Investigation of a proposed reservoir site at George Town North.

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Abstract

At George Town North an area has been outlined where foundation conditions are suitable for the construction of a circular, 4.5 Ml concrete reservoir. The underlying material is ferricrete, developed on grey Tertiary(?) clay.

INTRODUCTION

In response to a request from the George Town Council, an investigation was made of a site at George Town North [DQ867518] where it is proposed to build a reservoir. The reservoir is to have a diameter of 32 m, a depth of 7 m and is to be constructed from reinforced concrete with a peripheral strip footing and slab floor. The capacity of the reservoir will be 4.5 Ml.

GEOLOGY

The area is underlain by grey to mottled yellow-brown clay and sandy clay which are probably of Tertiary age although mapped by Gee (in Gee and Legge 1971) as Quaternary reworked silt, sand and clay. It is unlikely that the ferricrete, developed on the clay could have formed during Quaternary times. Underlying the Tertiary(?) clay at unknown depth is Jurassic dolerite which crops out about 300 m to the south at the foot of The Buffalo [DQ866515]. A thin veneer of Quaternary aeolian sand overlies the Tertiary(?) clay in the southern part of the proposed reservoir site. The degree of development of the podsol profile on the wind-blown sand indicates a probable Last Glacial age. The northern part of the area has a thin veneer of 'buckshot' gravel overlying clay. The gravel consists of ironstone pisolites and is likely to represent transported accumulations of remnants of older lateritic profiles developed on the Tertiary clay.

INVESTIGATION

The proposed site outlined by the Council is located in a small gravel pit. Ironstone gravel has been excavated for use as road materials. Massive ironstone has been exposed where the overlying loose pisolitic material has been removed. The ironstone is both concretionary and pisolitic and probably consists of hematite and goethite. From exposures in the gravel pits its thickness appears to be at least 1 or 2 metres. The investigation was to determine the extent of the ironstone cap. It was not considered desirable to site the reservoir where foundations were on both ironstone and clay in case differential settlement occurred. Seismic refraction methods were considered unsuitable due to seismic inversion effects. A back-hoe was eventually used to excavate test pits and refusal was used as an indicator of solid ironstone. An area approximately 35 m by 70 m underlain by solid ironstone was required in the event that future water requirements necessitated the construction of a second reservoir.

RESULTS

The NW-SE boundary of the ironstone outcrop is well defined by a 1 to 2 metre bench in the floor of the gravel pit. The northern and eastern boundaries were defined by digging back-hoe holes. The area has been approximately outlined on the locality map (fig. 1). As a large scale plan

was not available the area has been outlined on the ground in the presence of the assistant engineer and will be surveyed at a later date. The edge of the ironstone cap is well defined towards the north with a marked transition between solid ironstone and clay containing ironstone pisolites. The clay in this northern area is grey and contains approximately 20% reddish brown ironstone pisolites which are poorly consolidated and friable. Beyond the southern limit of the ironstone area the clay has a higher sand content, is grey with yellow-brown mottles and also contains friable ironstone pisolites. Clay exposed in test pits at the eastern limits of the area is much more competent than elsewhere. The clay is friable and moderately cemented due to iron induration of the clay and sandy clay and a larger percentage of concretionary iron than found elsewhere. These materials should have similar foundation qualities to the soild ironstone cap and little settlement or compaction is likely to occur. Iron induration is generally continuous to a depth of at least 3 m over the area.

CONCLUSIONS

The overall extent of the ironstone cap has been outlined on the ground surface by excavating test pits. Test pits around the perimeter of the outcrop have revealed that the Tertiary(?) clay varies in its degree of competence, controlled by the degree of iron induration and the presence of ironstone pisolites. If a second tank is to be built in the future then it is suggested that it be located adjacent to the first tank with the two aligned approximately NE-SW.

REFERENCE

GEE, R.D.; LEGGE, P.J. 1971. Geological atlas 1 mile series. Sheet 30 (8215N) Beaconsfield. *Department of Mines, Tasmania.*

[17 October 1978]

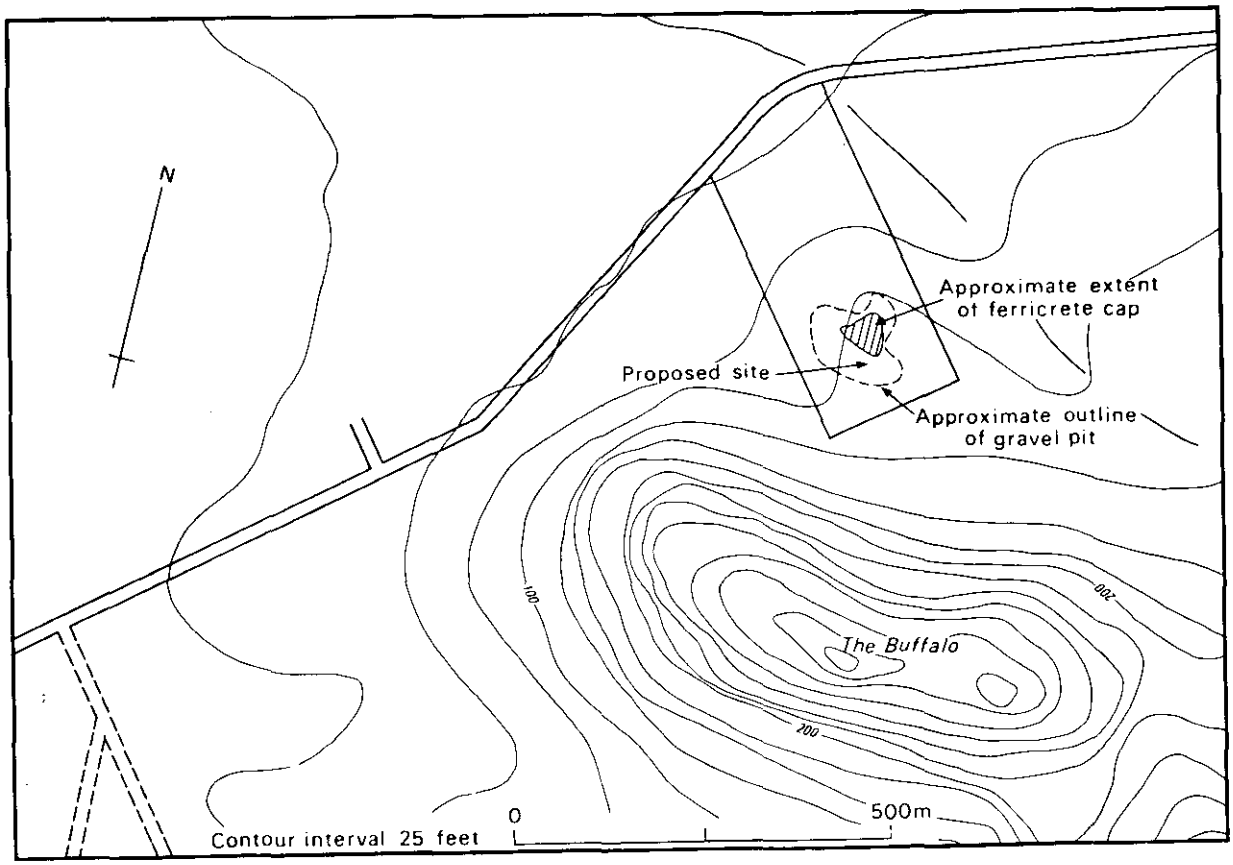

Figure 1

5 cm