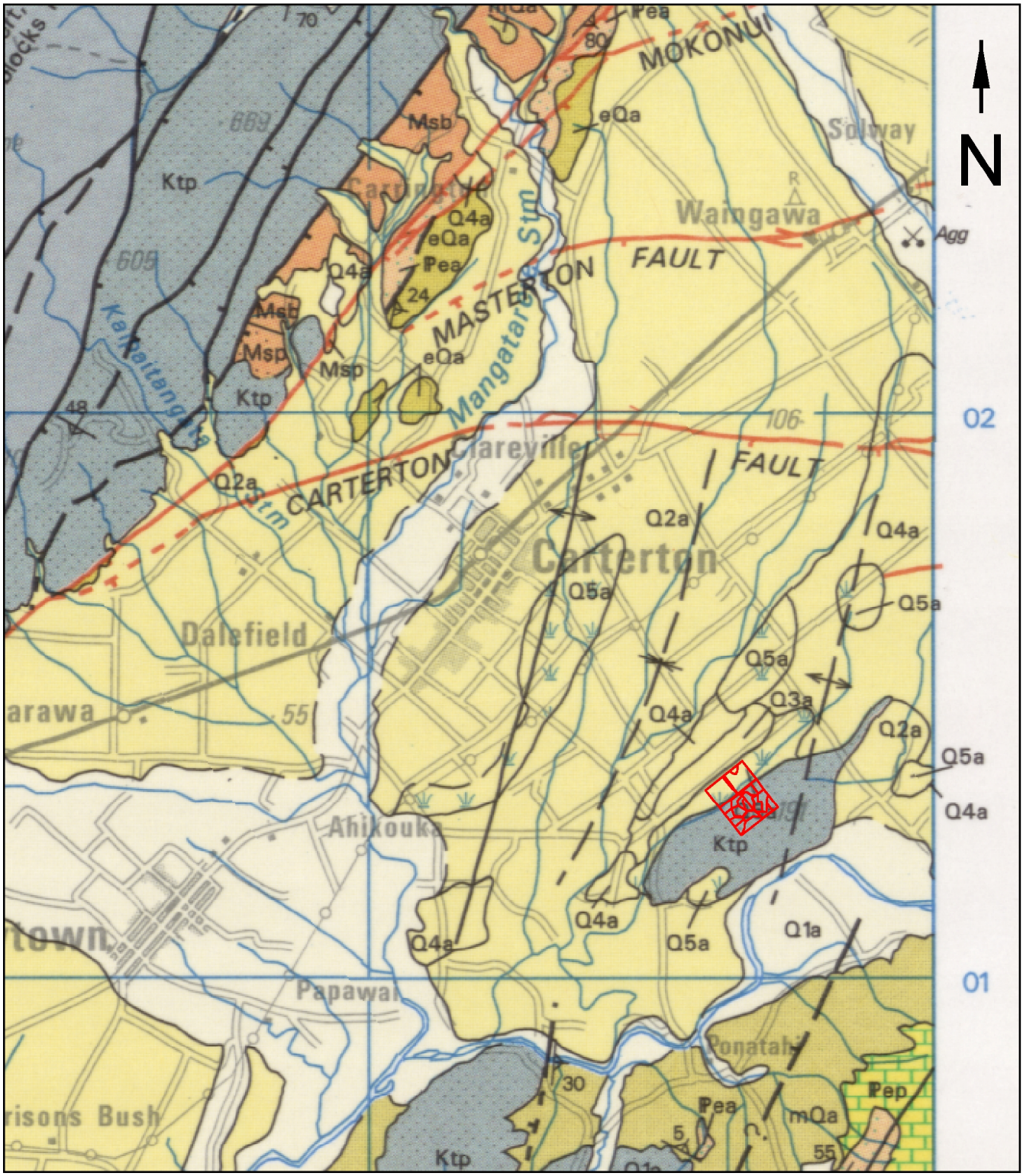
Photograph 2. Excavation of test pit 1

Photograph 3. Test pit 1

Photograph 4. Test pit 2

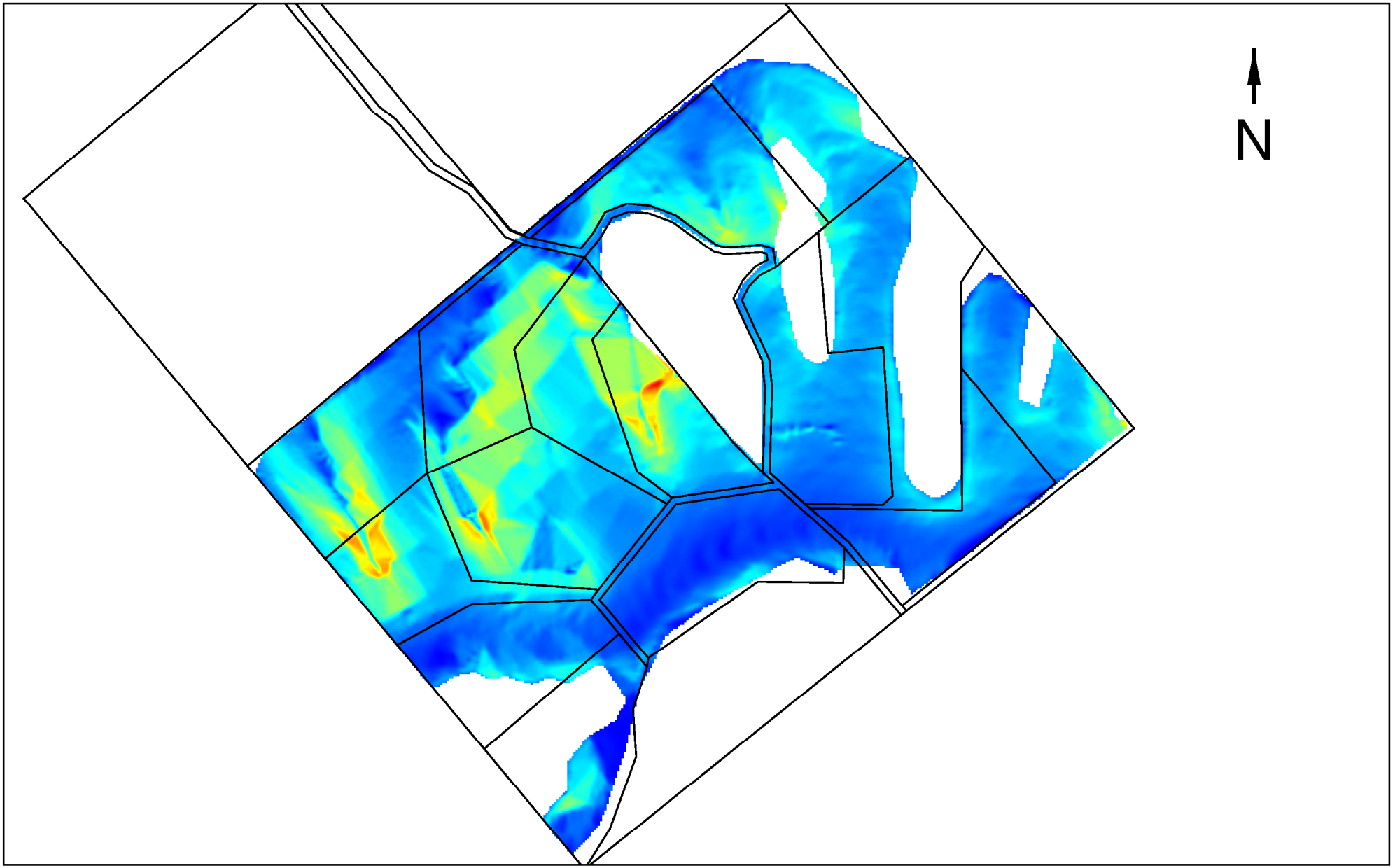
Photograph 5. Excavated slope at rear of house site, between proposed lots 4 and 9.

FIGURES



Regional geology (after Begg and Johnston 2000)

GRAPHIC SCALE 0 1 2 3 KM	ORIGINAL SCALE 1:100,000	Tomlinson & Carruthers Surveyors Ltd
EXPLANATION	JOB NO. 963	Schaef subdvision - Tiffin Hill Regional geology
Proposed subdivision area	Ian R Brown Associates Ltd *Geological Engineering Consultants*	DRAWN JPC / FIGURE 1
Ktp Pahau terrane - Late Jurrassic to early Cretaceous sedimentary and minor volcanic rocks	PO Box 24–147 Wellington New Zealand Tel (04) 471–1464 Fax (04) 471–1745	APPROVED IRB / DATE 22-Nov-2007



GRAPHIC SCALE 0 0.100 0.200 0.300 KM

EXPLANATION

0 10 20 30 40
degrees

ORIGINAL SCALE	1:6,000
JOB NO.	963

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Tomlinson & Carruthers Surveyors Ltd

Scaef subdivision - Tiffin Hill
Slope angle map

DRAWN	JPC	FIGURE	2
APPROVED	IRB	DATE	22-Nov-2007

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GRAPHIC SCALE 0 0.100 0.200 KM	ORIGINAL SCALE 1:7,000	Tomlinson & Carruthers Surveyors Ltd
EXPLANATION	JOB NO. 963	Schaef subdivison - Tiffin Hill Site plan
1 Test pit location	Ian R Brown Associates Ltd *Geological Engineering Consultants* PO Box 24–147 Wellington New Zealand Tel (04) 471–1464 Fax (04) 471–1745	DRAWN JPC FIGURE 3 APPROVED IRB DATE 22-Nov-2007