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**Geotechnical Assessment for
Proposed Plan Change Ohiro Road
For Ohiro Properties Limited**

28 June 2004
Reference 763835/CC
Revision 1

Document Control

Connell Wagner

Document ID: M:\7638\35\RS0001AB PLAN CHANGE.DOC

Rev No	Date	Revision Details	Typist	Author	Verifier	Approver
0	March 04		AMB	IDM	MF	CBH
1	June 04	Revised for final issue	AMB	IDM	AGM	CBH

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Table of Contents

<i>Section</i>	<i>Page</i>
1. Introduction	1
2. Scope of Work	1
3. Site Description	1
4. Site History	2
5. Geology	2
6. Seismicity And Regional Hazards	2
7. Engineering Considerations	3
7.1 General	3
7.2 Assessment against RMA	3
8. Summary And Conclusion	3
9. Limitations	4

Figures

- Figure 1 Site Locality Plan
- Figure 2 Site Layout Plan

1. Introduction

Ohiro Properties Limited have purchased land in Ohiro Rd currently zoned as Rural. They intend to seek a plan change to allow residential development southwards from a current subdivision at 282 Ohiro Rd (see Figure 1). The legal description of the land involved is:

- Lot 1 DP59971
- Pt SBDN17 Sec 14 (SO11342)
- Lots 1, 2 and 3 DP 50192
- Lots 1 and 2 DP 83641
- Lot 61 DP61507
- Pt Lot 2 and Pt Lot 3 DP69375
- Lot 1 DP86738

The proposed work requires the zoning of the land to be changed from Rural to Outer Residential. This report reviews geotechnical conditions of the land concerned and comments on the suitability of the land for residential development in terms of the Resource Management Act (1991) and amendments (RMA).

2. Scope of Work

The scope of work included:

- A review of an aerial photo provided by the WCC (see Figure 2).
- A review of published geological information (Begg and Mazengarb 1996).
- A review of aerial photographs held by the Institute of Nuclear and Geological Sciences dating from 1969;
- A walkover of the site on 19 March 2004. Not all parts of the site were inspected due to topographical and vegetation constraints.

3. Site Description

The site is located on the west side of Ohiro Road (see Figure 1). It is roughly rectangular in shape and is about 1000m long by 100m to 200m wide (Figure 2). The total area is about 15.3 hectares.

Based on contours in Figure 2, the ground rises to the west (ie. away from Ohiro Road) at an overall slope of about 25° with about 100m height difference between Ohiro Road and the west boundary. Locally slopes stand to about 40° and are up to 20m to 30m high.

The site is currently covered with vegetation 2m to 7m high including indigenous trees and shrubs and occasional large pine trees. There are no obvious signs of streams or springs but access is limited and some wetter areas are likely in parts of the site. In particular, there would be at least short term flows down the major gully features after rainfall. All drainage systems will need to be identified and addressed at the time of submission and/or development. Stormwater from the streets above the site may also discharge into the gullies and will need to be picked up and discharged in a controlled manner.

4. Site History

Inspection of stereoscopic aerial photos dating from 1969 indicate that at this time the site was regenerating from pasture with some grassy areas but vegetation re-establishing over most of the site. The large pine trees in the second large gully from the north end of the site can be seen on the 1969 aerial photos. There were no signs of instability or any slip features on the land at that time.

5. Geology

The 1:50,000 scale geological map for Wellington (Begg and Mazengarb 1996) indicates that the Ohiro Road area is underlain by "alternating cm-m bedded sandstone/argillite" (ie. Wellington Greywacke). This is consistent with our observations of cuts in the area and recent earthworks at 282 Ohiro Road.

Typically 1m to 2m of colluvium (silts to gravels) overlies moderately to highly weathered greywacke rock in cuttings along tracks on the site. Locally the colluvium is up to about 2m to 4m thick particularly along the lower parts of the site adjacent to Ohiro Rd. The colluvial slopes were generally stable though in one area near vertical cuts up to about 4m high had failed. This is not surprising given the height and steepness of the cuts, and the recent very heavy rain.

The greywacke cuts were up to about 4m to 6m high and in the range of 60 to 80 degrees from the horizontal (ie near vertical). Typically they were stable and the impression was that the ground on the site is more favourable from a stability perspective than the ground on the subdivision to the north with some rock described as moderately to slightly weathered rather than highly to moderately weathered.

6. Seismicity And Regional Hazards

The nearest fault to the site is the Wellington Fault, which lies about 2km to the west of the site. This fault is assessed as having a 10% probability of rupture in the next 50 years. The geological map for the area also shows that the Happy Valley Fault runs along Ohiro Road. This fault is inactive and hence is not of engineering concern.

The combined regional hazard map (scale 1:50,000) for the site area indicates that site hazard rating is generally low to moderate with a localised moderate to high rating in a gully feature approximately opposite Stock Street. The combined hazard rating for the site is based on the ground shaking, liquefaction, ground rupture and earthquake induced slope failure potential. There is no potential for liquefaction or ground rupture and the ground shaking hazard is low. The combined hazard rating is therefore controlled by the slope failure hazard potential.

The majority of the site has a low to moderate slope failure hazard rating apart from the gully feature, which has a high hazard rating. We understand that the slope failure hazard rating was assessed primarily on ground slope with limited field checking. Presumably therefore, when the slope failure hazard map was prepared, particularly steep ground was identified in this area. However, the contours in Figure 2 do not indicate especially steep ground in the area on the hazard map with the high hazard rating and the walkover did not indicate unusually steep ground. The basis of the hazard assessment and high landslide potential is therefore uncertain. It should also be recognised that the hazard maps are prepared on a regional basis and are not necessarily correct for a specific site.

7. Engineering Considerations

7.1 General

Development of the site will include significant cuts and fills and probably the use of retaining walls. No information is available on final site layout at this stage of the project and only general comments can be made on the effects of the development. The proposed development is evaluated in terms of Section 106 of the RMA in the following section and recommendations are made on ways to allow acceptable development.

7.2 Assessment against RMA

Section 106 of the RMA states *inter alia*

1. ... "a consent authority may refuse to grant a subdivision consent, or may grant a subdivision consent subject to conditions, if it considers that:
 - (a) the land in respect of which a consent is sought, or any structure on the land, is or is likely to be subject to material damage by erosion, falling debris, subsidence, slippage, or inundation from any source; or
 - (b) any subsequent use that is likely to be made of the land is likely to accelerate, worsen, or result in material damage to the land, other land, or structure by erosion, falling debris, subsidence, slippage, or inundation from any source; or
 - (c) sufficient provision has not been made for legal and physical access to each allotment to be created by the subdivision."

The site is not susceptible to inundation and subsidence is unlikely given the shallow depth to rock. Based on our site observations and desktop study, there is no evidence of significant erosion, falling debris or slippage. In our opinion therefore, Clause 106 1(a) would not provide grounds for refusing a subdivision consent following a zone change from Rural to Outer Residential.

Any proposed development will have to comply with relevant legislation, codes and standards. For example, fills would have to be constructed at safe slopes and cuts would have to be excavated to provide stable slopes. Provided that appropriate investigation and design inputs are made, subsequent use of the land following the proposed plan change is unlikely to accelerate, worsen, or result in material damage to the land, other land, or structures. In our opinion therefore, Clause 106 1(b) would not provide grounds for refusing a subdivisional consent following the proposed zone change.

Section 106 1(c) is not relevant to a geotechnical appraisal and therefore has not been considered in this report.

Any concerns that the WCC may have about the site, or particular aspects of the development once finished ground levels are developed, could be addressed by the imposition of conditions under Clause 106 (2) at the time of the issuing the particular resource consent.

8. Summary And Conclusion

In our opinion, under Section 106 1 of the RMA, there are no particular geotechnical reasons for the WCC to refuse to grant a consent for development of a subdivision following a change in zone from Rural to Outer Residential.

Any concerns that the WCC may have about the site, or particular aspects of the development once finished ground levels are developed, could be addressed by the imposition of conditions under Clause 106 (2) at the time of the issuing the particular resource consent.

Overall, therefore, in our opinion there are no geotechnical concerns that would prevent the rezoning of the site for residential purposes under Section 106 of the RMA.

9. Limitations

We have prepared this report in accordance with the brief as provided. The contents of the report are for the sole use of the Client and the Wellington City Council. Data or opinions contained within the report may not be used in other contexts or for any other purposes without our prior review and agreement.

Figures

Figure 1 Site Locality Plan

Figure 2 Site Layout Plan