

1986/76. Slope stability at a proposed subdivision at Rosevears.

B. D. Weldon

Abstract

An assessment of the slope stability of a proposed subdivision for Vos Nominees Pty Ltd, Craythorne Road, Rosevears has been made. The area covered by the proposal is mapped largely as Quaternary basalt talus. The majority of the proposed subdivision falls within the advisory Tamar Valley Landslip Zone IV, i.e. old landslips and adjacent areas. Slope mapping has been undertaken and an overlay produced for the orthophoto plan showing three slope categories. Building sites within category 3 (i.e. slopes steeper than 12°) will individually require detailed assessment of their slope stability. A seismic refraction survey revealed at least 5 m of soil-like materials beneath a proposed road cutting.

INTRODUCTION

The proposed subdivision by Vos Nominees Pty Ltd at Grindelwald (as detailed on an orthophoto map, part of Dilston 51, reproduced at 1:2000 scale) has been inspected by supervising geologist Mr P. C. Stevenson and geologist Mr B. D. Weldon of the Engineering Geology section. The inspection was requested by Campbell Smith, Phelps Pedley Pty Ltd in order to advise them on the stability of the land. Topographic and geological maps have been examined and manual slope mapping has been undertaken using the contours on the orthophoto map. The nature of the materials in a proposed road cutting was investigated using seismic refraction technique.

GEOLOGICAL SETTING

The area has been regionally mapped by Longman *et al.* (1964) and areas to the north of the current proposal have been the subject of reports by Matthews (1979) and Moore (1984). Muddy Creek and the boundary between the properties with unique property identifiers 5208 and 5209 on the supplied orthophoto plan (part of Dilston 51) corresponds roughly to the boundary between Jurassic dolerite in the south and Quaternary basalt talus in the north. Exposures are poor in the area under consideration. The soil is usually clay (brown, high plasticity, CH) and contains boulders of Tertiary basalt in places. Some grey sandy soils were observed below the farm track. These may well be derived from the Tertiary sediments known locally as the Launceston Beds which undoubtedly occur in the lower reaches of the valley. Tertiary basalt occurs north of the area under consideration (Moore, 1984, fig. 2).

ADVISORY LANDSLIP ZONES

Land located on dolerite and basalt rock falls within Zone I of the Provisional Tamar Valley Landslip Zone Map (3877, Windermere) i.e. stable ground on hard rock. Land located on the Quaternary basalt talus is classified as Zone IV i.e. old landslips and adjacent areas. The very steep, heavily vegetated slope leading down from the basaltic plateau on which the village of Grindelwald is constructed has been classified as Zone V i.e. active landslips and adjacent areas. These zones are shown on the accompanying plan which is presented as an overlay for the orthophoto plan at scale 1:2000.

The majority of the proposed extension of the subdivision is thus located

within the advisory landslip Zone IV. The generally hummocky nature of the ground and the complex shape of the contours which often show paired upslope indentations and downslope protrusions support this classification. In all probability the paired upslope indentations and downslope protrusions indicate former landslips.

SLOPE MAPPING

Slope mapping using the contours on the orthophoto map has been undertaken. It is generally accepted that in the Launceston Beds, first time failures (i.e. those where other than residual soil strength parameters are involved) can occur on slopes which exceed 12°. Where residual soil strength parameters are involved, such as in old landslip areas, slopes which exceed about 8° have been known to fail.

The area under consideration has therefore been categorised into slope units thus:-

- Category 1. Slope less than 8°.
- Category 2. Slope 8° to 12°.
- Category 3. Slope greater than 12°.

The slope categories are also shown on the accompanying plan along with the (provisional) advisory landslip zones.

STABILITY ASSESSMENT

This assessment is necessarily of a general nature. Areas delineated as slope category 3 are unsuitable as building sites without individual detailed examination of the subsurface conditions. Areas delineated as slope category 2 are doubtful building sites which will require individual assessment, but not necessarily detailed subsurface investigation. Areas classified as slope category 1 should be suitable as building sites.

This assessment means that several lots of the proposed subdivision do not offer any potential building sites without detailed subsurface investigations. In other cases the areas which might be suitable for building sites will probably not allow compliance with council requirements on set-backs from street frontages.

A relocation of the main access road slightly to the south may overcome some of these problems. The roadway need only be re-located by about the width of the road reservation between the points marked A and B on the plan. This should then provide building sites on those lots on the upslope side of the roadway. Such a re-location however places the roadway on steeper slopes and careful consideration of the affect of road cuttings and fillings is required.

SEISMIC REFRACTION SURVEY

A seismic refraction survey was conducted over a knoll near the farmhouse off Atkinsons Road (the location marked C on the accompanying plan). The survey consisted of a single traverse using 5 m geophone spacings. AN60 gelignite was used as an energy source. Shots were fired at either end, 50 metres offset from either end and at spread centre-point. The results are summarised in Table 1.

Table 1: RESULTS OF SEISMIC REFRACTION SURVEY

Shot location	Layer velocity (m/s)	Depth (m)	Geological interpretation
50 m W to E	1050	-	talus deposits.
0 m W to E	475	12.0	soil-like materials.
	2500		fractured/jointed rock (? basalt).
Centre to W	440	5.6	soil-like materials.
	910		talus deposits.
Centre to E	440	8.7	soil-like materials.
	2500		fracture/jointed rock (? basalt).
0 m E to W	435	5.2	soil-like materials.
	1250		talus deposits.
	4000		fresh rock (? basalt).
50 m E to W	1250	-	talus deposits.

The results are interpreted as indicating soil-like materials to at least 5 m depth i.e. to near the base of the proposed cutting. Talus deposits are indicated beneath these materials. The soil-like materials could be old landslip debris. It would be unwise to allow road cuttings with cut batters any steeper than 2 (horizontal):1 (vertical) in these materials. It may be prudent to re-locate the roadway in this area.

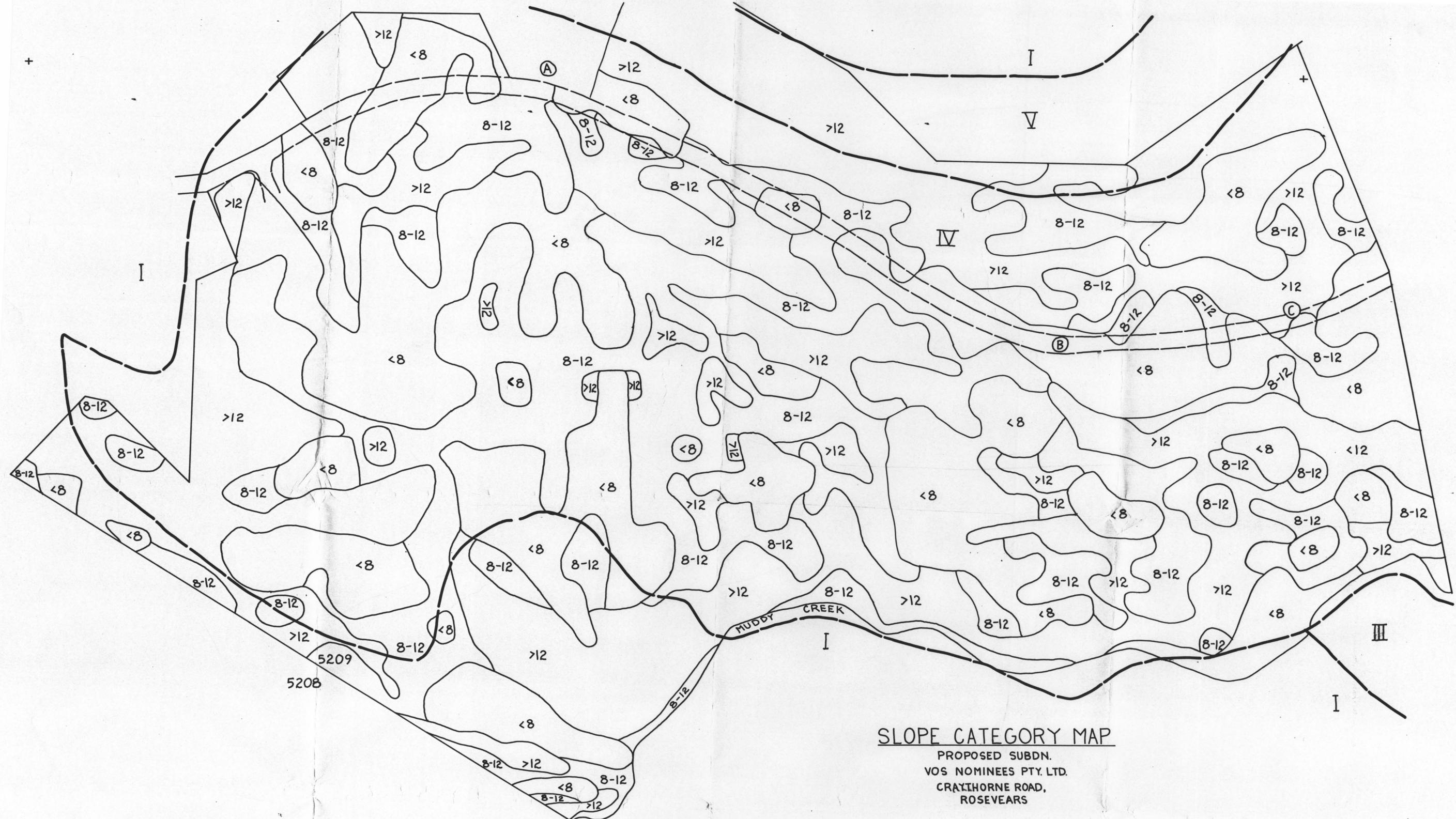
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[10 November 1986]



SLOPE CATEGORY MAP

PROPOSED SUBDN.
 VOS NOMINEES PTY. LTD.
 CRAYTHORNE ROAD,
 ROSEVEARS

TAMAR VALLEY (PROVISIONAL) LANDSLIDE ZONES

- I STABLE GROUND, HARD ROCK
- II STABLE GROUND, SOFT ROCK
- III POTENTIAL LANDSLIP AREAS
- IV OLD LANDSLIPS & ADJACENT AREAS
- V ACTIVE LANDSLIPS & ADJACENT AREAS

KEY

-  SLOPE CATEGORY 1 (<math>< 8^\circ</math>)
-  SLOPE CATEGORY 2 ($8-12^\circ$)
-  SLOPE CATEGORY 3 ($> 12^\circ$)