

1977/18. Investigation of possible highway routes between Latrobe and Devonport.

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Gutteridge, Haskins and Davey, consulting engineers, requested information on four possible road routes between Latrobe and Devonport. Three possible alignments are along existing roads while the other would be a new route (fig. 1). Comments were requested on soil stability and on the geology of the soil and rock, with particular attention to their suitability for road construction. The projected road is a dual carriageway with a 55 m wide road reserve. The survey undertaken along each route was only of a reconnaissance nature.

ROUTE 1 - OLD BASS HIGHWAY

A₁-B₁. Terrace gravel composed of rounded quartzite with some basalt boulders underlain by about one metre of ferruginous sand. This is underlain by a deeply weathered basalt-like layer one metre thick which lenses out to the north where underlying ferruginous sand underlies the terrace gravel. Small slumps have developed in this material in cuttings up to 4 m deep on the Bass Highway. The material at depth is probably dolerite and foundations should be fairly good.

B₁-C₁. A relatively flat area, with the road built on terrace deposits and fill with dolerite occurring around the foreshore and uphill from the road and likely to underlie the road at depth. Foundations should be fairly good.

C₁-D₁. Again the road is built on terrace deposits and dolerite. Cuttings on the western side of the road up to 3 m high show terrace deposits with local pinnacles of dolerite projecting into the sediments. The terrace deposits have required some support with riprap suggesting minor slumps have developed. Road foundations should be fairly good.

D₁-E₁. This section of the road is cut largely into dolerite and some difficulty might be experienced in excavating, although the dolerite is weathered at many points. Road foundations should be good.

E₁-F₁. Horsehead Creek estuary has been largely filled in and the stage of settlement is unknown. Some further settlement could occur.

F₁-G₁. This section of the road is flat and has been constructed on an older terrace deposit which is underlain by Permian sediments. Near F₁, the terrace deposits exposed in road cuttings consist largely of even-grained fine sandy to silty material with some clay. Near G₁, where the sediments have been quarried with a 4.5 m high face, they consist of grey silt, and fine sand with lenticular zones of quartzite gravel. Deep bores near the road (Watlings, Smiths, Mantachs, fig. 1) showed thicknesses of 15 m, 11m and 8 m of unconsolidated material overlying Permian mudstone and sandstone. This material is largely clay, silt and sand with some shingle and is probably derived from weathering of Permian rocks. It has been a fairly good foundation for the existing road. There may be areas where drainage is a problem because of the general flatness and because of the generally fine-grained nature of the sediments.

Where the road approaches the edge of the terrace at a₁, a small landslip has developed on the edge of the road. Just west of this landslip, a mudflow has developed recently from the road edge to the foot of the terrace exposing 4.5 m of brown silty clay probably derived from Permian fragments. The outlines of fragments can be seen at some levels. The mudflow appears

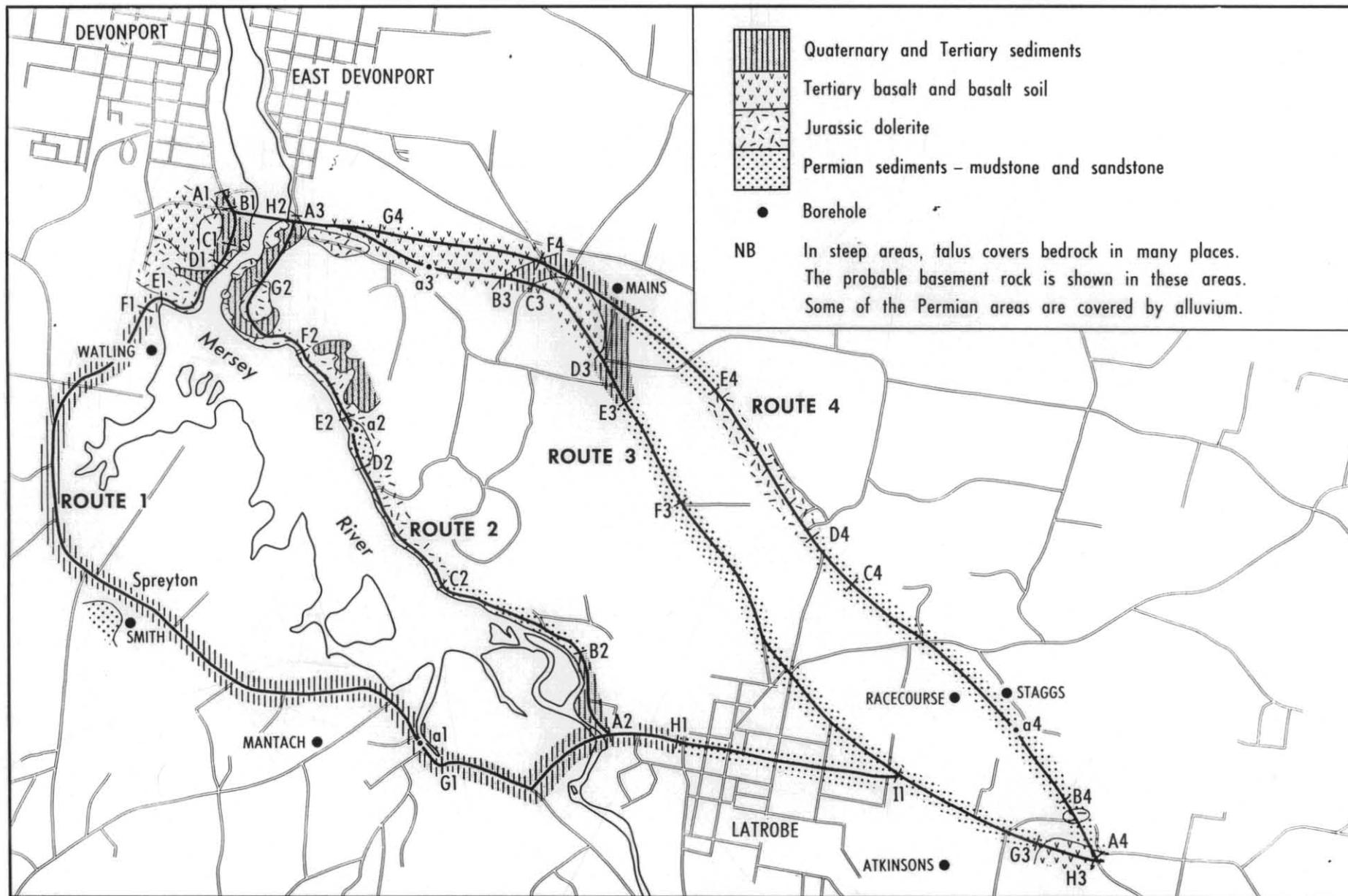


Figure 1.

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to have been caused by surface drainage being directed towards the area.

G₁ - H₁. This part of the road crosses the present flood plain around the Mersey River which is probably underlain by gravel and perhaps some silt and clay. The Latrobe Council has encountered gravel wherever excavations have been made. The foundation conditions are probably good overall with flood effects being the most serious hazard.

H₁ - I₁. Burns (1963) mapped this section as Permian sediments. It seems likely that much of it is probably underlain by the older terrace deposits, as occur between F₁ and G₁ with the Permian rocks underlying these. If Permian rocks occur, they are deeply weathered and the foundation conditions are likely to be similar. Excavations in the area by the Latrobe Council and builders have encountered clay to a depth of about 3.5 m. Foundation conditions of the present road appear good.

General comments on route

Small scale slumping has taken place in cuttings in sections A₁ - B₁ and C₁ - D₁, although these are probably only a minor problem. Where the road runs near the edge of the older terrace at a₁ slumping could be a greater problem and care with drainage may improve the situation.

Foundation conditions appear reasonable to good throughout, although drainage may be a problem in some parts of the older terrace area. Floods may affect the section G₁ - H₁. Excavation of dolerite may be difficult at some points between D₁ - E₁.

ROUTE 2 - RIVER ROUTE

A₂ - B₂. This section is built on recent flood plain deposits which are probably similar to the section G₁ - H₁. It will be subject to flood.

B₂ - C₂. This section appears to be underlain by Permian rocks composed of sandstone, pebbly sandstone and dark grey and black carbonaceous mudstone. Outcrops are scattered, the Permian rocks being largely covered by dolerite talus from dolerite areas further uphill. Large cuttings would be required in this section and talus slopes would cause some stability problems. Road foundations would, in general, be good. Excavation of the mudstone horizons should be fairly easy, with the sandstone beds being tougher.

C₂ - D₂. Dolerite, largely weathered but with possible unweathered areas, occurs in this section. Again, talus covers the slopes and stability problems in cuttings could be expected. Some old slips occur on existing road cuttings where the dolerite is unweathered. Excavation costs would be high but foundation conditions are expected to be good.

D₂ - E₂. Permian sandstone and shale crop out in this area. Comments as for B₂ - C₂. Old slips occur on existing road cuttings and one recent slip occurs at a₂.

E₂ - F₂. Dolerite appears to occur throughout this section. It may be less weathered than in C₂ - D₂.

F₂ - G₂. This section is underlain either by dolerite or dolerite talus with some terrace deposits. Where dolerite crops out, it appears less weathered than further south and excavation may be difficult. Slopes uphill from the road are low and there is little danger of unstable conditions in this section.

G₂ - H₂. Some basalt soil from old slips upslope extends to the road and there are some terrace deposits in parts. At depth, the area is probably underlain by dolerite. There is little risk that the area will be affected by slips provided that the slope is not cut into. Foundation conditions should be fairly good. Some extra measures may be required to ensure good drainage.

General comments on route

Road foundation conditions are probably reasonable to good over most of the route. Section A₂-B₂ may be subject to flood effects. From B₂-F₂ large cuttings would be necessary and unstable conditions could be expected in these.

ROUTE 3 - EXISTING BASS HIGHWAY

A₃ - B₃. This section is underlain mainly by basalt soil, basalt derived alluvium and weathered basalt. Near Victoria Bridge the road is near the contact of basalt and dolerite. North of the road at this point unstable conditions have been experienced and further undercutting of the embankment would aggravate this. Near B₃ and at a₃ the road has been cut into weathered basalt. Widening will create higher cuttings with the result of increasing stability risks. The slope of the land uphill is relatively gentle and it may be fairly easy to avoid these problems. A swampy section with two large farm dams above the road occurs near a₃. Foundation conditions may be poor in this area and special drainage may be necessary. Dam bursts could be a hazard.

B₃ - C₃. Burns (1963) mapped this area as Wesley Vale Sand which comprises mainly sand but with interbedded basalt, tuff, gravel, clay and probably lignite. In this section, conditions are a little swampy and the soil is a silty grey brown clay with a few quartz fragments. Because of the swampiness, special local drainage may be necessary.

C₃ - D₃. Basalt soil and weathered basalt with reasonable to good foundation conditions and little danger of unstable conditions in cuttings provided large cuts are not made on the south side of the road.

D₃ - E₃. This section crosses the Wesley Vale Sand of Burns. The soil is mainly silt with lateritic fragments, occasional quartz pebbles and sandy fragments. The land is sloping and drainage problems should not occur. Foundation conditions should be fairly good.

E₃ - F₃. Very weathered Permian rocks composed mainly of sandstone and pebbly sandstone occur in this section. There should be little difficulty in excavation and foundation conditions should be good. There is little danger of unstable conditions.

F₃ - G₃. Silt, clay and sand underlie this section. There is little doubt that Permian rocks underlie the area at depth but outcrops do not occur. In the Latrobe township area some of the section is probably alluvium derived from weathering of Permian rocks. Excavation to 3 m in the hospital extensions show yellow clay and a drain east of the hospital has silty clay to about 1.5 m. Atkinson's bore (fig. 1) struck mudstone (Permian) at 5 m after passing through clay. From the condition of the present road, foundation conditions should be reasonable. Special drainage may be necessary in some of the flatter areas. At G₃ a contact can be seen between basalt and Permian rocks in recent excavations for road improvements.

G₃ - H₃. Deep cuttings in the basalt could become unstable.

General comments on route

Sections of A₃-B₃ and G₃-H₃ could become unstable if basalt slopes are undercut. Parts of B₃-C₃ and F₃-G₃ and an area near a₃ may require special drainage measures because of the flat, and sometimes swampy, nature of the ground. In general, foundation conditions should be reasonable to good from the condition of the existing road.

POSSIBLE NEW ROUTE

A₄ - B₄. This section begins in basalt and then passes into Permian rocks with a small area of dolerite talus on top of the hill. The north slope of the hill is in Permian sediments and although fairly steep, the shape of the slope does not suggest any past instability. Unless deep cuttings are proposed, unstable conditions are unlikely. Foundation conditions should be reasonable.

B₄ - C₄. This area is underlain by deeply weathered Permian sediments and some surface alluvium. Slopes are low angle and there is no danger of landslips. At a₄, the route is near a bench with a low steep slope. This bench is capped with a resistant Permian sandstone bed. Otherwise the fragments of Permian rocks along this section of the route are of brown mudstone. Staggs and the Racecourse bores (fig. 1) struck weathered sandstone at 3 m and 4 m after passing through clay. Some special drainage may be needed where the road crosses the creek and the surrounding flat area.

C₄ - D₄. The topography is steeper sloping in this section and parts of the landsurface are hummocky, suggesting some old, fairly small landslips. A dirty Permian sandstone occurs near C₄ and where the route follows the existing road, a Permian mudstone (grey and dark carbonaceous) overlain by clean, coarse to fine-grained cross bedded sandstone is exposed. Talus from dolerite areas on the slopes above present some risk of unstable conditions if deep cuttings are excavated. Foundation conditions are expected to be good. Excavation could be fairly difficult in the sandstone beds.

D₄ - E₄. D₄ marks the contacts of the dolerite with the Permian rocks. The dolerite is very weathered. Where the new route leaves the existing road, the landsurface rises fairly steeply to a saddle between two knolls with relatively unweathered dolerite capping them. Some excavation difficulties may be encountered in this part of the D₄-E₄ section. After the summit, the slope to the west is gradual with the land being largely underlain by weathered dolerite with soil and boulders occurring at the surface. On the north end of Staggs Hill near E₄, fine-grained unweathered dolerite may be difficult to excavate over a short distance. Around the slopes southwest of this point are some old slip-like features which are probably in talus near the contact of Permian rocks and dolerite. These could cause some problems if traversed by the road.

E₄ - F₄. At E₄, weathered Permian rocks underlie the flat land. About the middle of this section, Burns has marked a boundary with Wesley Vale Sand. Hains' bore (fig. 1) passed through 6 m of clay and 0.3 m of sand before going into mudstone. The land is flat to very low undulating and there is not likely to be a risk of unstable conditions. Foundation conditions should be fairly good although the flat areas may require special attention to drainage. Basalt could extend almost to the proposed route just south of the road to Port Sorell.

F₄ - G₄. This section is in basalt and the position of the proposed

route at present will undercut some fairly steep slopes which could become unstable. If the route was moved closer to the present Bass Highway on the eastern end of this section, the land is flatter and this possibility may be avoided.

General comments on route

Some small local problems could be experienced with unstable conditions from C₃ to just past D₄ and near E₄. On the eastern end of F₄-G₄ there are definite possibilities of unstable conditions but these may be avoided by moving the route slightly. Some excavation difficulties may be encountered in the dolerite on the southern end of Staggs Hill and near E₄. Some special drainage measures may be needed in some of the flatter areas but in general foundation conditions should be fairly good overall.

CONCLUSIONS

The river road seems the most likely to be affected by landslips over long sections. The other three routes have small areas which may be subject to movement if special measures are not taken.

Excavations along the river route are expected to be more extensive because of the steep slopes up from the river over at least half of the route. Small areas (e.g. near Horsehead Creek on the Old Bass Highway and parts of Staggs Hill on the possible new route) on the other routes may present some excavation problems.

A section of the Old Bass Highway and the river road crosses the present flood plain of the Mersey River and this will require more earthworks or bridging.

Some special drainage may be necessary on the flatter sections of all routes except the river route.

From the condition of the present roads along three of these routes, foundation conditions should be reasonable to good.

It may not be possible to provide a 55 m reserve for the road in some sections of some routes without affecting some existing houses (e.g. at Ambleside) on the river route and the southern part of Devonport and parts of Quoiba, Spreyton and Tarleton on the Old Bass Highway route.

No investigation has been made of the possible division of individual rural properties by such a road route as envisaged.

REFERENCE

BURNS, K.L. 1963. Geological atlas 1 mile series. Zone 7 Sheet 29 (8115N). Devonport. *Department of Mines, Tasmania.*

[19 May 1977]