DEPARTMENT OF MINES
SOUTH AUSTRALIA

RECONNAISSANCE SURVEY FOR ROADMETAL HUNDREDS OF HUTCHINSON, KOPPIO AND YARANYACKA - COUNTY FLINDERS

(HIGHWAYS DEPARTMENT)

by

L.C. BARNES
GEOLOGIST
MINERAL RESOURCES DIVISION
GEOLOGICAL SURVEY

CONTENTS

FIGURES

No.	Title	Scale
71-63	Geological plan - Marble Occurrences Tumby Bay area.	1:63,360

Rept.Bk.No. 71/11
G.S. No. 4592
D.M. No. 560/70

2nd February, 1971.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

Rept.Bk.No. 71/11
G.S. No. 4592
D.M. No. 560/70

RECONNAISSANCE SURVEY FOR ROADMETAL HUNDREDS OF HUTCHINSON, KOPPIO AND YARANYACKA - COUNTY FLINDERS

(HIGHWAYS DEPARTMENT)

ABSTRACT

Three sites have been located from which dolomite marble suitable for base course and bitumen screenings could be won. The nearest deposit to the Tumby Bay-Cummins road is located ¼ mile south of Pillaworta H.S. Drilling will be necessary to establish reserves. The three sites are additional to a deposit held under lease by an ornamental stone company.

INTRODUCTION

A brief geological inspection of the area around Tumby Bay was made by the author on 24th and 25th of November, 1970, to locate deposits of road metal for use as base course and bitumen screenings on the Tumby Bay-Cummins road, and for additional projects in the Tumby Bay area.

Suitable dolomitic marble occurs in section 288, Hundred of Hutchinson but the deposit is held under mineral lease by the Tumby Bay Marble Company. Although this deposit covers a large area, the Marble Company fears that large scale blasting associated with a roadmetal quarry would damage marble required for ornamental stone.

REQUIREMENTS

Approximately 150,000 cubic yards of stone are required, and a strong preference has been expressed for crystalline dolomitic marble similar to that at the marble quarry. The source is required as close as possible to the Tumby Bay-Cummins road.

PHYSIOGRAPHY

Tumby Bay is situated on a marshy coastal plain about 5 miles wide backed by a range of hills which trend parallel to the coastline.

The eastern edge of these hills is marked by a well defined escarpment known as the Lincoln Scarp. High points on the range are about 2,000 feet above sea-level although the general elevation is about 700-800 feet. Although the hills are generally rounded, watercouses have cut steep sided rocky gorges in places, making vehicle access difficult.

GEOLOGY

General

The rocks forming the hills are Lower Proterozoic metasediments of the Flinders and Hutchinson Groups (Johns, 1961), (see plan 71-63).

The geological sequence tabulated below is adapted from the Tumby (Johns, 1958a) and Cummins (Johns, 1958b) 1 mile map sheets.

	Quaternary - Recent	(Alluvium, sands, clays and gravels (Recent fixed sand dunes.
	Tertiary	(Pisolitic nodular and massive laterites, fossil (soil development on high level peneplained (surfaces with clays and gravels.
Lower Proterozoic	(Hutchinson Group	(Undifferentiated metasediments and (migmatites, amphibolites, schists and (quartzites, graphitic schists (Haematite quartzite (Dolomite.
	(Flinders Group	(Undifferentiated augen gneisses, (amphibolites, quartz felspar gneisses, mica (schists and gneisses.

In the Tumby Bay area the older Flinders Group rocks outcrop poorly in several places along the sub-coastal plain. They also outcrop in the highlands in a belt which trends north-northeasterly from Yallunda Flat to Nyillow Hill.

Between the two areas of Flinders Group rocks the younger Hutchinson Group metasediments for a north-northeasterly trending belt, several miles wide which extends from Pillaworta Hill in the south to the Tumby Bay talc mine. (Locality III on plan 71-63) in the north.

Outcrops of the Precambrian rocks are in many places obscured by Tertiary laterites, clays and gravels, particularly in the western half of the map area. These deposits represent fossil soil horizons developed on the high level peneplained surface that existed during Tertiary times.

Quaternary and Recent alluvium, clays and gravels also cover much of the basement rock along major drainage channels and on the sub-coastal plain. A thin strip of Recent fixed sand dunes extends along the coast north and south of Tumby Bay.

Lower Proterozoic

The Lower Proterozoic rocks provide the only source of road metal in the area.

The following discussion relates the characteristics of these rocks to potential sources of stone.

The Flinders Group gneisses form the eastern and western limbs of a major syncline whose axis passes through Pillaworta H.S. and the talc mines (Locality III). However, there is little outcrop of these rocks adjacent to the road near Tumby Bay. Although dolomite beds occur in this sequence in the Cowell district none were seen in the map area.

Suitable dolomites occur in the Hutchinson Group rocks which occupy the core of the syncline. Hutchinson Group rocks are mainly mica schists which commonly have quartz lenses and stringers parallel to the bedding. Quartz-feldspar-biotite schists are common and coarse grained augen gneisses are developed in places.

Dolomitic marbles occur as massive ridges in this schist sequence. They are best developed at the Tumby Bay talc mines and in the Mine Creek - Waterfall Creek area, on the Tumby 1:63,360 map sheet. The dolomites are generally coarse grained crystalline dolomitic marbles with traces of tremolite, actinolite and talc. The marbles are white or grey with patchy green colouration due to the presence of serpentine.

The marble beds are up to 250 feet thick in the Mine Creek area but are lenticular and appear to exhibit considerable facies variations along strike.

Haematitic quartzites and flaggy sericitic quartzites are generally associated with the dolomites which change laterally and vertically into these siliceous rocks. Haematitic quartzites are conspicuous in the Mine Creek area (where some beds were mined for use as a flux in the Port Pirie smelters) but their relationship to the dolomites is obscured by the Tertiary laterites.

Olliver (1960), reported on the suitability for road material of the quartzites and haematitic quartzites in the Tumby Bay area. Several sites had sufficient reserves but the material was not regarded as being suitable for screenings.

Amphibolites make up the lower part of the Hutchinson Group and outcrop extensively stratigraphically above the Flinders Group rocks on both sides of the syncline. They are fine to medium grained rocks composed of hornblende, quartz and plagioclase with accessory biotite, iron oxides and apatite. Amphibolites in Section 110 Hundred of Koppio adjacent to the road were investigated by geological mapping and diamond drilling in 1965 (Robinson, 1967). Large reserves were indicated and laboratory testing showed the rock to be suitable for road metal and bitumen screenings. Amphibolite, probably from this deposit, has been used in places for base course material but dolomites are required for bitumen screenings.

POTENTIAL SOURCES OF DOLOMITE

(Refer to locality numbers on plan 71-63).

Locality I Sections 126 and 119, Hundred of Koppio, about ¼ mile southwest of Pillaworta homestead and about 2 miles from the Tumby Bay-Cummins road. (Freehold land - mineral rights subject to search of title but assumed to be the property of the owner.)

A bed of dolomite outcrops poorly on both sides of the road and in a creek that cuts the road at this point. The outcrop forms part of a gently sloping hill on the edge of Pillaworta Creek. The rock is a coarsely crystalline dolomitic marble with some amphibole and quartz. It is tough and appears to be similar to the Tumby Bay marble which has been classed as suitable for bitumen screenings.

The dolomite bed is estimated to be about 150 feet thick and to trend about 20°. Although outcrop is poor the bed seems to continue for at least 70 yards on the western side of the road and 50 yards on the eastern side. The total length is probably about 200 yards (including the width of the road). If all the marble in the bed is suitable about 3,000 cubic yards of material would be available per vertical foot. The dolomite bed is probably longer than this but drilling would be necessary to establish its total length.

The site should be suitable for quarrying because the dolomite bed forms a ridge about 20-40ft. above the marshy ground at the edge of Pillaworta Creek. However, care would be necessary during blasting because of the close proximity of the homestead.

Locality II Sections 288 and 293, Hundred of Hutchinson (Leasehold land).

Several beds of massive dolomitic marble occur on steep sided hills on the edge of Mine and Waterfall creeks. One of these beds on section 288 is worked by the Tumby Bay Marble Company.

Very large reserves of high quality marble exist on the Company's lease. Three beds 100-250 feet wide outcrop over a total strike length of at least a mile. Haematitic quartzites also occur in the section.

Just outside the Company's lease, at the junction of Mine Creek and Waterfall Creek, another thick bed of dolomitic marble is a potential source of supply to the Highways Department. This area is at present held under mineral claims 5746, 5747 and 5772 by F.D. Guglielmi and W.G. Thompson who have given options to Sturt's Meadows N.L. to undertake exploration for copper.

The dolomite bed outcrops at the junction of Mine Creek and Waterfall Creek (see plans 71-63), continuing northwards over a steep sided hill and southwards along the western bank of Mine Creek. The outcrop consists of a white coarse grained dolomitic marble with only a small amount of impurity.

The bed is of the order of 150-200 feet thick and continues for a minimum of 400 yards along strike.

The most suitable quarry site would be at the junction of the two creeks where the dolomite outcrops boldly to form a hill about 40 feet to 60 feet high. A farm track runs from the east to this point providing much easier access than the steep track into the Tumby Bay Marble Company's quarry.

A quarry developed at this site should provide about 40,000 cubic yards of material, and it could be continued south along the bank of Mine Creek if additional supplies are required.

LocalityIII - Tumby Bay Talc mines - Sections A^S 413, and 46,
Hundred of Yaranyacka, about 2 miles west of Lipson.
(Minerals reserved to the Crown).

The talc deposits are associated with a bed of dolomite which has an average width of 1,200 feet. This dolomite occupies the keel of a synclinal fold and outcrops strongly for about two miles.

The dolomite is generally finer grained than that at the Tumby Bay Marble quarry but it should be ideal road material. Access is by all-weather road from Lipsen and a quarry could be easily developed in the side of the ridge of dolomite in a number of places. The southern part of the dolomite bed is held under mineral lease 3152 by J.S. Jarvis but the northern section is not held under claim or lease. Reserves are very large.

Other outcrops shown on the published maps generally occur in cultivated fields and have no topographic expression.

CONCLUSIONS

Of the numerous dolomite occurrences shown on the Tumby Bay and Cummins 1 mile map sheets three are suggested as a source of road metal. Very large reserves are available on the Tumby Bay Marble Company's lease but as this is unabailable to the Highways Department, it is suggested that testing of the other deposits be carried out to determine their suitability for bitumen screenings.

Although testing is necessary, material from these sites should be suitable and sufficient reserves should be available at each locality.

Locality I (In Sections 126 & 119, Hd. Koppio) is the most favourable due to its closeness to the Tumby Bay-Cummins road. However, care will have to be taken during the development of a quarry due to the close proximity of a farm house. The gently sloping nature of the ground and the road through the middle of the outcrop may also place restrictions on quarry development.

Locality II Adjacent to Tumby Bay Marble Company's lease in Section 288, Hd. Hutchinson. Contains large reserved of suitable stone that will require a minimum of exploration. It is at present held under mineral claim. Quarry development will be hindered by nearby creeks that probably contain water for most of the year. Access is good but a round trip of about 9 miles to the closest point on the road is required.

Locality III At the Tumby Bay talc mine.

Contains large reserves of easily quarryable rock but a round trip of about 18 miles is required to the Tumby Bay-Cummins road.

RECOMMENDATIONS

A stadia survey and test drilling of the dolomite at locality I are recommended to establish reserves and to obtain samples of the dolomite for testing.

If this deposit is shown to be unsuitable then investigation of Localities II and III should be undertaken.

L. BARNES
GEOLOGIST
MINERAL RESOURCES DIVISION

LB:CMH
2.2.1971

REFERENCES

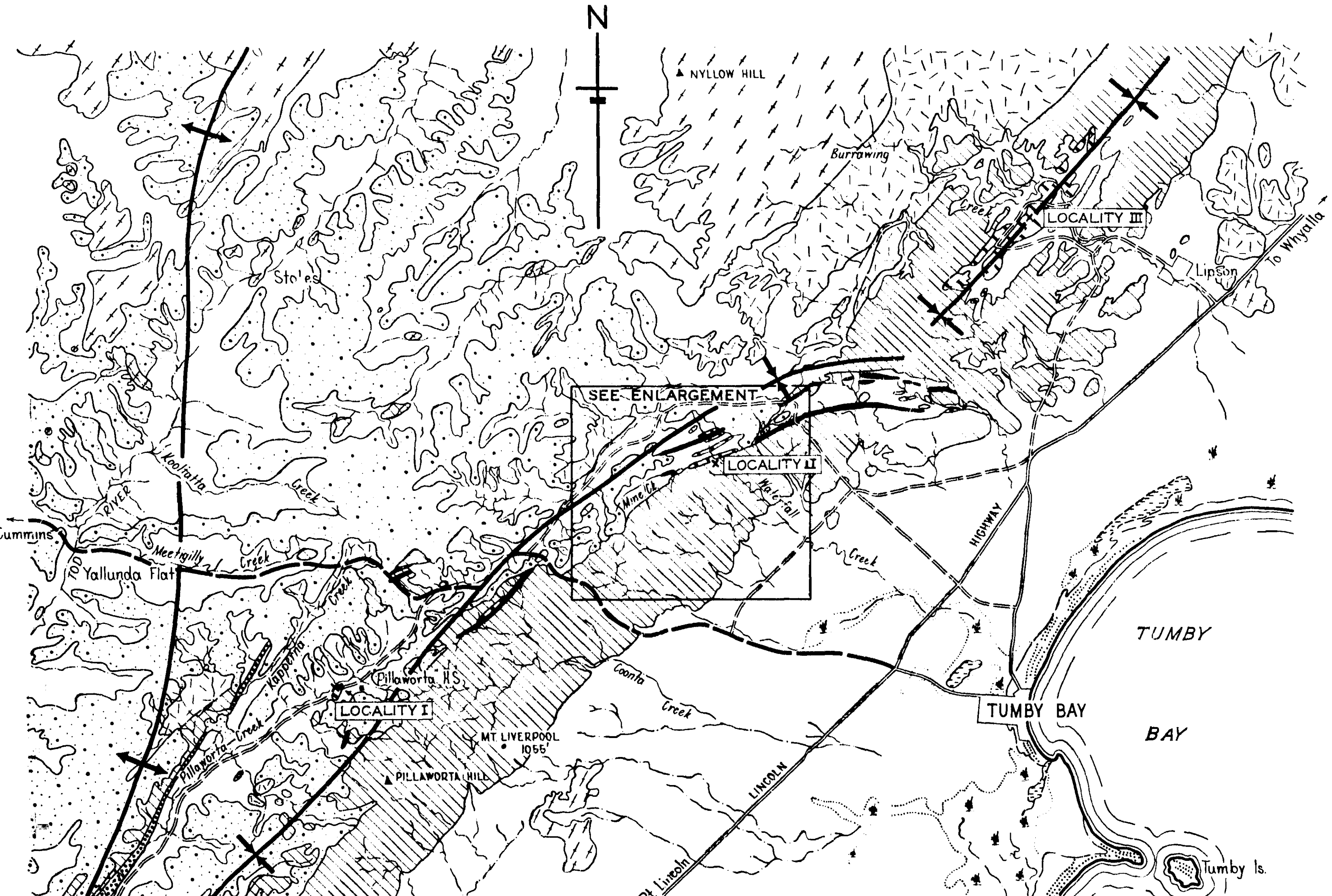
JOHNS, R.K., 1958a. Geological Atlas of S.A. Sheet Tumby 1:63,360 Series.

JOHNS, R.K., 1958b. Geological Atlas of S.A. Sheet Cummins 1:63,360 Series.

JOHNS, R.K., 1961. Geology, Mineral Resources of Southern Eyre Peninsula. Geol. Surv. S.Aust. Bulletin 37.

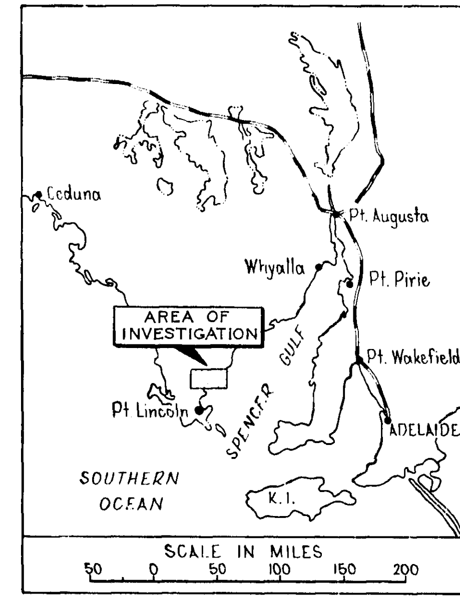
OLLIVER, J.G., 1960. Roadmetal Deposits Tumby Bay-Cummins Area. -unpublished report R.B. 50/62.

ROBINSON, W.B., 1967. Amphibolite Deposit, Tumby Bay. Mining Review 123, p.118.

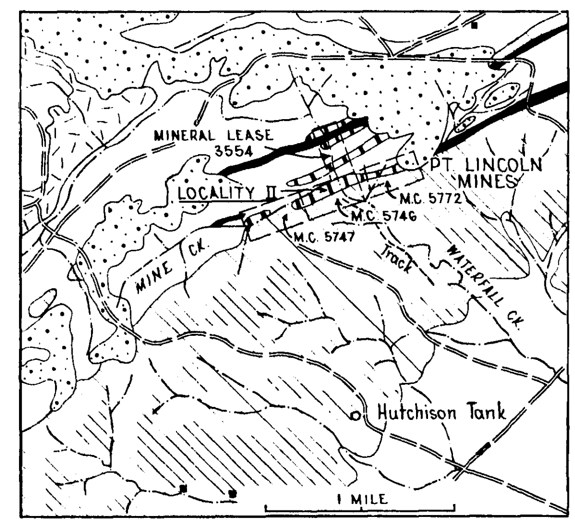


Regional geology from Tumby and Cummins 1:63,360 geological maps (R.K. Johns 1958)

LOCALITY PLAN



ENLARGEMENT



Mineral Lease 3554 held by Tumby Bay Marble Co.
Mineral Claim 5746 held by F.D. Guglielmi and W.G. Thomson
" " 5747 " " " " " "
" " 5772 " " " " " "

LEGEND

CAINOZOIC — QUATERNARY RECENT

- Alluvium, sands, clays and gravels of drainage lines and sub-coastal plain; includes resorted Tertiary laterites
- Recent fixed sand dunes

CAINOZOIC — ?TERTIARY

- Pisolitic, nodular and massive laterites. Fossil soil development on high level peneplained surfaces with clays and gravels

LOWER PROTEROZOIC — HUTCHISON GROUP

- Undifferentiated metasediments and migmatites, banded augen gneisses, amphibolites, schists and quartzites, quartz mica schists, mica schists, graphite schists, quartzites and gneisses.
- Quartzite, flaggy, sericitic; sericite schist. Haematite quartzite, ferruginous quartzites and cherts with interbedded schists
- Amphibolites (banded actinolitic metasediments)
- Dolomites

LOWER PROTEROZOIC — FLINDERS GROUP

- Undifferentiated coarse grained augen gneisses, granitoid gneisses, amphibolites, mica schists, sericite schists

- Anticline
- Syncline
- LOCALITY I × — Locality mentioned in text as suitable source of dolomite for bitumen screenings
- Main road
- Secondary road
- Track
- Tumby Bay - Cummins road
- Trig. station
- Creek
- Swamp

SCALE IN MILES
½ 0 1 2 3 4 5

DEPARTMENT OF MINES — SOUTH AUSTRALIA

MARBLE OCCURRENCES
TUMBY BAY AREA
GEOLOGICAL PLAN

MINERAL RESOURCES DIVISION	GEOLOGIST	Dr. L.C.B.	SCALE: As shown
		Trd. R.H.	71-63 Dn 8
		Ckd.	
Director of Mines	SEN. GEOLOGIST	Exd.	DATE: 25 Jan 1971