DEPARTMENT OF MINES
SOUTH AUSTRALIA

REPORT ON

CONCRETE AGGREGATE, MURRAY BRIDGE AREA

County Sturt

- L.C. Guerin -

by

M.N. HIERN
SENIOR GEOLOGIST
NON METALLIC MINERALS SECTION

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Mobilong Geological Map. 1:63,360.

Rept. Bk. No. 65/43
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D.M. 1029/67

7th September, 1967

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ABSTRACT

Potential sources of fine and coarse aggregate for concrete are described following a geological reconnaissance of the area. The Monarto granite is the most suitable rock for coarse aggregate and costeaning of two sites is recommended. Possible sources of fine aggregate are noted.

INTRODUCTION

Guerin's Limekilns supply concrete aggregate to the Murray Bridge district from a crusher located at their works adjacent to the town.

Rock is at present quarried from a narrow bed of pyritic schist located in Section 358, Hd. Monarto, 11 miles by road from Murray Bridge. This source is unsatisfactory because of the presence of pyrite and secondary sulphate minerals which render the aggregate unsuitable for high quality concrete. In addition a high proportion of fines are hauled to the crusher.

The Company have located two large white quartz reefs and are considering opening these up for the dual purpose

of producing coarse aggregate for concrete and fine aggregate for white cement bricks which are in demand in the town.

Following an application for geological assistance, the area was inspected by the author on 16th and 17th August, 1967, and some potential sites were shown to Mr. Guerin.

Mineral rights in the area are in most cases privately owned and title to sources of aggregate must be negotiated with the land owners. However, a few sections near the eastern boundary of Hd. Monarto are leasehold land and construction materials can be secured by pegging of claims. These sections are noted later in the report.

The survey was carried out principally to locate a source of coarse aggregate. However, as there is a shortage of fine aggregate in the district, some notes on possible deposits of this material are included in the report.

GEOLOGICAL SETTING

The area lies on the western margin of the Murray Basin. Local geology is shown on the Mobilong 1:63,360 map sheet which accompanies this report.

In the northwestern quadrant of the map area, hard rocks of Palaeozoic age, referred to as the Kanmantoo Group, underlie hilly country which forms the eastern slopes of the Mt. Lofty Range. These rocks consist predominantly of interbedded schists and greywackes in which a pronounced lineation and cleavage is developed. Two richly pyritic horizons occur;

these form locally prominent and distinct ridges.

Included in the older rocks are two types of granite.

Small outcrops of coarse grained pink granite occur in the River Murray valley downstream from Murray Bridge, a deposit at Swanport having been quarried for ornamental stone. Isolated outcrops also occur on the eastern side of the river near Monteith.

A pale grey fine grained granitic rock outcrops extensively in the area to the west and northwest of Kinchina. The rock usually has a faint lineation of mica and shows gradations with the enclosing rocks (Johns and Kruger, 1949). This is referred to as the Monarto Granite and is considered to have originated from in situ granitising processes rather than a magmatic intrusion as in the case of the Murray Bridge granite referred to above.

Quartz reefs, sometimes of quite large dimensions have been observed intruding the Kanmantoo Group rocks to the north of Monarto.

Fossiliferous limestone of the Mannum Formation forms the cliffs of the Murray River valley and similar rocks outcrop on the flanks of the hill country to the north and northeast of Monarto South and also in the vicinity of Hartley. Gravels and grits occur at the base of the limestone where it overlies bedrock.

Sandy clays and limestones of late Tertiary age are exposed in the river cliffs at Tailem Bend and erosional remnants of a formerly extensive horizon of sands and grits

(Parilla Sands) are preserved in three localities in the northwestern part of the map area. These sediments are usually well sorted and are capped by ferruginous sandstone.

White and yellowish siliceous sand and kunkar limestone of Quaternary age blanket almost the entire surface of the Murray plains.

Sands and sandy clays overlie Permian clays of glacial origin in the area southwest of Strathalbyn and northwest of Finniss. These are discussed later as a possible source of fine aggregate.

CONCRETE AGGREGATE SOURCES

Coarse Aggregate

The Monarto Granite offers the most potential as a source of coarse aggregate because of its proximity to Murray Bridge and its physical properties. Samples of granite from the Kinchina Quarries were tested exhaustively as a source of concrete aggregate for the Chowilla Dam project. Los Angeles Abrasion and sulphate soundness values were in the range generally accepted for aggregate. Granite from the surface zone of two of the four test quarries returned L.A. losses in excess of 50% but fresh rock from shallow depth was satisfactory.

The granite is exposed in the Kinchina Quarries (Sections 517, 518, 520, Hd. Mobilong) and in a railway cutting in Section 38, Hd. Mobilong. Here it is moderately

well jointed but will be harder to bore and blast than the existing source of aggregate. Other outcrops of granite in the area are shown on the accompanying plan.

Intensely jointed granite and granitic rock is exposed in a small quarry in Section 526, Hd. Mobilong and thick float of a similar rock occurs in Section 209, Hd. Mobilong. The former site has been previously suggested as a source of road metal (Wegener, 1952 - unpublished report R.B. 33-77). Both of these sites warrant some exploratory bulldozing to determine whether sufficient quantities of suitable rock are present. Rights to construction stone on both properties are privately owned.

Granite outcrops extensively in the area to the north of the Monarto-Sedan railway and a site in Section 231, Hd. Monarto appears to have sufficient relief to establish a quarry face of moderate height. On this section rights to minerals and construction stone are reserved to the Crown and title can be acquired by pegging of a claim.

The Murray Bridge granite is coarse grained and contains abundant microcline felspar. Both of these features have been found to be deleterious in some granites overseas and thorough laboratory testing of material from this source, which is close to Murray Bridge, would be necessary. A high proportion of waste would result from crushing rock of this grain size.

In the Kanmantoo Group rocks the greywacke members of the sequence outcrop boldly and are mineralogically more

suitable for aggregate than the schists. However, these rocks are strongly foliated and break into platey tabular fragments. Potential quarry sites exist near the present quarry in Section 357, Hd. Monarto and a few miles west of Murray Bridge in Section 175, Hd. Mobilong. Laboratory testing of representative samples of this material should be carried out before establishing a quarry.

White reef quartz is not usually a source of suitable concrete aggregate. When used as coarse aggregate the vitreous surface gives only a weak bond with cement paste and the particle shape of the fine aggregate is usually unsatisfactory.

Recrystallised limestone from the Mannum Formation from sources near Murray Bridge is used for aggregate but the rock is of variable quality and is not considered to be suitable for high quality concrete.

Fine Aggregate

The field survey did not include an examination of possible sources of fine aggregate but from Departmental records the following localities offer some potential.

1. Coarse sand and grit were recorded in the upper section of drainage bores in the vicinity of the Murray Bridge Hospital.
2. Clayey sand, fine to coarse grained, was logged from 0-10' in a bore in Section 346, Hd. Mobilong where

Rocky Gully emerges onto the plains west of Murray Bridge.

3. Clayey sand and gravel up to 60ft. in depth were recorded in bores at Callington township and in Section 2016A, Hd. Monarto, ½ mile to the east of the town.

4. Fine sand was intersected beneath 5-10ft. of clay in bores in Sections 121, 123 and 3561, Hd. Freeling on the eastern side of the River Bremer, 10-12 miles south of Callington.

5. Johns (1961) refers to gravels and grits at the base of Mannum Formation near Hartley.

6. Erosional remnants of the Parilla Sand, capped by ferruginous sandstone occur in Sections 233, 235, Hd. Monarto and also near "Lucernbrae" in Hd. Monarto. The grain size of these may be too uniform for concrete aggregate.

7. Sand and gravel overlie the Permian glacial clays over a wide area southwest of Strathalbyn. Well exposed sections are reported to occur in the banks of Giles Creek, northwest of Finniss (Firman, personal communication).

Inspection and investigation of these areas with shallow auger drilling is warranted.

SUMMARY AND CONCLUSIONS

The most promising source of concrete aggregate in the area is the Monarto Granite which outcrops to the west and northwest of Murray Bridge.

Extensive laboratory testing for the Chowilla Project showed this rock to be suitable for high quality concrete.

Generally the granite is hard and only moderately jointed but in Sections 526 and 209, Hd. Mobilong, granitic rocks are intensely fractured. Further investigation of these is warranted. Alternatively more massive granite occurs extensively northwest of Kinchina.

Throughout most of the area mineral rights are privately owned and access for quarrying must be negotiated with the land owners.

Mineral rights are reserved to the Crown in Section 231, Hd. Monarto and a favourable quarry site in granite may exist.

Some potential sources of fine aggregate occur and warrant further investigation by the applicant.

M.N. HIERN
SENIOR GEOLOGIST
NON METALLIC MINERALS SECTION

MNH:CAE
7.9.1967

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MOBILONG

GEOLOGICAL SURVEY OF SOUTH AUSTRALIA
DEPARTMENT OF MINES ADELAIDE

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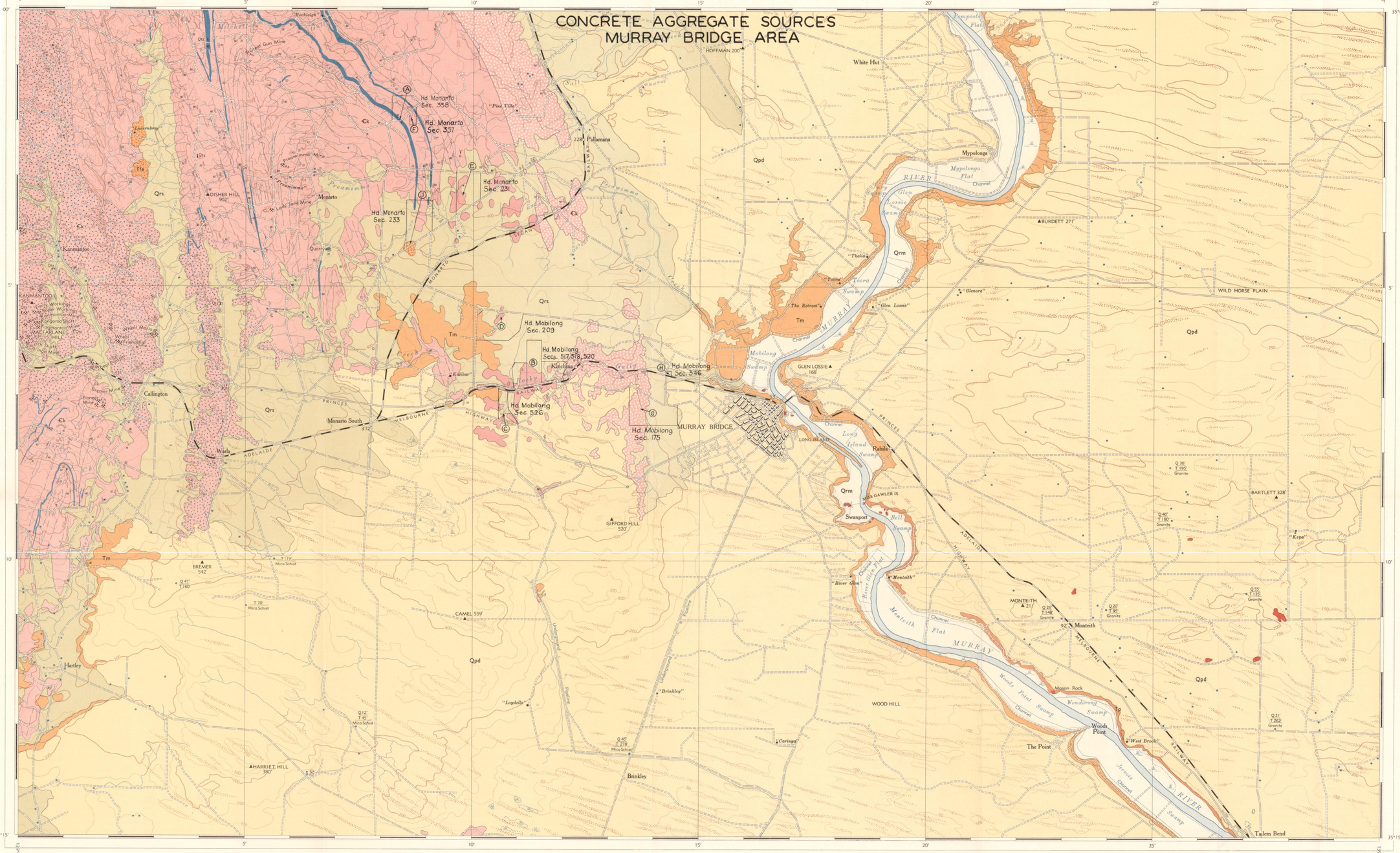
GEOLOGICAL ATLAS 1 MILE SERIES
MAP REFERENCE No. 821 ZONE 6

CONCRETE AGGREGATE SOURCES MURRAY BRIDGE AREA



REFERENCE

CAINOZOIC

QUATERNARY — RECENT

- Qrm — *Alluvium of the River Murray canyon.*
- Qrs — *Shallow alluvial deposits of creek channels and flood plains.*

QUATERNARY — PLEISTOCENE–RECENT

- Qpd — *Aeolian deposits. Siliceous dune sands and kunkar of the Murray Plains.* *Sand dunes.*

PLIOCENE

- Tfe — *Pisolitic laterites.*

TERTIARY — PLIOCENE

- Tp — *North West Bend Formation — Limestone, sands, sandstone exposed in cliffs near Tailem Bend.*

MIOCENE

- Tm — *Manoora Formation—Fossiferous marine limestones, calcarenites typically exposed in Murray River cliffs; gravels and gritty limestones at base.*

PALAEOZOIC — CAMBRIAN — KANMANTOO GROUP

- Ck — *Even grained greywackes, quartz-mica-felspar-schists. Pyritic schists; bi-mica schists with pyrite, sillimanite, garnet. Mica schists, dark grey shales, knotted andalusite schists; greywackes. Migmatites, schists, gneisses and amphibolites. Zone of migmatization.*

GRANITOID AND RELATED ROCKS

- *Murray Bridge granite.*
- *Monarto "granite"; adamellite.*
- Qtz — *Quartz veins.*

GEOLOGICAL BOUNDARIES
OBSERVED
APPROXIMATE

BEDDING
STRIKE AND DIP
VERTICAL
OVERTURNED
STRUCTURE FORM LINE

PLUNGE
FOLDS
LINEATION

MAIN ROAD
SECONDARY ROAD
TRACK
RAILWAY
TRIANGULATION STATION
MINE
QUARRY
RIVER OR CREEK
SWAMP
DAM
BORE
WELL
TANK
CONTOURS (50 FEET INTERVAL)
GOLD — Au — ARSENIC — As
COPPER — Cu

LOCALITY

INDEX TO ADJOINING SHEETS

ADELAIDE	MANNUM	CAURNAMONT
ECHUNGA	MOBILONG	KAROONDA
MILANG	ALEXANDRINA	MOORLANDS

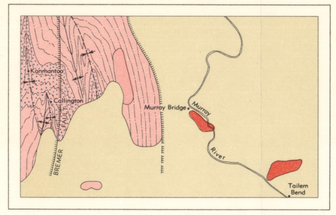
SCALE 1 : 63360 1 INCH TO 1 MILE

CHAINS 80 60 40 20 0 1 2 3 4 5 6 7 8 9 MILES

METRES 1000 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 KILOMETRES

N. J. WALL, GOVERNMENT PHOTOLITHOGRAPHER, ADELAIDE

TECTONIC SKETCH



- Cainozoic
- Palaeozoic (Kanmantoo Group)
- Murray Bridge granite
- Monarto granite
- Fault Scarp
- Anticline
- Syncline

Geology by R. K. Johns, B.Sc., Senior Geologist.

B. P. Webb, M.Sc., Senior Geologist in charge of regional map preparation.

E. S. O'Driscoll, B.Sc., Chief Geologist.

Base map compiled from 1 inch to 1 mile Military Sheet.

Cartography by Geological Drafting Section, Dept. Mines, S.A.

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