

1976/50. The effect of a water bore on a nearby dam at Hagley.

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The Rivers and Water Supply Commission requested advice on whether a bore, used for irrigation, was affecting the water level of a dam on a neighbouring property. The bore is situated on the property of P. Beveridge, located approximately 2 km north-west of Hagley (fig. 1). The dam, on the property of R. Lynch, is approximately 100 m north-east of the bore.

The general relief of the area is flat to undulating. The bore is situated on a low angled easterly slope and the dam is located near the foot of a south sloping hill.

#### GEOLOGY

The area is underlain by clay sediments of Tertiary age. Light grey plastic clay can be seen in the bottom of the dam, but Tertiary basalt crops out to the east. The log of the bore, as supplied by Monopumps, was:

Depth (m)	Description
0-0.3	Top soil
0.3-5.8	Brown clay
5.8-7.7	Mudstone
7.7-8.8	Blue clay
8.8-15.0	Mudstone
15.0-22.8	Basalt
22.9-25.9	Decomposed material (grey) with bands of clay.
25.9-27.5	Basalt honeycombed with feldspar.
27.5-30.3	Basalt

#### HYDROLOGY

The bore was reported to be delivering 11 500 l/h when installed in March 1973, the standing water level being 3 m below the surface. Water was struck at 5.8, 6.1, 10.6 and 23 m. The property owner states that the bore is artesian for about six months of the year and is usually pumped at a rate of about 36 000 l/h. The dam has been in use for approximately 20 years.

The bore log shows that clay and mudstone occur to a considerable depth below the surface. The clay visible at the surface would be expected to be watertight. The dam on the neighbouring property is supplied by a spring which is probably supplied by groundwater contained in the Tertiary sediments underlying the slopes to the north of the dam.

The property where the bore is situated has a small water hole about 50 m east of the bore. During pumping, the water level in this hole is drawn down and it seems quite likely that a dam 100 m away could also be affected. There is, however, some difference in the times when water levels are lowered. The small water hole on Beveridge's property is reportedly affected almost immediately after pumping starts, whereas the water level in Lynch's dam is reported to have gone very low some 6 weeks after irrigation from the bore ceased.

Rainfall for 1975 was about 200 mm above the 11 year mean for the district, and it is unlikely that lack of rainfall is the cause of Mr Lynch's dam going dry. Greater use of water with more intensive farming may be partly responsible.

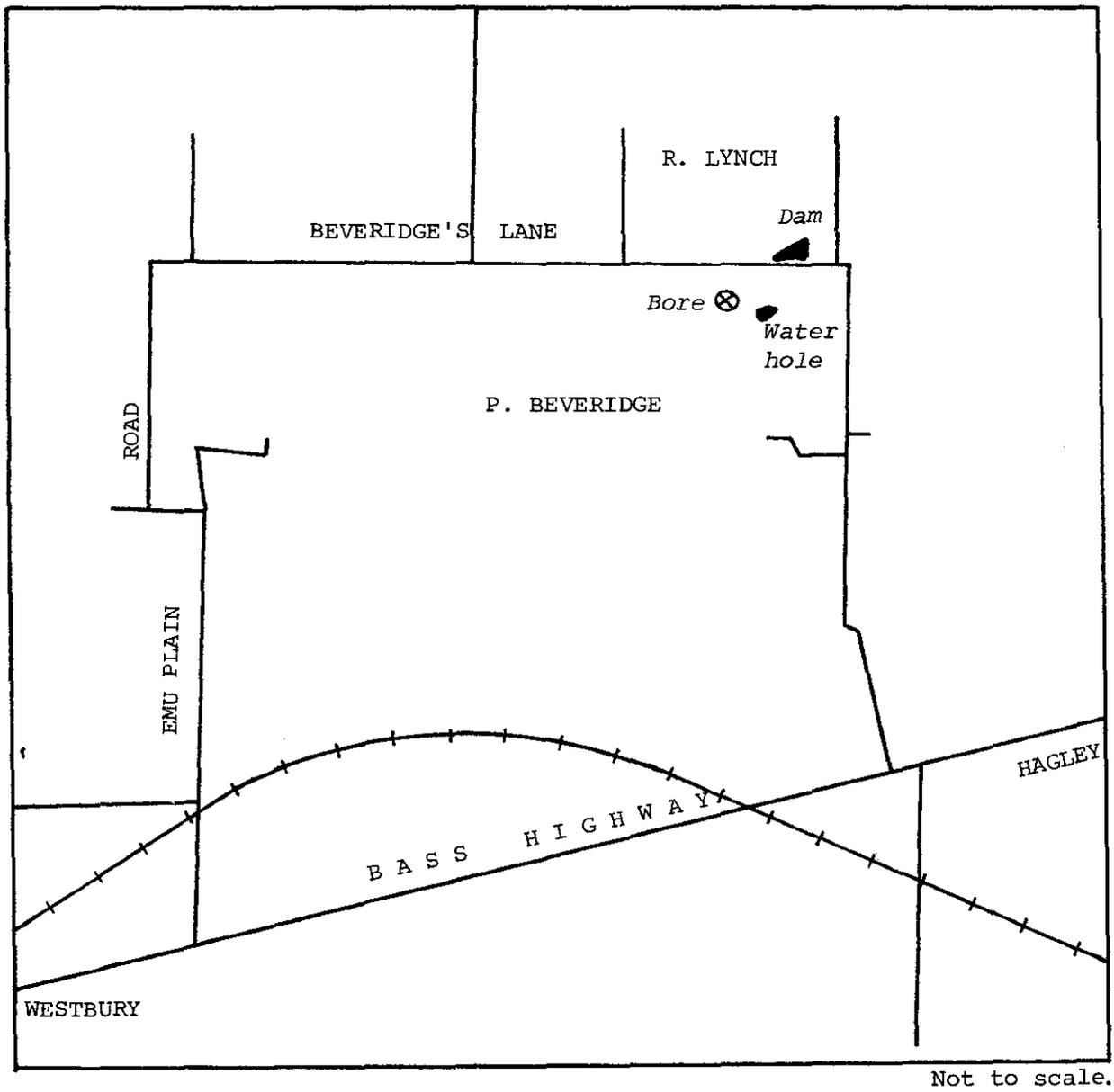


Figure 1. Location of dams and bore hole, Hagley area.

5 cm

CONCLUSIONS

If a dam 50 m away from a bore is affected during pumping, it would appear likely that a dam 100 m away could also be affected, with a slight delay, providing conditions at the two dams were the same. There seems little difference in the surface materials at the two water holes.

The fact that Beveridge's water hole is affected almost immediately pumping starts, but the water level in Lynch's dam became low some 6 weeks after pumping stopped is difficult to explain. Pumping from the bore may have lowered the water table in the whole area and depleted the source supplying the spring which feeds the dam.

As the rainfall preceding the time when Lynch's dam became depleted was above average, insufficient rainfall is not the cause.

Greater use of water from the dam with demands caused by more intensive farming could have been a significant influence on the water level becoming very low.

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