

Report on the land stability of a proposed subdivision at Windermere

by P. C. Stevenson

The Department was asked to give an opinion on the stability of an area of land at Windermere, by the owner Mr R. H. Harris of Windermere Farm.

The land was that indicated in Figure 1. The area was first examined by a seismic survey to reveal the subsurface geology (Leaman, 1972). This survey showed that no basalt rock exists in the area, and that it consists of 3 to 5 m of basalt talus overlying Tertiary sedimentary clay.

Six trial pits were excavated and examined on 30 May in the positions shown on Figure 1. The sections seen in the pits are described below.

Pit 1

Top soil 1 ft

Talus of hard angular basalt boulders in basalt clay matrix, became too hard to dig at 6½ ft

Pit 2

Top soil 1 ft

Weathered basalt talus with some hard boulders, became too hard to dig at 10 ft

Pit 3

Top soil 1 ft

Talus of weathered basalt, mainly clay with a few basalt boulders at depth, 11 ft.

Pit 4

Top soil 1 ft

Brown plastic clay 2 ft

Deeply weathered basalt with occasional boulders to 9 ft 6 in where difficult to dig

Pit 5

Top soil 1 ft

Brown sandy clay 2 ft

Weathered basalt talus becoming too hard to dig at 8½ ft

Pit 6

Top soil 1 ft

None of the pits was deep enough to reach the Tertiary clay, but that this is present is in no doubt:

- (a) because it outcrops along the Tamar shore below the area;
- (b) because its presence was detected by the seismic survey; and
- (c) it is known to be present from regional mapping.

Because of the presence of the clays, the subdivision cannot be said to be without risks, but these are to some extent reduced by the presence of the basalt talus. The talus, when weathered, is itself a slip-labile material but is much less so than the clay.

The liability to slip can be expressed in terms of the angle at which slopes are known to be 'reasonably stable'. This last expression implies that the slope is not subjected to unusual stresses of loading, or moisture, or both. The basalt talus in these terms is stable to about 16–20° and the clays are stable to about 7–11°.

The steepest slopes in the area are at the positions of Pit 1 (12°), Pit 2 (10°) and Pit 5 (14°) and it will be seen that these angles lie between the stability estimates for basalt talus and sediments given above.

It is recommended therefore:

- (a) that houses are not built on slopes greater than 10° or in any position less than 100 ft uphill of any slope of 10°;
- (b) that stormwater and septic tank drainage, if any, is carried away to river level in pipes so constructed as to be flexible and not subject to leakage when in tension;
- (c) that roads are constructed as far as possible to avoid the steeper slopes or areas immediately uphill or downhill of them; and

(d) that the planting of trees is encouraged especially in the steeper areas.

No detailed contour plan is known to exist for the area, but when such a plan is prepared in the course of subdivision, the areas of limitation could more clearly be defined,

Reference

LEAMAN, D. E. 1972. Seismic survey — Windermere subdivision. *Unpubl. Rep. Dep. Mines Tasm.* 1972/44.

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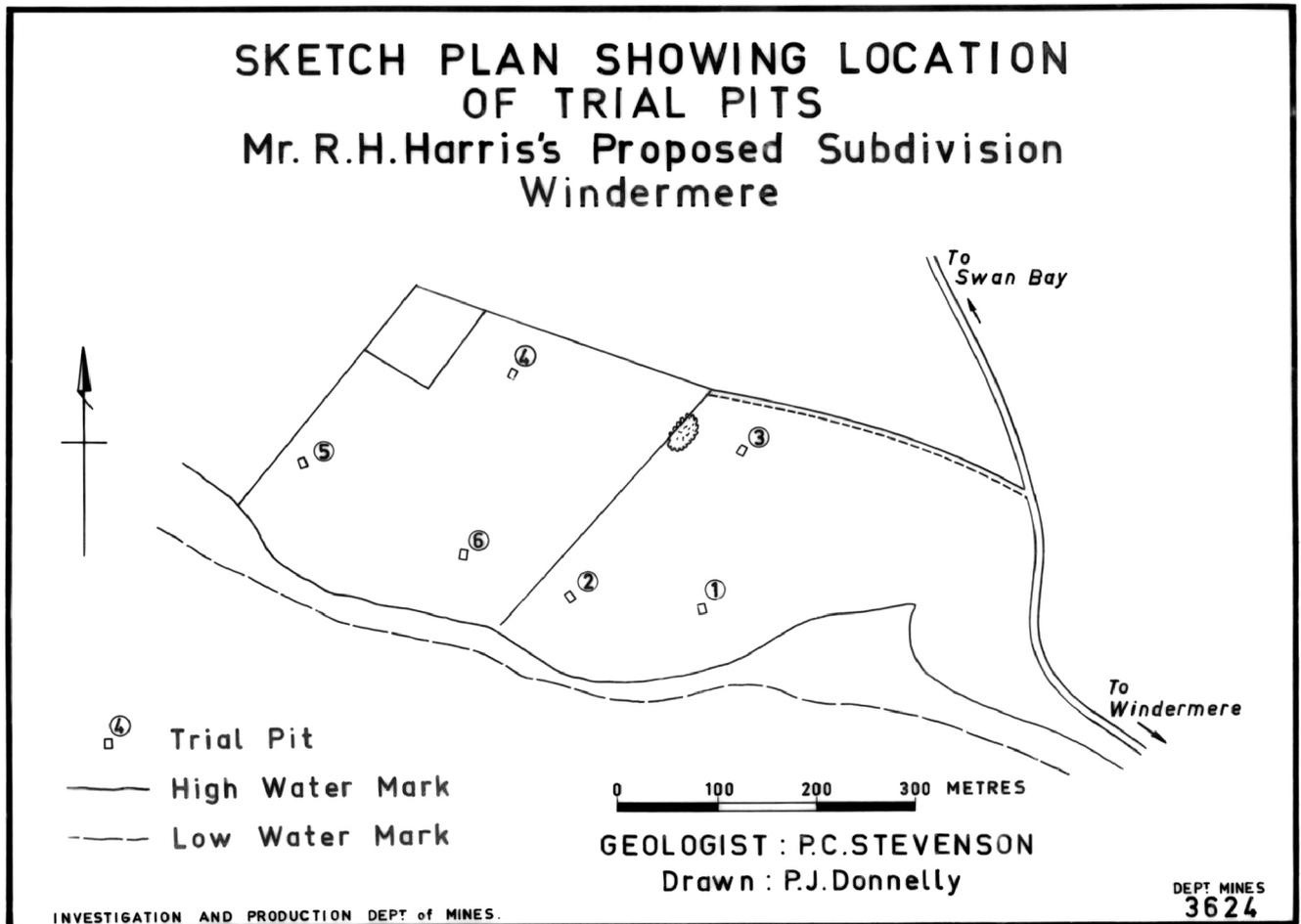


Figure 1