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Suitability of a building site near Glenlusk.

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Mr M. Ziegler owns land adjoining Faulkners Rivulet, one kilometre east of Glenlusk. He proposes to erect a new residence on the southern side of the rivulet 200 m downstream from his existing house, and has requested that the slope stability of the building site [EN174589] be assessed. The area is one of high relief and slope angles of less than 15° are rare.

GEOLOGY

Jurassic dolerite and sub-horizontal Permian sediments are the principal rock types in the Glenlusk area (Sutherland, 1964). The latter crop out in Faulkners Rivulet and are well exposed in cuttings along Glenlusk Road. Structurally the area is complex and near Mr Ziegler's property the Permian sequence is disrupted by numerous faults (fig. 1). Two minor N-trending faults are exposed in Glenlusk Road adjacent to the proposed building site; they extend to Faulkners Rivulet and abut against Jurassic dolerite. Between them they enclose a small (15 m) segment of fossiliferous Bundella siltstone which separates brown unfossiliferous mudstone of the Woody Island Formation from richly fossiliferous calcareous siltstone of the lower Bundella Formation.

Further to the south [EN170583] along Glenlusk Road, and higher in the Permian sequence, at least six faults are present, and Bundella siltstone is thrown against Jurassic dolerite and finely laminated micaceous mudstone of the Faulkner Group.

The Permian sediments are extensively fractured and exposures of the Woody Island Formation in particular fret rapidly to produce a loose fragmented scree. Generally, however, weathering of the sediments has produced a gravelly clay colluvial horizon in which angular clay and sandstone fragments of the parent rocks are dispersed in a clayey matrix. This weathered horizon is of variable thickness, and in road cuttings generally attains a thickness of about one metre. On well drained and naturally forested areas, this material forms a thin but compact and stable soil covering. On steep slopes and in creek beds, however, where soil creep has aided its accumulation, the colluvium attains a thickness of 3-4 m and becomes unstable during heavy rains.

THE BUILDING SITE

The proposed site is located between Glenlusk Road and Faulkners Rivulet. The two faults mentioned above pass through, or near to, the western end of the site. Mr Ziegler has cut and filled an area of about 600 m^2 on a slope of 17° covered with a variable thickness of soil and colluvium. Solid bedrock (the Woody Island Formation) was struck at a depth of 2.5 m. The cut at the rear of the excavation slopes at 70°, and is unstable. It is composed of a mixture of colluvium, road-making fill and partly fragmented mudstone associated with the adjacent fault zone. The natural slope angle (22°) above the excavation has been accentuated by road widening.

RECOMMENDATIONS

With the (temporary) exception of the artificially exposed backwall of the excavation, the building site is not considered to be a potential landslip locality. However, the proximity of the fault zone may affect the suitability of the site. Above Glenlusk Road a shallow valley has developed

along the faults, and while normal surface runoff is adequately diverted by road culverts, it is likely that the crush zone of the fault is acting as a sub-surface conduit for seepage. It would be judicious to postpone any construction until the summer months, when surface drainage is minimal, to assess the extent of this seepage. The suitability of the site and the long-term stability of the proposed building thus descends to a greater extent on sound and proper engineering practice rather than on potential slope failure.

In this context, the site is considered suitable for building subject to the following recommendations:

(1) The construction, at the rear of the excavation, of a free-draining retaining wall, founded on bedrock and of sufficient strength to arrest natural soil creep.

(2) Adequate drainage of the slope above the wall.

(3) The sinking (to bedrock) of reinforced concrete piers and associated cross-beams in the fill beneath the proposed house.

(4) The drainage of the fill itself; and

(5) The piping of all stormwater, surface and sub-surface drainage direct to Faulkners Rivulet. (Septic tank effluent should be directed to the eastern side of the site, away from the fault zone).

To enhance the long-term stability of the building, it is strongly recommended that all the above measures be strictly adhered to, and that all construction work associated with them be periodically inspected.

REFERENCE

SUTHERLAND, F.L. 1964. The geology of the Collinsvale area. *Pap.Proc.R. Soc.Tasm.* 98:119-135.

[15 August 1975]

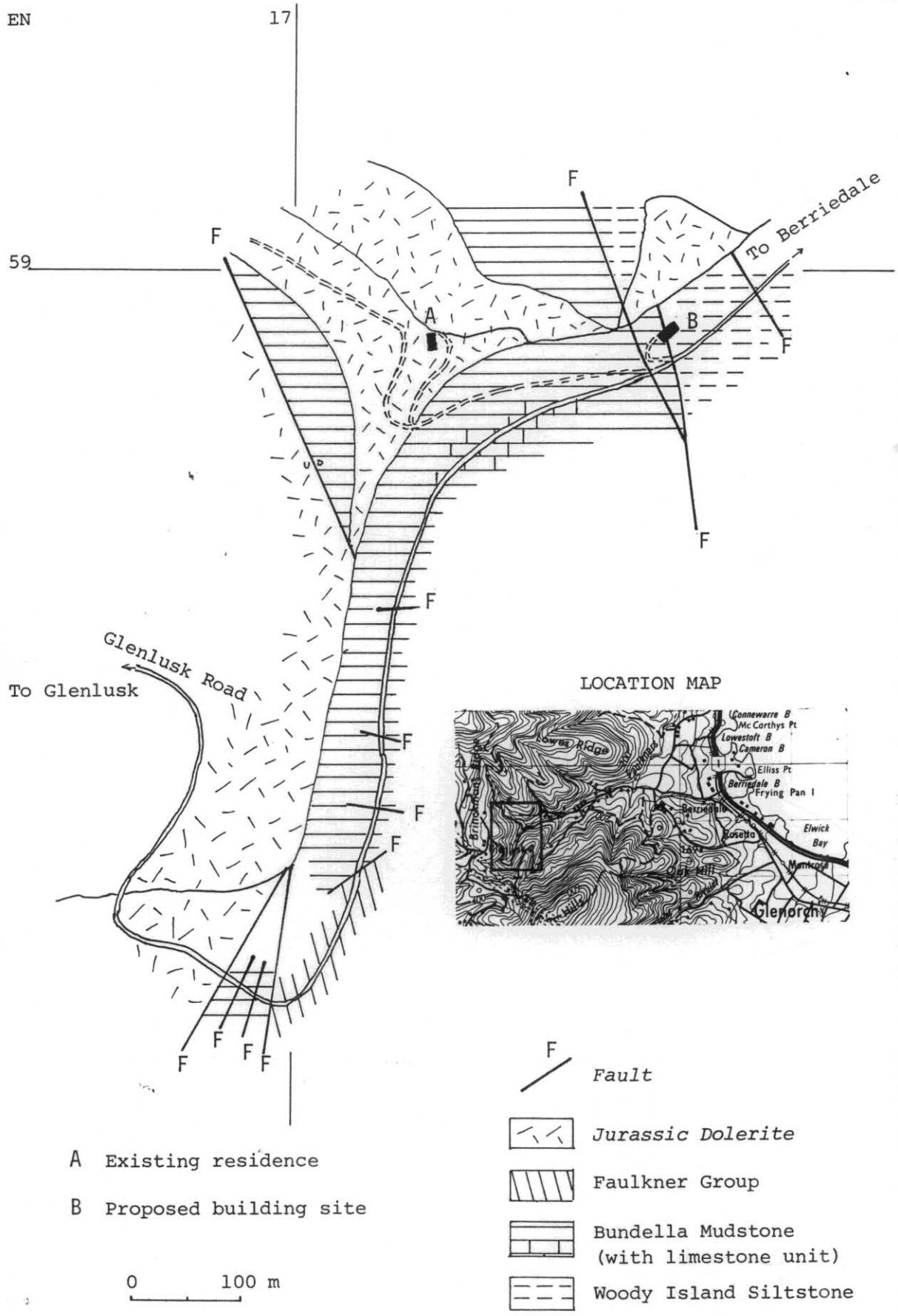

Figure 1. *Geological sketch map of part of Glenlusk Road (after Sutherland, 1964).*

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