GROUNDWATER SURVEY
HUNDRED UPPER WAKEFIELD
SECTIONS 137, 631-633 & 650-652

P. C. SMITH

Department of Mines
South Australia —

DEPARTMENT OF MINES
SOUTH AUSTRALIA

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GROUNDWATER SURVEY

Location

General: 4 miles (6.5 km) east-north-east of Halbury

Region: 4

County: Stanley

Hundred: Upper Wakefield

Sections: 137, 631-633 and 650-652

Owner: W.F. Gregor

Postal Address: HALBURY, S.A. 5463.

Telephone: Halbury 63 1263

Requirements

Water required for: Irrigation of lucerne

Quantity: 10-15 000 gallons per hour (45-67.5 m^3/hour)

Quality: Less than 3 000 milligrams per litre (mg/l).
Same numerical value as parts per million.

HYDROGEOLOGICAL REPORT

Physiography and Land Use

The property lies between 750 and 1 000 feet (230 and 300 metres) above mean sea level. The western portion of the farm is gently undulating which rises to rounded hills of moderate relief to the east.

The property has been entirely cleared of native scrub and used for grain growing and sheep grazing. The intense clearing has caused some minor erosion problems.

Climate

Nearest rainfall station: Hoyleton

Mean annual rainfall: 17.68 inches (449 mm)

Remarks on rainfall pattern: The mean monthly rainfall distribution over the past 86 years to 1964 has been in points (1 inch = 100 points).

Month	Jan.	Feb.	Mar.	April	May	June
Points	80	71	74	147	201	217
Month	July	Aug.	Sept.	Oct.	Nov.	Dec.
Points	204	218	191	163	111	91

However, the rainfall distribution for the property is thought to be of the order of 20 inches (510 mm) with the monthly distribution similar to the above figures.

Surface Hydrology

Creek name: Several ephemeral creek channels occur on the property together with one unnamed tributary to the Wakefield River.

Characteristics: The ephemeral drainage lines have cut steeply incised channels in the Quaternary outwash alluvials derived from the hills. They have generally westerly flow directions and disappear underground a short distance west of the property.

Springs: No springs occur on the property.

Surface storage: Minor surface storage is effected in small dams on the slopes of the hills.

Geology

Soil Cover: Soil cover is almost complete over the property except for minor suboutcrop near the crests of the hills. Soil is variable, being predominantly a sandy loam with a lesser amount of a red clay.

Rock Units: Quaternary - Pooraka Formation - clayey and sandy soil with gravel lenses near the ranges.

Proterozoic (Willouran) - Boconnoc Formation - phyllites, micaceous sandstones etc.
Ingomar Formation - feldspathic quartzite

Lithology: Underlying the eastern part of the farm at shallow depth is a succession of pelitic metasediments of Willouran age. Minor sub-outcrop occurs on the tops of the hills. A similar succession is thought to underlie the western portion of the property at greater depth than to the east.

Direction and Amount of dip: The rocks trend in a generally north-north-westerly direction with variable dip (from

25° to 75°) to the east.

Structural Features: Occurring in the extreme eastern portion of the property is an inferred faulted contact between the pelitic metasediments of the Boconnoc Formation and a succession of feldspathic quartzites of the Ingomar Formation (both of Willouran Age).

Aquifer Assessment

Type: Free water table. Water is stored in the fractures and joints of the underlying Proterozoic bedrock and in the pores between sediment grains in the Quaternary deposits. The fracture density in the Proterozoic rocks and the porosity of the alluvial deposits determine the storage capacity of each aquifer type.

Unfortunately in this case, the fractures are filled with the clay weathering products of the Proterozoic rocks thus reducing the storage capacity. Similarly in the alluvial slope deposits, the high proportion of clay in the sediments reduces the storage capacity of this aquifer.

Potential Recharge: Recharge is effected by the infiltration of rainfall and the downward percolation of runoff provided by the drainage lines. However, the sealing effect of the clay in the soil and in the fractures in bedrock inhibit the downward movement of surface water to the water table. The moderate rainfall of the area also places a limit on the recharge potential.

Borehole Site Location

General: No bore hole site (to obtain the supply required) can be recommended.

Reason for non-location: It is thought that the most desirable site on the property has already been drilled. A supply of 3 600 gallons per hour (16.2 m^3/hour) is available from this bore at a quality suitable for lucerne irrigation. Therefore drilling at hydrogeologically inferior sites to obtain a greater supply than the above cannot be recommended.

Summary

The property was inspected geologically and no borehole site is recommended.

Underlying the farm is a sequence of rocks unsuitable for the production of large supplies of good quality water.

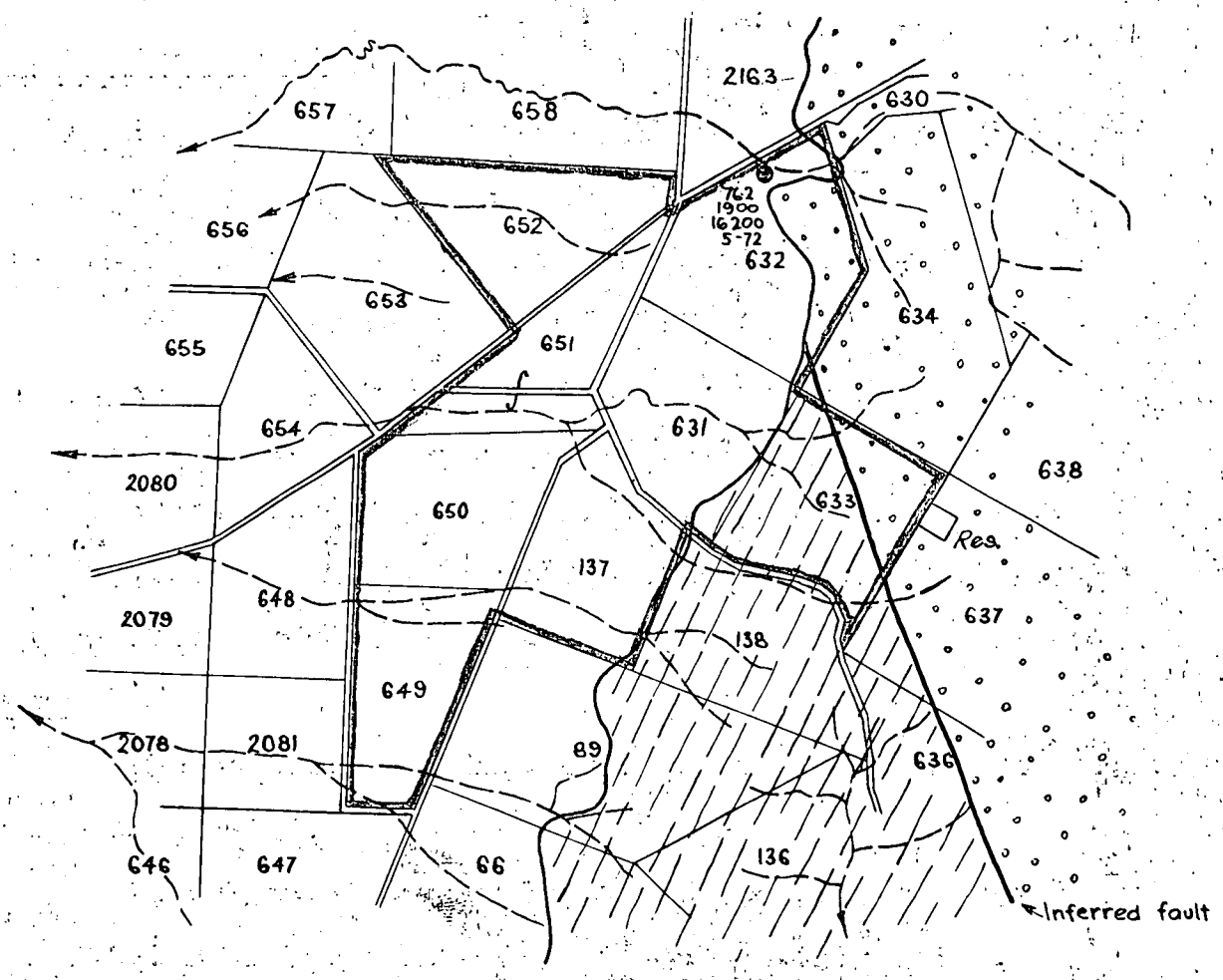
The bore already drilled is thought to be at the most favourable site, hence drilling at inferior sites to obtain a larger supply is not advisable.

P.C.S.

PS:AM
18.1.73

P.C. SMITH
GEOLOGICAL ASSISTANT B.Sc. (Hons.)

SURVEY DATE: 10.1.73



SCALE

METRES 1000 0 1000 2000 METRES

LEGEND

Quaternary – Pooraka Formation – red, brown clayey sand sediments

Proterozoic (Willouran) – Ingomar Formation – feldspathic quartzite

" " Boconnoc Formation – grey sandy phyllite

Existing borehole: 160 – Depth in metres; 2015 – Salinity in milligrams per litre; 5000 – Supply in litres per hour; 2-72 – Month, year

Well

Spring

Abandoned borehole

Proposed boresite

No borehole site proposed

Strike and dip of bedding 60

Strike and dip of jointing 50

Strike and dip of foliation 35

Strike and dip of cleavage 45

Geological boundary

Fault line

Drainage lines

Surface storage

DEPARTMENT OF MINES - SOUTH AUSTRALIA

HYDROGEOLOGY SECTION	GROUNDWATER SURVEY SECS. 137, 631, 632, 633, 649, 650, 651, 652 HD. UPPER WAKEFIELD W. F. GREGOR	Date. 5 JAN 1973
Compiled P.C. Smith		Drg.No. S10097 Gd16
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