

1976/25. Groundwater investigations near Mortimer Bay.

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The Department of Mines received a request from the Clarence Council to investigate the groundwater potential of the Mortimer Bay Estate, a proposed subdivision of about 200 ha on J. Assman's property near Mortimer Bay. The estate includes the flat, low-lying area behind Gorringes Beach and includes the lower south-western slopes of Mt Augustus [EN 400423]. Large quantities of water for domestic use are required for the proposed residential area of about 100 two hectare lots.

The Department investigated the area in late 1974 for J. Assman. A number of shallow holes were augered, and one was pump-tested by spear bore. During the present survey (11 May 1976) three proline holes were augered in the unconsolidated sediments behind Gorringes Beach.

#### GEOLOGY

##### *Permian rocks*

The basement rocks of the area are sandstone and mudstone of the marine Lower Parmeener Super Group, ascribed (Leaman, 1973) to the Malbina and Fern-tree Formations. The Malbina Formation crops out on Mt Augustus and dips west at about 9°. Mudstone and sandstone of the Ferntree Formation occur on the headland at the south of Gorringes Beach where they dip west at 12-14°.

##### *Quaternary and Tertiary deposits*

Most of the proposed estate is underlain by unconsolidated sediments which occupy the flat, low-lying area behind Gorringes Beach. The Quaternary deposits include clay, shelly grit and aeolian sand of variable, but generally small, thickness. The sand overlies and in places completely covers the basement rocks, and in places has been blown at least 2 km inland. Locally it is several metres thick, and many deposits have been mined.

Behind Gorringes Beach the sand is absent or less than one metre thick, and is underlain by clay and clayey sand to a depth of at least 10 m (table 1). Some of this material may be Tertiary in age.

#### HYDROLOGY

Groundwater is present in the unconsolidated deposits and in the harder basement sandstone and mudstone; but neither is a potential supplier of large quantities of water.

##### *Unconsolidated deposits*

Although these sediments contain water, probably in large quantities, they are mainly clayey sand and yields from bores sunk in them will be low. Any water obtained will contain a high level of suspended solids and be aesthetically unacceptable for domestic consumption. In addition, the groundwater is expected to be of marginal to poor quality. The only water analysis from the area (Cromer and Sloane, 1976) is of moderate quality water (table 2), which was obtained from a low yielding (6 l/min) spear bore sunk to 5 m in windblown sand at the southern end of Gorringes Beach [EN388398]. The spear was sited at an elevation of about 20 m on a hill underlain by sandstone and mudstone, and the aeolian sand contained only small amounts of clay. Elsewhere on the property, yields may be similar but the quality is expected to be poor because of the high clay content of the sediments. Health

Table 1. GEOLOGICAL LOGS OF PROLINE HOLES, MORTIMER BAY

Hole 1. [EN392405]. 100 m east of high water mark.

Depth (m)	Interpretation
0-0.2	Grey sandy topsoil.
0.2-1	Stiff light brown, grey and green sandy clay.
1.0-2.5	Friable, grey clayey, fine sand
2.5-4.0	Grey-brown fine medium-grained clayey sand.
4.0-5.0	Yellow-brown clayey sand.
5.0-9.0	Light grey-green wet clayey sand with small amounts of quartz grit.
9.0-10.0	Mottled dark brown-green pebbly clay.

Hole 2. [EN394406]. 200 m east of Hole 1, near eastern boundary of property.

Depth (m)	Interpretation
0-0.2	Grey sandy topsoil.
0.2-7.0	Grey-brown, slightly clayey quartz sand; clay content increases between 4 and 5 m.
7.0-8.0	Stiff grey and yellow-brown clay grading into brown weathered sandstone basement.

Hole 3. [EN 392413]. Near creek on south side of Mt Augustus.

Depth (m)	Interpretation
0-2.0	Stiff grey-white gravelly clay, containing sandstone pebbles.
2.0-6.0	Grey clayey quartz sand.
6.0-12.0	Wet grey clayey sand.

Table 2. CHEMICAL ANALYSIS<sup>1</sup> OF GROUNDWATER FROM AEOLIAN SAND NEAR MORTIMER BAY.

Constituent	742681 <sup>2</sup>	
	mg/l	meq/l
Silica (SiO <sub>2</sub> )	3	-
Iron (Fe)	0.3	0.01
Aluminium (Al)	0.2	0.01
Calcium (Ca)	42	2.10
Magnesium (Mg)	31	2.55
Sodium (Na)	150	6.53
Potassium (K)	11	0.28
Bicarbonate (HCO <sub>3</sub> )	120	1.97
Sulphate (SO <sub>4</sub> )	41	0.85
Chloride (Cl)	280	7.90
	pH	7.4
Total dissolved solids	820	22.3
Hardness (total)	235	
Alkalinity	95	

<sup>1</sup>Analysis by Department of Mines Laboratories, Launceston

<sup>2</sup>Registered number. Sample collected December 1974.

problems may occur if septic tank effluent is allowed to percolate into the aquifer.

*Sandstone and mudstone*

Elsewhere in Tasmania, rocks of the Lower Permian Super Group are reliable sources of marginal to poor quality water. Yields are generally low; about 15-30 l/min.

A successful bore was drilled by the army some years ago in sandstone east of the proposed estate near [EN400404]. Little is known of the yield and quality of the water, but the bore was artesian.

Conditions elsewhere on the property are considered favourable for obtaining groundwater from the sandstone. The rocks dip west and bores sited on the lower flanks of Mt Augustus are likely to be successful. Some bores may be artesian.

CONCLUSIONS

Groundwater may be obtained from either the unconsolidated sediments near Gorringes Beach, or from the sandstone and mudstone on the lower slopes of Mt Augustus. In both cases, however, yields will be low and the water of marginal quality. The groundwater is better suited to small-scale development for agricultural purposes. The prospect of obtaining domestic supplies for a subdivision of 100 lots is geologically unfavourable, and probably not economically viable.

REFERENCES

CROMER, W.C.; SLOANE, D.J. 1976. Hydrology of Seven Mile Beach. *Unpubl.Rep. Dep.Mines Tasm.* 1976/10.

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