

### Test pits at 52 William Street, Ulverstone

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Test pits have been dug on this property to examine subsurface materials. A landslide occurred about thirty years ago involving some 750 m<sup>3</sup> of material and this extended on to the property. The recent assessment was undertaken to aid in determining any limitations on the development of the land as a result of the past instability and possible future movements.

The land comprising the lot is relatively flat in the front part near the street but has a gentle slope at the rear. The land steepens directly behind the lot. The general area is underlain by basalt of Tertiary age and material derived from the weathering of the basalt. The flat front part of the lot is part of an extensive flat area which extends to the north. This flat area is an old terrace that was formed at a time of higher sea level.

The locations of the test pits are shown on Figure 1 and brief descriptions of the material encountered are attached.

The material in the test pits consists of fill and soil near the surface with a brown plastic clay and friable sandy silty clay at deeper levels. There was significantly more plastic clay in Pit 1 compared to the other two pits. Tests with a hand penetrometer indicate variable strength of the material in the pits. A sample taken from Pit 1 was tested in the laboratory with the following results:

**Pit 1, 1.4-1.5 m depth**

Liquid limit	147
Plastic limit	36
Linear shrinkage	27

X-ray analysis

Smectite 80%, K feldspar 15%,  
quartz 5%, ilmenite 2%

Strength test  $\sigma_r$  20%,  $c_r$  2 kPa)

(Determinations by R. N. Woolley,  
Mineral Resources Tasmania)

The strength test indicates a relatively high residual strength value considering the nature of the material from visual inspection and also from the results of the other tests undertaken. The high liquid limit and presence of a high percentage of smectite, as determined by x-ray analysis, suggest that a much lower value for the strength factors (particularly  $\sigma_r$ ) would have been obtained. The higher than expected value is almost certainly due to the presence of some

coarser fragments scattered throughout the plastic clay involved in the test. For the other tests, these coarser fragments would have been removed.

As a result of the material encountered in the test pits and the laboratory tests undertaken on one sample, the risk of landslides originating on the lot (i.e. to the north of the present back fence which is apparently north of the lot boundary) is regarded as small. However the risk of landslides originating on the steeper land behind must still be considered. There are prospects of such movements occurring again and extending on to the area north of the back fence as the landslide did some thirty years ago. The sloping land on the lot is probably debris from previous movements. For this reason a zone should be left undeveloped north of the present back fence to act as a buffer and a distance of some six to eight metres from this fence is suggested to achieve this.

The slope behind the property obviously has some potential to be involved in future landslide movements. Trees, which would normally have a stabilising influence, have been removed in recent times and drainage recommended in a report after the landslide in the 1960s appears to be somewhat disrupted. It is difficult to control the management of land outside the property but the maintenance of good drainage and vegetation is expected to reduce the potential for unstable conditions to develop on the steep slope. Drainage on the lot itself should and can be maintained in good condition and a drain along the rear boundary is recommended to remove surface and near-surface water from running on to the property.

In summary, there is some risk of landslide movements developing on the steep slope behind the property affecting the southern portion, and it is recommended that no buildings be constructed within six to eight metres of the present fence. The risk of landslide movements originating on the lot itself is regarded as low. Drainage along the southern boundary of the lot is recommended and if it can be arranged, good drainage and vegetation, including appropriate trees, should be maintained on the steep slope behind as an aid to maintaining the stability.

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**Pit 1**

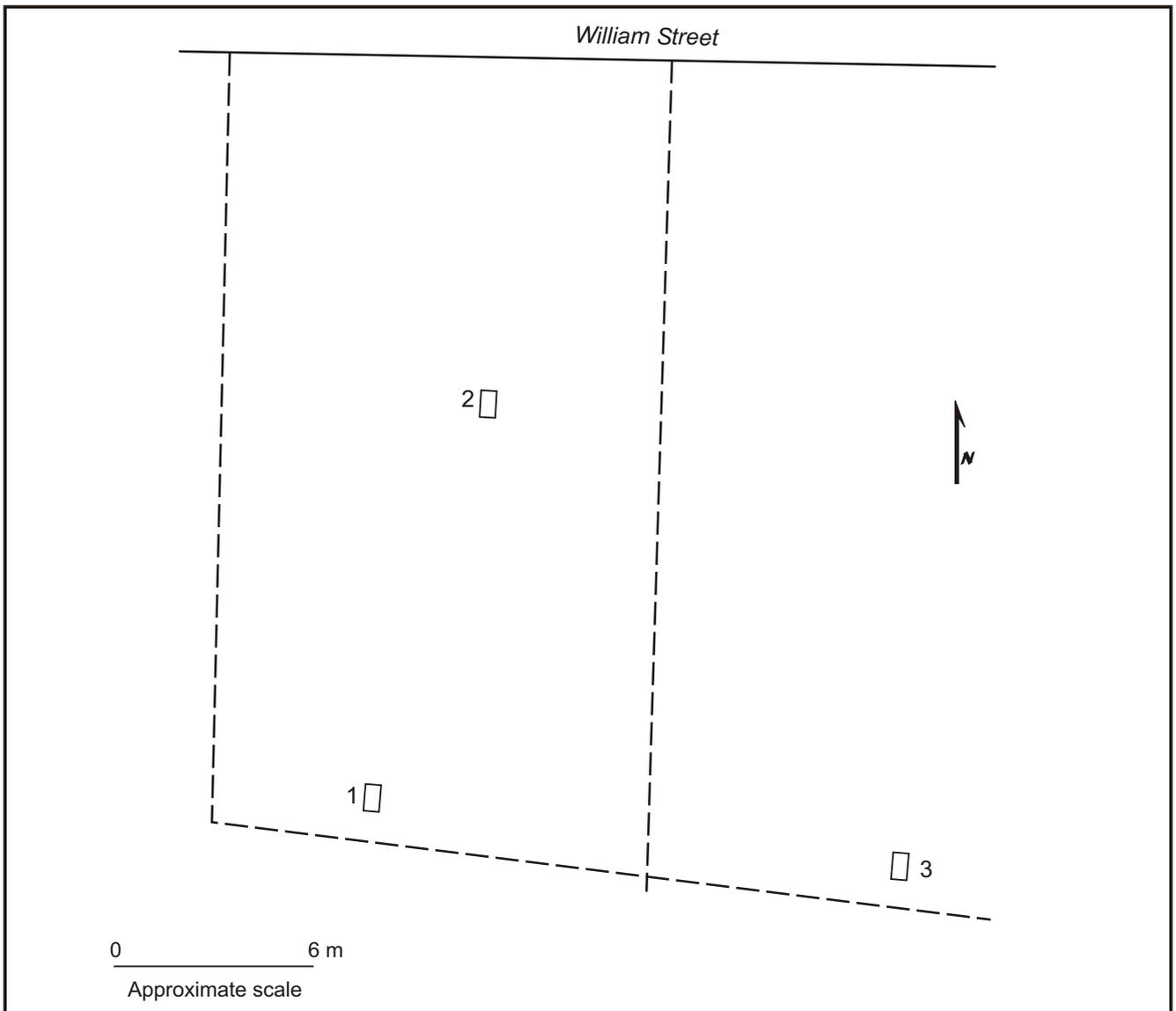
- 0-0.2 m Dark brown grey silty clay soil, moist, roots
- 0.2-0.5 m Grey brown plastic clay, not continuous around pit
- 0.5-1.2 m Dark brown grey clay friable to slightly plastic, some possible charcoal fragments
- 1.2-1.7 m Grey plastic clay with slip surfaces, 1.75-2.5 kg/cm<sup>2</sup> penetrometer tests.
- 1.7-3.0 m Brown sandy silty clay with basalt fragments, friable, some roots to 2.3 m, becoming more plastic towards base. Shiny slip surface throughout, penetrometer tests 2.5-4 kg/cm<sup>2</sup>

**Pit 2**

- 0-0.3 m Fill – soil, pipes, roots, moist
- 0.3-0.9 m Mid grey brown plastic clay, a few basalt fragments
- 0.9-2.0 m Brown sandy silty clay, becoming harder, some basalt boulders. 4->4.5 kg/cm<sup>2</sup> (penetrometer tests).
- 2.0 - 3.0 m Grey silty clay with basalt boulders up to 100 mm across. Numerous slip surfaces or fissures, friable to plastic, a little lighter grey at bottom.

**Pit 3**

- 0-0.1 m Fill (quartz gravel)
- 0.1-0.5 m Brown sandy silty clay, moist and soft. 1.5-2.5 kg/cm<sup>2</sup> (penetrometer tests)
- 0.5-2.7 m Brown sandy silty clay with some small basalt boulders. Not known whether it is situ basalt or debris – slip surfaces or fissures common. 4->4.5 kg/cm<sup>2</sup> (penetrometer tests).



**Figure 1.** Sketch plan, 52 William Street, Ulverstone, showing location of test pits.