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UNDERGROUND WATER AT 7 MILE BEACH GOLF COURSE

The Royal Hobart Golf Club at 7 Mile Beach is dependent on underground water to supply the club house, greens and fairways. Rain water is collected for drinking. Club officials are concerned about the possibility of the supply becoming depleted during a dry season or of contamination by salt water.

The golf course is underlain by Cainozoic sediments composed dominantly of fine sand and shell deposits which indicate a marine environment during part of the deposition. Dune sand overlies the marine sediments in some areas. The depth of sand is unknown but sand with a clay matrix has been excavated in dams to the west of the course. Topographic surveys of the course show a variation of from 12' to 9' above sea level and measurements of water table levels have shown a drop from the N.W. to S.E. of about 1'6".

Three soaks have been excavated in the sand and water of different quality has been obtained from each No. 1 on the east at the moment yields water with about 750 p.p.m. dissolved solids, No. 2 on the west - 1500 p.p.m. and No. 3 in the N.W. corner - 3000 p.p.m. Nos. 1 and 2 are bottomed either at sea level or just above it, whilst No. 3 extends to 3' below sea level.

Since the soils in this district are free draining it should be possible to use more highly saline water than normal. However, it would be advisable to determine the upper limit of salinity which the greens can tolerate.

An attempt should be made to determine the cause of the high salinities. There are two possibilities.

1. The water is beihg contaminated with sea water.

2. The sediments contain salt from deposition or from recent fluctuations in sea level.

Since the water is non-pressure the soaks are filled by water under the influence of gravity and a hole excavated to sea level or slightly above should not be affected by sea water. The bottom of No. 3 soak is below sea level and heavy pumping just after installation could have resulted in a rise of the salt water/fresh water interface causing contamination. It is expected that if this has occurred it would take some time for the soak to recover .

It is also expected that the ground water will be stratified to some extent, according to quality. This is shown in the results of analyses taken for the different soaks at various times of the year. However, some areas may have poorer quality water than others. A series of test holes and water analyses from each would indicate these areas, if they exist. They could then be avoided for the development of future soaks. Soak No. 2 appears to be in a much saltier zone than No. 1.

Chemical methods for determining the origin of dissolved solids in water are limited. One means is recorded (Todd) where the ratio of concentrations $\frac{Cl}{CO_3+HCO_3}$ has been determined in a series of test holes extending from an area where no intrusion of seawater has taken place to an area where intrusion is suspected. A sharp rise in the ratio value indicates contamination with seawater. The method depends on the fact that the bicarbonate radical makes up a greater proportion of the dissolved solids in normal ground water than seawater.

If the stratigraphic sequence were known approximately, some idea of the storage capacity of the 7 Mile Beach area could be determined. Extensive depths of sand could mean appreciable supplies of suitable water occurring under sea level, while if an impervious clay band occurred at a shallow depth it is probable that salt water would occur underneath.

Conductivity meters can be used for determinations of the approximate value of total dissolved solids. They would not of course give any indications of variations in individual salts such as carbonates and bicarbonates.

Reference

Todd, D.K., (1959) Ground Water Hydrology.

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