

UR1975-73

Seismic survey at a golf course at Penguin.

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Following a previous inspection (Matthews, 1975) four seismic spreads were fired to investigate groundwater prospects at the golf course presently under construction [DQ224461]. Spread 1 was fired near a successful bore, Spreads 2 and 3 were fired in areas where it would be convenient to locate a bore, and Spread 4 was fired across a creek at a possible dam site.

RESULTS OF SEISMIC SPREADS

The results of these spreads are summarised in Table 1. The approximate positions of the spreads are shown in Figure 1 and interpreted cross sections are given in Figure 2.

Table 1. SUMMARY OF SEISMIC RESULTS

Spread	V ₀ (m/s)	Thickness (m)	V ₁ (m/s)	Thickness (m)	V ₂ (m/s)	Depth to V ₁ /V ₂ Interface (m)
1	430	2-2.5	625	6- 6.5	2900	7.5-9.0
2	520	3-5	2680			
3	530	2.5-3	1570	14-18.5	3505	17-21
4	370	1-2.5	2620			

The material with seismic velocities of 370-625 m/s is unconsolidated material - soil, sand and gravel. This material may be moist but could not be saturated with water given a velocity of that magnitude. A velocity of 1570 m/s could represent a number of materials - clay, saturated gravel or sand, or weathered rock. Material with velocities of 2620-3505 m/s is bed-rock.

DISCUSSION OF RESULTS

Spread 1 was fired beside a bore which the driller (private contractor) logged as follows:

Depth (m)	Description
0- 0.6	Topsoil
0.6- 5.2	Clay
5.2- 5.3	Gravel
5.3- 8.8	Slate
8.8- 9.1	Clay
9.1-11.3	Slate
11.3-13.1	Clay
13.1-17.4	Slate
17.4-38.1	Slate with occasional basalt and feldspar

Burns (1963) mapped Motton Spilite and Barrington Chert in the vicinity of the bore, with alluvium around the stream. Mudstone horizons are included in the chert formation and much of the log suggests that this may be the formation penetrated, with the exception of the last section which penetrated "feldspar and basalt". As the chert unit is older than the spilite, it would be unlikely that the spilite would be encountered beneath the chert. All the bedrock encountered in the bore probably belongs either to the chert unit or to the spilite, the former being the more likely. The spilite does not tend to weather very deeply in most areas and would be expected to give higher

seismic velocities than were obtained.

The chert unit probably underlies Spread 2, as chert crops out on the ridges opposite both ends of the Spread. If chert underlies Spread 1, the rock underlying Spread 2 is probably more fractured, giving a lower seismic velocity. This would indicate that the prospects of groundwater are better than near Spread 1. An alternative explanation for the lower velocity on Spread 2 is that mudstone is the underlying rock. Similarly if chert underlies Spread 3 at depth then it would be less fractured (having a higher seismic velocity) than Spreads 1 and 2 and would have less potential as an aquifer.

Bedrock is overlain by unconsolidated material below Spreads 1, 2 and 3 and it is unlikely that much of the water supplying the bore comes from this material. There could be a thin water bearing horizon on top of the bedrock under Spread 2 and it is possible that the material ($V_1 = 1570$ m/s) underlying Spread 3 is saturated sand or gravel.

GROUNDWATER PROSPECTS

Topographically, the area immediately south of South Road is an ideal site for a water bore. The area is flat and has a large catchment area behind it. If chert underlies the area, there is a good chance that large supplies of groundwater could be obtained, as the chert cropping out in the area is highly fractured. Adequate supplies of water could still be obtained if mudstone underlies the area. If insufficient water is struck in one bore, one or more extra bores sufficiently spread could be drilled.

DAM SITE AREA

One spread was fired diagonally across the centre line of dam site 1 and indicated a depth to bedrock of 1-2.5 m. If work at the dam site is to continue, it would be necessary for this to be confirmed by digging a trench across the creek bed, and also to determine the nature of the bedrock material. The geology of the surrounding area suggests that mudstone should underlie the dam site, but if fractured chert occurs there, large scale seepage could be expected.

CONCLUSIONS

There are good prospects of obtaining adequate quantities of groundwater at the northern end of the proposed golf course. If sufficient water is not obtained from one bore, additional bores could be drilled. The underlying bedrock is likely to be chert or mudstone.

The most suitable site for drilling the first bore appears to be near or south of Spread 2.

Bedrock lies at shallow depth under the creek bed at dam site 1. If work is to continue at this site a trench should be dug across the creek. This would confirm the depth to the bedrock and would also allow the nature of the bedrock to be determined. Test pits should be dug up the eastern embankment to determine the thickness of the gravel and the nature of the bedrock. Alternately the centre line of the dam could be sited a few metres upstream where there is clayey soil.

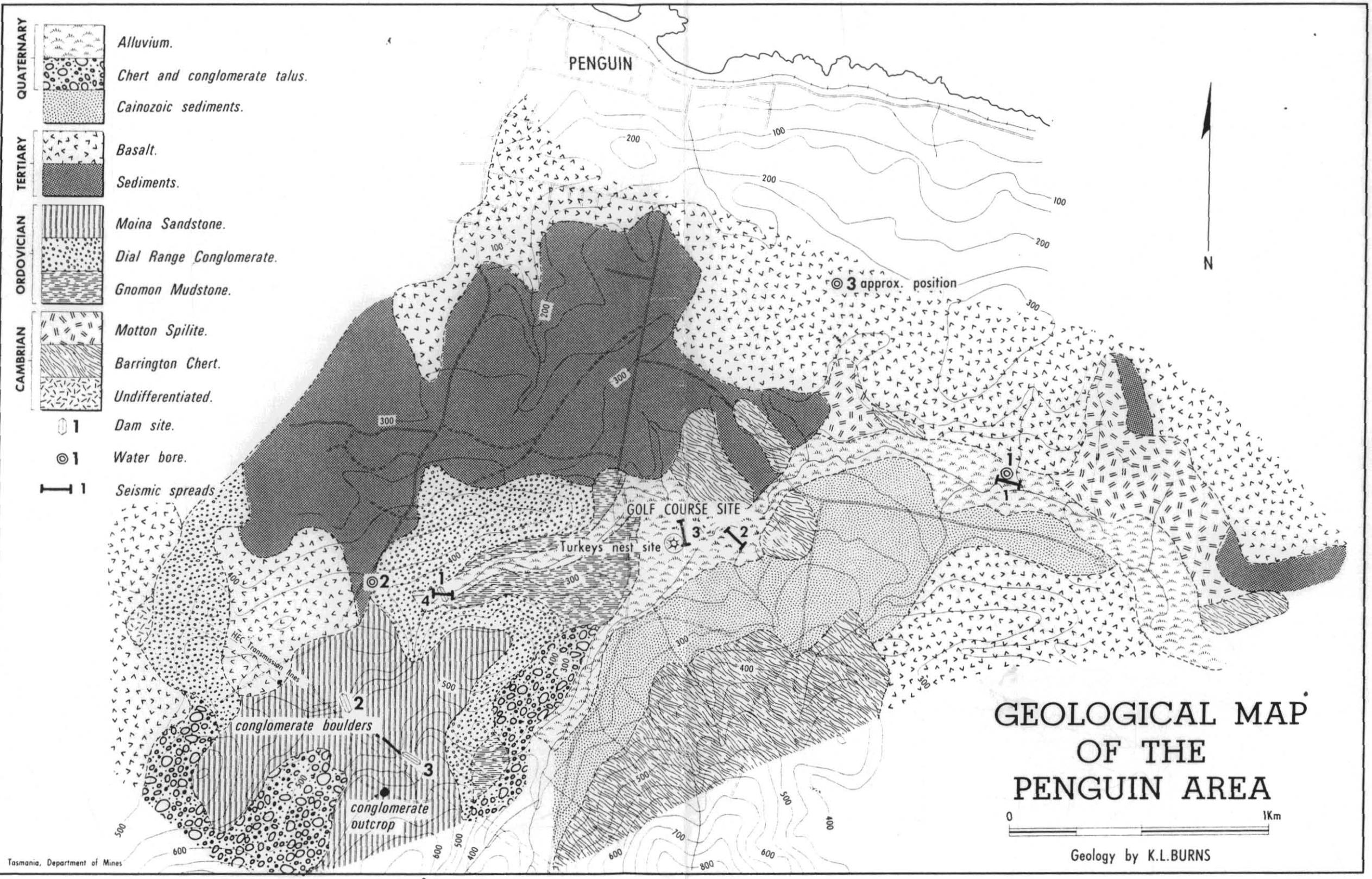
REFERENCES

BURNS, K.L. 1963. Geological atlas 1 mile series. Zone 7 Sheet 29 (8115N)
Devonport. *Department of Mines, Tasmania.*

MATTHEWS, W.L. 1975. Water supply for a golf course at Penguin. *Unpubl.*
Rep. Dep. Mines Tasm. 1975:60.

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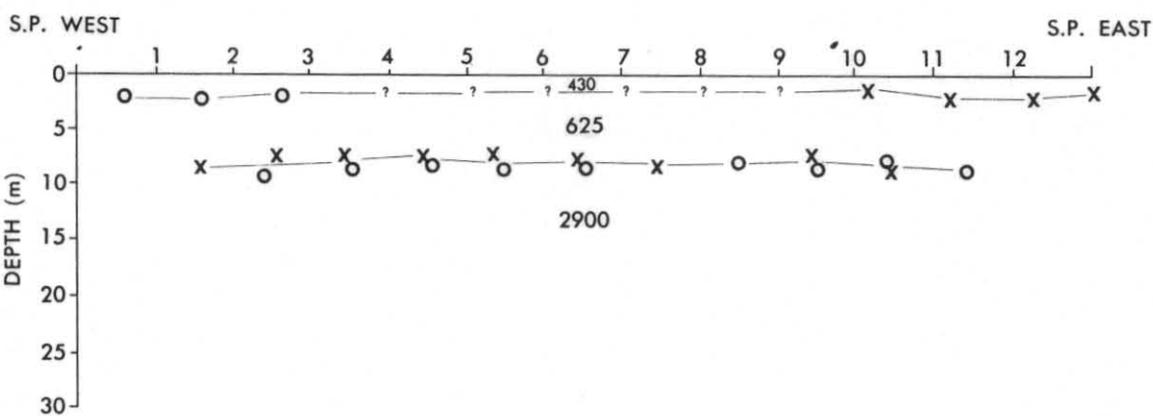
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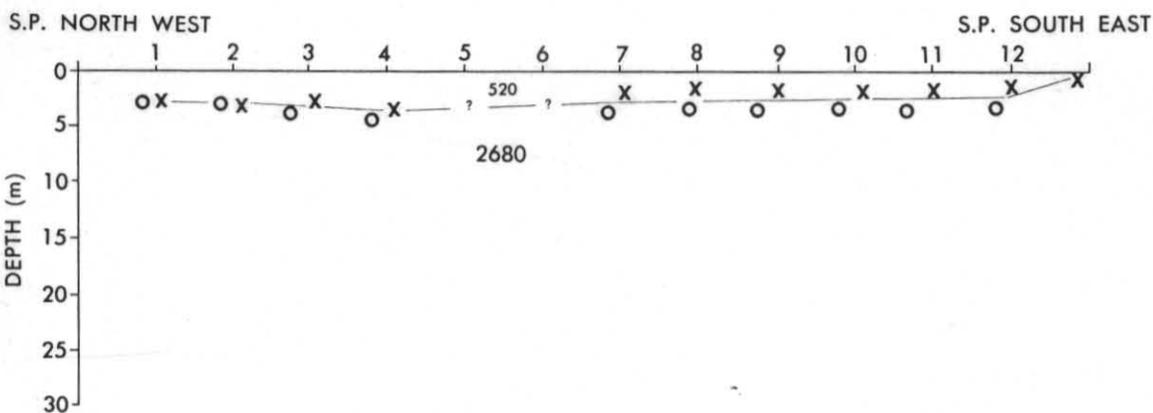
Tasmania, Department of Mines

Figure 1

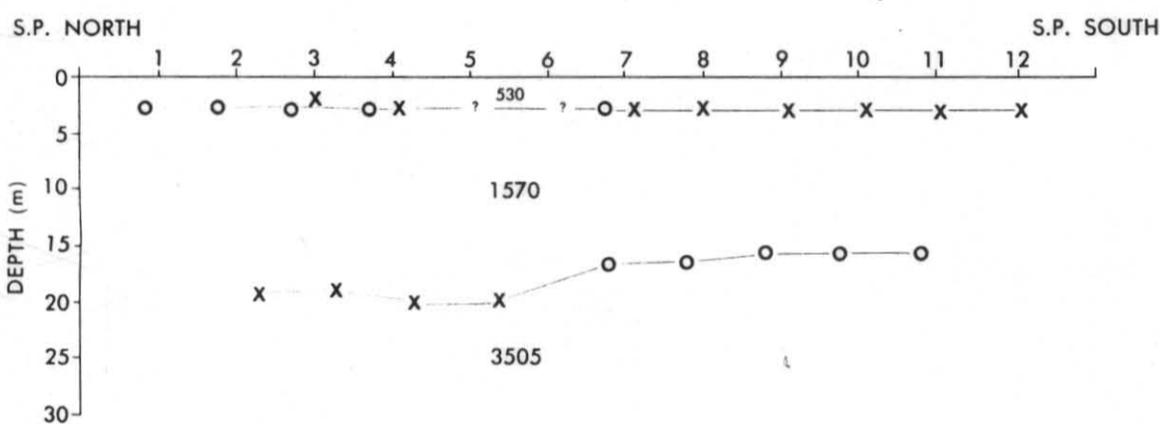
SPREAD 1



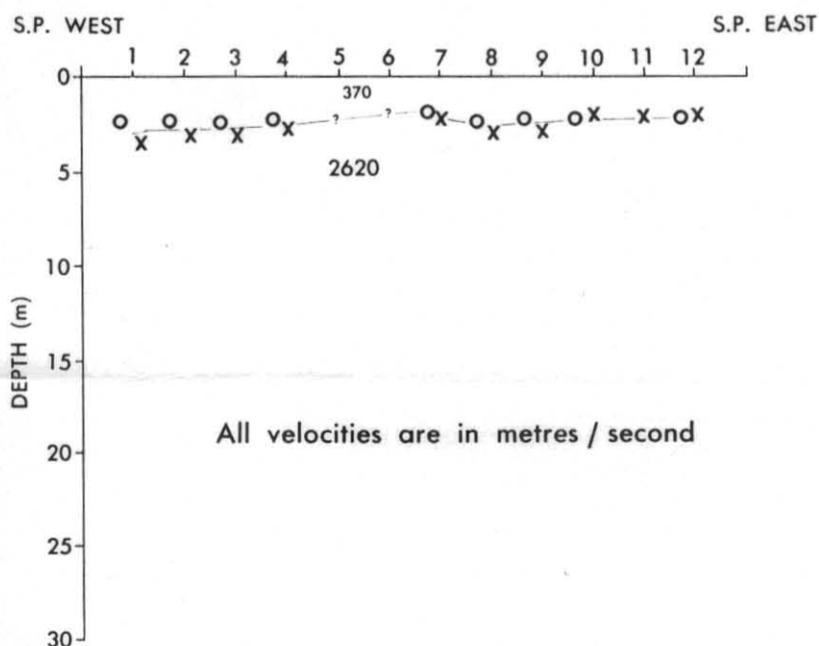
SPREAD 2



SPREAD 3



SPREAD 4



INTERPRETED CROSS SECTIONS
PENGUIN GOLF COURSE SEISMIC SURVEY

Figure 2

