DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept.Bk.No. 80/72

QUARTZITE DEPOSIT-TANUNDA
(Private Mine 205)
Pt. Section 512 Hd. Nuriootpa

GEOLOGICAL SURVEY

by

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MINERAL RESOURCES SECTION

JULY, 1980.

D.M. No. 1309/72

Tanunda quartzite quarry - view to the southeast, June, 1980 (S15369)

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ABSTRACT

Quartzite quarried by David Linke Contractors Pty. Ltd. from a site 2.5 km northwest of Tanunda is used as pavement material in road construction by the District Councils of Tanunda and Light.

The quarry is located in the hinge of a north-south syncline in rocks equated with Sturt Tillite of Adelaidean age.

Reserves of quartzite, to a depth of 5 m are inferred to be 100 000 tonnes; sufficient for a further 20 years at current usage.

INTRODUCTION

A small operating quartzite quarry was mapped in October, 1979 during reconnaissance drilling of Tertiary sediments in the Rowland Flat-Tanunda district. The quarry supplies aggregate to the District Councils of Tanunda and Light for surfacing unsealed roads and as base-course for sealed roads.

The workings were surveyed by stadia theodolite on the 3rd October 1979 by P.P. Crettenden and B.W. Atterton, (Field Assistants, Mineral Resources Section). A. Papanikolas (Field Assistant) assisted with field measurements and mapping.

LOCATION AND ACCESS

The quarry is 2.5 km northwest of Tanunda town centre on part allotment 1, section 512, hundred of Nuriootpa in the District Council of Light, part of the Outer Metropolitan Planning Area.

Access from Tanunda is gained north along Bilyara

Street to Longmeil Street turning off at the bridge crossing the North Para River and continuing northwest for a further 1.5 km (Fig. 1).

The 2.4 ha area available for mining is a low southeasterly trending ridge with uncleared native scrub. Adjacent land is used for viticulture, cereal crops and grazing. The southern part of the section is a picnic area used by a local church group.

HISTORY AND PRODUCTION

In August 1969, the District Council of Tanunda approached the Department of Mines for assistance in locating sources of road base aggregate which could be exploited when surplus crushed rock from marble quarries near Angaston was unavailable. A reconnaissance survey in October of that year identified several potential quarry sites, the nearest being a small disused quarry in quartzite on section 512 hundred of Nuriootpa (Pain, 1972).

This quarry was reopened by L.M. Bensch in January 1971 and a contract was subsequently drawn up with the landowner, F. Kaesler in November 1971.

Land ownership was transferred to W.R. and R.F. Kaesler in September 1972 and in December 1972, Bensch applied for a private mine. Private Mine 205 was gazetted on 15th November 1973.

In December 1977, David Linke Contractors Pty. Ltd. took over the operation of the quarry.

Current workings comprise a small pit with a 5 m working face. Quartzite is blasted and loaded into a truck by front-end loader. The rock is crushed on site using a primary jaw crusher with 250 mm throat and a secondary intercone crusher. The crusher-run product is suitable for surfacing unsealed roads but is screened to remove the minus 25 mm fraction when required as sub-base for sealed roads.

Production since 1971 is summarised in Table 1. The quantity of quartzite removed prior to 1971 is unknown but present quarry size, would suggest less than a few thousand tonnes.

TABLE 1 - Production of aggregate PM 205

YEAR	TONNES
1971-1973	10 000 (estimated)
1974	2 309
1975	1 034
1976	4 330
1977	2 220
1978	7 704
1979	4 615
TOTAL	32 212

REGIONAL GEOLOGY

Regional geology is summarised in Figure 1 adapted from ADELAIDE (Thomson, 1969), Gawler (Campana and Whittle, 1953) and Kapunda (Dickinson and Coats, 1957) geological maps. The boundary of Tertiary sediments has been redrawn from field mapping by A.M. Pain.

Basement rocks in the area are Adelaidean quartzite, siltstone and shale which have been subdivided into:-

Upper Burra Group - predominantly siltstone and silty shale;

Sturt Tillite - periglacial quartzite, sandstone and siltstone with minor erratics;

Tapley Hill Formation - finely laminated marine shale.

These rocks are tightly folded with fold axes trending north-south. The deposit is in the hinge of an elongate syncline, the quartzite being at or near the base of the Sturt Tillite.

South and east of the quarry, basement is blanketed

by Tertiary sand, silt and clay which, in places, is covered by a calcareous, clayey soil equated with Pooraka Formation of Pleistocene to Holocene age.

SITE GEOLOGY

The whole of the area available for mining is underlain by quartzite which crops out along the northern boundary and as patches where the sandy loam overburden has been removed (Figure 2). Surface exposures are generally weathered and iron stained.

The sequence exposed in the quarry face is typically, from top to floor, 1 m of orange, weathered quartzite, 2-3 m massive white quartzite, 0.1-0.3 m white silty clay, 1 m quartzite over weathered white or pink friable, fine to medium grained sandstone.

The thin interbedded clay contains 5 per cent opaque grains, 0.02-1.5 mm size, identified by AMDEL as predominantly tourmaline with 1 per cent rutile and minor goethite. The full report is reproduced in Appendix A.

Quartzite is pale yellow to white, medium to coarse grained containing 5-20 per cent weathered feldspar, minor amounts of mica and a trace of opaque minerals. Bedding strikes northwest-southeasterly and dips at between 14^{o}-35^{o} to the southwest. The rock shows weak near-vertical foliation orientated approximately north-south.

The 4 prominant joint sets are summarised below:

	Strike (o)	Dip (o)	Frequency	Comments
1	140-150	30SW	50-300mm	bedding plane joints
2	160-170	65E-80W	100-200mm	parallel to foliation and minor fault planes
3	70-90	60-80N	300-600mm	
4	80-110	30-75S	20-200mm	

Joint faces are commonly coated with white clay. Quartzite

adjacent to open joints is often weathered for 10-15 mm to a friable sandstone. Quartz stringers, 5-10 mm width, are common throughout the deposit and minor faults showing displacements of 0.3 m are also present.

Broken rock on the quarry floor is of average size 150 x 350 x 100 mm but is readily shattered along the poorly developed foliation planes with a hammer blow.

Friable sandstone is exposed below the quartzite in the northern end of the pit. The thickness and persistence of this unit is unknown. It is unsuitable for use as road base aggregate and may restrict the depth to which the quarry can be worked.

RESERVES

Inferred reserves to a depth of 5 m, within the indenture boundaries (as shown on Figure 2) and excluding the plant area are of the order of 100 000 tonnes; sufficient at present usage for the next 20 years.

Limited exposure and the absence of drillhole information preclude an accurate reserve calculation. Geological factors which will reduce available reserves include the depth of surface weathering, the persistence and thickness of clay and sandstone interbeds and the presence of highly fractured zones.

In order to meet the size specification for base-course for sealed roads, wastage of up to 40 per cent could be expected.

SUMMARY AND CONCLUSIONS

A small quartzite quarry, 2.5 km northwest of Tanunda was reopened in 1971 to supply road base material for the District Councils of Tanunda and Light.

The deposit is in the hinge of a north-south trending syncline in Adelaidean rocks; the quartzite being correlated as a periglacial deposit near the base of the Sturt Tillite.

The rock is well jointed and breaks along a poorly developed

foliation during crushing. Friable sandstone and clay are interbedded with the quartzite.

Reserves to a depth of 5 m are inferred to be of the order of 100 000 tonnes. Where quarry product is required to meet coarse aggregate size specification, high wastage is expected.

JLK:ZV

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REFERENCES

Campana, B. and Whittle, A.W.G., 1953. Gawler map sheet, Geological Atlas of South Australia, 1:63 360 series. Geol. Surv. S. Aust.

Dickinson, S.B. and Coats, R.P., 1957. Kapunda map sheet, Geological Atlas of South Australia, 1:63 360 series. Geol. Surv. S. Aust.

Pain, A.M., 1972. Reconnaissance for road metal in the Tanunda district. Mineral Resour. Rev., S. Aust., 132:59-64.

Thomson, B.P., 1969. ADELAIDE map sheet, Geological Atlas of South Australia, 1:250 000 series. Geol. Surv. S. Aust.

APPENDIX A

Petrological description of clay sample

(extracted from AMDEL report GS 1944/80 by

Dr. P. Moeskops)

MINERAGRAPHY OF ONE CLAY SAMPLE (PRIVATE MINE 205)

Sample No. 6628/050/RS-2022; PS28117

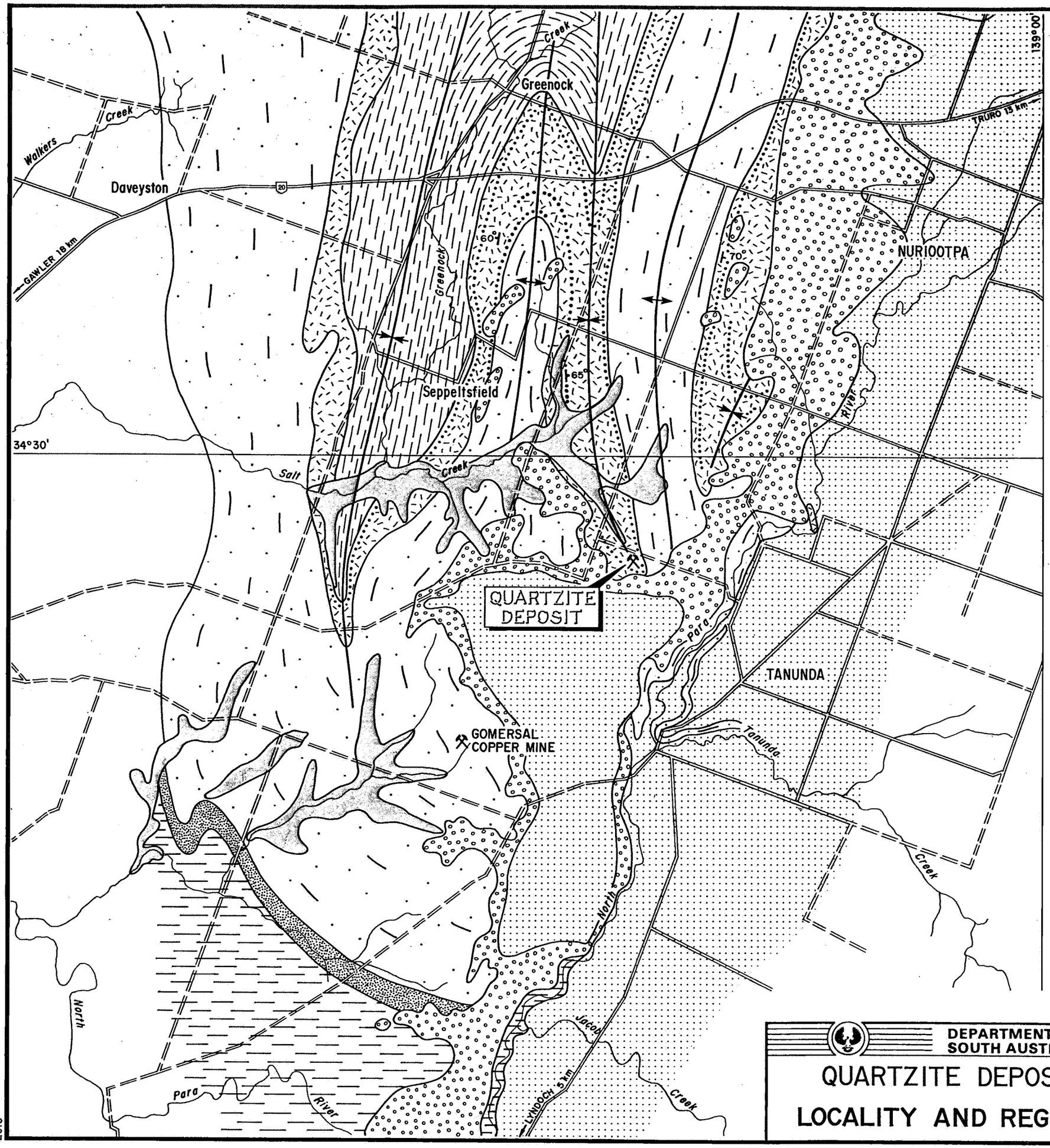
Location:
Private Mine 205

Hand Specimen:
Fragments of white friable, very fine-grained greasy-white clay.

Polished Section:
An optical estimate of the constituents gives the following:

	%
Clay	95+
Tourmaline	3-5
Rutile	1
Goethite	minor trace

Tourmaline occurs as evenly disseminated euhedral to subhedral squat to slightly elongate crystals which range in size from 0.02 to 0.15 mm, averaging 0.06 mm. Under the stereobinocular microscope the tourmaline appears brown-green and translucent in colour. Tourmaline is accompanied by about 1% rutile. This is also evenly disseminated and appears orange under the stereobinocular microscope the tourmaline appears brown-green and translucent in colour. Tourmaline is accompanied by about 1% rutile. This is also evenly disseminated and appears orange under the stereobinocular microscope. Rutile grains are generally anhedral to subhedral and range in size from 0.02 to 0.7 mm, averaging about 0.04 mm. In reflected light using a polarizing microscope the rutile exhibits the highly diagnostic internal reflection. The polished section also contains minor traces of what appears to be secondary iron oxides (?mainly goethite) after grains of original ?carbonate. These patches occur only in minor traces and are of similar size to the tourmaline grains.



LEGEND

TERTIARY QUATERNARY

PLEISTOCENE HOLOCENE

- Fluviatile silt sand and gravel of the modern drainage channels.
- POORAKA FORMATION: Pale red-brown sandy clay with carbonate.
- Undifferentiated white and orange quartz sand pebbly conglomerate and silty clay.

ADELAIDEAN

STURTIAN

- TAPLEY HILL FORMATION: Laminated silty shale.
- STURT TILLITE: Quartzite sandstone and siltstone with a few horizons of boulder tillite.

TORRENSIAN

- SADDLEWORTH FORMATION: Laminated calcareous siltstone and silty shale.
- UNDALYA QUARTZITE: Flaggy feldspathic quartzite and siltstone.
- WOOLSHED FLAT SHALE: Grey laminated siltstone and shale.

- Syncline.
- Anticline.
- Strike and dip of bedding.

METRES 1000 0 1 2 KILOMETRES

FIG. 1

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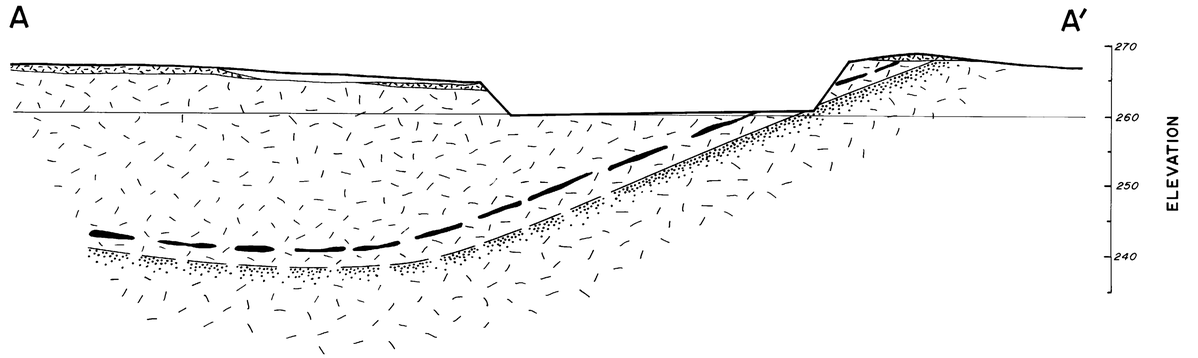
SOUTH AUSTRALIA

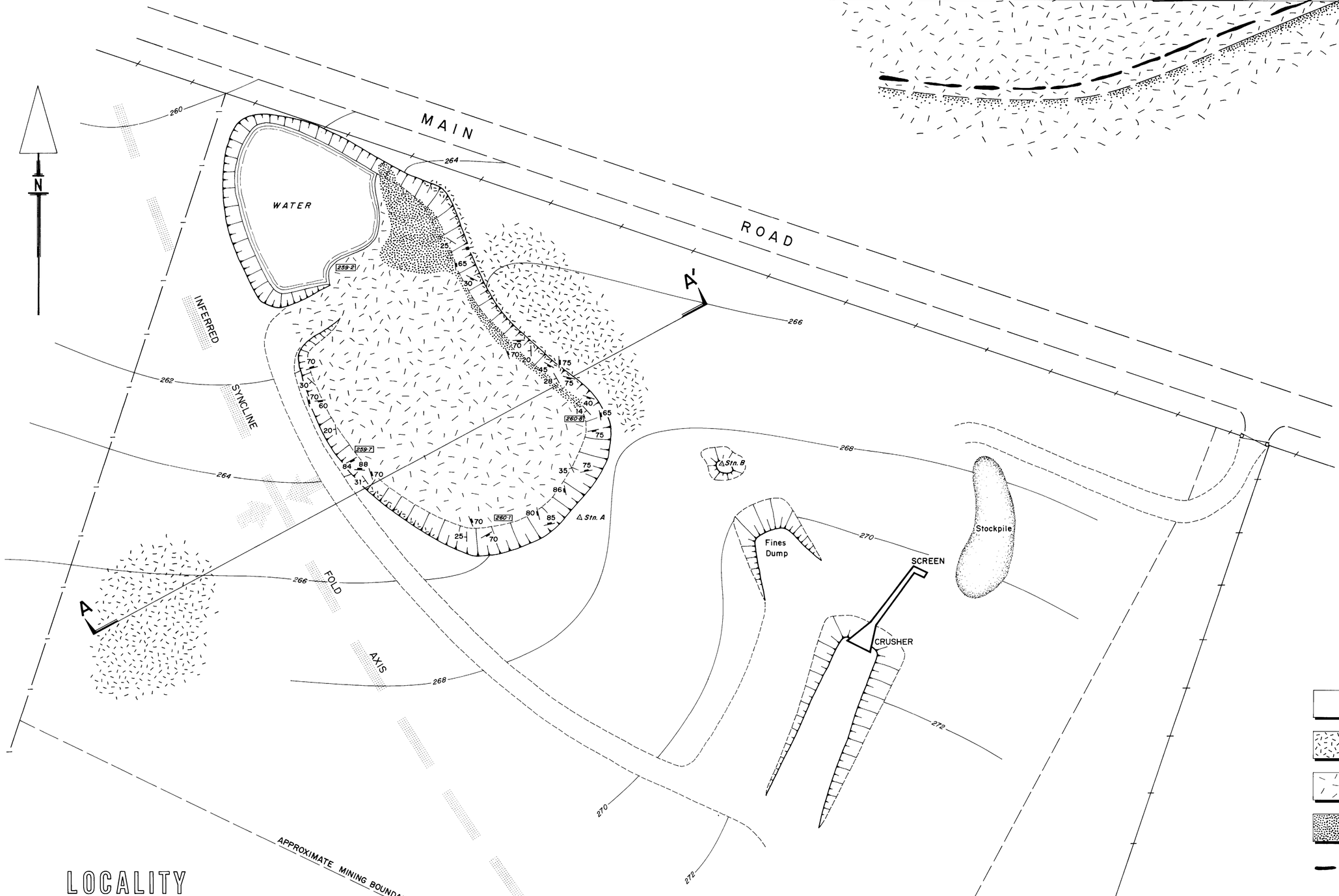
QUARTZITE DEPOSIT – TANUNDA
LOCALITY AND REGIONAL GEOLOGY

COMPILED J. K.	CDO 9.7.80 DATE
DRAWN N. S.	SCALE 1:50 000
DATE 6·6·80	PLAN NUMBER 80-373
CHECKED	

2015

SECTION

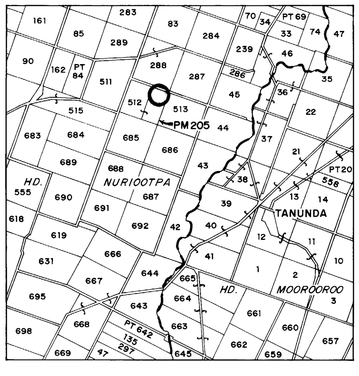




LEGEND

- Sandy loam overburden.
- Quartzite ; ironstained, weathered, friable.
- Quartzite ; medium to coarse grained, white, feldspathic, well jointed.
- Sandstone ; medium to fine grained, moderately to weakly cemented.
- Clay ; white, silty, with 5% opaque minerals (section only).
- 35 Strike and dip of bedding.
- 60 Strike and dip of jointing.
- Vertical joint.
- 259·2 Spot height.

LOCALITY



SCALE – 1 : 50000

METRES 1000 0 1 2 KILOMETRES

NOTES

1. Elevations in metres – Datum approx. AHD
2. Survey by P.P. Crettenden 3·10·79 (SFB 607)

METRES 0 10 20 30 40 50

FIG. 2

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QUARTZITE DEPOSIT — TANUNDA

PRIVATE MINE 205 • SEC. 512 HD. NURIOOTPA

PLAN AND SECTION OF WORKINGS

COMPILED	J.K.
DRAWN	N.S.
DATE	6·6·80
CHECKED	
C.D.O.	4.7.80 DATE
SCALE	1 : 500
PLAN NUMBER	80-374

2015