

## 29. Engineering geology, Bellerive by-pass

D.E. Leaman

The proposed Bellerive by-pass would connect the Eastern Outlet Road and the expanding suburbs of Howray, Tamere and Rokeby. The point of junction with the Eastern Outlet Road is at Mornington Road. The first 1.8 km of the route has been recently re-surveyed and references are made to distances along the centreline of the 37 m wide reservation. Comments have been included on the route to a chainage (Ch.) of 8,000 ft (2.4 km) along the alignment although survey pegs are now absent from 6,000 ft (1.8 km). Consequently references to distance are approximate only (fig.26).

The road alignment passed across a wide hill saddle at about Ch. 3,600-4,000 ft (1.1-1.2 km) and on the whole hill slopes are gentle. In grading the road a deep cut is anticipated in the region of the saddle. In order to advise on rock quality and type in this region a detailed seismic and geological survey has been undertaken and the results are presented on the associated map. Interpretation has been complicated by the presence of faults in the region of the saddle but the information gained in such a region is applicable to materials along the greater part of the route.

## ROCK TYPES

*Sandy clay overburden* (seismic velocity 600-900 m/s)

From Ch. 1,000-2,600 ft, 2,900-4,100 ft (300-800 m, 900-1,250 m) the route lies across areas with thick soil cover. Estimates on thickness to hard rock are indicated on the map. In the saddle area the thickness is proven to be extremely variable but normally within the range 1.5-6 m. The sand-clay overburden is derived from the sandstone cropping out to the west and is in most cases a true soil. In places there has been some drift and transport of the material to the east. Due to its thickness and hydrological properties it suffers bad-land erosion and good examples of this can be seen in the recently cut embankments of play areas in the adjacent housing estate. Any cut of depth, as will be required in the saddle, will need to allow for erosion of this material particularly as it may be up to 6 m thick in parts of the cut.

*Sandstone* (seismic velocity 1,400-1,700 m/s)

A medium coarse-grained quartz sandstone crops out sporadically west of the proposed alignment. Weathering is deep and outcrops are rare. The rock is thickly bedded and very poorly jointed. It could only be ripped in the region of the faults where it will be shattered and deeply weathered. Elsewhere a combination of blasting and ripping will be needed.

Any cut in sandstone will stand well with a steep face, although allowance may have to be made on the western side of the cut for slip blocks due to an easterly dip in the rocks.

*Mudstone-siltstone* (seismic velocity usually 3,000-4,500 m/s)

The rock is hard, brittle, well bedded and intensely jointed. Soil covering is normally very thin or absent and most excavations require intensive blasting. On blasting the material breaks to small easily removed blocks. In view of the route and rock distribution no major cut will be required in this material.

Dolerite (seismic velocity 3,000-4,500 m/s)

Dolerite crops out over the hill, spur on the east side of the alignment in the region of the saddle. It is covered by thin, brown soils and normally about 3 m of very weathered and jointed dolerite (represented by a seismic velocity of about 1,500 m/s). The nature and depth of weathering is indicated in the seismic sections. The block size of the weathered dolerite is about 15 cm across. Distinct zones of oxide and calcareous weathering occur, for example near Ch. 5,000 ft (1.5 km).

Dolerite-derived material with seismic velocities less than 3,000 m/s is normally rippable and scrapeable. Dolerite with velocities in excess of this will require high density blasting. Massive dolerite often has velocities in excess of 6,000 m/s and the absence of velocities higher than 4,500 m/s in this area suggests that the whole mass is reasonably well jointed, a property which will aid in excavation.

#### Fault zone material

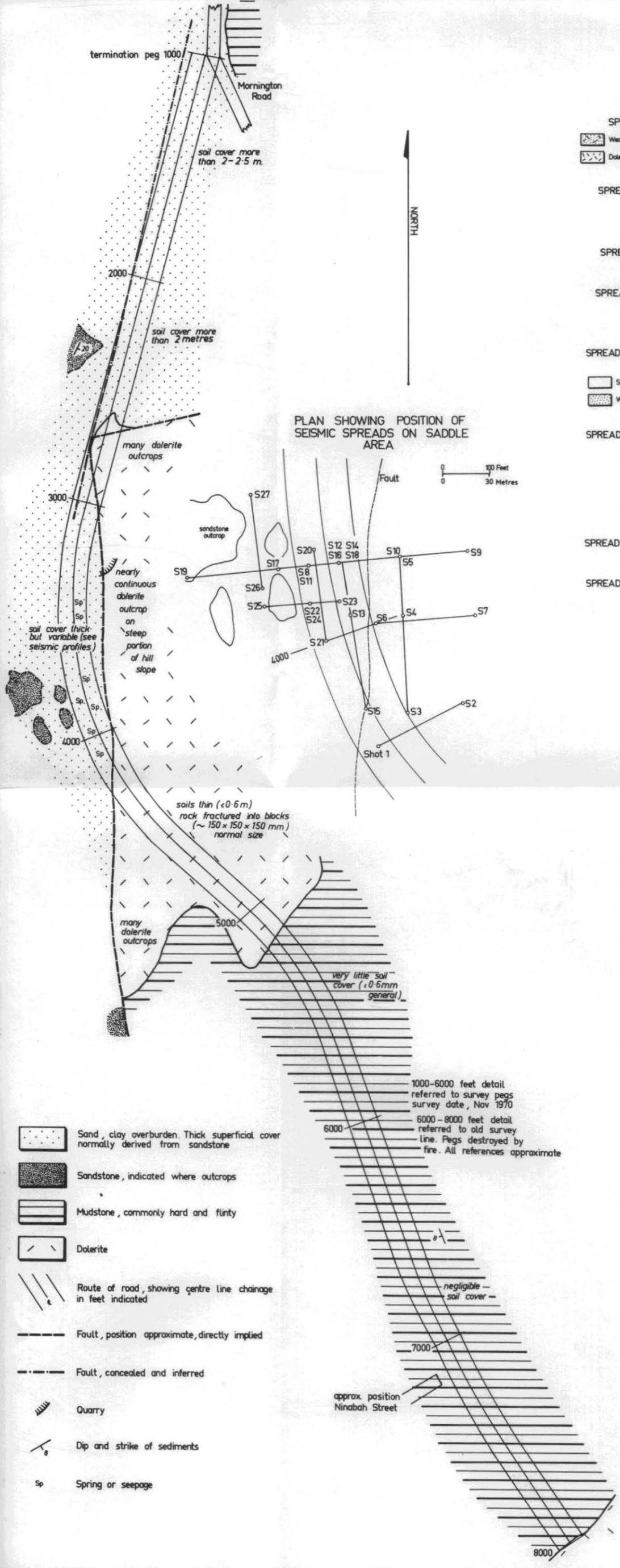
A number of faults have been indicated on the map. Only those bounding the dolerite can be considered reliably placed. Even so it is expected, particularly in view of the seismic results, that a number of other small faults pass through the saddle. The effect of faulting in each case is to initiate deep weathering and hence softening of all materials. A small quarry east of Ch. 3,200 (1 km) displays this effect at the dolerite/sandstone junction. The large number of springs across the saddle is also suggestive of fault dams where clay is produced in the fault surfaces. The width of material affected by a fault is unknown but in these rock types may be up to 15 m.

#### CHANGES OF ALIGNMENT

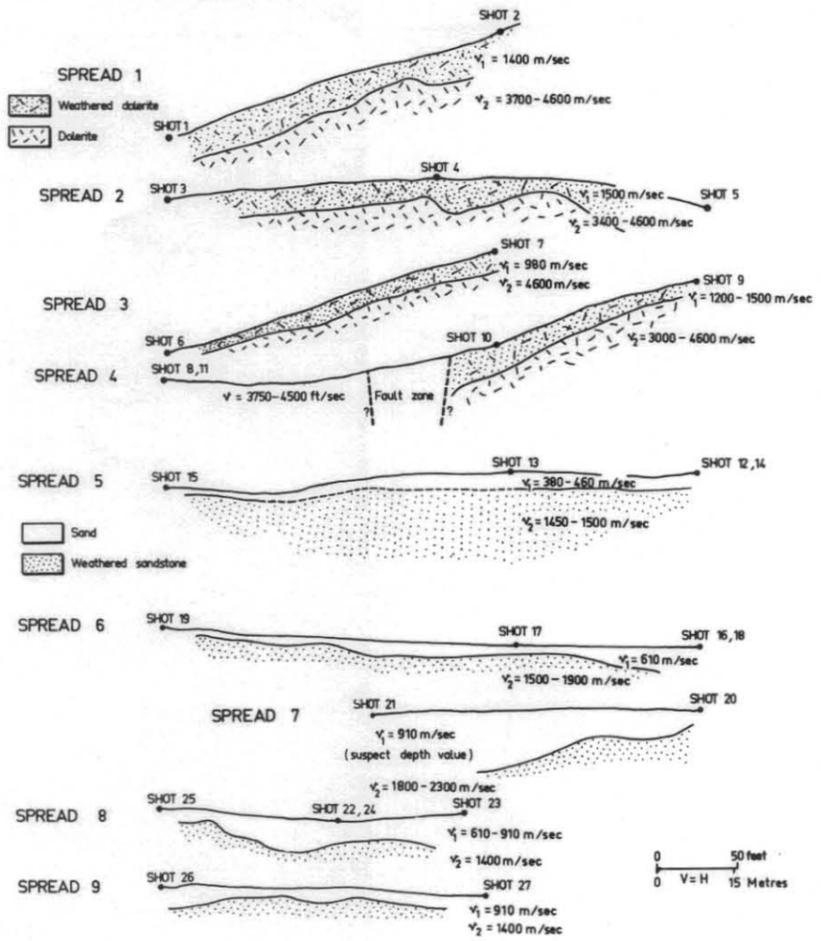
The present proposed route of the road is probably the best available from geological and economic aspects. The major problems would undoubtedly be associated with any excavations required in the dolerite and the present route avoids much of this. Any variations to increase the radius of curvature of the road in the region of the saddle should be west of the present proposed route as operations in sandstone are far easier and cheaper. No route to meet the requirements of the alignment from Howrah to the saddle can avoid small cuttings in the south end of the dolerite spur.

#### REFERENCE

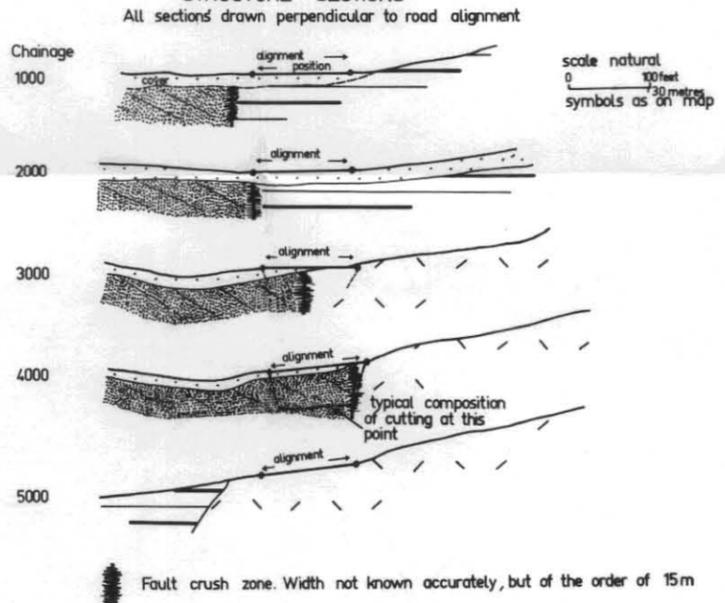
LEAMAN, D.E. 1973. Gravity survey of the Hobart district. Bull. Geol. Surv. Tasmania. 23.



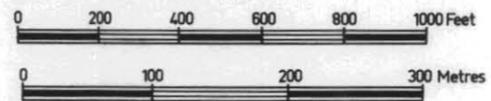
**DETAIL OF SEISMIC INTERPRETATION**



**STRUCTURE SECTIONS**



**GEOLOGICAL OBSERVATIONS ON THE ROUTE OF THE PROPOSED BELLERIVE BY-PASS**



Geologist: D.E. LEAMAN  
Draughtsman: T.R. Bellis  
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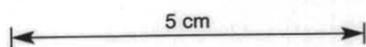


Figure 26.