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Test pits at Danbury Heights, West Tamar.

W.L. Matthews

Surface examination (Matthews, 1974) of about 350 ha of land planned for subdivision on this property [EQ045195] indicated that Tertiary sediments occur on steep slopes in some areas. Test pits have been dug to examine the nature and depth of these sediments and some measurements of shear strength have been made with a vane tester. The logs of the test pits are given below and their approximate position is shown in Figure 1.

RESULTS OF TEST PITS

HOLE 1

Depth (m)

0-0.5	Soil, silty grey with limonite nodules.
0.5-2.7	Clay, red and grey mottled, dry, fissured, slip surfaces, small limonite nodules throughout.

HOLE 2

0-0.6	Brown sandy clayey soil.
0.6-2.6	Grey and red mottled clay and sandy clay, centres of limonitic material, slip surfaces.
2.6-2.7	Grey clay, plastic but stiff, slip surfaces.

HOLE 3

0-0.5	Soil and red clay.
0.5-2.0	Grey brown and red mottled clay, fissured, some limonitic areas.
2.0-2.9	Grey and brown clayey sand, some mica. Contact between the mottled clay and clayey sand dips downslope at 5-10°.

HOLE 4

0-0.5	Brown silty soil, some dolerite boulders.
0.5-1.4	Brown and red hard, fissured clay, areas of limonite cemented sand or horizon at 1.2 m.
1.4-2.6	Grey and red softer but still hard plastic fissured clay, slip surfaces. Iron oxide concretions at 2.4 m.

HOLE 5

0-0.5	Brown sandy silty soil.
0.5-2.0	Hard red and grey-brown mottled clay, limonite pisoliths and iron oxide cemented areas, a little sand in the clay. Towards the bottom mainly grey and white clay. Weathered dolerite struck on west side of pit at 1.2 m.

HOLE 6

0-0.5	Loose sandy soil, some limonite nodules.
0.5-1.5	Intermixed red and brown sand, sandy clay and clay.
1.5-2.4	Fine even-grained semi-consolidated sand, some brown and red iron oxide staining, ilmenite common, (some zircon and possibly rutile present).

HOLE 7

Depth (m)
 0-0.3 Sandy soil.
 0.3-1.2 Brown stiff fissured clay, slip surfaces.
 1.2-2.1 Brown and grey mottled clay becoming soft and somewhat friable (not very plastic), becoming softer with depth. Iron oxide nodules towards bottom.

HOLE 8

0-0.3 Grey sandy soil
 0.3-1.5 Mainly hard brown and grey fissured clay.
 1.5-2.7 Grey plastic clay, some iron oxide stained patches, fissured, with slip surfaces.

HOLE 9

0-0.3 Sandy soil.
 0.3-1.2 Dark grey brown hard clay.
 1.2-1.4 Decomposed coarse-grained dolerite.

HOLE 10

0-0.5 Sand with limonite nodules.
 0.5-2.3 Brown, passing into grey and reddish, mottled clay, fissured and plastic, texture possibly indicating weathered dolerite at bottom.

HOLE 11

0-0.9 Gravelly silt (limonite nodules).
 0.9 Hard clay with limonite nodules (too hard to excavate).

HOLE 12

0-0.5 Pisolitic gravels (limonite).
 0.5-0.9 Brown fissured clay, fairly hard, some pisoliths.
 0.9-1.5 Light grey and red mottled clay, fissured.
 1.5-1.7 Weathered dolerite.

HOLE 13

0-0.3 Sandy soil.
 0.3-1.2 Brown fissured clay with thin seams of sand (drying cracks filled with surface sand).
 1.2-2.4 Light grey and red mottled clay and sandy clay, mottled, fissured. Limonite rich zone at 2.1 m.

HOLE 14

0-0.6 Sand and pisolitic gravel (limonite).
 0.6-1.5 Brown and reddish mottled clay, hard fissured, with slip surfaces.
 1.5-2.6 Red and light grey mottled clay, fissured, slip surfaces, some limonite pisoliths up to 15 mm in diameter.
 2.6-2.7 Mainly grey clay.

HOLE 15

Depth (m)
 0-0.3 Sandy brown soil.
 0.3-1.1 Brown clay.
 1.1-2.1 Weathered dolerite

HOLE 16

0-0.5 Sandy soil.
 0.5-1.4 Brown and reddish mottled clay, fissured, some limonite pisoliths. Sand seams to 0.8 m in clay.
 1.4-2.3 Grey, brown and reddish mottled clay, mainly mid grey-brown at bottom, medium hardness, fissured, slip surfaces.

HOLE 17

0-0.9 Brown soil passing into brown clay with white specks (igneous texture?).
 0.9-1.4 Very weathered dolerite.

HOLE 18

0-0.9 Sandy clayey soil passing into brown clay.
 0.9-1.4 Weathered dolerite.

HOLE 19

0-0.3 Sandy soil.
 0.3-1.5 Brown hard clay, a little sand.
 1.5-2.3 Red and light grey mottled clay, becoming softer with depth.

SHEAR STRENGTH USING VANE TESTER

Hole No.	Peak Shear Strength (kPa)	Residual Shear Strength (kPa)
2	134	19
3	134	31
4	134	23
8	122	29
10	67	21
13	134	25
14	110	23
16	70	25
19	120	19

DISCUSSION OF RESULTS

The map accompanying the previous report indicated areas where test pits should be dug to examine subsurface conditions. It was thought that some areas shown on the Landslip Zone Map as Class III (fig. 1) could be reclassified. The positions of the test pits shown on Figure 1 are only approximate, except for pits 3 and 4 which have been fairly accurately located.

The materials obtained in the test pits indicate the position is much more complicated than at first thought. There are small zones within the larger zones which could be classified differently. Two attempts on separate

occasions have been made to delimit the various zones but further test pits will be needed before definite boundaries can be drawn.

The shear strengths measured are quite high but as the work was carried out just after the summer before any appreciable winter rains, it is likely that the values will be lower at other times of the year. The generally fissured nature of the clays will allow some percolation of water through them. A feature of the measurements is the high sensitivity of the clays i.e. the high ratio of peak to residual strength. It is important that slips are not caused by development work because of the resulting large decrease in strength. The lowered strength could persist for a considerable time after movement occurs.

The logs of Holes 1, 2, 3 and 4 suggest that this area should remain in Class III. The upper boundary should be moved up hill as shown in Figure 1.

In Hole 5 weathered dolerite is close to the surface and there are good prospects that the area classified as Class III around this test pit could be decreased in extent with further work.

Hole 6 encountered fine semi-compacted sand which may be weathered Triassic sediments. Similar comments to that for Hole 5 can be made.

Holes 7 and 8 are in areas underlain by clay and the areas around them should remain in Class III.

Holes 15, 17, 18 and 9 struck weathered dolerite at shallow depth and are thus in areas that it might be possible to rezone as Class I, whereas Holes 19, 10 and 16 are in areas where clay extends to the depth dug, and should remain as Class III. More work would be required to accurately mark the boundaries between the two zones.

Holes 14 and 13 are in areas which should remain in a Class III zone. There are areas around Holes 11 and 12 which it might be possible to rezone (probably as Class II) but more work would be required to define their boundaries.

CONCLUSIONS

The results of the test pits dug so far indicate that some alterations can be made to the boundaries of the zones that have been marked on the Landslip Zone Map as Class III. Apart from the area closest to the West Tamar Highway, further work would be required to determine the boundaries precisely.

The Class III area which lies parallel to, and to the west of, the West Tamar Highway has been extended up hill as shown on Figure 1.

The clay where encountered, is stiff although fissured, and there is only a small risk of instability. In wetter periods, the fissures could allow moisture to percolate and reduce the strength of the clay. The areas, where this material occurs on steep slopes, should remain as Class III.

REFERENCE

MATTHEWS, W.L. 1974. Stability of land at Danbury Heights, West Tamar. *Unpubl.Rep.Dep.Mines Tasm.* 1974/26.

[27 May 1974]

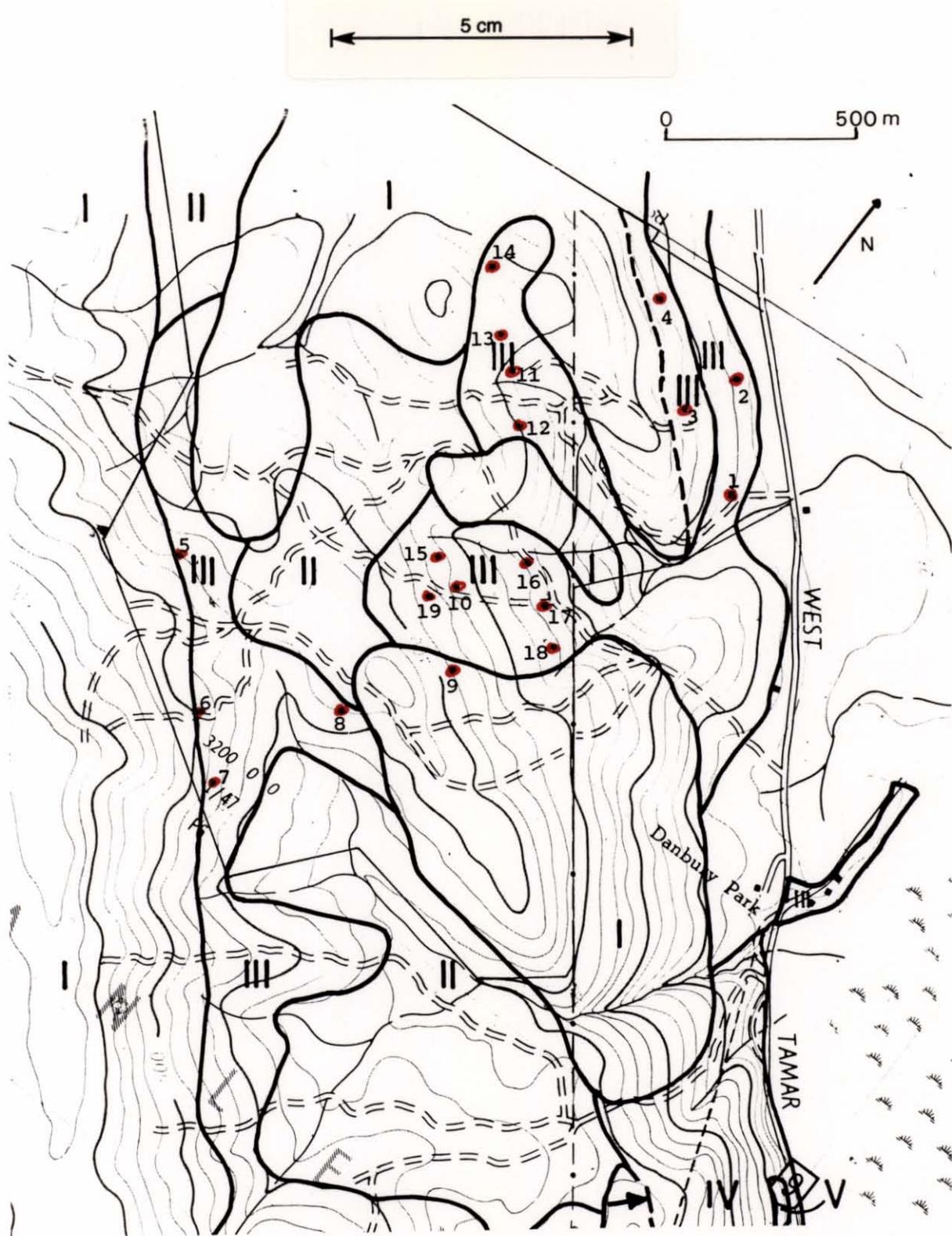


Figure 1. Proposed subdivision at Danbury Heights showing approximate positions of test pits.