

## Section 3—Engineering Geology

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# GEOLOGY OF THE PRESENT AND FORMER BRIDGE SITES AT FINGAL

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It is proposed to build a new bridge across the South Esk River at Fingal. So that road access to Mathinna can be maintained during periods of heavy rainfall and local river flood it is necessary for this bridge and approaches to be situated above flood level.

Two sites have been proposed for the bridge, one on the site of the present road bridge but built up to a higher elevation and the other on the site of the former road bridge near the Fingal Town Hall. These two sites were examined to determine their suitability from a geological viewpoint.

At the present bridge site the river has probably been flowing in or near its present channel since the beginning of the Quaternary, and to the north is restricted by hills of Mathinna Group rocks, mainly quartzite and slate striking at 225° and dipping 30° to the north-west. On the western bank the hills form steep slopes to within a short distance of the river and the rocks are well exposed in the road cuttings, minor local folding can be seen and there are three sets of joints developed.

The more pronounced joint sets strike at 146° and 230° and dip at 65° and 75° to the south-west and north-west respectively. The minor jointing strikes at 205° and dips at 57° to the north-west. These joints are emphasized at the surface by weathering agencies and it is probable that they would be fairly tight below the zone of surface weathering so that these rocks should make a good firm foundation. On the eastern bank there is a rounded hill with numerous boulders of the Mathinna Group rocks on the surface but the surrounding country is covered by alluvium.

Evidence of small changes in the course of the river can be seen on both banks just upstream from the present bridge. On the eastern side there is an old cut off meander about one chain upstream but although this area is subjected to flooding, it is not likely that it will again form part of the river channel. On the western side about five chains upstream there is an old river channel which would also form part of the river course in flood periods and the course of the river here may probably prove more variable.

Drill holes to test the depth to bedrock would be needed on the eastern bank and probably close to the river bank on the western side.

Downstream at the former bridge site near the Town Hall there is evidence of numerous former courses of the river though at present it flows in a narrow channel between banks of sand and gravel. Here the eastern bank rises to higher ground probably above flood level but the western bank is mainly low lying, undulating, sand and gravel banks and would be subject to severe flooding for a considerable distance from the river. There is also the added

danger that in this area the river could again change course and flow in one of the old river courses which are now a series of meanders to the west of the proposed bridge site.

At this site extensive drilling would be required on both banks and possibly to a considerable distance from the river on the western bank if an elevated roadway is desired.

Of the two sites the present bridge location has the advantages of a relatively stable river course, probably better foundations and less preparatory drilling work required.