

TASMANIA DEPARTMENT OF MINES
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A landslip affecting a pipeline near Bradys Lookout, West Tamar

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A small landslip is affecting the West Tamar water pipeline east of Bradys Lookout [DQ999244]. The surrounding slopes are composed of clay sediments of Tertiary age and are relatively steep for such sediments. There are many slips, both active and old, shallow and deep within the vicinity.

The active slip under concern is on a slope of 14°. It appears to be shallow seated and has a slow mudflow at the toe. This small active area is situated on an older, larger landslip structure which could be only marginally stable (fig. 1).

A series of proline auger holes were drilled.

1. To establish a depth for the active movement.
2. To assess the stability of the old structure.

The positions of the holes are marked on Figure 1. The logs are as follows.

Hole 1 (Dry hole)

Depth (m)

- 0 – 0.9 Soft brown-orange clay.
- 0.9 – 1.8 Stiff, red and grey mottled clay with polished surfaces.
- 1.8 – 2.7 Medium soft, dark red clay. Crumbly texture, small ironstone pieces.
- 2.7 – 3.6 Layer of stiff plastic clay over fragmented clay, plastic to touch. Orange coloured, plus organic laminae.
- 3.6 – 4.6 As above. Over medium stiff, plastic fawn clay, with polished surfaces. Some ironstone pieces.
- 4.6 – 5.5 Crumbly clay over stiff, plastic, orange fissured clay.
- 5.5 – 6.4 Crumbly brown clay.
- 6.4 – 7.3 As above.

Hole 2 (Dry hole)

Depth (m)

- 0 – 0.9 Soft orange clay.
- 0.9 – 1.8 Very soft orange clay, some ironstone fragments.
- 1.8 – 2.7 Firm, mottled orange clay with ironstone fragments.
- 2.7 – 3.6 As above. Over stiff orange, grey and black, fissured plastic clay with organics.
- 3.6 – 4.6 Stiff plastic orange, fawn and grey clay. Breaks into lumps.
- 4.6 – 5.5 Crumbly clay over stiff fawn, plastic clay.

Hole 3a, b, c (Dry hole)
a, b, and c adjacent to each other

Depth (m)

- 0 – 0.9 Very soft orange clay.
0.9 – 1.8 Very soft, wet, plastic, fawn clay over stiffer grey clay with black partings.
1.8 – 2.7 Soft orange clay, becoming firmer.
Holes 3a and 3b met an impenetrable layer at 2.7 m.
2.7 – 4.0 In hole 3c only, dry crumbly clay.
4.0 Impenetrable layer.

Hole 4 (Dry hole)

Depth (m)

- 0 – 0.9 Soft brown clay.
0.9 – 1.8 Fairly stiff orange clay, hard ironstone band at 1.8 m.
1.8 – 2.7 Softish orange fawn clay.
2.7 – 3.6 Dryer, more crumbly orange clay with ironstone pieces.
3.6 – 4.6 As above, tough clay.

Assessment

From the bore hole logs, the active slip is shallow, between 1.8 and 2.7 m deep near the pipe. Although the clays were often near saturation, there was no freely running water in any of the holes. It appears that this activity occurs when the clays approach saturation and hence zero cohesion. This type of slip reacts to a few days of heavy rain and will stop moving after a short period of dry weather.

Hole 1 was drilled through the heel of the old structure to a depth of 7.3 metres. Layers of stiff plastic clays with fissures were intersected, but there was no sign of water. This old slip appears to be stable.

Recommendations

Because the active slip is so shallow, there is a good chance of limiting future movement, and possibly stopping the slip altogether.

1. Open surface drains should be installed to intersect surface runoff; one set to be close to the top of the bank of the old structure, another set to be installed around the active slip area. Water from both sets of drains may be taken by pipe to the natural watercourse below the slip.
2. In this type of shallow slip vegetation is an important stabiliser, both because of transpiration from depth in the soil and binding together by roots. Fast growing trees or bushes are suggested, preferably those with vegetative reproduction. It is suggested that vegetation is extended to include the heel area of the old structure.
3. If the previous measures are carried out, this will improve the stability of both the old and new slips. It should then be safe to tie back the pipe onto the old slip, well back from present activity.

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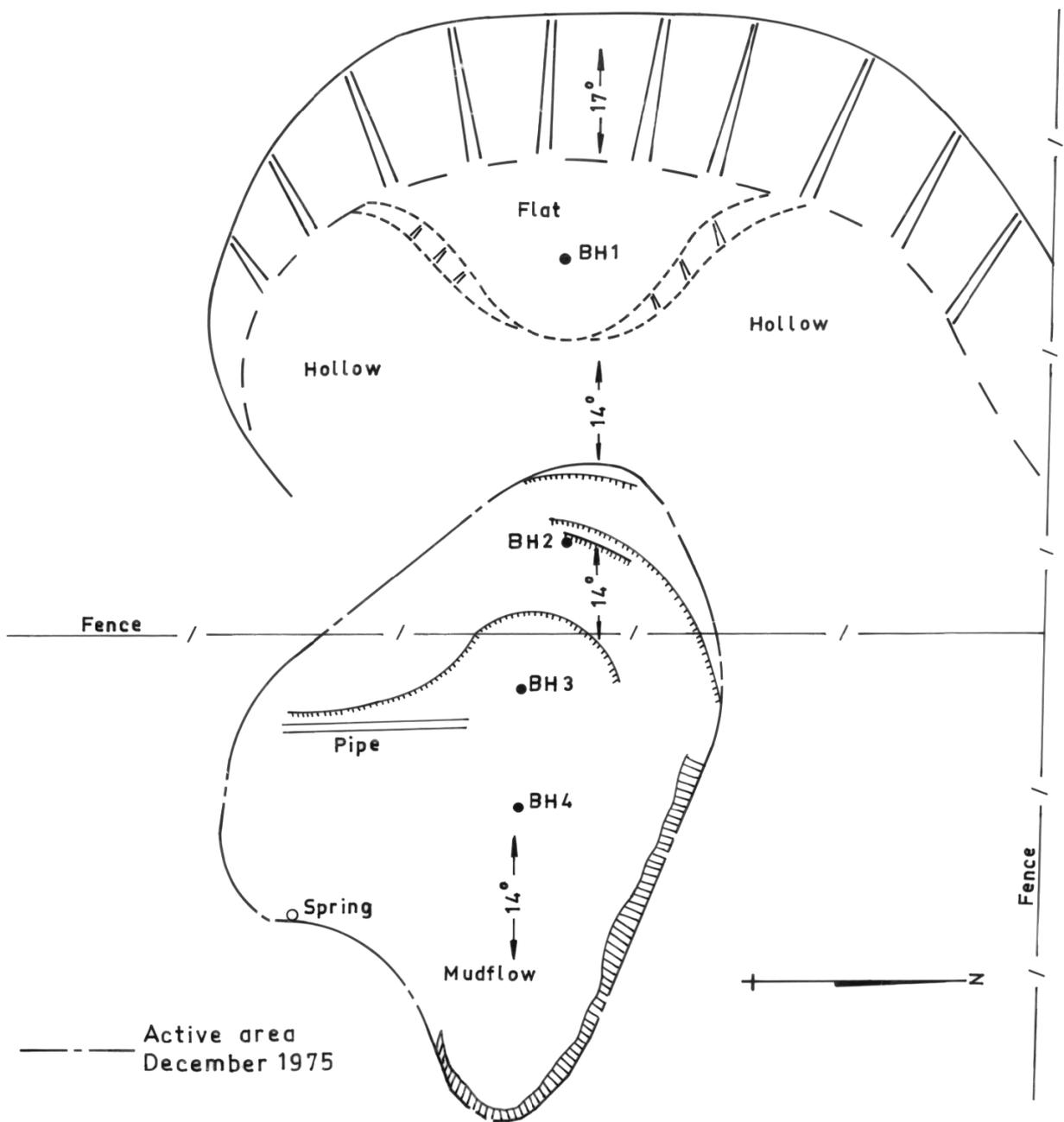


Figure 1

Landslip affecting pipeline east of Bradys Lookout