Report on trial pits at Tamar Avenue, George Town.

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Trial pits were dug by back-hoe on 1 December 1971 at Tamar Avenue, George Town (fig. 1). They were excavated under geological control in order to more accurately determine the extent of the potential slip area as calculated from an earlier investigation (Stevenson, 1972). A further reason for the excavations was to clarify the nature of the material through which the George Town Council had proposed to place a sewer line. This project was seen by the local residents as being contrary to the recommendations of the original report.

Pits were used as a source of subsurface information in preference to drilling or augering because of their advantages of providing information in three dimensions, providing a much larger sample and enabling a more meaningful interpretation of macro-structure. Also pits are not subject to the blank zones that occur when core is lost in drilling, and for these reasons they are favoured in investigations of this type.

Access to the positions of the pits was difficult due to thick scrub and the slope of the ground. Hole 1 was sited on the original boundary of the potential landslip area which was itself based on the outcrops of basalt and sediment on the shore. Holes 2, 3 and 4 were placed according to the findings in the preceding pit. Details and interpretation are given below.

RESULTS OF TRIAL PITS

The locations of the pits are shown on Figure 1.

Hole 1

Depth (ft)	*Description*
0-1	Top soil.
1-6	Basalt talus with interstitial clay from weathered basalt.
6-9	*In situ* weathered basalt with spheroidally weathered joints.
	Excavation difficult at 9 ft.

Hole 2

0-2	Top soil.
2-7	Basalt talus.
7-11	Spheroidally weathered *in situ* basalt, hard digging.
	Machine refused to dig at 11 ft.

Hole 3

0-1	Top soil.
1-12	Basalt talus, subangular with interstitial weathered basalt clay.
	No *in situ* basalt. Maximum reach of machine.

Hole 4

0-1	Top soil.
1-5	Basalt talus.
5-6	Columnar basalt *in situ*.
	Machine unable to dig in this material.

INTERPRETATION

The geology of the Tamar Avenue bluff area has been described previously (Stevenson, 1972). In brief it consists of sands and weathered basalt clays overlying basalt. These in turn overlie a thick plastic clay sequence which continues below sea level.

Basalt which occurs on the downhill slope from south to north, may be seen to pass below sea level near where the original boundary line of the potential landslip area crosses the foreshore reserve. From this locality and extending to the north in the direction of the coastline, the basalt forms an unbroken and protective layer over the plastic clays and thus increases their stability. To the south of the boundary line however, the basalt slowly rises above sea level and swings across the foreshore reserve and the house gardens, forming the rising ground at the southern part of Tamar Avenue. The plastic clays beneath are left unprotected from the bluff to the shoreline and this situation creates the risk of landslip.

Basalt talus further complicates the matter by having been eroded in the past from the exposed edge of the basalt layer, and it now mantles the foreshore and garden area. Some of this talus is deeply weathered into clay, but it is usually recognisable by an abundance of subangular boulders. A top soil profile, sometimes containing sands also helps to conceal the rocks beneath.

The pits were dug in an attempt to trace the course of the basalt edge where it crosses the foreshore reserve and swings inland to form the bluff. The presence of *in situ* basalt had to be recognised under the continuous basalt talus layer.

In situ basalt was observed in Holes, 1, 2 and 4 while none was found in Hole 3. This showed some agreement with the conditions seen on the shore. The sediments on the shore below Blocks 75 and 76 are exposed by a local rise in the basalt base, but they do not detract from the inference that *in situ* basalt continues under Blocks 74, 75, 76 and 77. The further extension of the basalt is currently unknown as Hole 3 was dug as deep as possible without encountering any. Some *in situ* basalt may be observed on the shore below Blocks 80 and 81, but from here it rises steeply above sea level and exposes plastic clays beneath, and therefore must be considered a risk from this locality to the south. The precise course of the basalt edge from where it leaves the shore outcrop ceases to be of much significance as the ground rises, as the greater stresses of the steeper slope become more significant than the stability provided by the *in situ* basalt. The basalt itself becomes a source of instability because of its weight resting on the clay beneath.

The excavation of the pits markedly increased geological knowledge of the area and enabled a re-assessment of the potential for instability. Although further re-assessment would involve increasingly difficult analysis of bluff stability, additional pits should be considered.

CONCLUSIONS

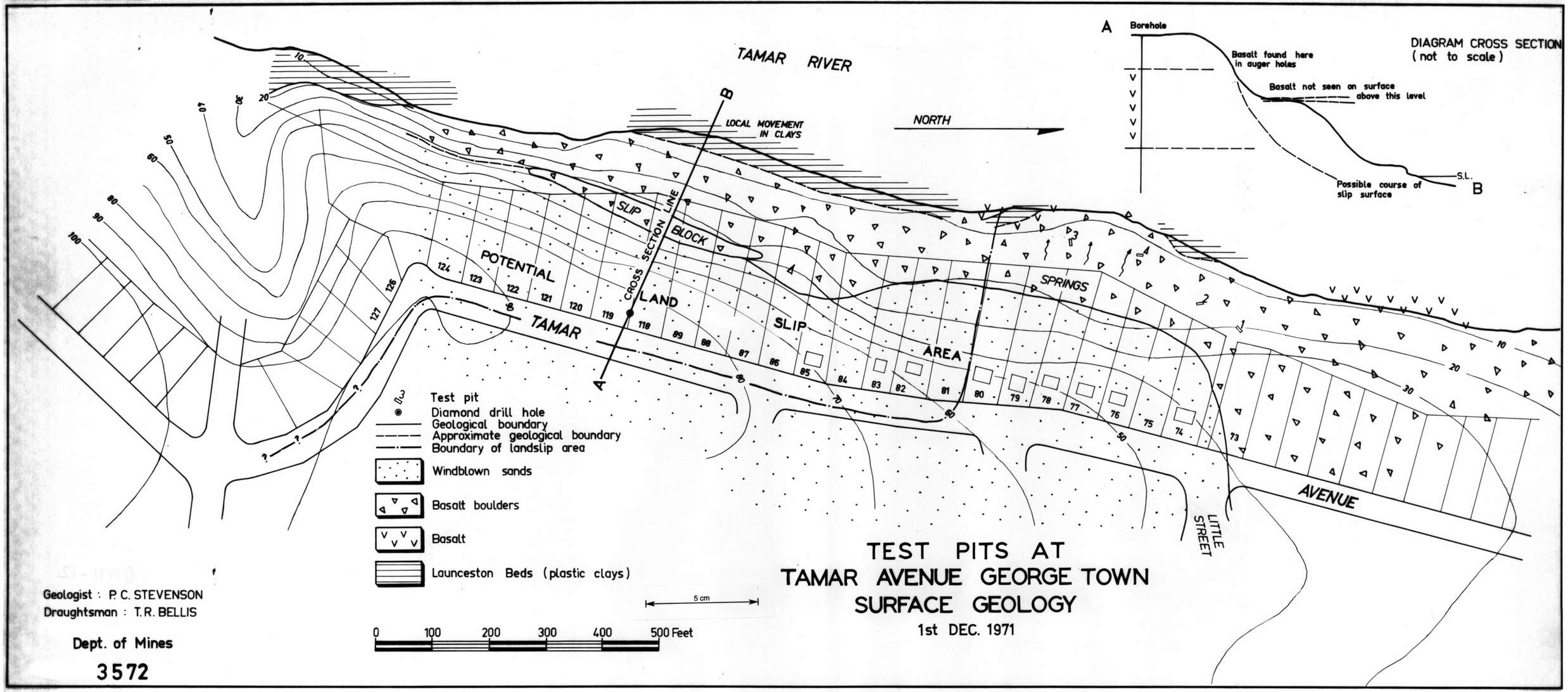
(1) The thickness of basalt talus and basalt in the vicinity of Holes 1, 2 and 4 reduces the risk of landslip caused by pipeline excavations to an insignificant level.

(2) The boundary of the potential slip area may be more accurately located along the southern boundary of Block 80.

REFERENCE

Stevenson, P.C. 1972. Foundation conditions at Tamar Avenue, George Town. *Tech.Rep.Dep.Mines Tasm.* 15:64-66.

[8 December 1971]



TEST PITS AT TAMAR AVENUE GEORGE TOWN SURFACE GEOLOGY

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