

**TASMANIA DEPARTMENT OF MINES  
UNPUBLISHED REPORT 1986/92**

## **Test pits on Hill's subdivision, Windermere**

*by W. L. Matthews*

Following a request for advice on Lot 3 at Hill's subdivision, Windermere, two test pits have been examined at the site where it was planned to build a house (fig. 1).

A small proportion of the lot is in a Class 3 zone on the landslip zone map of the Tamar Valley but most of it is in Class 4. A recently active slip occurs on the western part of the lot and an area of Class 5 surrounds this feature. Class 4 areas consist of land that shows signs of old landslips. It is uncertain whether these areas are likely to be reactivated and subsurface investigations are often required to make an assessment of the future stability. Class 3 land consists of moderately sloping to steep land where there are no obvious signs of landslips, either old or recent. The stability of a large proportion of the slopes around Windermere is uncertain and house sites must be selected and developed with this in mind.

The house site selected is a relatively small flat area on the end of a narrow ridge in a Class 3 area. Because of the topography test pits were dug to examine subsurface materials and groundwater conditions. The logs of these test pits are attached (Appendix 1).

Each test pit encountered a grey soil passing into brown plastic clay at the surface. Slightly compacted sand with a small clay content underlies the clay to the base of each pit. At the contact of the two materials there is a thin band of iron oxide with another thin iron oxide band separated by sand below the contact. The sand layer between the two iron oxide bands is thicker in the second test pit. No free water entered either of the test pits although the materials were moist.

It can be assumed from the materials encountered in the pits that it is unlikely that the actual house site has been subject to movement in the past as a similar sequence occurs in each pit. It is likely that the sand bed will extend around the nose of the ridge below the house site (i.e. to the south).

Because of the presence of the sand bed under the surface clay, the site should remain well drained and although the house site takes up a large proportion of the flatter land on the end of the ridge, it should be possible to build a house in reasonable safety with some precautions.

The house should be sited so that it is as far as possible from the steeper land to the south and west. Drainage around the site should be maintained in excellent condition and water should not be allowed to accumulate so that it can seep underground. Septic tank and sullage should be piped away from the house site. A possible dispersal area is some 30–40 m down the ridge to the south of the house site but if this is unsuitable, it should be completely removed from the narrow ridge making up the house site. Stormwater should be piped to one of the valleys on either side of the ridge. Swimming pools and other below-ground water storages should be avoided because of the possibility of leakage. Excavations around the side of the ridge should also be avoided as far as possible and any cuts larger than about 0.5 m should be retained with a drained structure. It would be preferable for the access road to be installed straight up the slope (at right angles to the contours) behind the house site, rather than around the contours. Erosion around the side of the ridge should be prevented and a vegetation cover will help ensure this.

Clay is likely to underlie the sand at depth and from previous measurements in the Windermere area, most of the clay sediments are low strength. A strength test on the clay encountered in the test pits also indicates a low residual strength ( $c \approx 5.5$  kPa,  $\phi' \approx 10^\circ$ ) and it must be ensured that a slip is not initiated. In the event that a movement occurs at any point on the ridge comprising the house site, remedial measures should be commenced immediately.

The surface clay on which the house will be built is likely to have some expansive properties as X-ray analysis shows it contains some montmorillonite. Foundations should be designed taking this into account. A reinforced slab foundation is often used in these conditions and it may be worthwhile having a foundation design prepared by an engineer.

In summary, there may be some risk of unstable conditions affecting the area but with care in development the risk should be within reasonable limits.

[27 February 1986]

## APPENDIX 1 Test pit logs

### ***Pit 1***

0	- 0.3 m	Grey brown silty soil
0.3	- 1.60 m	Brown plastic clay, becoming a little harder and fractured towards the base
1.6	- 1.63 m	Iron oxide horizon, hard, extends around whole of pit
1.63	- 1.80 m	Brown moist sand, possibly slightly clayey
1.80	- 1.83 m	Iron oxide band with a little clay, extends around whole pit
1.83	- 3.65 m	Brown sand becoming more moist with depth, occasional clay pellets and thin bands of clayey sand

### ***Pit 2***

0	- 0.46 m	Grey silty soil passing into fractured broken clay
0.46	- 1.93 m	Brown plastic clay
1.93	- 1.98 m	Brown friable iron oxide layer
1.98	- 2.64 m	Brown sand
2.64	- 2.69 m	Grey clay with thin iron oxide band at base
2.69	- 3.48 m	Brown sand, moist, layered and micaceous

