DEPARTMENT OF MINES
SOUTH AUSTRALIA

PROGRESS REPORT

WHITE ROCK QUARRY

Sections 1107, 1108, 1109, Hd. Adelaide, Co. Adelaide

(White Rock Enterprises)

by

M.N. HIERN
SUPERVISING GEOLOGIST
MINERAL RESOURCES DIVISION

24th July, 1972

Rept.Bk.No. 72/137

DEPARTMENT OF MINES
SOUTH AUSTRALIA

CONTENTS

PLANS

Plan No.	Title	Scale
S 9811	Locality plan	1" to 20 chains
72-616	White Rock Quarry Preliminary Geological Plan.	1" to 200 ft
72-617	White Rock Quarry Cross-sections D-D' & G-G'.	1" to 100 ft

DEPARTMENT OF MINES
SOUTH AUSTRALIA

Rept.Bk.No. 72/137
G.S. No. 4904
D.M. No. 1220/71

PROGRESS REPORT

WHITE ROCK QUARRY

Sections 1107, 1108, 1109, Hd. Adelaide, Co. Adelaide

(White Rock Enterprises)

ABSTRACT

The Undalya Quartzite is the principal source of quartzite for coarse aggregate in the Adelaide area. At White Rock Quarry the bed is worked to produce coarse aggregate for concrete. Artificial concrete sand is recovered from fines in an associated washing plant.

Geological mapping has shown the limits of the bed in the quarry area from which the quantities of rock available have been estimated. However the suitability of this material is subject to the results of a diamond drilling programme which is still in progress.

Assuming that the drilling proves acceptable quality material, there are approximately 9 million cubic yards available in the deposit. Of this approximately 3.4 million cubic yards can be won without breaking the ridge crest. Removal of the remaining 5.6 million cubic yards involves lifting of the present restriction to work the northern slopes of the ridge.

INTRODUCTION

White Rock Quarry is located 6.5 miles east of Adelaide in the western Mt. Lofty Range. The workings occupy the southern side of a prominent steep sloped ridge known as the Giles Range which is bounded to the north by the Old Norton Summit road and to the south by Horsnell Gully.

Mineral rights under the Mining Act 1930-1962 were owned by the operating company, White Rock Enterprises. The property includes Pysees Knob, a prominent rock face overlooking the Old Norton Summit road in the north-eastern corner of Section 1107. Stability of the rock face was recently investigated by Rogers (1972) who concluded that the face was reasonably stable although spalling of surface blocks is likely to be a continuous process.

A geological survey of the quarry area has been carried out on instructions from the Director of Mines following complaints from local residents, particularly in respect to the intention of the operators to breach the ridge crest.

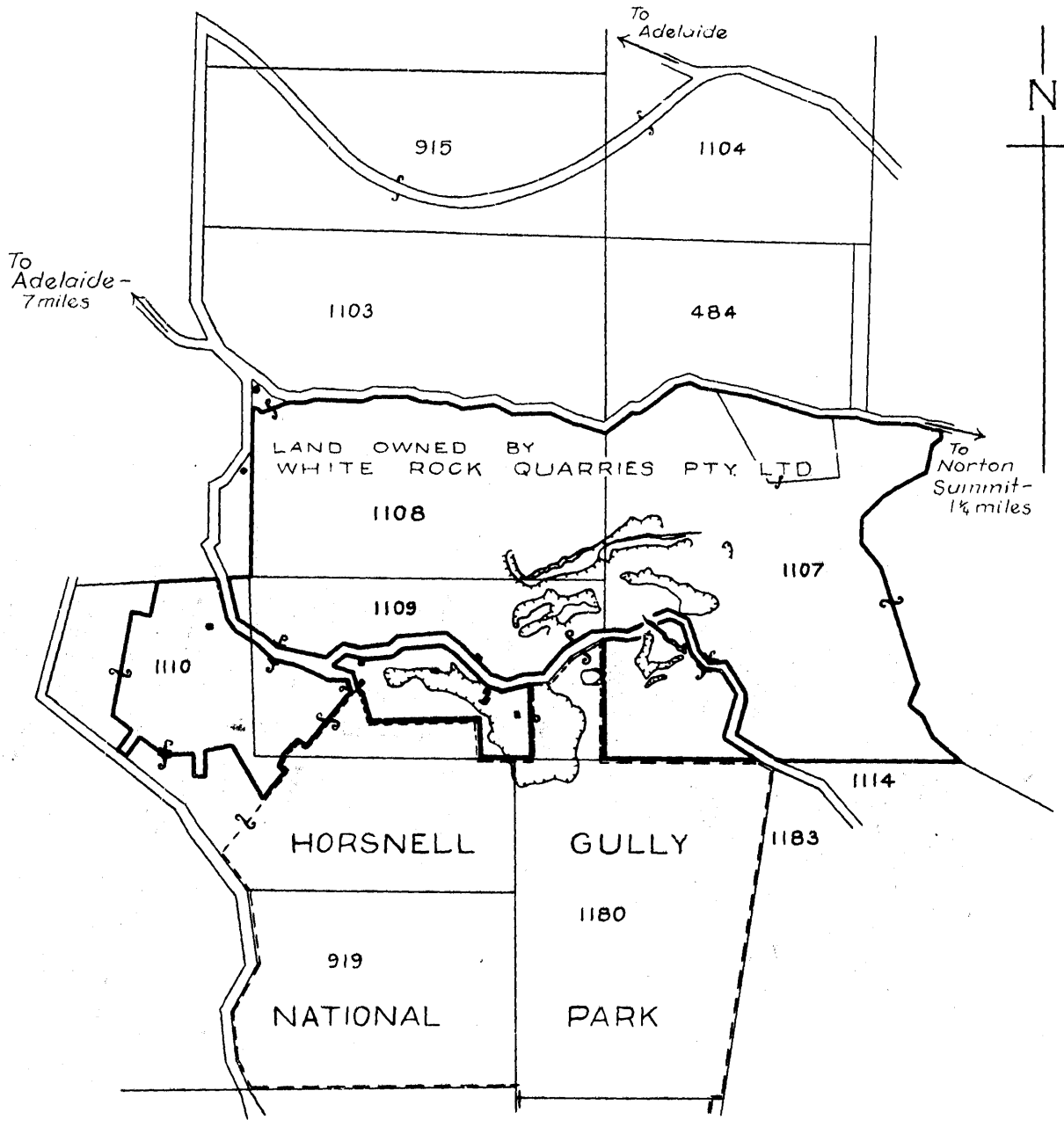
At present Pioneer Quarries (Victoria) Pty. Ltd. of Melbourne are diamond drilling the deposit under an option arrangement negotiated with White Rock Enterprises. Siting of the four initial diamond drill holes in the programme was recommended by the author from the results of the geological survey. Three other holes are proposed by Pioneer Quarries Pty. Ltd.

A full appraisal of the deposit as a source of aggregate is not possible until the diamond drilling programme has been completed and the results of laboratory testing of cores and other samples taken by Pioneer Quarries are available. The present report summarises information available to date.

OPERATIONS AND PRODUCTION

The quarry produces fine and coarse aggregate for use in pre-mix concrete. Approximately half of the production is used on site by an associated pre-mix concrete firm and the remainder sold to other pre-mix operators.

Fines from the crusher are processed in a washing plant on site to produce an artificial concrete sand. The slimes from this plant are held in a



MINERAL RESOURCES DIVISION	**DEPARTMENT OF MINES — SOUTH AUSTRALIA**	Scale: As Shown
Compiled: J. B. F	WHITE ROCK QUARRY	Date: 2nd May 1972
Drn. M.A.S. Ckd. R.H.	Pt Secs 1107, 1108 & 1109 Hd. Adelaide	Drg. No.
	LOCALITY PLAN	S9811 Hoc.

1M—2.70 A1810

number of dams on the property (see plan 72-616).

There have been recent complaints of effluent from the washing operations polluting the creek downstream from the property.

Scalpings are sold for roadwork and filling.

Production for the calendar years 1966, 1968 and 1970, provided by the company under Regulation 439 of the Mines and Works Inspection Act, are as follows.

	1966	1968	1970
Washed sand	45087 tons	47009 tons	86532 tons
Screenings	99929 "	1016-8 "	129176 "
Scalpings	30353 "	27999 "	22821 "
Total	175369 "	176676 "	238529 "

None of the quarry products have been tested for quality in the current geological survey but it is assumed that they meet specifications for concrete materials.

As will be described in a later section of this report, the rock in the faces varies considerably. In general the best material occurs in the eastern end and to a lesser extent the western end of all benches while the central section contains an appreciable quantity of friable to semi-friable sandstone which provides the source of the fine aggregate produced. A uniform crusher feed is maintained by selective loading and blending.

The better quality rock in the ends of the deposit is only easily accessible if the lower grade central section is worked as well. Thus the economics of working this deposit for concrete aggregate appear to depend to a large extent on the existence of the washing plant to utilise the fines as artificial concrete sand.

It is likely that the material from the central section of the quarry would meet specifications for some classes of roadwork. It is thus possible that the quarry could work economically if the washing plant was not permitted

to operate but this aspect requires further study.

HISTORY OF OPERATIONS AND PREVIOUS REPORTS

The area was first opened up for quarrying in about 1945 and was acquired by Mr. C. Ferraro in 1947.

Quarrying began in Sections 1109 and 1180 on the southern side of Horsnell's Gully Road, and reports by Mansfield (1949), Ridgway (1950) and Nixon (1956) relate to deposits on land held at that time by the operating company. Nixon (op. cit) referred to the occurrence of high quality quartzite in Sections 1107 and 1108 to the north on land held by other interests.

It is reported that Mr. Ferraro acquired Sections 1107 and 1108 in 1957, including the area known as Pysees Knob, for the express purpose of extending his quarrying operations.

Nixon (1959) mapped the eastern portion of Sections 1108 and 1109 in mid 1957 and referred to an operating quarry in Section 1109 on the northern side of the creek. He recorded "reserves available for quarrying are estimated at less than 50% of the calculated volume of 3½ million cubic yards. Good quality quartzite is approximately 30% of the togal calculated volume".

Quarrying extended into Section 1107 along the southern face of the ridge and by mid 1971 the excavation had reached the crest. Following complaints from residents on the northern side, breaching of the ridge crest was prohibited by the Department of Mines.

GEOLOGICAL SETTING

Rocks in the quarry area are assigned to the Burra Group of the Adelaide System and the bed being quarried is equated with the Undalya Quartzite (formerly referred to as the Stonyfell Quartzite). This unit has a thickness of approximately

1000 ft in the Adelaide area and is the principal bed worked in the Mt. Lofty Ranges for coarse aggregate.

One of the major block faults in the ranges, the Stonyfell Fault, forms the northern boundary to the deposit (Sprigg et al. 1951).

GEOLOGY OF THE QUARRY AREA

The dominant structural feature in the quarry area is an overturned anticlinal fold whose axis strikes in a northeasterly direction transversely across the ridge. A minor syncline is developed in the vicinity of old workings on the eastern end of the southern slope (see plan 72-616).

Detailed mapping has not been extended as far as Pysees Knob but reconnaissance shows the presence of an asymmetrical syncline which brings the flat dipping beds exposed in the northwestern face abruptly upwards on the eastern side in an almost vertical limb. Outcrop on the top of the Knob is poor but this structure suggests that good quality quartzite will underlie the eastern side of the crest.

The area is extensively faulted. Nixon (1956) mapped several faults on the southern side of Horsnell Gully and three major faults have been recognised in the quarry area. Movement on two of these latter faults is such as to control the northern and eastern limits of the bed being worked.

The axial plane of the major anticlinal fold also appears to have been faulted.

The full stratigraphic thickness of the Undalya Quartzite is not exposed in the quarry area. On the overturned western limb of the anticline the succession passes down from phyllite to sandstone into the Undalya Quartzite. A thin band of phyllite occurs in the eastern end of the lower bench of the old quarry on this limb of the fold but there is no evidence that this marks the base of the Undalya Quartzite.

On the eastern side of the quarry the Undalya Quartzite is faulted

against the overlying sandstone. The fault strikes northeasterly and dips at about 60° S.E. but there is no evidence of the amount of movement. One of the proposed diamond drill holes has been sited on Bench 4 to determine the amount of movement.

The Stonyfell Fault crosses a minor saddle to the west of the workings and trends along the lower slopes of northern side of the ridge and passes just to the north of the base of the rock face of Pysees Knob. This fault separates the Undalya Quartzite from a sequence of phyllite containing a prominent thin quartzite bed.

While the Undalya Quartzite contrasts sharply with the overlying sandstone the lithology within the bed varies considerably.

The upper section consists of a hard well crystallised quartzite. It is thickest on the flat dipping eastern limb suggesting that differential recrystallisation may have occurred. Below the quartzite, particularly in the lower faces of the old western quarries, is arkosic quartzite, which, because the feldspar has been altered to kaolin, tends to break easily across the fabric of the rock. The lower section of the bed consists of sandstone showing a varying degree of cementation. Disintegration of these latter two rock types during blasting and crushing provides the source of fine aggregate.

The disposition of these beds in the anticlinal fold places the higher quality recrystallised quartzite in the western and eastern ends of the quarry with the friable sandstone in the centre (see plan 72-617).

RESERVES

Although the good exposures in the faces permit evaluation of quality in the quarry, outcrop on the northern slope is largely obscured by soil and talus and much of the exposed rock on the southern slope is inaccessible for detailed inspection.

Thus the volumes quoted below are tentative, being based on the assumptio that material similar to that in the workings underlies the northern slope and occupies the core of the ridge. This assumption will be substantiated by the diamond drilling.

Volume has been calculated from cross sections (not included in this report) down to RL 1100 which coincides approximately with the floor of Horsnell Gully. A batter slope of 45^{o} has been used which corresponds to final benches 60 ft high with a berm of 20 ft between each.

Volume A represents material available without breaking the ridge crest from the western end of the quarry to 100 ft east of Section G-G! (see plan 72-616).

Volume B includes all of the bed down to the Stonyfell Fault on the northern side of the ridge from the western end of the quarry to the gully separating Pysees Knob from the quarry area (i.e. 700 ft east of Section G-G!).

Reserves within the above limits are as follows.

Volume A 3.4 million cubic yards

Volume B 9.0 " " "

SUMMARY AND CONCLUSIONS

The Undalya Quartzite shows considerable variation in the quarry area and economic operation depends on the utilisation of friable lower grade material in the central section of the workings. At present this is processed in a washing plant to produce an artificial concrete sand. It is possible that it is suitable for roadwork and that the deposit could be worked without the present dependence on the washing plant. This aspect requires further consideration.

The northern and eastern limits of the bed are controlled by faults while the western boundary is a stratigraphic feature.

Outcrop is poor outside of the benches and full appraisal of the deposit depends on the results of a diamond drilling programme at present in progress.

Assuming that the material beneath the northern slope and in the core of the ridge is similar to that in the faces, there are 3.4 million cubic yards available down to RL 1100 without breaking the crest of the ridge, and a total of 9.0 million cubic yards if the bed is worked down the northern slope to the Stonyfell Fault. None of these reserves include Pysees Knob.

24th July, 1972

M.N. HIERN
SUPERVISING GEOLOGIST
MINERAL RESOURCES DIVISION

REFERENCES

Mansfield, L.L.,1949. White Rock Quarries Ltd., Horsnell Gully.
Dept. of Mines, unpublished report RB.24/287.

Nixon, L.G.B., 1956. White Rock Quarries. Sec. 1180, Pt. Sec. 1109.
Hd. Adelaide, Co. Adelaide. (White Rock Quarries Ltd.)
Dept. of Mines, unpublished report RB.43/9.

_____, 1959. Quartzite Deposit - White Rock Quarries.
Min. Rev., Adelaide, 107: 110-115.

Ridgway, J.E., 1950. Horsnell's Gully Quartzite. Sections 1180 and 1189,
Hundred of Adelaide.
Dept. of Mines, unpublished report RB.28/78.

Rogers, P.A., 1972. Rock stability, Pysees Knob, Pt. Sect. 1107,
Hd. Adelaide. Dept. of Mines, unpublished report RB.72/8.

Sprigg, R.C., Whittle, A.W.G. and Campana, B., 1951. Adelaide map sheet,
Geological Atlas of South Australia, 1:63 360 series,
geol. Surv. S.Aust.

N

PYSEES NOB

DH1 DH2 DH3 DH4 DH5 DH6

DAM

A A' B B' C C' D D' E E' F F' G G' H H'

LEGEND

NORTHERN SLOPE OF QUARRY

Shale with minor Quartzite

SOUTHERN SLOPE OF QUARRY

PROTEROZOIC - ADELAIDE SYSTEM

TORRENSIAN

BURRA GROUP

SADDLEWORTH FORMATION

UNDALYA (STONYFELL) QUARTZITE

- Upper Shale
- Sandstone
- "Quartzite"
- Shale

- Fault
- Anticlinal Axis
- Geological boundary
- Approximate geological bdy
- Contours (in feet)
- Strike and dip of bedding
- Strike and dip of jointing
- Strike and dip of cleavage
- Diamond Drill Hole Vertical Showing direction of inclination

SCALE IN METRES

50 0 50 100 150

100 0 100 200 300 400 500

SCALE IN FEET

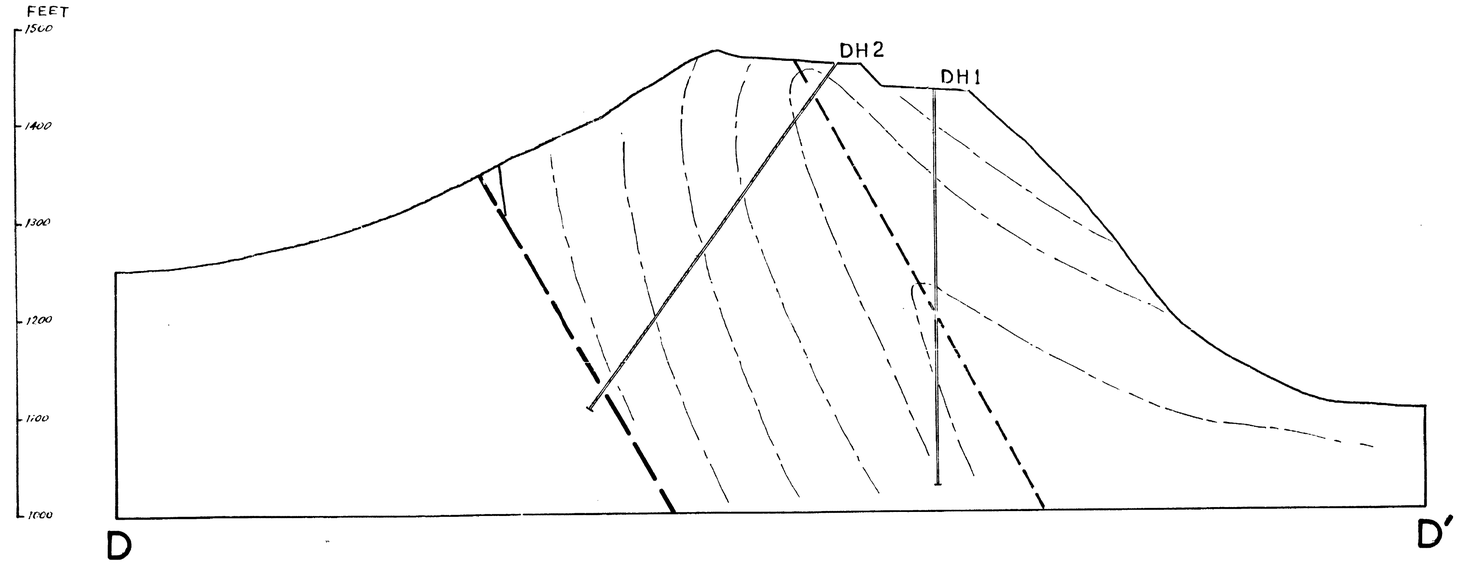
A A' Geological Section See plan 72-

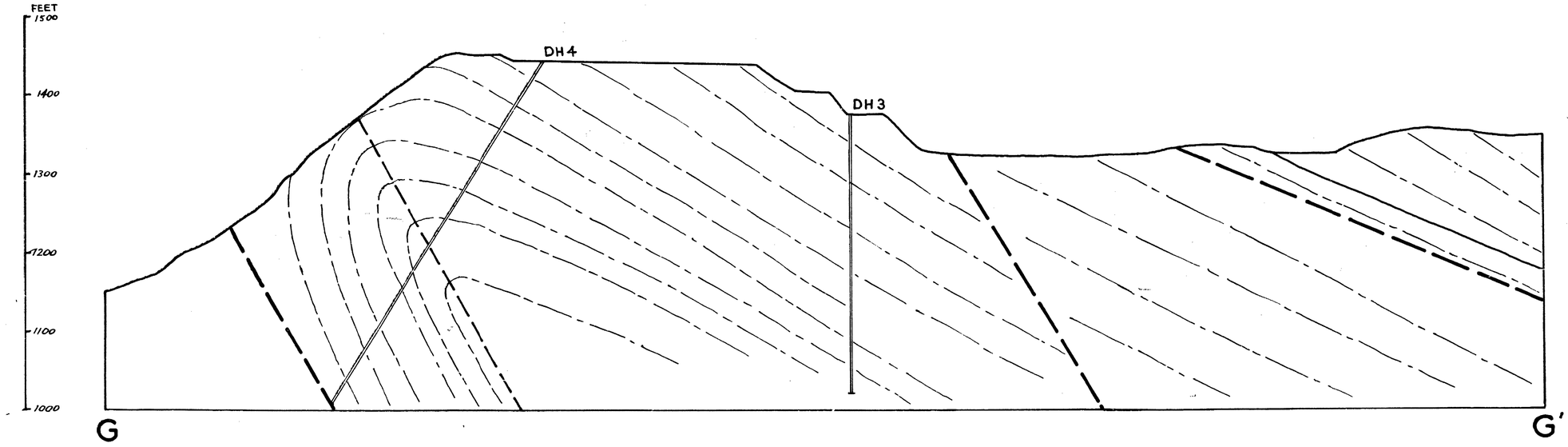
10 CENTIMETRES

Field Survey by J. Erkelens Nov 1971 - April 1972
Stadia Field Book No 442, 443, 448, 450, 468
Datum - M.S.L. Pt Adelaide = 0

DEPARTMENT OF MINES — SOUTH AUSTRALIA			
WHITE ROCK QUARRY SECS. 1108 & 1109 HD ADELAIDE GEOLOGICAL PLAN (WHITE ROCK QUARRIES PTY LTD)			
MINERAL RESOURCES DIVISION	D. Nichol GEOLOGIST	Drn. D.N	SCALE 1:1200 (orig)
		Tr. A.F	72-616a
Director of Mines	SUP. GEOLOGIST	Chd.	
		Exd.	DATE 29th June 1972

U328





SCALE : 1 inch reps 100 feet

For legend and locality see plan 72-616

10 CENTIMETRES

DEPARTMENT OF MINES — SOUTH AUSTRALIA

WHITE ROCK QUARRY
SECTIONS D-D' & G-G'

WORKING PLAN ONLY

MINERAL RESOURCES DIVISION		Drn. D.N.	SCALE : 1:1200
		Tcd. A.F.	72-617 Ha6
		Ckd.	
Director of Mines		Exd.	DATE : July 1972