

1977/28. Underground water prospects, Lisdillon, Little Swanport.

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The Department of Mines was requested by civil engineer P.C. Rayner to conduct a preliminary survey to investigate the possibility of obtaining groundwater to fill and maintain a sewerage treatment lagoon with a capacity in the order of 3.5 Ml on a proposed subdivision 'Lisdillon'. The proposed subdivision covers an approximate area of 725 hectares and extends 1.7 km northwards and eastwards from the northern point at the entrance to Little Swanport Bay [EQ823151].

#### RELIEF

The area is undulating, attaining a maximum altitude of 20 m. The area can be broadly divided into two regions, an undulatory higher relief area, more than  $\sim 6$  m a.s.l., and a coastal section, about 150 m in width, less than  $\sim 6$  m a.s.l. The coastal section consists of a gently shelving terrace, ( $\sim 4-6$  m a.s.l.) fronted by coastal beach compartments with a single foredune ridge backing the beaches (fig. 1). The beaches are separated by dolerite headlands. Streams in the region are small and ephemeral. There is a small lagoon at the northern end of the area where coastal sand has dammed the mouth of the larger creek.

#### GEOLOGY AND GEOMORPHOLOGY

The area is entirely underlain by Jurassic dolerite. The dolerite crops out extensively in the higher relief area and on the coastal headlands. Smooth exposure surfaces can be found in the coastal terrace region indicating that this terrace has probably originated as a wave-cut platform, during a period of higher sea level. The altitude of this terrace may indicate that it has formed at some stage during the Last Interglacial period. The coastal terrace is considered to have only a thin veneer of weathered dolerite-derived material overlying *in situ* dolerite. The upper surface of the coastal headland outcrops is also accordant in height with this terrace level. The higher relief area is mantled by thin slope deposits of angular dolerite fragments in a weathered dolerite-derived clayey-silt matrix, on which has developed a thin brown soil. Dolerite gravels, 1-2 m in thickness, overlie *in situ* dolerite at the mouth of the larger creek at the northern end of the area, and on the point at the southern end of the area where boating facilities are proposed. Shell midden material in a thin brown-black A<sub>1</sub> soil horizon occurs above the rounded dolerite gravels in this latter area. Small gravel and weathered dolerite-derived silty clay deposits, about one metre in thickness are exposed in the lower section of the small creek in the centre of the proposed subdivision.

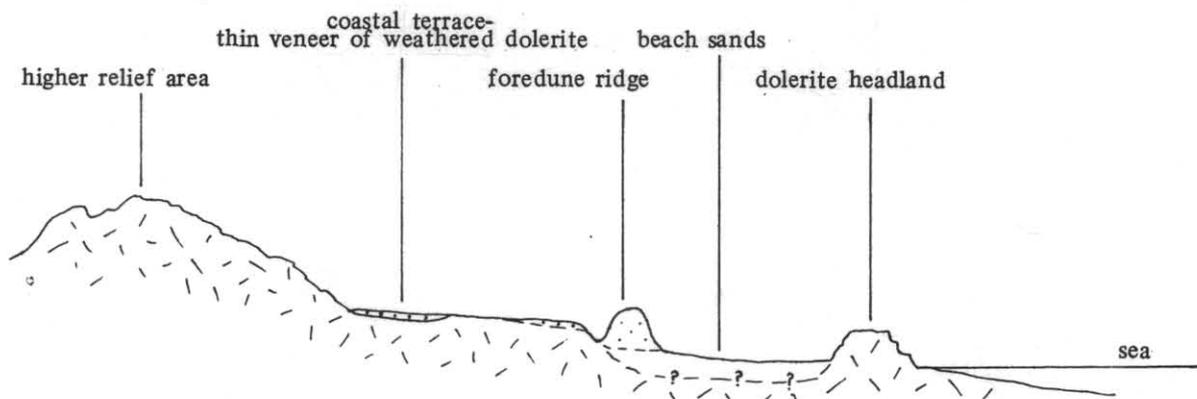


Figure 2.

The coastal area is composed of marine and aeolian sand in the form of beaches, backed by a single vegetated foredune ridge. It appears that this dune ridge is backed up to the edge of the terrace behind and in places has encroached onto it. The degree of development of the podsol profile on the dune sand indicated that it is probably of Holocene age. The accompanying sketch cross-section (fig. 2) indicates the relationships described above.

#### GROUNDWATER PROSPECTS

Most of the area is underlain by dolerite. Our records show that dolerite is an unreliable aquifer producing only small quantities of moderate to poor quality water.

Unconsolidated Quaternary sand deposits are usually reliable aquifers in coastal areas, producing good quantities of average to good quality groundwater. However in the area examined the coastal sand bodies are of small areal extent and are shallow in depth. The quantity of water required will therefore not be obtainable from these deposits.

#### CONCLUSIONS AND RECOMMENDATIONS

Both the dolerite and Quaternary sand deposits are unlikely to produce the quantities of groundwater required. The possibility of constructing a dam on the larger creek at the northern end of the proposed subdivision should be investigated. Dolerite is exposed in the creek bed and would therefore provide an adequate base for such a dam. Water could then be pumped up to the proposed lagoon site. Suitable quantities of groundwater could possibly be obtained from coastal sand deposits in the Lisdillon Lagoon area to the north, providing the cost of piping the water to the proposed lagoon area is not prohibitive.

[4 July 1977]

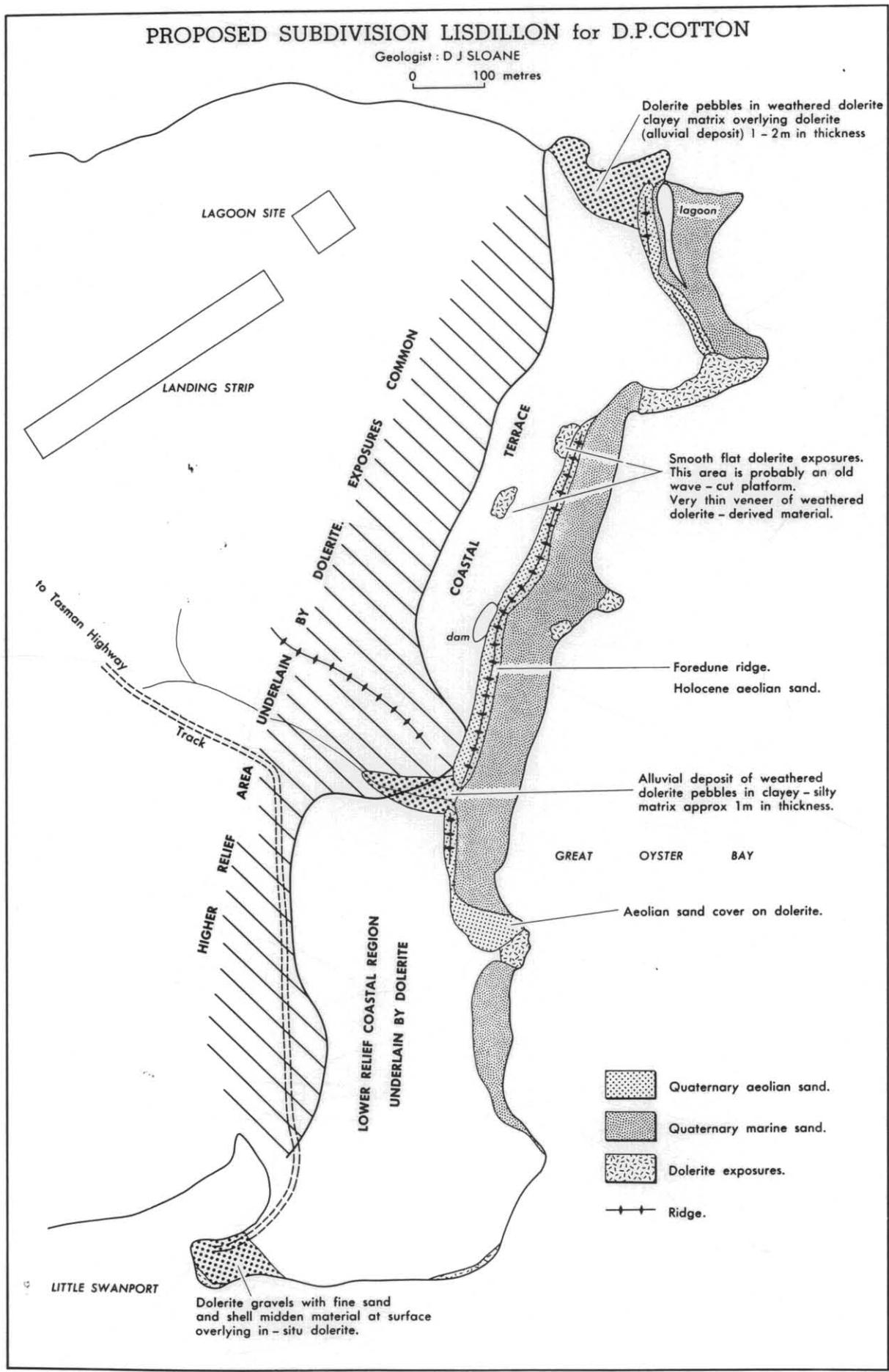


Figure 1.

