

1979/44. Foundation conditions at George Town Golf Club

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Abstract

Investigation of foundation conditions at the George Town Golf Club does not show any evidence of mass movement, although a minor risk of slow toppling of basalt columns exists. Examination of foundation rock by trenching is recommended.

INTRODUCTION

This investigation was undertaken at the request of the George Town Golf Club on 24 and 25 July by P.C. Stevenson and A.T. Moon.

The clubhouse stands on the crest of a rock escarpment overlooking the River Tamar [DQ910458]. The club wishes to extend the building toward the escarpment edge which is about 16 m from the present building.

GEOLOGY

Slope stability problems are known to exist in this part of the Tamar Valley, where more or less weathered basalt in beds from 3 to 30 m thick overlies soft clay. The clay, softened by rainwater and weathering, can be squeezed out from under the heavy rock and cause the rock to crack under its own weight and begin to move downslope. The river slopes below Comalco Aluminium Limiteds Bell Bay works show this phenomenon in an extreme form.

A visual examination of the hill slopes of the escarpment below the golf club does not show any evidence for the presence of clay or for mass movement of the kind described. Nevertheless, a building placed close to the crest of a steep slope does ask for some investigation. Basalt is a jointed (cracked) rock because of its origin as a lava, and that at Bell Bay can be seen to be columnar. Each of the close-packed columns is 1 - 2 m across, with well marked cross joints every 1 - 3 m vertically, so that the whole rock mass may be likened to a pile of bricks all standing on end in close stacked, unbonded layers. The top bricks at the edge of the stack may tend to lean outward, and similarly some slight instability may be present at the escarpment edge.

To examine this possibility, small scale detailed seismic velocity and electrical resistivity measurements were made in the positions shown in Figure 1. The measurements were made to discover if any open or clay-filled gaps could be found in the rock close to the surface. Gaps of this kind would be expected to show up as a local reduction in both the seismic velocity and in the resistivity of the rock close to the surface.

The observed seismic velocities and resistivity values are given in Figures 2 and 3. Irregularities (anomalies) thought to correspond to clay filled open joints that could affect the projected building are present on spreads 2, 3 and 7. Similar features are also present on spreads 4 and 5 away from the projected building.

Some confirmation of the direction of the open joints is provided by spread 8. This is parallel to the escarpment crest and so parallel to the possible open joints. It shows no irregularities and would not be expected to if the open-joint picture is a correct one, since open joints will be shown only by spreads crossing the joint direction.

LOCATION OF SEISMIC SPREADS-GEORGE TOWN GOLF CLUB

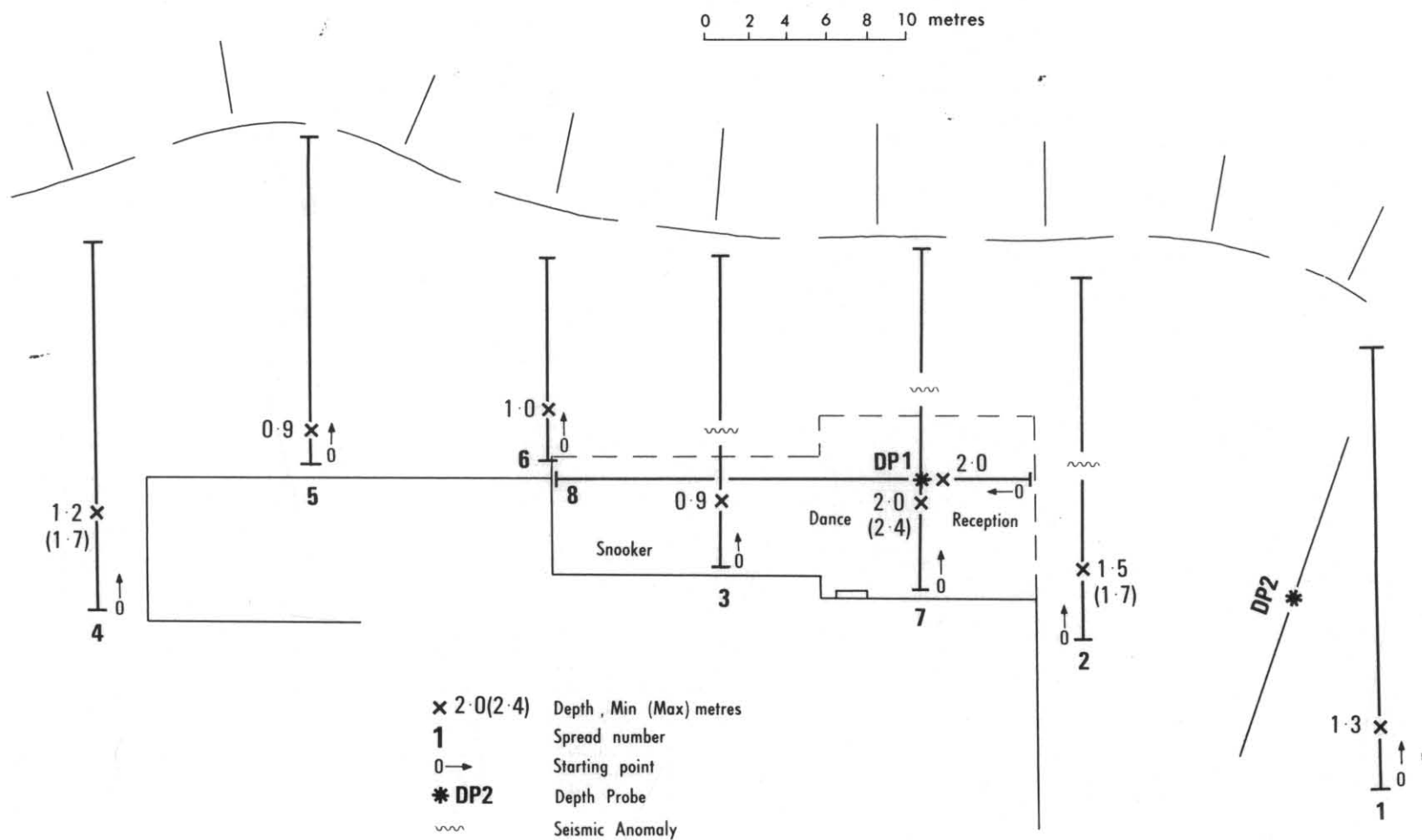


Figure 1.

5 cm

CONCLUSIONS

It is concluded that no clay sediments are present in the escarpment face that can give rise to instability and so endanger the projected building.

Because of the nature of the basalt rock a minor risk of slow column toppling exists and open clay filled joints are thought to exist close to the projected building.

RECOMMENDATIONS

It would be prudent to examine the foundation rock by means of trenches along the lines of spreads 3 and 7 excavated to rock or to 3 m depth. The rock conditions, and particularly the state of the rock joints can then be determined and the risk to the building extensions estimated.

[24 September, 1979]

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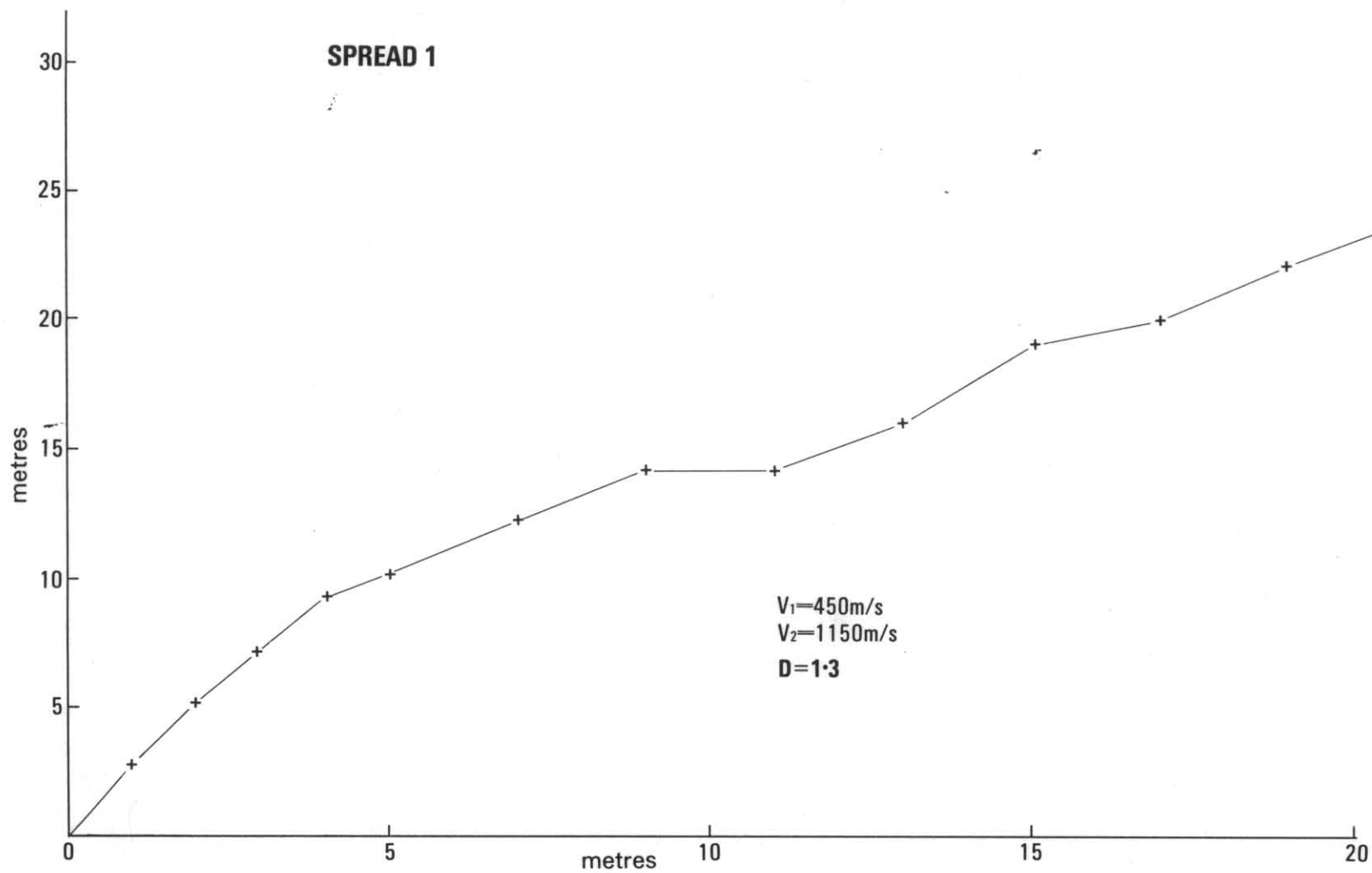


Figure 2. Seismic survey, George Town Golf Club

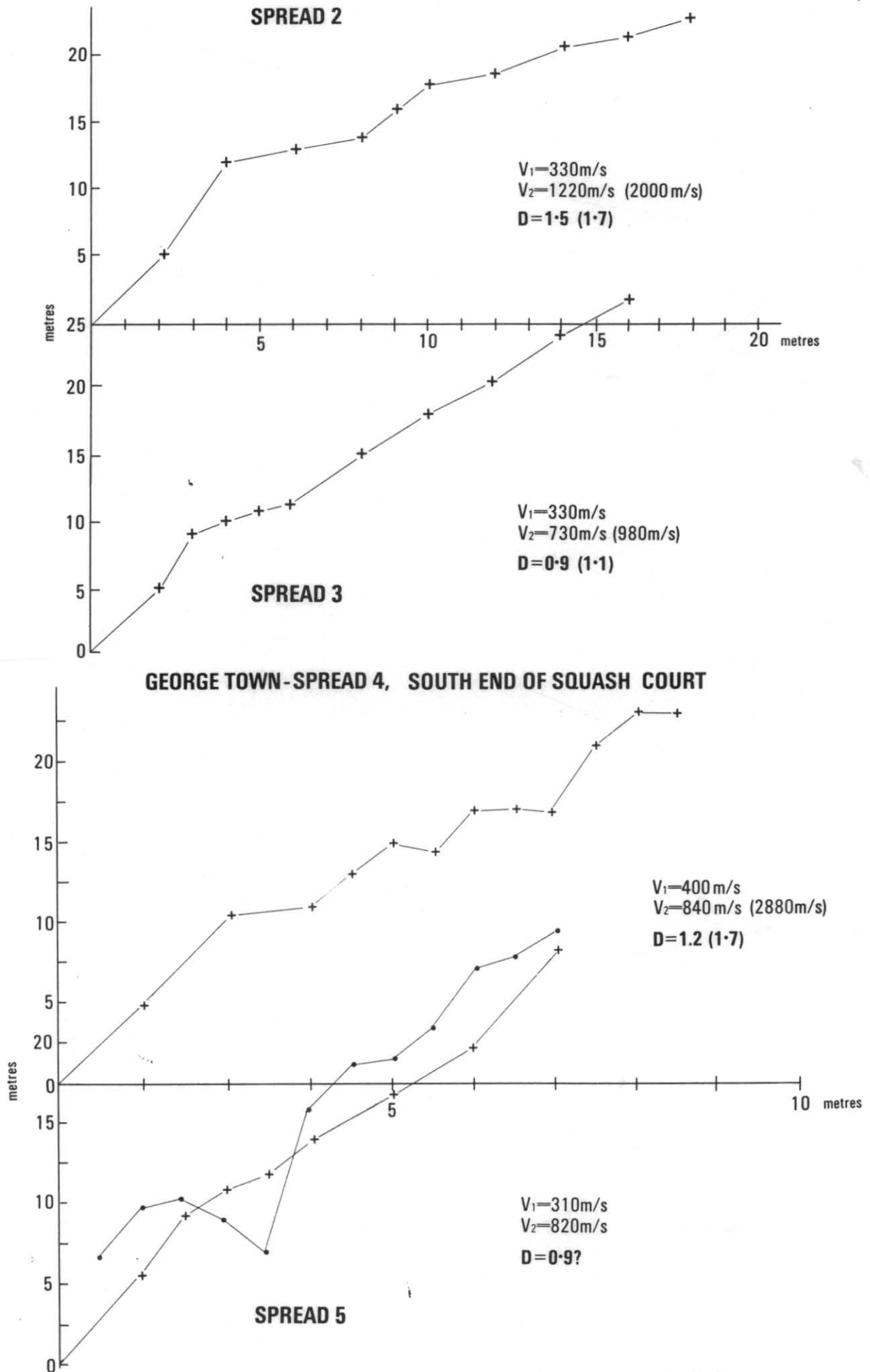
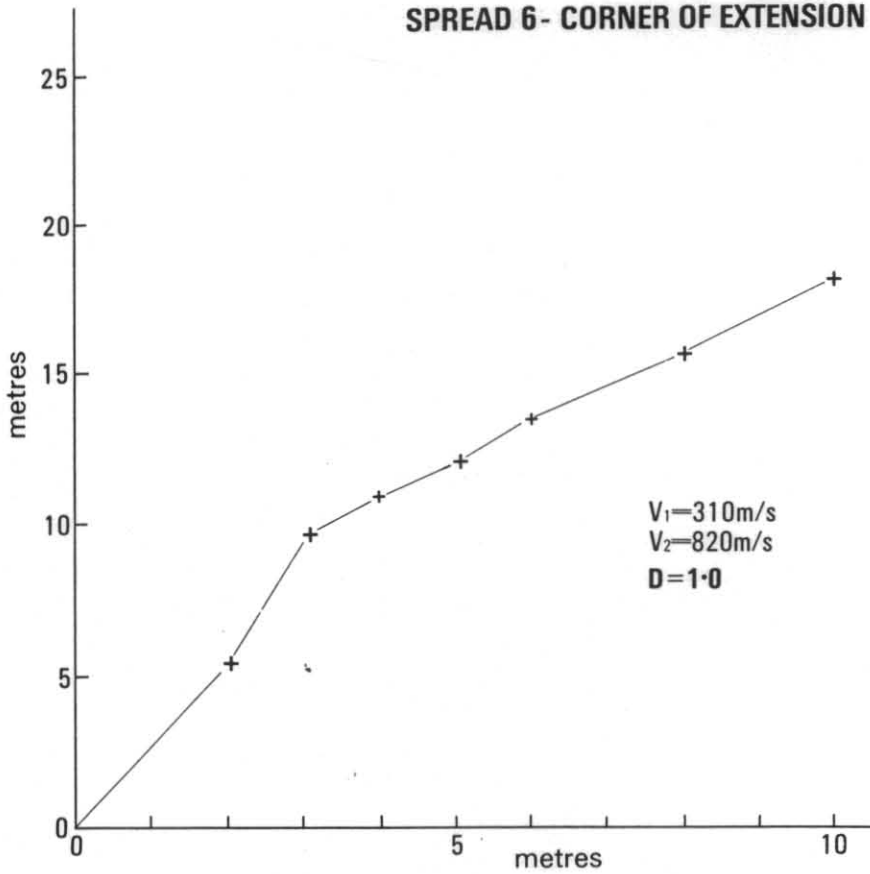
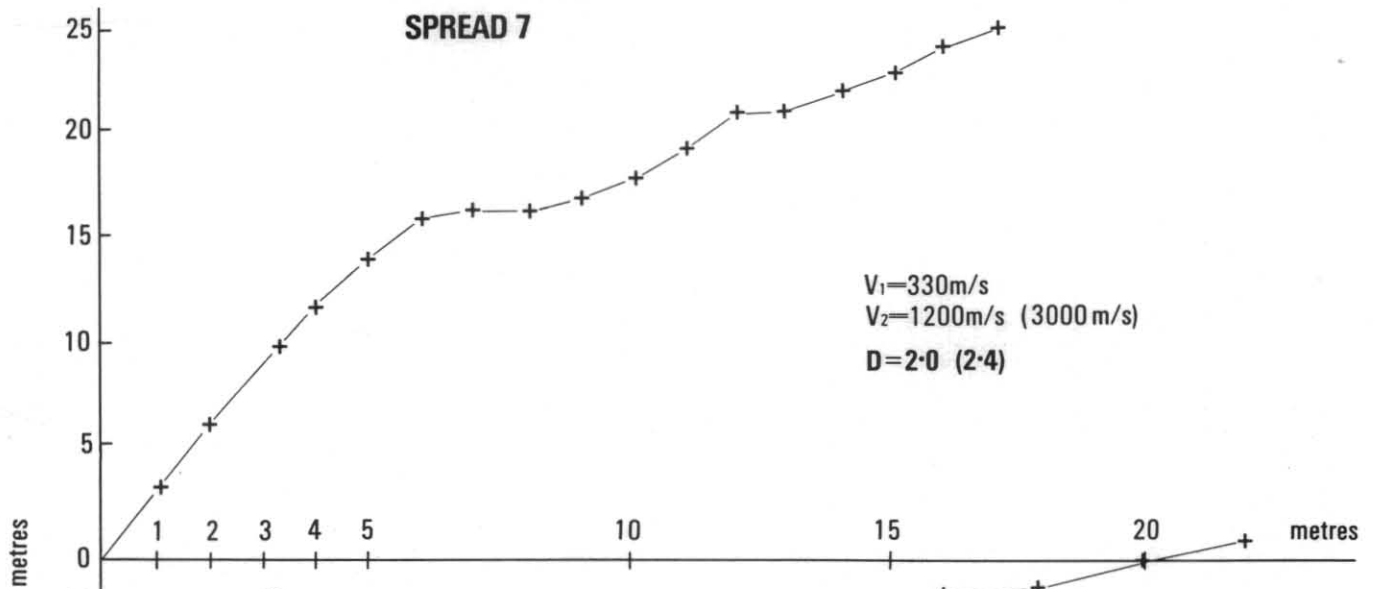


Figure 2. (continued)

SPREAD 6 - CORNER OF EXTENSION



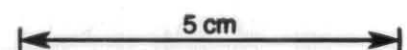
SPREAD 7



SPREAD 8



Figure 2. (continued)



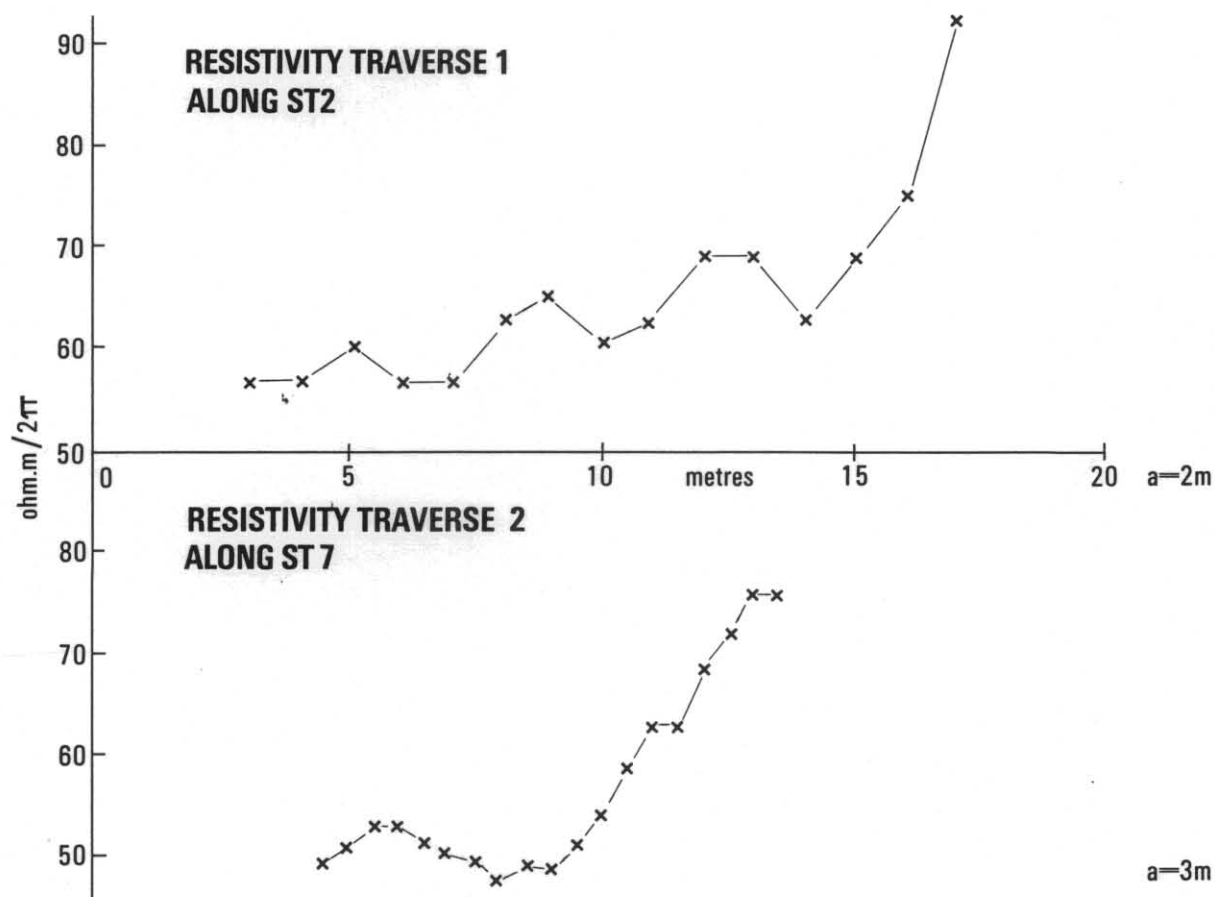


Figure 3. Resistivity survey, George Town Golf Club

5 cm