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26. Foundation conditions at Supreme Court building site, Salamanca Place, Hobart

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A drilling and augering programme was carried out at the request of the Public Works Department. Thirteen holes were included in the programme: eight holes around the periphery of the site and five covering the area of high loading for the proposed building. In general, the holes around the periphery were augered to bedrock and diamond drilled for a short distance to prove rock. The holes at the four corners of the central tower were carried about 20 ft into rock whilst the central hole (13) was taken about 50 ft into rock. Where unusual rock conditions were encountered the depth of the holes was varied accordingly. The programme totalled about 325 ft of boring of which about 120 ft was augering and 205 ft was W.M.L.C. diamond drilling.

A seismic refraction survey of the site, which indicated approximate depths to bedrock, had been previously carried out.

GEOLOGY

The building site is underlain by a variable layer of superficial material of unknown age. This consists of clay, silty clay and pebbly clays with, in some places, a few boulders at the base. The augering showed that this material mainly consists of stiff moist clay in the upper levels. In many of the holes from the last 2 or 3 ft above the bedrock, the augers produced a sample of the consistency of thick whipped cream. Doubtless the augers thoroughly disturbed the clay to result in this condition, but it nevertheless indicates that the bottom few feet of this superficial material are saturated. Back hoe trenches at strategic positions would be necessary to obtain undisturbed samples of this material. The layer is of importance as it may result in slippage into the excavation during construction activities.

The bedrock consists of Triassic mudstone, siltstone and feldspathic sandstone. Much of the sediment is 'contaminated' resulting in a complex pile of silty or sandy mudstone and muddy or silty sandstone.

An attempt has been made to draw geological cross sections of the site but due to the complex sedimentation, rapid facies changes and relatively short drill holes, no reliable sections could be produced. The Triassic rocks are moderately jointed, many horizontal and sub-horizontal, as well as sub-vertical joints being encountered. Some of the joint faces are striated and polished indicating movement along the joints but apart from the zones of brecciation indicated on the logs in Holes 3 and 13, no important shattered zones were observed. Weathering extends to a general depth of about 40 ft in Hole 13: the rocks above this level were stained brown and red whilst below it the rock generally is grey coloured. Slight weathering is evident along all joints to the greatest depths encountered by drilling. The sequence dips at least 10° in an unknown direction. Bedding core angles range from about 10° to more than 25°; the higher readings are probably a reflection of current bedding in the sandstone units rather than the true dip of the rocks.

The drill holes were filled with water at night and the standing water level recorded next morning. The results of these tests are recorded below. Due to the necessity to fill holes on the road, no water levels were recorded for Holes 5, 6 and 7.

WATER LEVELS

	Depths below ground surface			
Bore	*ft in*	*Bore*	*ft in*	
1	6 6	9	6 6	
2	1 10	10	NR	
3	5 6	11	6 6	
4	3 0	12	2 4	
8	8 0	13	5 6	

These levels indicate a perched water table within the overburden overlying the bedrock. No artesian flows were noted in the Triassic rocks.

CONCLUSIONS

The building site is underlain by a variable thickness of clay and silty clay containing occasional pebbles and boulders. The bottom 2-3 ft of this material is probably waterlogged.

The bedrock consists of Triassic mudstone, siltstone and feldspathic sandstone units which change facies and interfinger with one another. The sediments are tilted at least 10° in an unknown direction. The rocks are moderately jointed and some small scale faults and shattered zones are likely to be present.

On the whole, the foundations do not appear to offer any special difficulties. It will be necessary to excavate in bedrock for some of the foundations but bearing strengths generally should be adequate. Special attention may be required for small shattered zones accompanied by deep weathering but there is no evidence to suggest that such conditions are likely to be encountered in other than local areas. The bottom layer of the overburden could cause problems by slippage during excavation. The overburden material does not appear to have sufficient bearing capacity to carry foundations and would introduce complications due to the waterlogged layer at its base.

The drilling indicates that the depths to bedrock interpreted from the seismic refraction survey were in all cases too deep. This is probably due to the unreliability of velocity determination in the upper layer.

At some time before the design of the foundations is finalised, it is important to determine the direction of dip of the Triassic rocks. If these rocks dip at more than 10° toward the buried shoreline in the vicinity of Parliament House, this could lead to a condition of instability.