Section

DEPARTMENT OF MINES

SOUTH AUSTRALIA

GEOLOGICAL SURVEY

SOILS GEOLOGY SECTION

SUPPLEMENTARY GEOLOGICAL REPORT ON TANK SITE

BLOCK 13 & PART BLOCK 101, QUEEN STREET, PENOLA.

ENGINEERING & WATER SUPPLY DEPARTMENT

by

A. A. Gibson,
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INTRODUCTION:

This site was examined by Mr. W. Johnson and was the subject of a report by him dated 20.2.62 (G.S.No.2256). In that report Mr. Johnson described and assessed the engineering aspects of the geology on the basis of test pits and information yielded by a water bore put down in the grounds of the nearby Penola Area School.

Recently the site for the proposed elevated tank was excavated, the excavation being 48 ft. in diameter and 6'0" to 6'6" deep. At the request of the E. & W.S. Department, this excavation was examined by the writer in company with Mr. H. D. Fleming of that Department.

ENGINEERING GEOLOGY:

On the northern side of the excavation, dark grey-brown sandy loam with variable amounts of limestone rubble can be seen to overlie a limestone. To southward, the soil cover gradually deepens, with marked profile development, until on the southern side of the excavation, the following profile occurs:-

0 - 8" Grey-brown, finely sandy, friable loam.

8" - 3'3" Yellowish-brown to khaki, very silty and finely sandy clay, with dark red vertical streaking containing small iron oxide pockets and nodules. Strong, but fine prismatic structure, with a finely granular sub-structure. Dull sheen to earthy surface on structural units. Abundant vertical cracking. Friable.

3'3" - 6'6" Limestone.

The limestone is off-white with patches of yellow staining, soft to moderately firm; very porous, with abundant small to medium (4" to 12" max. diam.) lenticular, hard, dense limestone lumps, forming 40% to 50% of the mass. The hard lumps are formed by solution and redeposition of the carbonate in the limestone and they are so disposed as to give a general impression of rough horizontal layering. The soft to moderately firm limestone which occurs more or less interstitial to these lumps can be seen under a hand lens to be very cellular with the voids lined with secondary carbonate. Dr. N. H. Ludbrook examined this material under a microscope and gave the opinion that this material probably is re-worked Gambier limestone, but this identification is not positive.

Dr. Ludbrook also observed that this rock contained a high proportion of clay. The writer's estimate of the clay content is of the order of 30%.

CONCLUSIONS & RECOMMENDATIONS:

Although the limestone is heterogeneous in character in detail, it is anticipated that it will behave as homogeneous material in the mass. Provided this material is kept dry, it appears to be quite capable of safely supporting the proposed elevated tank, but the degree of ultimate settlement is apt to be a little greater than is normally encountered. Settlement could be minimized by preconsolidation of the site prior to construction. This could be effected to some degree by simply flooding the excavation and allowing it to dry. However, this probably would delay construction until next summer and must therefore be considered impracticable. The alternative is to take every precaution to keep the foundation material dry and to allow for some settlement in the design.

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