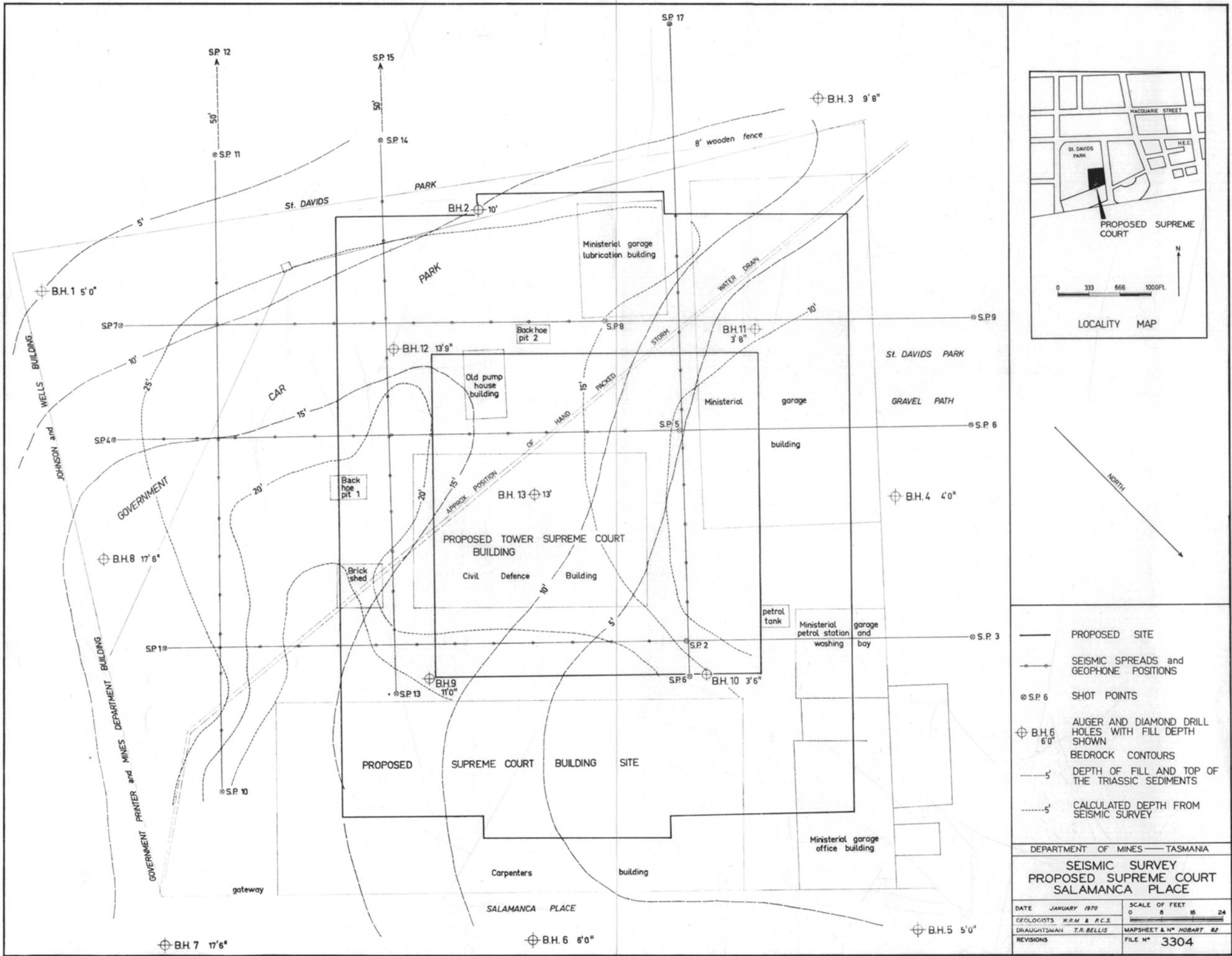


TR14-111-113

**25. Seismic refraction survey, Supreme Court building site,
Salamanca Place, Hobart**

W. R. MOORE

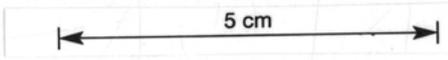
The survey was undertaken at the request of the Public Works Department. Six spreads were fired with geophones placed at 10-foot intervals and their location on the site is shown in Figure 34. The positioning of these spreads and particularly the positioning of the shot-firing points was controlled by the presence of buildings, underground petrol tanks, storm water drains and other services rather than by the requirements for accurate interpretation.



- PROPOSED SITE
- SEISMIC SPREADS and GEOPHONE POSITIONS
- ⊙ S.P. 6 SHOT POINTS
- ⊕ B.H. 6 6'0" AUGER AND DIAMOND DRILL HOLES WITH FILL DEPTH SHOWN
- BEDROCK CONTOURS
- 5' DEPTH OF FILL AND TOP OF THE TRIASSIC SEDIMENTS
- 5' CALCULATED DEPTH FROM SEISMIC SURVEY

DEPARTMENT OF MINES — TASMANIA	
SEISMIC SURVEY PROPOSED SUPREME COURT SALAMANCA PLACE	
DATE JANUARY 1970	SCALE OF FEET 0 6 15 24
GEOLOGISTS W.R.M. & P.C.S.	DRAUGHTSMAN T.R. BELLIS
REVISIONS	MAPSHEET & N ^o HOBART 82 FILE N ^o 3304

FIGURE 34 *TRIA-108-111*



Three velocity layers were found at the site:

- (1) A surface layer with a velocity of 1,000 ft/sec.
- (2) An intermediate layer with a velocity of 2,000 ft/sec.
- (3) A bottom layer with a velocity of 7,500 ft/sec which increased with depth to 10,000 ft/sec.

The slow surface layer was interpreted as a fill horizon of dry gravel and clay. This horizon appeared to be impersistent over the site and where present its thickness varied from 6 inches to 7 ft.

The intermediate horizon, with a velocity of 2,000 ft/sec, was thought to consist of water-saturated fill, composed mainly of silts, fine sands mixed with some clay and a few boulders.

The bottom, fast layer was thought to be Triassic sandstone and mudstone.

Two exploration pits were dug to a depth of 10 ft by a back hoe for the Public Works Department (fig. 34) before the seismic survey was carried out. Both pits were entirely in fill with no definite Triassic sandstone or mudstone present. The fill was a mixture of oil-impregnated, water-saturated, black sands and silts with some beach sands, dolerite-derived clays, Triassic sandstone blocks and dolerite boulders. A thin superficial layer of road metal bound with clay was observed at the surface. Water was weeping in from the walls of both trenches from 18-24 in below ground level, and was seeping in rapidly at the bottom of the trench.

The seismic survey showed that the depth of the interface between the 2,000 and 7,500 ft/sec layers varied from 5 to 25 ft on the site and that a trough or valley 25 ft deep was present near the SE corner of the present car park and that the valley extended diagonally across the car park in a WNW direction shallowing to 10 ft towards the western corner of the Ministerial Garage and St Davids Park (fig. 34).

The valley in the bottom layer closely parallels the approximate position of an old hand-packed 15-inch stone storm-water drain. It appears likely that a small streamlet once occupied this shallow valley in the Triassic sandstone and mudstone and this stream was covered and diverted some 20 ft to the E by the drain and then filled to various levels since the time the drain was built. A shallow depression some 5-7 ft deep, following the outline of the old valley was in existence when this site was occupied by the Vacuum Oil Company (pers. comm. T. L. Clarke, Explosives Inspector, Department of Mines, who worked for the company as a youth).

Since drilling was carried out at the site the calculated depth of the fill from the seismic interpretation appears to be 5-8 ft too deep with the valley having a depth of $9\frac{1}{2}$ ft in borehole 3, near the WNW corner of the Ministerial Garage in St Davids Park and $17\frac{1}{2}$ ft deep in borehole 7, near the SE corner of the present car park.

Bedrock contours on the top of the Triassic sediments plotted from the drilling results indicate the position of a valley coinciding in position with that shown by the seismic survey, although the valley appears to be considerably shallower in the SE corner. The existence and position of this stream and its valley has been confirmed by the finding, in the State Archives, of an old con-

struction and site plan for the building of the hand-packed drain in the old St Davids Burial Ground by the Architectural Branch of the Public Works Department.

The excessive depth in the seismic interpretation can be accounted for by the fact that the velocity difference between the 1,000 ft/sec upper layer and the 2,000 ft/sec second layer was too small for the refraction point between these layers to be recognised in many of the spreads. This led to the wrong conclusion that the slow surface layer was not present over the entire site particularly in areas covered by bitumen and concrete through which the geophone and shot holes had been placed. If allowance had been made for a slow surface layer of 3-5 ft thick over the entire site the depth of the 2,000 ft/sec and 7,500 ft/sec interface would have been reduced considerably particularly in the S and E where no extended shots were possible because of the Salamanca Place roadway and the presence of the old buildings occupied by the Department of Mines and the Government Printer. This excessive depth error could also have been avoided by firing a weathering spread of 20 ft or less on each individual spread at this type of site where much fill and made ground were present.