1977/34. Inspection of a proposed subdivision below Bonnet Hill.

R.C. Donaldson

It is proposed to subdivide 22 ha of rural land in the vicinity of Bonnet Hill [EN270425] into eleven lots of approximately 2 ha (fig. 1). Messrs Fowler England and Newton, Consulting Chartered Engineers, acting on behalf of their client Mr R. Contencin, requested the Department of Mines to report on the stability of the land with respect to landslips arising from septic tank installation. The request follows advice from the Department of Health stating that 'this land does not appear to be at all suitable for building with on site drainage disposal due to the steepness of the allotments and possible surface landslip'.

TOPOGRAPHY AND GEOLOGY

The subdivision is characterised by moderate to steep slopes which fall away from the crest of an east-west trending spur. An unnamed stream runs through the western portion of the land giving rise to steep sides with slope angles of 22-26°. Locally rugged terrain is evidenced by the numerous small cliffs which have developed on Triassic sandstone.

The distribution of rock types is shown in Figure 1. The oldest exposed rocks crop out over the eastern one third of the subdivision and comprise a Permian quartz siltstone-mudstone sequence faulted against Triassic sandstone to the west. Jurassic dolerite abuts the Triassic sandstone and crops out over the western part of the subdivision.

Several test pits excavated to bedrock revealed the nature and weathering characteristics of each rock type. Soil development is generally poor, being thin (less than 1.0 m) on Permian rocks and dolerite and up to 2 m thick on Triassic rocks. The Permian rocks are relatively unweathered at shallow depths, whilst the Triassic sandstone tends to exhibit a gradational weathering profile. Irregular weathering is characteristic of the dolerite, as is the soil shrinkage/expansion problem associated with the black soil.

LAND STABILITY

Mass movement, whether as a result of natural causes or induced by man in the course of development, is not likely to be a problem within the area specified for subdivision. Although slopes are locally steep, factors such as poor soil development, moderately flat lying rocks and a low to moderate annual rainfall, ensure that the rock materials and their soils generally possess a high degree of natural stability.

Shallow surface landslips (earth flows) create a problem in areas where thick soils are present and water conditions are such that the subsurface soil is continually saturated. With respect to the proposed subdivision, only the latter of these two conditions may occur; *i.e.* saturated soils in the vicinity of discharge of effluents. This situation can be largely avoided if consideration is given to the design and layout of subsurface drainage trenches so as to complement the shape and levels of the area available for development.

Being a rural-residential type subdivision with blocks approximately 2.0 ha, the density of housing is low. Thus a concentration and accumulation of effluent at any one point through the interaction of adjacent disposal systems is unlikely.

CONCLUSIONS AND RECOMMENDATIONS

Despite the relative steepness of the slopes, there is minimal danger of earth flows resulting from on-site drainage disposal, assuming a sensible approach to the layout and design of the system. The dolerite soils are potentially the least stable. To minimise any possibility of potential mass movement within the dolerite soils, it is recommended that building on Lots 7, 8 and 9 should not be permitted on the slope between the Channel Highway and the stream. The area is uniformly steep (26°), there is a lack of natural vegetation and active soil creep is present which is an indication as to the nature of the near surface materials. In addition, this slope is liable to receive the surface runoff from the Channel Highway, adding additional water to the system.

With respect to the whole subdivision, it is considered desirable to retain as much of the natural vegetation as feasible in order to bind the soil and minimise erosive processes.

REFERENCE

DONALDSON, R.C. 1976. Investigation of a proposed subdivision, Bonnet Hill. *Unpubl.Rep.Dep.Mines Tasm.* 1976/60.

[17 August 1977]

R.CONTENCIN SUBDIVISION BONNET HILL KINGSTON

0 2 4 6 8 10 metres

Geologist – R.C.DONALDSON

Triassic sandstone

Jurassic dolerite

Permian siltstone

Test pit

Slope angle

Department of Mines

Contour interval 25 metres

Figure 1

5 cm