



Test pits at a proposed subdivision at Windermere

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An inspection has been made of an additional block proposed for a subdivision at Windermere. The land is part of a Class 3 zone on the advisory landslip map and slopes at moderate to steep angles in some parts.

Because of the relatively steep nature of the land and a little unevenness of the land surface, it was suggested that two or three test pits to 2.5–3 m depth be dug with a backhoe before an opinion could be expressed. From the surface examination an area on top of a small ridge near the road and timberline may be the most favourable site for a house because of its flatter and well-drained situation.

Test pits

Three test pits were dug to examine subsurface conditions. The excavations struck relatively soft clay to about one metre depth or a little greater which was underlain by stiffer clay. Tests were undertaken on a sample from pit 1.

Depth	1.0 m
Liquid limit	108
Plastic limit	27
Linear shrinkage	22
X-ray analysis — clay fraction (%)	
Montmorillonite	50
Kaolinite	50

Determinations by R. N. Woolley.

Each pit had similar material at about one metre depth with stiffer clay at depth. There was slightly softer material at lower levels in pits 1 and 3 than in pit 2. The above properties suggest that the clay will have fairly high expansive properties and this should be taken into consideration when designing foundations for any structures. The material is also likely to have low strength when fully moistened. For this reason a house should be sited on the flatter portion of the land. A probable old landslip occurs below pit 1 and a house site should be confined to the area marked on Figure 1 and above pit 1.

Good drainage should be maintained on the area surrounding the house site. The nearby shallow valley should get particular attention as far as drainage is concerned. Excavations should be avoided as far as possible on nearby steeper slopes and tree planting should be encouraged in these parts. Sullage, septic tank water and stormwater should be discharged

downslope but not directly below the house (i.e. below pit 1). With these precautions the site should be reasonably safe to develop.

Test pits

Pit 1

0 – 0.3 m	Dark brown silty clay soil, roots, moist.
0.3 – 1.4 m	Light brown plastic clay, some lenses with obvious sand content, occasional basalt fragments. Section soft at top and hard at base. Some slip surfaces.
1.4 – 2.1 m	Brownish grey and brown mottled fragmental clay with black iron oxide coated surfaces. Fissured and some areas show slip surfaces.

Hand penetrometer unconfined strength measurements

0.5 m	0.5–0.75 kg/cm ²
0.7 m	1.25–3 kg/cm ²
1.0 m	2.5–3 kg/cm ²

Pit 2

0 – 0.25 m	Brown clayey silt soil, fairly dry and loose.
0.25 – 0.5 m	Brown fractured clay, fairly hard, dry, some roots.
0.5 – 2.1 m	Mainly brown and dark grey mottled clay at top, then brown and light grey mottled clay, fractured and fragmental, slightly moist but hard tree roots extend to about 0.9 m.

Hand penetrometer unconfined strength measurements

0.7 m	3–4.5 kg/cm ²
1 m	2.5 kg/cm ²
2 m	4 kg/cm ²

Pit 3

0 – 0.15 m	Dark brown silty clay soil, grass roots, dry.
0.15 – 0.3 m	Brown clay, fractured, grass roots.
0.3 – 1.0 m	Light brown plastic clay, moist, soft towards top, becoming harder and more fragmental towards base, occasional basalt boulder.
1.0 – 2.0 m	Fragmental to plastic clay, hard and fractures, occasional basalt boulder.

Hand penetrometer unconfined strength measurements

0.7 m	0.75–1.5 kg/cm ²
1.0 m	1.75–2.5 kg/cm ²
1.6 m	2.5–3 kg/cm ²

[22 May 1989]

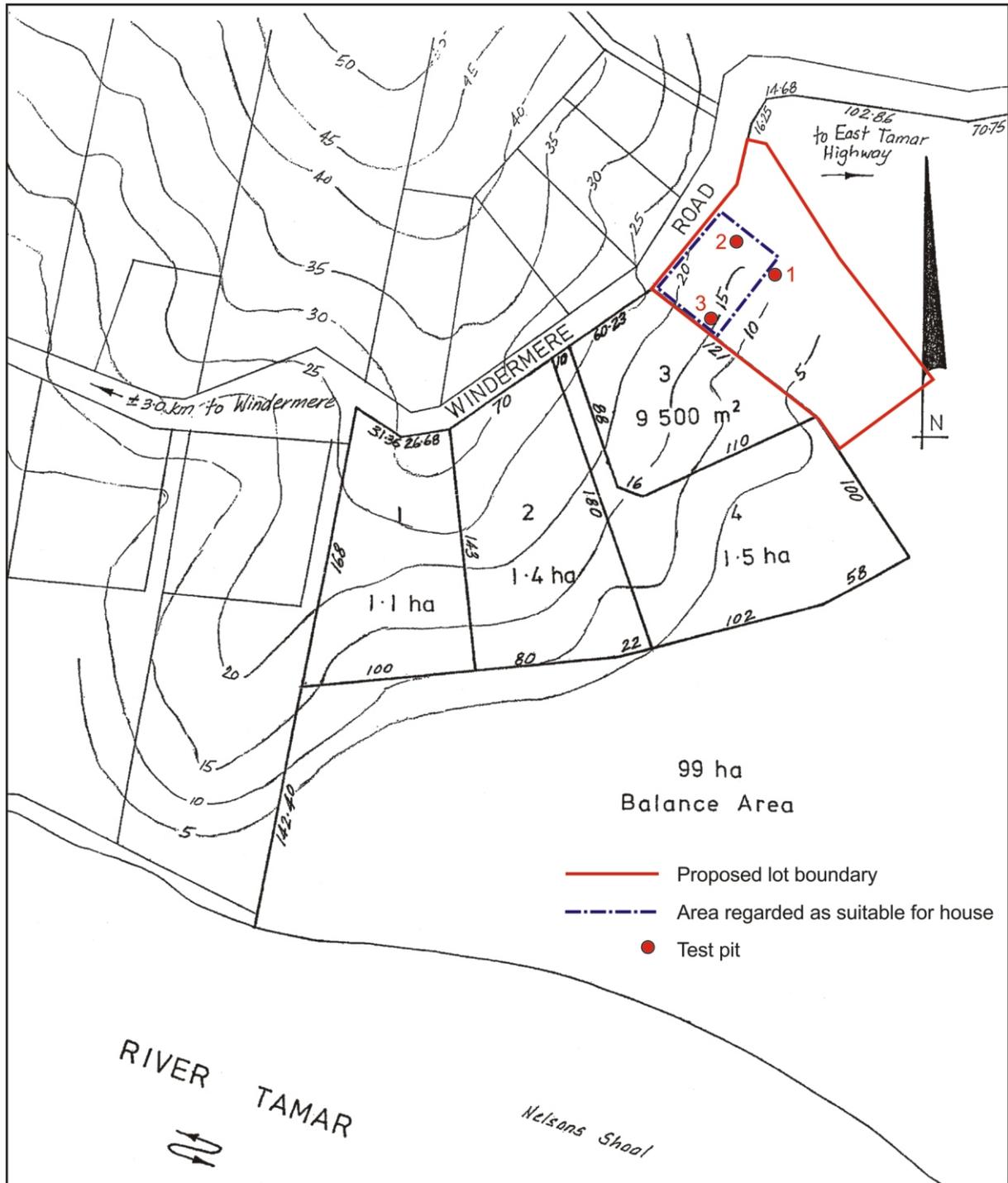


Figure 1
Location of proposed additional block and test pits.