DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
ENVIRONMENT AND RESOURCES DIVISION

QUARTZITE DEPOSIT
Section 2965, Hundred of Macclesfield

- Investigation Drilling -
Pty. Ltd.

by

J.A. REED
GEOLOGIST
CONSTRUCTION MATERIALS SECTION

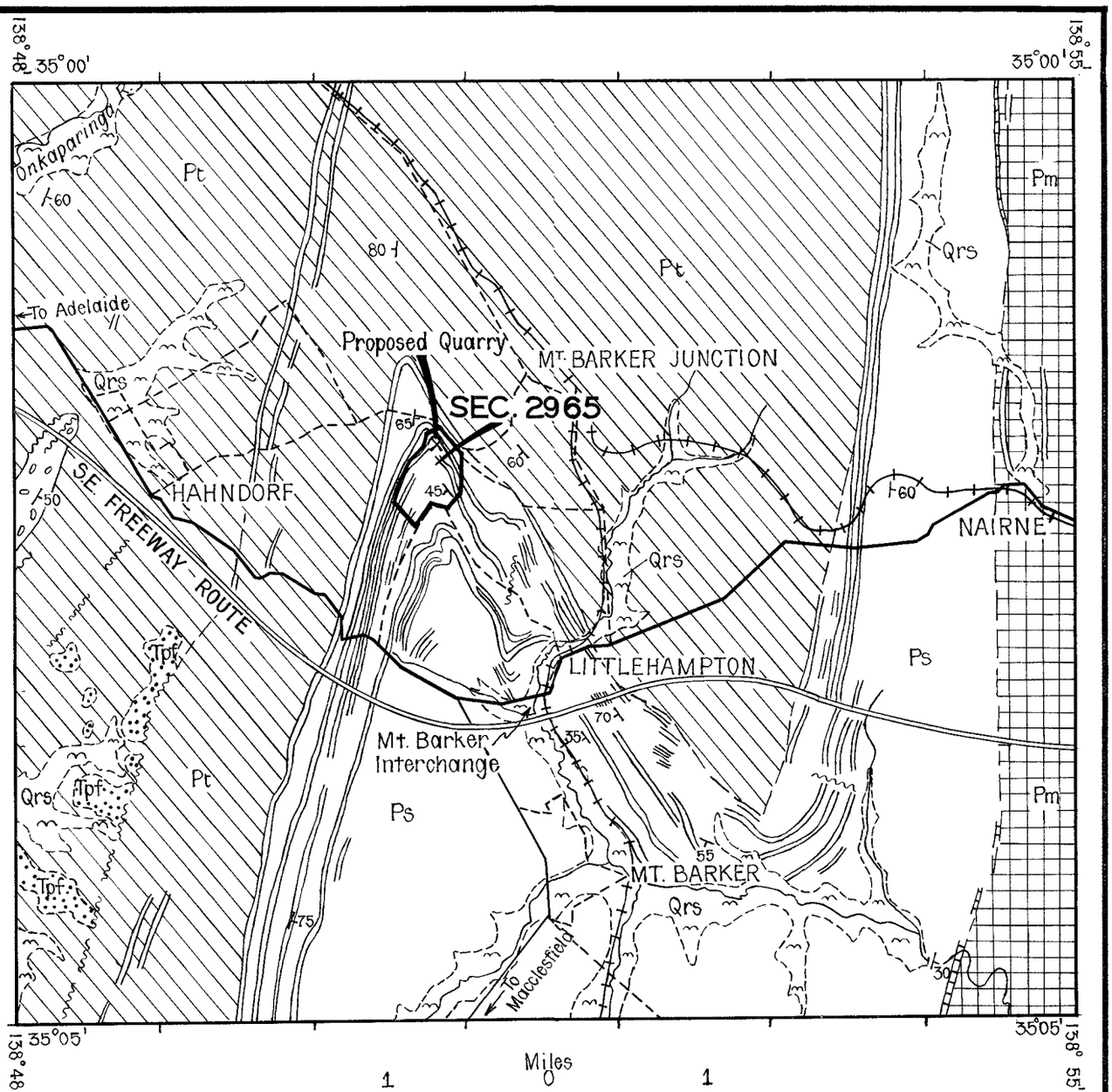
Rept.Bk.No. 74/83
G.S. No. 5402
D.M. No. 856/73

28th March, 1974

CONTENTS

PLANS

Plan No.	Title	Scale
S10737	Quartzite Deposit Sec. 2965, Hd. Macclesfield Location and Regional Geology.	1:63 360
74-151	Quartzite Deposit Sec. 2965, Hd. Macclesfield Geological Plan and Sections.	1:2 000



LEGEND

Cainozoic	Quaternary	Qrs	Alluvial flood plains
	Tertiary	Tpf	Freshwater gravels and sandstones
Proterozoic	Marinoan	Pm	Phyllites with interbedded feldspathic quartzite
	Sturtian	Ps	Schistose laminated slates with interbedded quartzites and sandstones.
	Torrensian	Pt	Phyllites and slates with minor quartzites.
			Stonyfell Quartzite

Geological boundary
Fault
Strike and dip of bedding
Main road
Minor road
Railway

Compiled from Echunga 1:63 360 sheet.

Refer plan 74-151

DEPARTMENT OF MINES — SOUTH AUSTRALIA

ENVIRONMENT AND RESOURCES DIVIS.	Drn. J.A.R.	SEC. 2965 HD. MACCLESFIELD QUARTZITE DEPOSIT LOCATION & REGIONAL GEOLOGY	SCALE: 1 : 63 360
	Tcd. B.D.W.		S10737
GEOLOGIST J.A. REED	Ckd.		Hc1
	Exd.		DATE: 4TH MARCH 1974

500—2,69 665

TRIM - LINE

DEPARTMENT OF MINES
SOUTH AUSTRALIA

Rept.Bk.No.74/83
G.S. No. 5402
DM. No. 856/73

QUARTZITE DEPOSIT

Section 2965, Hundred of Macclesfield

ABSTRACT

A proposed road metal quarry site in Section 2965, Hundred of Macclesfield, comprises lenticular quartzite, suitable for concrete aggregate and highway base-courses, stratigraphically above poor quality friable sandstone, considered unsuitable for sub-base or as a source of construction sand.

A maximum 22 000 cubic metres of quartzite is inferred, to a depth of 18 metres.

Bulldozer trenching and laboratory testing of representative samples are required to prove thickness, attitude and quality of the beds.

Further work is not warranted at this stage due to the small potential volumes of material.

INTRODUCTION

The State Mining Engineer requested geological appraisal of a sandstone/quartzite deposit in Section 2965, Hundred of Macclesfield. The site was inspected by the author, in company with Mr. R.W. O'Neill (Investigation Drilling Pty. Ltd.), on the 6th November, 1973.

Mr. O'Neill proposes to quarry sub-base for the South Eastern Freeway. A small crushing plant may be installed to produce concrete aggregate and sand.

Nine vertical air-track holes, each 15.2 metres deep, were drilled by Investigation Drilling prior to this inspection. Geological logs by the author, are appended.

The accompanying geological plan (No. 74-151) is based on enlarged aerial photograph No. 7061, Echunga Survey 820. Contours were re-interpolated from the Echunga B topographic map sheet.

MINERAL TENURE

Section 2965 has been declared Private Mine No. 167, under the Mining Act, 1971. The land,of 38 hectares, is owned by Mr. A.T.V. Hirte of Hahndorf.

The nearest occupied house lies approximately 260 metres east of the proposed quarry and about 30 metres from the section boundary (see plan No. 74-151).

PHYSIOGRAPHY

The property is located 2.4 kilometres northwest of Littlehampton. Gravel roads connect to Littlehampton, Verdun and the proposed Mount Barker - South Eastern Freeway interchange.

The entire section is covered with tall eucalypts, the only remaining stand of natural vegetation in the area. Surrounding country has been cleared for grazing.

The deposit forms a ridge in the northern corner of the section. A quarry established in the adjoining valley, to the south, would be completely screened from all houses and public roads.

GEOLOGY

Lower Sturtian laminated slates, with interbedded quartzites and sandstones, are folded into a north-northwest trending syncline (see plan S10737).

The proposed site is on a lower arenaceous bed, approximately 16 metres thick, near the nose of the fold. Dips are approximately 45^{0} southwest, towards the valley centre. Outcrop, which is restricted to the ridge-top, is partly obscured by sand and soil overburden.

The arenaceous unit comprises, in ascending stratigraphic order:-

(1) Friable sandstone - yellow brown to light grey, massive to thin-bedded, fine to very fine grained. Intergranular clay varies from 5% to 40% (visual estimate).

Thin interbeds of quartzite, 1 to 30 centimetres thick, are common. Seams of white clay, up to 1 centimetre thick, have formed parallel to and cross-cutting the bedding.

Thickness of the bed is approximately 12 metres. The base does not crop out, but was intersected in drillholes Nos. PL2, PL4 and PL6.

Rock strength is weak to very weak. The stone breaks down easily to fine, yellow brown, clayey sand.

From surface indications, the bed is considered unsuitable for sub-base. However, broken stone may be acceptable for local council roads and for rock fill. Crushed sand is expected to be too fine for mortar, plaster or concrete.

(2) Lenticular grey quartzite - thick to thin bedded, fine grained and strong. Thickness varies from zero to a probable maximum, in the small cuttings, of 7 metres.

The upper boundary is concealed by talus and soil, but was intersected in drillholes Nos. PL7 and PL8.

Two main joint sets, 70^{0} - 90^{0} to the bedding, produce rectangular breakage. Broken quartzite, in the cutting, has an average block size of approximately 10 centimetres. Clay content could not be determined, due to poor exposures, but appears to be low.

When crushed the quartzite should be suitable for concrete aggregate and highway base-course, and yield small amounts of construction sand.

Light grey shale was intersected stratigraphically above the quartzite in drillholes Nos. PL3, PL5 and PL8. Micaceous shales were encountered, below the friable sandstone bed, in drillholes PL1, PL2, PL4 and PL6.

DRILLING RESULTS

Six of the nine vertical percussion holes were located in the field. Collar elevations are unknown. Samples were provided by Mr. O'Neill.

Holes Nos. PL7 and PL8 each intersected approximately 7 metres of quartzite, below 3 metres and 6 metres, respectively of soil and shale overburden. Assuming 45^{0} dips, true thickness of the quartzite is 5 metres.

Approximately 3 metres of quartzite (true thickness 2 metres) were intersected below 3 metres of soil and talus and 4.5 metres of friable sandstone in drillhole No. PL9. Sparse thin quartzite bands were encountered near the top of the friable sandstone in drillhole No. PL5.

The drilling results indicate lensing of the quartzite bed near drillhole No. PL5 and southwards from the cutting.

QUANTITIES OF STONE

Available data is insufficient for accurate calculation of reserves. Topographic surveying, geological mapping and follow up shallow diamond drilling would be required.

However, approximate estimates of in situ rock, as detailed in Table 1, were calculated, using the Prismoidal formula, from the three geological cross sections shown on plan 74-151, based on the following assumptions:

(i) uniform dips of 45^{0},

(ii) continuity of the quartzite bed along strike,

(iii) development of the quarry as a single face, of maximum height 18 metres (as proposed by the operator), to a base level of 445 metres a.s.l.

(iv) pit slopes of 70° on the southwestern face and 45° on the northeastern face.

The results were checked geometrically using estimated average thicknesses.

TABLE 1 - Approximate Volumes

Rock Type	Approx. volume measured (cub. metres)	Approx. ave. thickness (metres)	Approx. geometrical volume (cub. metres)
overburden	29 000	-	-
quartzite	20 000	4	19 000
sandstone	62 000	12	57 000

The actual volume of quartzite is expected to be less, due to lensing of the bed.

SUMMARY AND CONCLUSIONS

A sandstone/quartzite bed is exposed for 260 metres along a ridge-top in northern Section 2965, Hundred of Macclesfield.

The deposit is approximately 2.6 kilometres from the South Eastern Freeway. Quarrying can be concealed from surrounding properties and public roads.

Outcrop consists of good quality, lenticular quartzite, suitable for concrete aggregate and highway base-courses, overlying poor quality sandstone, considered unsuitable for sub-base or construction sand.

Available data are inadequate for the calculation of reserves. However, inferred volumes, to a maximum depth of 18 metres, amount to 20 000 cubic metres of quartzite and 62 000 cubic metres of sandstone, overlain by 29 000 cubic metres of overburden.

Detailed mapping and shallow diamond drilling would be required for accurate reserve calculations.

RECOMMENDATIONS

(i) Bulldozer trenching at right angles to the strike, especially in areas concealed by overburden, would enable a more reliable determination of thickness, attitude and quality of the beds.

(ii) Submission of representative samples to the Highways Department for testing as base materials.

However, the deposit is not a significant source of construction material and no further work appears warranted at this stage.

J.A. Reed.

J.A.R.:FdeA
27/3/74

J.A. REED
GEOLOGIST

A P P E N D I X

Logs of Percussion Drillholes Nos. PL1-PL9

LOG OF AIR-TRACK DRILL HOLE NO. PL.1

Sec. 2965, Hd. Macclesfield — Plan Reference: 74-151

Drilled by: Investigation Drilling Pty.Ltd. — Logged by: J.A. Reed

Interval (feet) from	to	Probable rock type	Description of cuttings
0	10	SHALE	Pale yellow clay. Abundant very fine to silt-sized quartz and mica.
10	20	SHALE	Light grey clay. Small amounts of silt-sized quartz and mica.
20	30	SHALE	Light grey silty clay.
30	40	SHALE	Light grey silty clay.
40	50	No sample.	

END OF HOLE 50 FEET

LOG OF AIR-TRACK DRILL HOLE NO. PL.2

Sec. 2965, Hd. Macclesfield — Plan reference: 74-151

Drilled by: Investigation Drilling Pty.Ltd. — Logged by: J.A. Reed

Interval (feet) from	to	Probable rock type	Description of cuttings
0	10	Friable SANDSTONE	Very pale brown, medium to very fine grained quartz sand. Slightly clayey (approx. 5%).
10	20	Friable SANDSTONE	Very pale pinkish brown, fine to very fine grained, quartz sand. Moderately clayey (approx. 15%-30%).
20	30	Friable clayey SANDSTONE	Very pale yellow brown, fine to very fine grained quartz sand. Very clayey (approx. 45%).
30	40	Friable SANDSTONE	Very pale brown, fine to very fine grained quartz sand. Moderately clayey (approx. 30%).
40	50	SILTSTONE - SHALE	White, moderately sandy to silty, micaceous clay.

END OF HOLE 50 FEET

LOG OF AIR-TRACK DRILL HOLE NO. PL.3

Sec. 2965, Hd. Macclesfield — Plan Reference: 74-151

Drilled by: Investigation Drilling Pty.Ltd. — Logged by: J.A. Reed

Interval (feet) from	to	Probable rock type	Description of cuttings
0	10	SHALE	Light grey, silty clay.
10	20	Friable SANDSTONE and SILTSTONE	Very pale brown, fine to very fine grained, moderately clayey, quartz sand. Abundant chips of friable fine sandstone and siltstone.
20	30	SHALE	Light grey clay.
30	40	SHALE	Light grey clay.
40	50	SHALE	Light grey clay.

END OF HOLE 50 FEET

LOG OF AIR-TRACK DRILL HOLE NO. 4

Sec. 2965, Hd. Macclesfield — Plan reference: 74-151

Drilled by: Investigation Drilling Pty.Ltd. — Logged by: J.A. Reed

Interval (feet) from	to	Probable rock type	Description of cuttings
0	10	Friable SANDSTONE	Very pale brown, fine grained, moderately clayey quartz sand. Chips white clay and sandstone.
10	20	SHALE	Very pale brown, silt-sized mica and quartz.
20	30	SHALE	Light grey, silt-sized, mica and quartz.
30	40	SHALE	As above.
40	50	SHALE	As above.

END OF HOLE 50 FEET

LOG OF AIR-TRACK DRILL HOLE NO. PL5

Sec. 2965, Hd. Macclesfield — Plan Reference: 74-151

Drilled by: Investigation Drilling Pty.Ltd. — Logged by: J.A. Reed

Interval (feet) from	to	Probable rock type	Description of cuttings
0	10	SOIL and SHALE	Light olive grey silt and clay. Plant remains.
10	20	SHALE and Friable SANDSTONE	Light grey, fine to very fine grained, moderately clayey, quartz sand. Small chips grey shale, white clay and trace quartzite.
20	30	Friable SANDSTONE with thin bands QUARTZITE	Very pale brown, fine to very fine grained, slightly clayey (approx. 15%), quartz sand. Small quartzite chips common.
30	40	Friable SANDSTONE	Very pale brown, fine to very fine grained, moderately clayey (15-20%), quartz sand. Sparse quartzite chips.
40	50	Friable SANDSTONE	White, fine to very fine grained, moderately clayey, quartz sand.

END OF HOLE 50 FEET

LOG OF AIR-TRACK DRILL HOLE NO. PL.6

Sec. 2965, Hd. Macclesfield — Plan reference: 74-151

Drilled by: Investigation Drilling Pty.Ltd. — Logged by: J.A. Reed

Interval (feet) from	to	Probable rock type	Description of cutting
0	10	Friable SANDSTONE	Very pale brown, fine to very fine grained, moderately clayey (approx. 20%-30%), quartz sand. Sparse small chips quartzite and white clay.
10	20	Friable SANDSTONE and SHALE	Pale brown, fine to very fine grained, moderately clayey, quartz sand. Abundant chips of light grey very clayey sandstone and white clay-shale. Sparse small quartzite chips.

20	30	Friable clayey SANDSTONE	Very pale brown, fine to very fine grained, very clayey (approx. 30-40%), quartz sand.
30	40	Friable SANDSTONE and SHALE	Pale brown, fine to very fine grained, moderately clayey, quartz sand. Abundant (approx. 40%) chips grey very clayey sandstone, shale and white clay.
40	50	SHALE	Light grey, silt-sized, mica and quartz.

END OF HOLE 50 FEET

LOG OF AIR-TRACK HOLE NO. PL7

Sec. 2965, Hd. Macclesfield — Plan reference: 74-151

Drilled by: Investigation Drilling Pty.Ltd. — Logged by: J.A. Reed

Interval (feet) from	to	Probable rock type	Description of cuttings
0	10	GRAVELLY SOIL	Light brown sand and clay soil, with quartzite and sandstone gravel. Plant remains.
10	20	QUARTZITE	Light grey, quartzite chips and coarse to fine grained, slightly clayey sand. Approx. 5% white clay lumps.
20	30	QUARTZITE	Pinkish white, medium to fine grained, slightly clayey (approx. 5%), quartz sand. Coarse sand to gravel sized chips grey quartzite. Sparse friable sandstone.
30	40	QUARTZITE, Friable SANDSTONE	White, fine to very fine grained, slightly clayey (approx. 15%) quartz sand. Abundant small chips grey quartzite and iron stained, brown, friable sandstone. Approx. 5% white clay lumps.
40	50	Friable SANDSTONE and SHALE	Pale brown, fine to very fine grained, moderately clayey, quartz sand. Abundant chips light grey shale and white clay. Sparse quartzite and friable sandstone.

LOG OF AIR-TRACK DRILL HOLE NO. PL.8

Sec. 2965, Hd. Macclesfield Plan reference 74-151

Drilled by: Investigation Drilling Pty. Ltd. Logged by: J.A. Reed

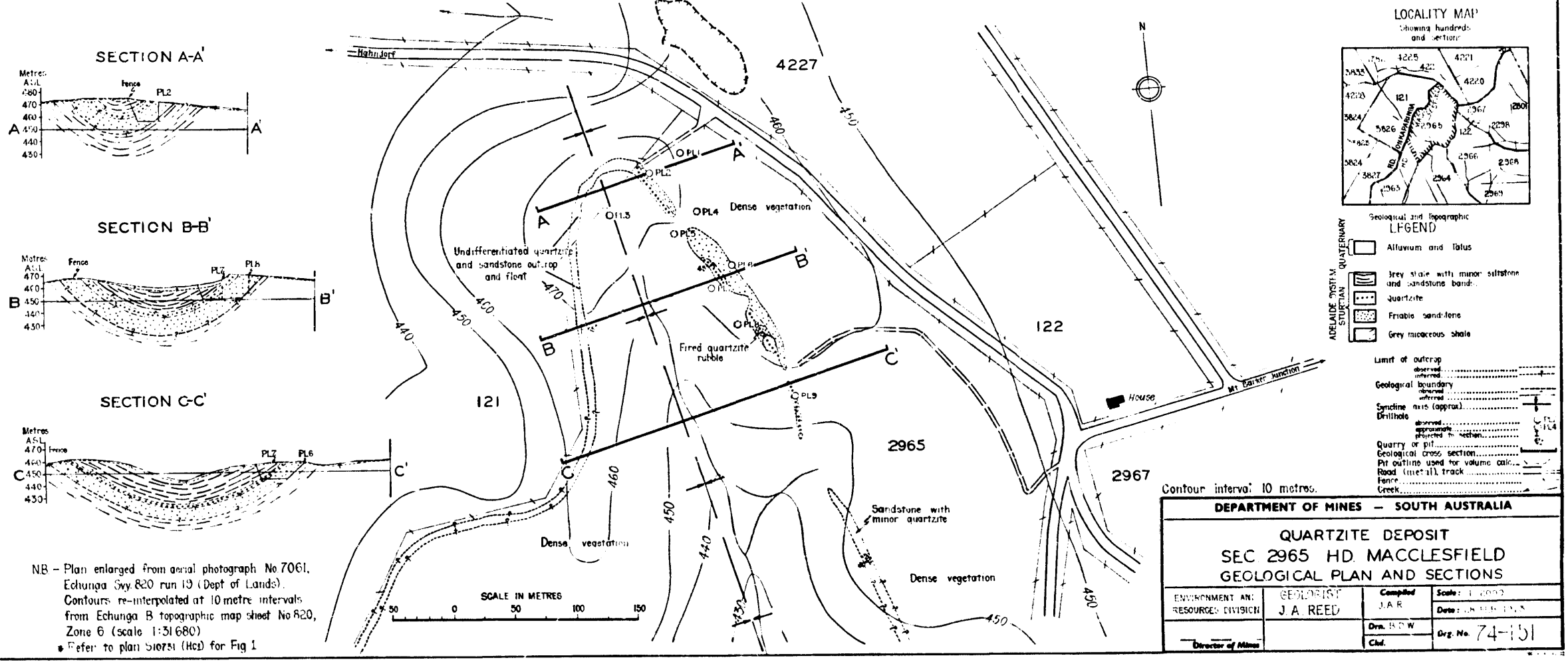
Interval (feet)		Probable rock type	Description of cuttings
From	To		
0	10	SOIL & TALUS	Friable sandstone and quartzite gravel. Sand and clay soil. Plant remains.
10	20	SHALE	Red, brown and yellow clay and sandy clay. Sparse chips friable sandstone, quartzite and shale.
20	30	QUARTZITE	Pinkish white, medium to very fine grained, slightly clayey, quartz sand. Coarse sand to medium gravel-sized chips quartzite. Approx. 5-10% white clay lumps (? thin seams).
30	40	QUARTZITE	As above
40	50	Friable SANDSTONE and QUARTZITE	Pinkish white, fine to very fine grained, very clayey (approx. 30-40%), quartz sand. Approx. 20% small quartzite chips.

LOG OF AIR-TRACK DRILL HOLE NO. PL. 9

Sec. 2965, Hd. Macclesfield — Plan reference: 74-151

Drilled by: Investigation Drilling Pty. Ltd. — Logged by: J.A. Reed

Interval (feet) From	To	Probable rock type	Description of cuttings
0	10	Clay-sand SOIL, QUARTZITE (?) talus	Very pale brown, very clayey, fine to very fine grained quartz sand. Abundant quartzite gravel. Sparse friable sandstone.
10	20	Friable SANDSTONE. Sparse thin QUARTZITE beds.	Very pale brown, fine to very fine grained, moderately clayey, quartz sand. Abundant small chips white clay and approx. 10% quartzite.
20	30	Friable SANDSTONE and QUARTZITE	Very pale brown, medium to very fine grained, moderately clayey, quartz sand. Abundant chips white clay and quartzite. Sparse shale and friable sandstone.
30	40	QUARTZITE and friable SANDSTONE	Very pale brown, fine to very fine grained, moderately clayey, quartz sand. Abundant quartzite and white clay chips. Sparse siltstone, shale and friable sandstone.
40	50	Friable SANDSTONE and SHALE	Very pale brown, fine to very fine grained, micaceous, very clayey quartz sand. Abundant small chips white clay. Trace friable sandstone.



N.B – Plan enlarged from aerial photograph No 7061, Echunga Svy. 820 run 19 (Dept of Lands). Contours re-interpolated at 10 metre intervals from Echunga B topographic map sheet No 820, Zone 6 (scale 1:31680)

* Refer to plan S10751 (Hcl) for Fig 1

DEPARTMENT OF MINES — SOUTH AUSTRALIA

QUARTZITE DEPOSIT
SEC 2965 HD. MACCLESFIELD
GEOLOGICAL PLAN AND SECTIONS

ENVIRONMENT AND RESOURCES DIVISION	GEOLOGIST J.A. REED	Compiled J.A.R	Scale: 1:2000
		Drn. B.D.W	Date: [illegible]
Director of Mines		Chd.	Drg. No. 74-151