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DIAMOND DRILLING AT SITE OF WEETANGERA RESERVOIR

by

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DIAMOND DRILLING AT SITE OF WEETANGERA RESERVOIR

PURPOSE OF THE DRILLING

The drilling was done by Pacific Boring Company under contract to the Department of Works . It was intended to disclose the following:

1. The lithology of the rock-material that will be excavated from the reservoir site. If suitable the material will be used for road filling and surfacing.

2. The presence of any faults and fractures which might weaken the cement lining of the reservoir. Fractures that become filled with seeping ground-water could build up sufficient hydrostatic pressure to crack the lining.

DRILLING

The reservoir is to be sited on the crest of a ridge in the approximate position shown in the locality map included with the drawings at the end of this report. Four drill holes were put down at the boundaries of the area to be excavated, Nos.1 and 2, two hundred feet apart on the road that runs along the crest of the ridge, and Nos.3 and 4 equidistant from the other holes, one hundred feet north and south of the road. A rock-drill 6½ inch diameter was used from the surface to a depth of fourteen feet in each hole. The hole was then cased with 5 inch diameter casing, and drilling continued with a diamond bit. Core recovered is 2-3/16" diameter. It is stored in core boxes supplied by the Department of Works.

While drilling was in progress the bit frequently became blocked. Core recovery was very poor except in hole No.4 (see drawing that accompanies this report). In an effort to improve core recovery, core was lifted every two feet. It is unfortunate that the split-inner-tube N.M. core barrel, available at the Works Department could not be used with the contractor's equipment, as this barrel would have given good core recovery.

RESULTS

Lithology.

Nearly all the rock drilled was thinly laminated shale and siliceous shale, in part cherty (radiolarian ?). The thin, brittle bands tended to break up and little core was recovered except in hole No.4. In places the core has been fractured. Where no cementing material has been introduced into the fractures core recovery is even more difficult. Some fractures and adjoining country-rock have been silicified, and here core recovery is good. In places, notably in hole No.4, the drill has penetrated relatively thick bands of mudstone and siltstone or very fine sandstone. These rocks core well.

Structure

The drill holes were sited by the Works Department for construction purposes and are not suitably placed to elucidate the structure of the area. The thin beds appear to be folded into a sharp syncline puckered by minor (? drag) folds. The axis of folding is approximately parallel to the crest of the ridge. A possible interpretation of the dips seen in core from holes Nos.1 and 4 is given in the drawings at the end of this report.

Suitability for Road Material

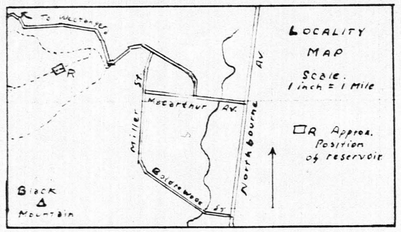
The core and rock-fragments recovered are essentially the same as those exposed in much of Southwell's quarry and presumably will have equivalent usefulness as road material. Some of the siliceous shale is fairly hard, but it alternates with softer, less siliceous bands. The rock is closely - jointed and should break up while being excavated into fragments of suitable size for road-making. Small quartz-veins are plentiful, providing a small proportion of very hard material. Probably some of the thicker bands of mudstone, siltstone and fine sandstone, particularly where brecciated and re-silicified, will be excavated as fairly large, hard masses, unsuitable for use unless crushed or spalled. This material forms only a small proportion of the total bulk to be excavated.

Presence of Fractures.

It is clear that numerous minor fracture zones are present, ranging in width from a fraction of an inch up to about two feet. The drill holes were not suitably placed to give much information on the actual position of the fractures. Some appear to strike parallel to the ridge and if so they could carry water down from the higher ground westwards along the ridge and build up a considerable pressure under the reservoir. When the excavating is finished, the ground should be examined and any such fracture-zones located. Appropriate measures can then be taken to prevent the entry of water along them, or to drain it away.

(D.E. GARDNER)

DIAMOND DRILLING AT RESERVOIR SITE, WEETANGERA.
LOCS OF DRILL HOLES.



0 5 10 Feet

Sections of holes are drawn at right angles to the strike of the beds, looking N 30° W.

The first 14 Feet in each hole was drilled with a non-coring bit.

HOLE No 1

Cuttings — Depth Feet 0

Weathered Shale and Siliceous Shale

Cherty from depth of 14'

Core Recovery

6"	14'	
	17'	Thinly laminated Shale and Siliceous Shale. Horizontal.
6"	18'	
	20'	Ditto, in part cherty. Horizontal.
5'	22'	Ditto.
6"	22'6	
5"	23'3	Low angle fracture.
1'6"		Many thin laminae from 23'3 to 24'. Horizontal.
	25'	Here Weathered Shale, partly Siliceous.
3"	26'	Ditto; low angle brecciation. Vein qtz and limonite.
4"	26'4	
2"		Siliceous Shale, in part cherty. Much fuscity material. Dip 5°
	28'6	Weathered Shale and Siliceous Shale. Dip 7°. Kaolinitic below 29'.
24"	30'6	Kaolinitic to 31'. Below 31' is Siliceous Shale
27"		and Sandy Shale, in part cherty. Dip to 30°.
	32'9	
4"		Here Siliceous Shale. Horizontal.
4"	36'8	Ditto
5"	37'1	Here Siliceous Shale. Dip 60°. Fractures 70°.
12"	38'2	Ditto. Dip 35°. A little brecciated.
19"	39'7	Weathered Siliceous Shale, in part Cherty. Horizontal. Brecciated
Nil	40'	

HOLE No 2

Cuttings — Depth Feet 0

Weathered Siliceous shale and Siltstone

A little cherty from 5'. More chert from 10' to 11'

Core Recovery

	14'	
6"		Siliceous shale, with cherty bands. Weathered. Dip 45°-60°
	17'	
6"	18'	Fractured. Quartz stringers Dip 85°
6"		Ditto, in part brecciated
	20'11	
Nil		
	31'	
2"	32'	Brecciated Siliceous shale and chert. Vein quartz.
3"		Siliceous Shale A ½-inch vein of quartz.
	38'6	
12"	40'	Siliceous shale and cherty Shale, sharply folded.

HOLE No 3

Cuttings — Depth Feet 0

Weathered Shale and Siliceous shale. A little cherty from 7' to 13'. Much chert at 10'

Core Recovery

	14'	
4"		Weathered Shale and Siliceous Shale. Fractured; a little vein quartz
	17'7	
21"		Siliceous Shale and siltstone or very fine Sandstone
	22'8	
?		Weathered Shale and Cherty Siliceous Shale. Dip 45°
	24'8	
3"		Siliceous Shale, in part cherty.
	29'7	
8"		Siliceous Shale, finely laminated, in part brecciated.
	40'	

HOLE No 4

Cuttings — Depth Feet 0

Weathered Shale; not very Siliceous.

Core Recovery

	14'	
2'7"		Weathered Shale and fine Sandy or Silty Shale. Probably fractured below 15'. Vertical.
6"	16'7	Ditto
1'0"	17'4	Ditto. Fracture 50°. Limonite and Quartz. Very broken below 18'. Finely laminated. Vertical.
4"	14'2	Siliceous Shale. Dip 60°
18"	14'3	Finely laminated Shale. Dip 60°
2'0"	21'4	Siliceous Shale and Silty Shale. Dip 60°. Fractures across laminae 60-70°, a little limonite
11"	24'2	Ditto, mainly very broken
1"	25'1	Shale, a little Siliceous. Dip 50°
2'9"	25'10	Siliceous Shale, brecciated and re-silicified. Very broken below 27'10.
	29'2	
3'0"		Mudstone and Siltstone or very fine Sandstone. Rough fractures; much fine Quartz veining. Grading coloured
12"	32'6	Siltstone, not apparently laminated.
6"	33'7	Ditto, broken into very small fragments.
6"	34'7	Siltstone, ground up during drilling (bit worn out)
	37'1	