

TR10-103-105

26. DAM SITE INVESTIGATION — THE GRANGE, KEMPTON

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INTRODUCTION

It is proposed to build a 25 to 40-foot high dam across a stream through 'The Grange' property at Kempton. Near the homestead the stream has cut a deep, narrow ravine in a dolerite ridge while on either side of the ravine the topography is gentle to near flat and the stream profile reflects this (fig. 27). The site is located on the upstream side of the ridge, and thus water from two tributaries would be impounded where the stream grade is less than 1 in 40.

GEOLOGY OF THE SITE

The geology of the area around the site is shown in fig. 27. Jurassic dolerite has intruded the area, the ridge line being formed by a near vertical dyke 200-300 yards wide which then passes laterally into the lower Triassic quartz sandstones and shales as an inclined sheet. The dip of the sheet approximates that of the sediments—7° W.

The proposed centre line of the dam passes from a small spur of closely jointed dolerite to the near vertical contact of the dyke on the opposite side of the valley.

5 cm

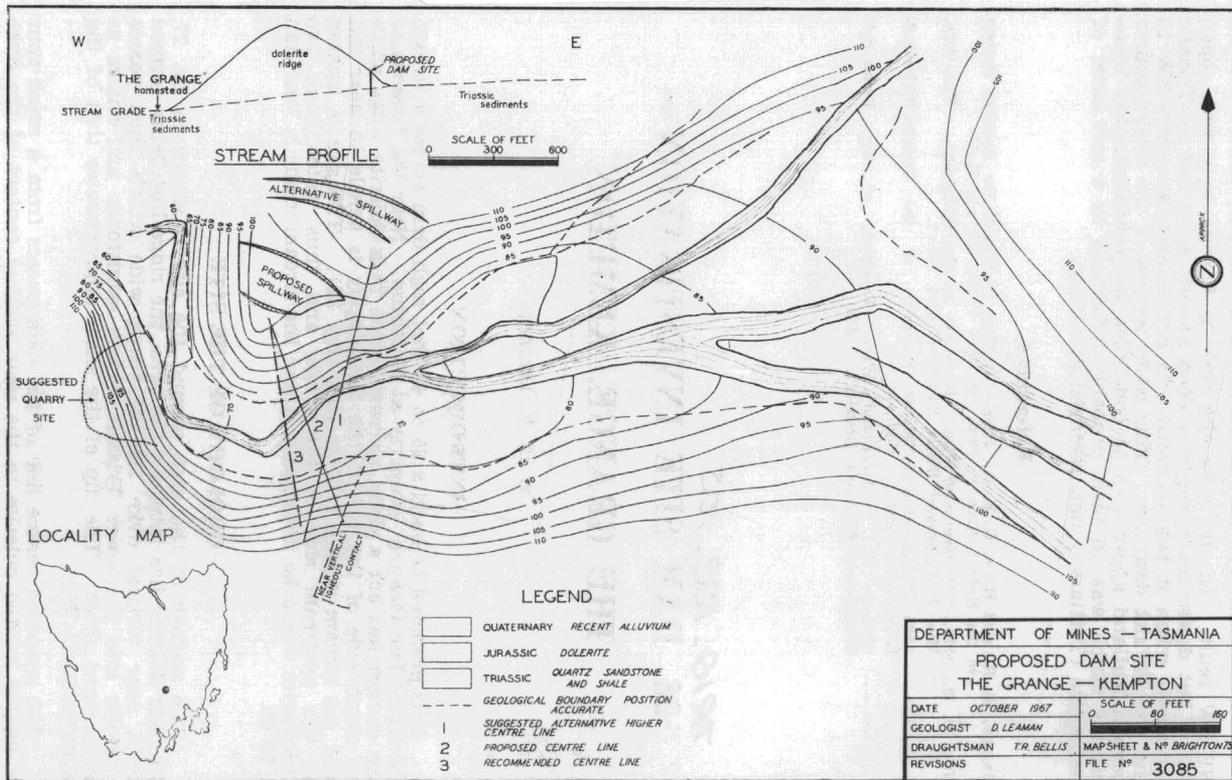


FIGURE 27

No quantitative figures can be given of the jointing at either abutment since this is not permitted by the outcrop. However the joint density appears to be three to four per foot in mutually perpendicular directions. The form is generally platy, the rock separating into rectangular slabs. Above the southern abutment the joints have been measured as follows:—

Strike, 180-210; dip approximately 30° E.

Strike, 70; dip approximately 70° N.

Strike, 290; dip approximately 40° - 50° W.

Away from the contact zones the joint density decreases, and on the valley sides W of the dam site the block size is one cubic foot. The jointing is very nearly horizontal or vertical with the vertical joints common and more prominent.

Alluvium occupies the floor of the valley. Excavation has shown it to be thicker than five feet. Little clay is present.

Both the original spillway and the higher alternative spillway (see map) are through closely jointed dolerite and although not posing excavation difficulties may be subject to scouring effects. Either spillway spur may also be susceptible to considerable leakage although no estimates of this can be given. The original spillway would be deeper but shorter than the alternative. Either may require lining on completion.

CONSTRUCTION MATERIALS

No reserves of clay have been observed, either close to the site or near Kempton.

Excellent quarry sites are available for rock fill in the ravine W of the dam sites.

RECOMMENDATIONS

The dam as proposed is some 30 feet high. Should a higher dam be required it is suggested that the alternative site be considered. In either case the southern abutment should be moved downstream (by 40 feet at least) so as to be securely founded on reasonably massive dolerite and also to minimise the leakage problems that the sandstone or contact zone may produce.

It is likely that serious leakage will occur in the saddle beneath the spillway. Lack of outcrop precludes a detailed assessment.