RB 54/99

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
NON METALLIC MINERALS SECTION

Report on

GEOLOGICAL SURVEY OF ROAD BUILDING MATERIAL PORTION OF COUNTIES VICTORIA & DALHOUSIE (DISTRICT COUNCIL OF JAMESTOWN)

by

N. N. Hiern
Geologist

NON METALLIC MINERALS SECTION

GEOLOGICAL SURVEY

CONTENTS

PLAN ACCOMPANYING THE REPORT

Number	Title	Scale
62-208	Regional Geology & Road Material Occurrences in Portion of the District Council of Jamestown	Approx. 1" to 1 mile.

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9th April, 1962.

REPORT ON

GEOLOGICAL SURVEY OF ROAD BUILDING MATERIAL

PORTION OF COUNTIES VICTORIA & DALHOUSIE

(DISTRICT COUNCIL OF JAMESTOWN)

1. ABSTRACT

The report describes eighteen possible new occurrences of road building material and discusses some general aids in locating and evaluating future deposits. The regional geology of portion of the Jamestown Military Sheet is shown on the accompanying plan.

2. INTRODUCTION

The District Council of Jamestown obtains material for local road construction from deposits of fractured and weathered slate, phyllite and blue dolomite. The Council has no crushing plant but is well equipped with powerful earth moving machines. The main criteria for suitable materials are that the rock produced must be hard enough to withstand wear and tear after placement but that, in situ, it is sufficiently fractured and broken to be won with bulldozer and ripper.

Generally, useful and potentially useful deposits are widespread throughout the Council area but it is the policy of the Council to obtain material as close as possible to roads under construction. New deposits are required in three areas where outcrop is poor to reduce haulage distances from known pits. The survey was conducted during the periods 26/2/62 to 2/3/62 and 7/3/62 to 9/3/62 inclusive and several possible new sources of material were shown to the Council Overseer.

The accompanying plan shows the general geology of the area and the location of the possible new sources of material, as well as many of the existing pits. The plan has been compiled by extending, by means of air photo interpretation and field mapping, the geological map of the Jamestown area prepared by T. Langford-Smith[1] in 1942.

A description of individual deposits is included in the text and some general aids for locating future deposits are discussed.

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[1] "The Geology of the Jamestown District, South Australia" by T. Langford Smith. Trans. Roy. Soc. S.A. 71 (2) p. 281-295.

3. GEOLOGICAL SETTING

Basement rocks in the area belong to the Adelaide System of Proterozoic Age. The succession, which is shown in ascending order in the legend of the accompanying plan, consists of hard quartzites and tillite interbedded with slates, phyllites and thin blue dolomite bands.

On the western side of the area the basement rocks have been folded into an anticline while in the central section they occupy a syncline. The axes of these folds trend north-south with little or no plunge so that the country is made up of a series of well defined ridges consisting of the harder members of the sequence, viz. quartzite and tillite, separated by wide valleys containing low rounded hills which are underlain by the softer slates, phyllites and dolomites.

A major fault, trending N.N.W. - S.S.E. runs through the central part of the area cutting off the beds on the northern end of the syncline. The horizontal direction of movement along this fault is east block to the north west. Numerous ironstone reefs are associated with this structure.

A north plunging anticline, overturned to the east, occurs on the north eastern side of the fault and the beds on this side are much lower down in the sequence than those occurring directly across the fault.

A sequence of yellow sandy clay overlain by rounded ferruginous gravel occurring in Section 217, Hd. Mannanarie is probably of Tertiary Age. It lies close to the major fault and it is likely that other deposits of this material will occur along the fault zone.

Extensive areas of alluvium occupy the lower parts of the wide valleys throughout the area. Adjacent to the ranges this material contains abundant quartzite boulders but towards the centre of the valley the alluvium consists of a red sandy to gritty clay.

4. ROAD BUILDING MATERIALS

Slates, phyllites and blue dolomites from several stratigraphic horizons are exploited by the Council for road construction.

Throughout the area there is a well developed cleavage in these rocks which dips from 50° to 80° to the west and this is generally the dominant

weakness in the rocks. Bedding is usually visible but except where this and cleavage are near coincident there is no rock weakness along the bedding planes.

The rocks are only usable for road construction where they can be quarried by ripping and bulldozing. Two factors contribute towards making a particular deposit useful.

1) Fracturing.

In many localities sets of closely spaced fractures are present normal to the cleavage and material from these places is the most satisfactory for road construction and the pits can be worked to a considerable depth. The occurrence of this close fracturing is apparently not related to local minor fold structures or to any other recognisable geological feature and therefore it is not possible to define areas where suitably fractured rock will occur.

2) Weathering.

The rocks have been affected by surface weathering and a gradation occurs downwards from soft rock with abundant clay to harder material in which clay is absent. A deposit can be quarried down to a depth of about 5 feet in weathered material regardless of the degree of fracturing, but often this does not make a high class road because of a high proportion of fines and the soft nature of the rock fragments. The harder material below the weathered zone cannot be used if the close fracturin g is absent.

Thus it is possible to predict to some extent the amount of material which can be won from any particular deposit by the presence or absence of cross fracturing. In a pit which is well fractured the softer weathered rock could be used to better advantage by working the pit on two levels and mixing the products before placement on the road.

In the few quarries near the major fault the rocks are weathered to a degree greater than usual and a deeply weathered zone can be anticipated in any future quarries adjacent to the fault line.

5. INDIVIDUAL DEPOSITS

New sources located during the survey are indicated on the accompanying plan by numbers and described in the text below.

1. Section 244, Hd. Mansansarie

A low rise containing a 2' surface layer of nodular and massive kunkar limestone overlying brown weathered slates or tillite.

2. Section 246, Hd. Mansansarie

Brownish weathered slates, dipping 5° south, poorly exposed on roadside. Appear to be fairly well fractured.

3. Section 193N, Hd. Yeoguia

Poorly exposed brown slates along roadside.

4. Section 217, Hd. Mansansarie

Ferruginous conglomerate underlain by rounded gravel and then yellowish clayey sand of probable Tertiary age forming a capping to a low rise. Deposit requires auger drilling to define boundaries.

5. Section 117N, Hd. Mansansarie

Small exposure of soft weathered grey-brown slate at foot of quartzite range. Extends eastwards but covered by increasingly thick mantle of boulders and alluvium. Requires opening up by bulldozer to check quality.

6. Section 117S, Hd. Mansansarie

Poor outcrop of yellow fine sandy siltstone in creek. Probably only a narrow bed striking N-S but worth some exploratory bulldozing if a source of material is required in this area.

7. Section 308, Hd. Kelalie

Brown slate with moderately intense cross fracturing. Interbedded with grey calcareous slates which powder rapidly on the road and are therefore generally avoided. Deposit should therefore be worked in a north-south direction.

8. Section 460 & Blk 461, Hd. SBelalie

Brown phyllitic slate with widely spaced cross fracturing. Occurs on both sides of the road.

9 & 10. Section 464, Hd. Belalie

Pale yellowish silty fine sandstone, not well exposed but appears to be intensely cross fractured. Some bulldozing necessary to define extent of deposit.

11. Section 159, Hd. Belalie

Brown weathered slate exposed in road cutting. Cross fracturing not well developed.

12. Section 129, Hd. Belalie

Similar to 11 but appears to be more intensely fractured.

13. Section 189, Hd. Belalie

Brown weathered slate exposed in trial pits underlying 1-2' of calcareous soil. Appears to be well fractured and worth opening up with the bulldizer.

14. Section 25, Hd. Whyte

Fragments of blue dolomite from power line post hole lying on southerly projection of fractured blue dolomite quarried in Section 683, Hd. Whyte by District Councils of Jamestown and Hallett. Requires bulldozing of overburden (perhaps 2-3') to outline reserves. Useful material should persist to considerable depth.

15. Forest Reserve 1, Hd. Belalie

Area of poor outcrop but probably underlain by interbedded slates and blue dolomites similar to No. 18.

16. On road reserve opposite section 100, Hd. Yangya - area of poor outcrop similar to 15.

17. On road reserve opposite section 559, Pd. Bundaleer - similar to 15.

18. Pit in road reserve opposite Section 566, Pd. Bundaleer containing interbedded hard fractured blue dolomite and softer weathered slates. Quality of mixed material will improve with depth provided that harder bands can still be ripped.

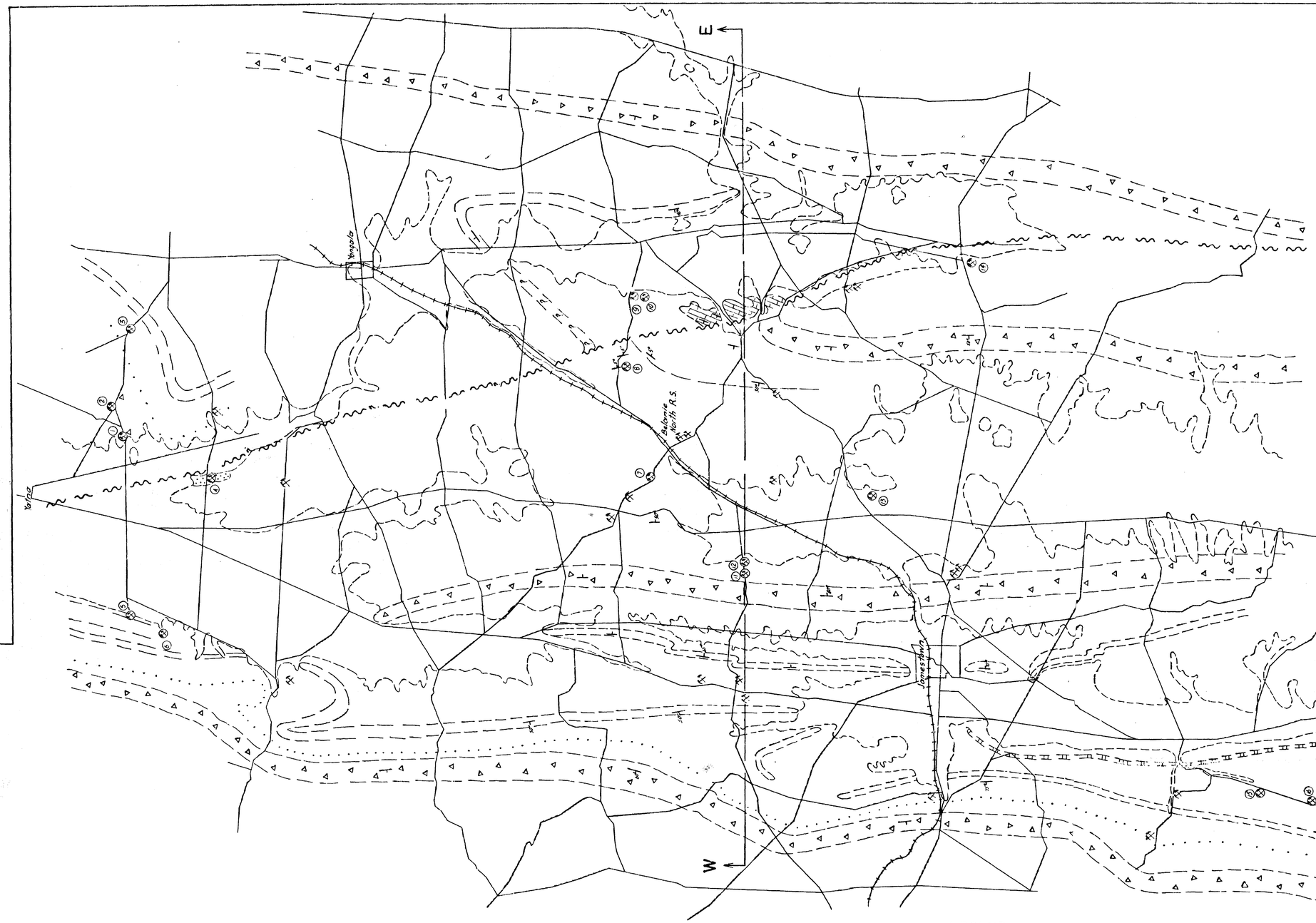
6. SUMMARY & CONCLUSIONS

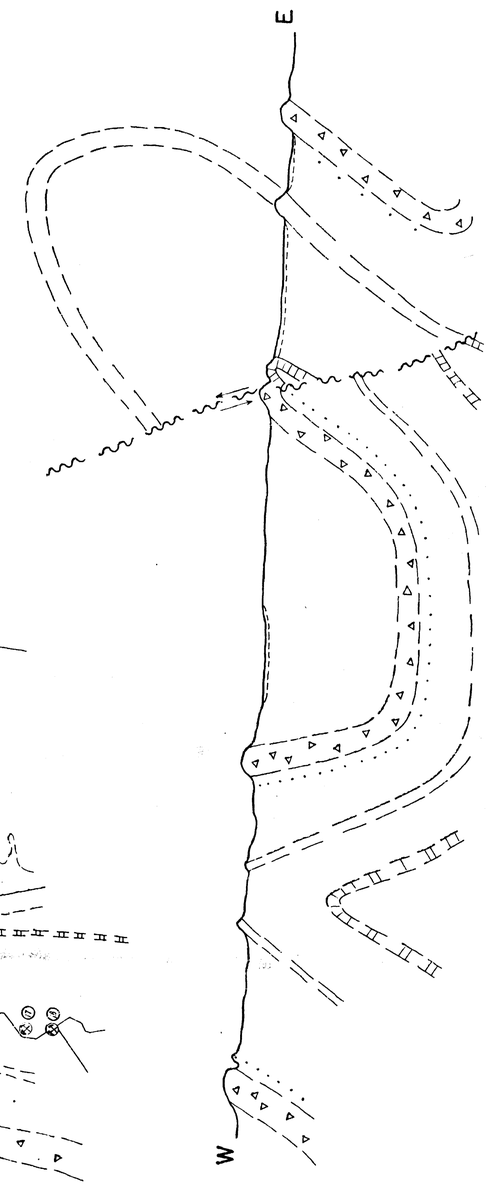
The survey has located a number of potential deposits in areas where future road construction will take place. Outcrop is generally poor and exploratory bulldozing is necessary to properly define both the quality and quantity of material.

The accompanying plan shows the geological structure of the area and the extent of the slate and phyllite beds. As a general rule when prospecting for new sources in areas of no outcrop, attention should be paid to all low rounded rises and exploratory bulldozing carried out over these.

M. N. HIERN
GEOLOGIST
NON-METALLIC MINERALS SECTION

MNH:AGK
9/4/62





CROSS SECTION W-E

SCALE
(APPROXIMATE)

MILE 1 0 1 2 3 4 MILES

LEGEND

RECENT
- Alluvium with rounded and sub rounded boulders in part

TERTIARY ?
- Yellow sandy clays overlain by ferruginous gravel semi-cemented

PRECAMBRIAN
- Blue brown slates and phyllites
- Tillite and inter bedded quartzite
- Brownish and greyish slates and quartzites
- Quartzite and sandstone
- Brown slates and phyllites with thin blue dolomites and inter-bedded quartzites
- Quartzite and sandstone
- Blue, green, brown slates, fine sandy siltstones with inter-bedded thin blue dolomites and quartzites
- White cream marble

- Road material pit
- Possible new pit
- Railway
- Road
- Strike and dip of bedding
- Fault

NOTE:
Only principal roads shown.

Base map compiled from uncontrolled air photo mosaics.

To accompany report by W. Horn

S.A. DEPT. OF MINES

REGIONAL GEOLOGY AND ROAD MATERIAL OCCURRENCES IN PORTION OF THE DISTRICT COUNCIL OF JAMESTOWN

Req. No.	D.M.	Compiled from

Associated Drawing	No.	No.	Amendment	Exd.	Date

Approved	Passed
Director of Mines	

Drn. Ccd. BLG Chd. Exd.

Scale: 1" to 1 MILE (Approx.)

62-208 FG.

Date 29-3-62