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# 11. GEOLOGICAL CONDITIONS IN THE VICINITY OF MR A. E. KRAEMER'S PROPERTY NEAR SORELL CREEK

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## INTRODUCTION

Mr Kraemer's property lies on the N side of the Lyell Highway about ½ mile W of Sorell Creek. It is situated on a low relatively flat flood plain of the Derwent River lying between the highway and the river. S of the highway the country rises abruptly in a series of hills which have been dissected by steep sided erosional gullies. Immediately S of Mr Kraemer's property one such gully emerges on the flood plain of the Derwent River and at the foot of this gully about 120 feet S of the highway a small gravel pit has been excavated extending to a few feet below the general level of the surrounding area.

## GEOLOGY

### Basement Rocks

The basement rocks in this area are fossiliferous siltstone of Permian age which contains occasional pebbles. These rocks outcrop on the spur immediately E of the gravel pit and have also been encountered in the excavation of the West Derwent pipeline. The rocks themselves are relatively impermeable but are strongly jointed and have well developed bedding planes, both of which would permit the flow of underground water.

### Pleistocene Gravel

In the N, E and S of the gravel pit Permian rocks are overlain by some 10 to 20 feet of gravel. This material consists of angular to subangular particles chiefly of siltstone and sandstone set in a matrix of clay, silt and sand grade material. The size of the gravel particles varies from several inches across down to about half an inch. The whole deposit shows crude bedding and the amount of matrix present varies considerably from point to point in the available exposures. At some places scarcely any matrix is present at all and the deposit consists of an open framework of angular pebbles which would be exceedingly permeable.

Deposits similar to that described above occur in the Risdon, Bellerive and Cambridge districts of SE Tasmania. They are characteristic of torrential conditions of sedimentation and are regarded as having been deposited by sheet floods during a fluvial period of the Pleistocene glaciation.

### Recent Talus

Along a part of the W side of the gravel pit the Pleistocene gravel appears to be missing and the bedrock is overlain by a few feet of silty and clayey soil containing large angular blocks of fossiliferous Permian siltstone. This appears to be a talus deposit of Recent origin and younger than the gravel described earlier.

Some exposures are available to the N of the gravel pit in a drain put in by the Public Works Department which leads to a twin 42-inch reinforced concrete pipe culvert. The deposits exposed in this drain are at first similar to the Pleistocene gravel but as the highway is approached from the S the content of rounded pebbles increases and it is inferred that this is due to the resorting and rounding effects of river action on the gravel along the edge of the present flood plain.

No exposures were observed of any of the material N of the Lyell Highway.

### Geological History

During the Pleistocene glacial period this area was subject to heavy rainfall resulting in flash flooding and extensive sheet erosion. The result of this was to build up an extensive wedge of crudely sorted and rapidly deposited gravel at the mouth of the gully.

At the close of the glacial period the change in climatic environment resulted in the erosion of Pleistocene deposits and the initiation of the present drainage system. The Pleistocene gravel wedge has, therefore, been dissected by the present drainage channels and in places Recent talus has been deposited on top of or around the edges of remnants of the Pleistocene deposits.

## CONCLUSIONS

The Pleistocene gravel deposit is the result of torrential deposition during the waning stages of the last glacial period. The material comprising the deposit is highly variable in texture, grain size and proportion of matrix to pebbles. In some beds almost no matrix at all is present and the deposit simply consists of an open pebble bed which would be exceedingly permeable and capable of transmitting large volumes of groundwater. The deposit itself is irregular and therefore the zones of permeability within it are also expected to be irregularly distributed. However, it is expected that the general movement of groundwater from the hills which lie to the S of Mr Kraemer's property would be to the N, downslope and roughly parallel to the bedding of the Pleistocene gravel.