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QUARTERLY NOTES
THE PUNKERRI SANDSTONE

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Department of Mines
South Australia —

DEPARTMENT OF MINES

SOUTH AUSTRALIA

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THE PUNKERRI SANDSTONE

This is a new name applied to a Late Precambrian sequence of red and white sandstone which is found in the North West Province of South Australia. It is equated to the Pound Quartzite of the Adelaide Geosyncline on both lithological and fossil evidence.

Origin of name

The type section is in the North West Province of South Australia and is located across the southern flank of the Punkerri Hills. These are on the Punkerri 1:63 360 sheet area in the southeast part of the BIRKSGATE 1:250 000 sheet area (see Major et al., 1971). The Punkerri Hills form the nose of a west-southwest plunging anticline.

Locality

The basal (northern) end of the type section is at approx. Lat. S.27°40', Long. E.130°25' although the base is not seen. The section line is oriented about 175° T and is 7 050 metres long.

Map letter symbol: Ewk

General lithology

Wirrildar Beds

conformity or paraconformity

Punkerri Sandstone

(Top - not seen - south
(>935 metres: white and red sandstone. Ediacara-type trace fossils.
(>265 metres: red hard (micaceous) flaggy sandstone
(Base - not seen - north

disconformity

Wright Hill Beds

Although neither the top or bottom of the Punkerri Sandstone is seen the bulk of the formation outcrops well. The tops of the hills (up to 100 metres above plain level) are generally covered by a veneer of soil and pebbles but there are sufficient outcrops in this surficial layer and in the ephemeral creeks to provide good exposure overall.

The sandstone has two members - a lower "red" and a "white and red" upper member. The lower member is generally a purple or red brown medium grained flaggy sandstone with some feldspar and biotite. There is abundant evidence of quite active currents in the form of scour casts, bedding lineation, ripple marks and pellets and flakes of siltstone. The white and red upper member consists mainly of pink or white medium grained feldspathic sandstone and quartzite with interbedded red sandstone and siltstone (see Fig. 2). Some cross-bedding is seen as well as very coarse sand grains, quartz pebbles and casts of siltstone or clay fragments. The depositional currents were probably milder than, or the environment of deposition was different from, those in the red member.

The western flank of the Punkerri Hills has a thin pebble conglomerate (see Fig. 2, J.E. Johnson, S.A.D.M. unpublished field notes) and examples of the Precambrian Ediacara fauna in the upper member.

Stratigraphic relations, and regional extent.

The Punkerri Sandstone overlies the Wright Hill Beds either paraconformably or disconformably. These units are structurally conformable on BIRKSGATE and LINDSAY. Evidence for the erosion of the Wright Hill Beds during the deposition of the sandstone is provided by the clasts in the pebble conglomerate in the Punkerri Sandstones. This conglomerate is found at about 70 metres above the base of the white upper unit on the west flank of the Punkerri Hills (J.E. Johnson, S.A.D.M., unpublished field notes). It contains pebbles of a black oolitic chert which is similar to that found in the Wright Hill Beds (Major, 1973a) and presumably came from them.

No contact has been seen with the overlying Wirrildar Beds but the contact is presumed to be conformable, paraconformable or disconformable because the units are structurally conformable on BIRKSGATE (see Major, 1973b).

The Punkerri Sandstone outcrops on LINDSAY at Wright Hill and west of Purndu Hills. It extends from BIRKSGATE, into Western Australia, at the western end of the Patricia Johnson Hills although Lowry et al. (1971) do not describe it there but appear to include it in the Townsend Quartzite (see their map).

Correlations, fossils and age

The Punkerri Sandstone is correlated with the Upper Marinoan Pound Quartzite of the Flinders Ranges on both

lithological and fossil evidence. The sandstone has a lower red unit and an upper white (and red) unit similar to the lower red Bonney Sandstone Member and the upper white Rawnsley Quartzite Member of the Pound Quartzite (Forbes, 1971).

In 1964, a party led by W. Johnson found rock specimens containing the impressions of Ediacara-type fauna of the Pound Quartzite in loose rocks at the northern end of the Punkerri Hills (personal communication, J.E. Johnson, S.A.D.M., 1965). These fossils include Rangea cf Rangea arborea Glaessner, Charnia Ford, Tribrachidium heraldicum Glaessner, ?Charniodiscus Ford and a "double spiral" (Daily, 1964). This fossil locality was described by Glaessner (1966, 1971) and Wade (1970) but the latter author (p.100) refers to Daily's Rangea sp. as Arborea arborea. Unfortunately these fossils have not as yet, been found in situ and so a comparison of their stratigraphic position to those in the white upper member of the Pound Quartzite (Wade, 1970, p.92) cannot be made. However, the specimen of Rangea sp. (or Arborea arborea) seen by the author (R.B.M.) is on light coloured sandstone and presumably came from the upper unit of the Punkerri Sandstone. Glaessner (1971) concludes that the known age range of the Ediacara fauna lies between 600 m.y. - 700 m.y. (approximately).

Lowry et al. (1971) do not describe any rocks equivalent to the Punkerri Sandstone in the Western Australian part of the Officer Basin.

The Pound Quartzite (and hence the Punkerri Sandstone) has been correlated with the Arumbera Sandstone and Eninta Sandstone of the Pertaoorrta Group in the Amadeus Basin (Dalgarno, in Mirams et al., 1964). (The Arumbera Sandstone was formally the Arumbera Greywacke (see Wells et al., 1967, p. 31). The lower part of the Arumbera Sandstone contains the trace fossil Rangea c.f. longa Glaessner and Wade and is probably Precambrian, but the top of the sandstone is Lower Cambrian (see Wade, 1970, p. 101). On this basis the Punkerri Sandstone is equated with (at least) the lower part of the Arumbera Sandstone.

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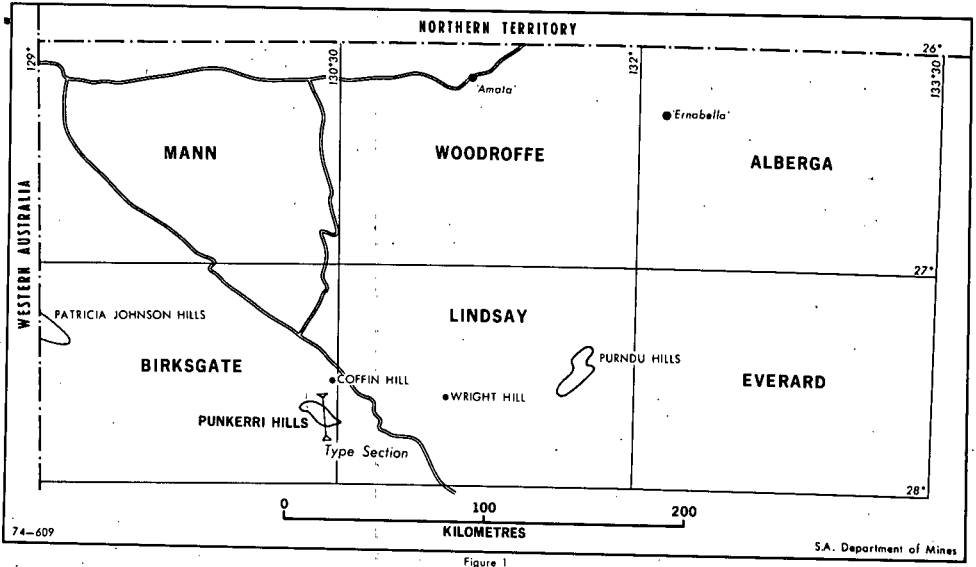
NORTHERN TERRITORY
WESTERN AUSTRALIA
129°
130°30
132°
133°30
26°
27°
28°
'Amata'
'Ernabella'
MANN
WOODROFFE
ALBERGA
PATRICIA JOHNSON HILLS
LINDSAY
BIRKSGATE
COFFIN HILL
WRIGHT HILL
PURNDU HILLS
EVERARD
PUNKERRI HILLS
Type Section
0
100
200
KILOMETRES
74—609
S.A. Department of Mines

Figure 1

- MORRIS B. J. and NICHOL D.—Basic Rocks of the Kanmantoo Group at Tailem Bend

Foreword

The Editor would be pleased to receive for consideration, contributions from individuals, companies, Universities, and other Government personnel for inclusion in Quarterly Geological Notes. This facility is provided as a service in keeping with the Geological Survey's function of dissemination of geological knowledge of the State. Papers should be brief and simply illustrated. Quarterly Geological Notes are intended to provide a means of rapid publication especially for definition of new stratigraphic names.

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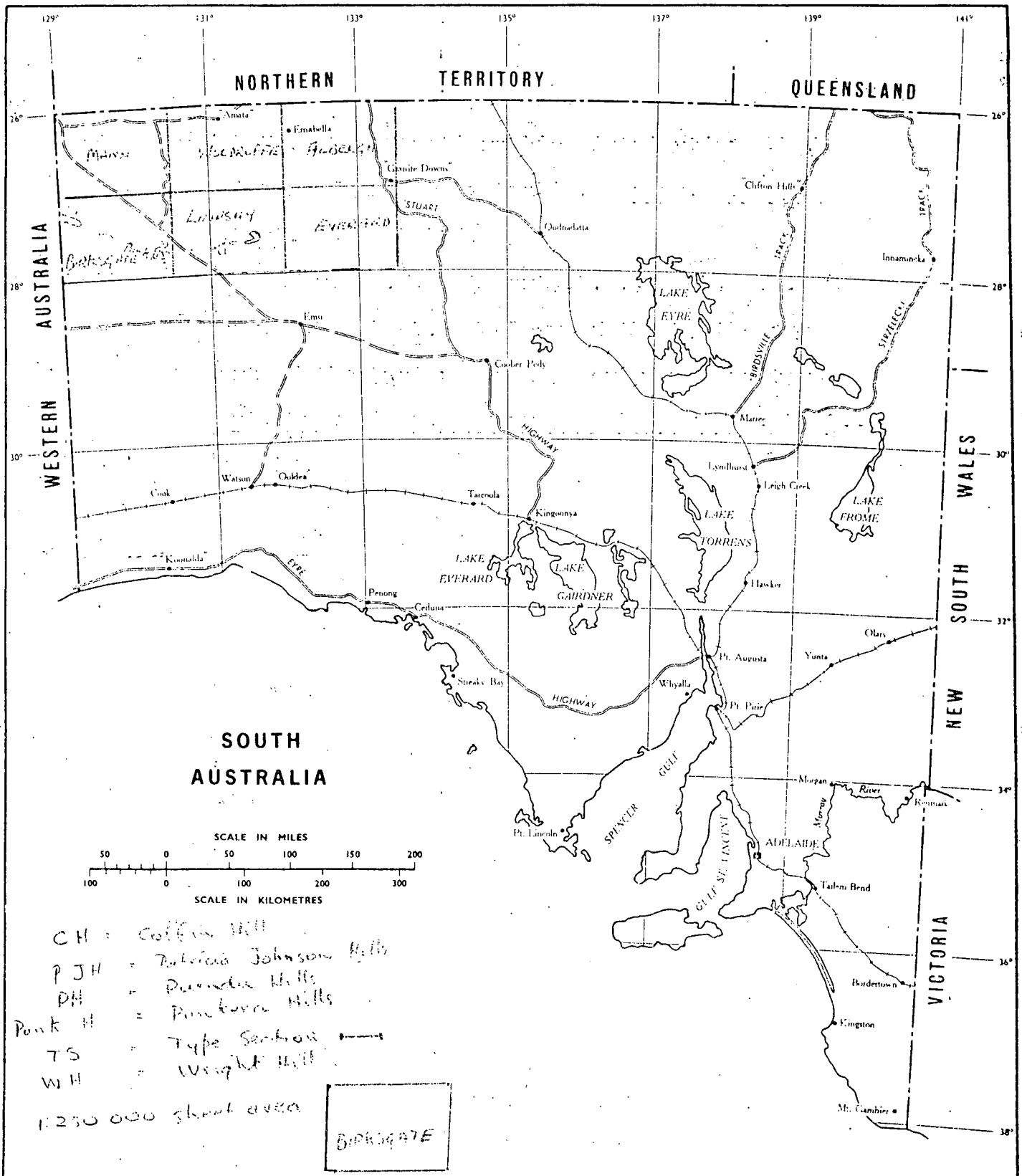

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Compiled. R.B.M.	Pankerri Sandstone Localities of outcrops. North West Province Fig. 1.		Date:
Drn.	Ckd.		Drg. No.

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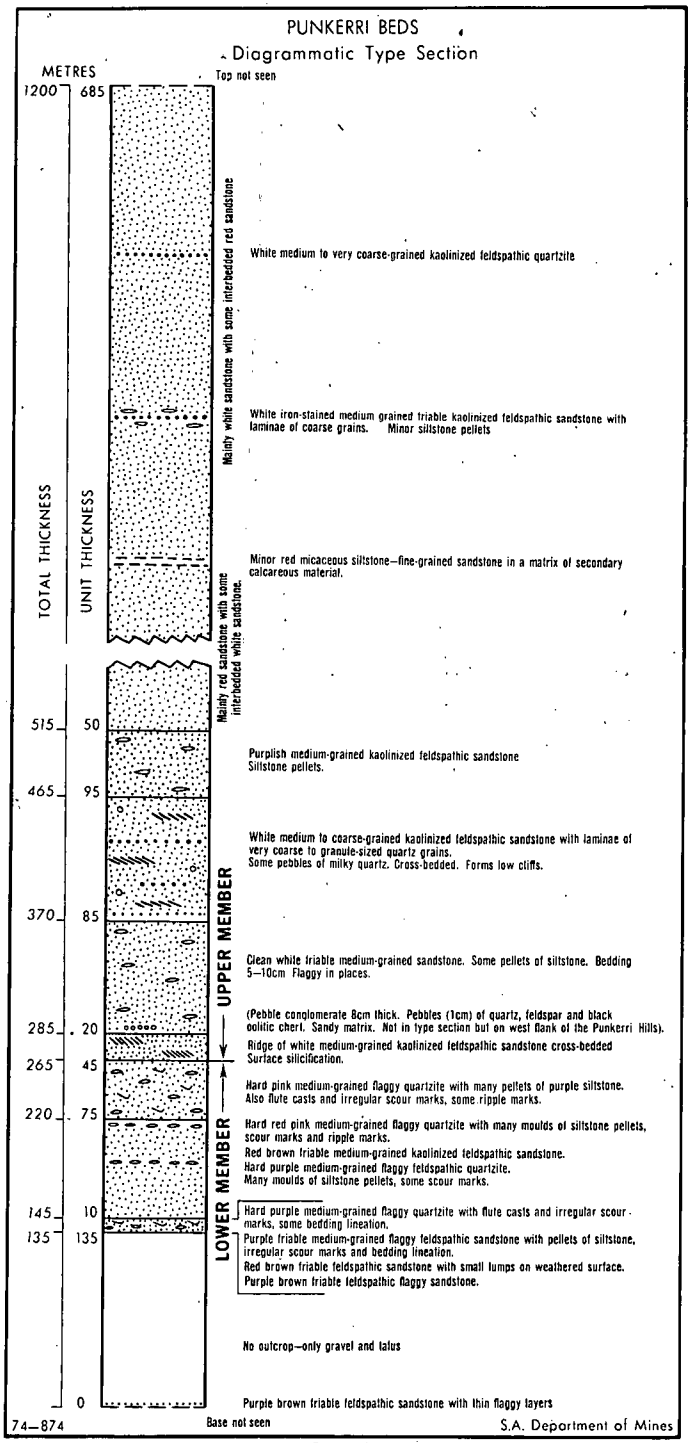
PUNKERRI BEDS
Diagrammatic Type Section
METRES
TOTAL THICKNESS
UNIT THICKNESS
Top not seen
1200
685
Mainly white sandstone with some interbedded red sandstone
White medium to very coarse-grained kaolinized feldspathic quartzite
White iron-stained medium grained friable kaolinized feldspathic sandstone with laminae of coarse grains. Minor siltstone pellets
Minor red micaceous siltstone—fine-grained sandstone in a matrix of secondary calcareous material.
Mainly red sandstone with some interbedded white sandstone.
515
50
Purplish medium-grained kaolinized feldspathic sandstone
Siltstone pellets.
465
95
White medium to coarse-grained kaolinized feldspathic sandstone with laminae of very coarse to granule-sized quartz grains.
Some pebbles of milky quartz. Cross-bedded. Forms low cliffs.
370
85
UPPER MEMBER
Clean white friable medium-grained sandstone. Some pellets of siltstone. Bedding 5—10cm Flaggy in places.
285
20
(Pebble conglomerate 8cm thick. Pebbles (1cm) of quartz, feldspar and black oolitic chert. Sandy matrix. Not in type section but on west flank of the Punkerri Hills).
Ridge of white medium-grained kaolinized feldspathic sandstone cross-bedded
Surface silicification.
265
45
Hard pink medium-grained flaggy quartzite with many pellets of purple siltstone.
Also flute casts and irregular scour marks, some ripple marks.
220
75
LOWER MEMBER
Hard red pink medium-grained flaggy quartzite with many moulds of siltstone pellets, scour marks and ripple marks.
Red brown friable medium-grained kaolinized feldspathic sandstone.
Hard purple medium-grained flaggy feldspathic quartzite.
Many moulds of siltstone pellets, some scour marks.
145
10
Hard purple medium-grained flaggy quartzite with flute casts and irregular scour marks, some bedding lineation.
135
135
Purple friable medium-grained flaggy feldspathic sandstone with pellets of siltstone, irregular scour marks and bedding lineation.
Red brown friable feldspathic sandstone with small lumps on weathered surface.
Purple brown friable feldspathic flaggy sandstone.
No outcrop—only gravel and talus
0
Purple brown friable feldspathic sandstone with thin flaggy layers
74—874
Base not seen
S.A. Department of Mines

Figure 2

The sandstone has two members - a lower "red" and a "white and red" upper member. The lower member is generally a purple or red-brown, medium-grained flaggy sandstone with some feldspar and biotite. There is abundant evidence of quite active currents in the form of scour casts, bedding lineation, ripple marks, pellets and flakes of siltstone. The white and red upper member consists mainly of pink or white medium grained feldspathic sandstone and quartzite with interbedded red sandstone and siltstone (see Fig. 2). Some cross-bedding is evident as well as very coarse sand grains, quartz pebbles and casts of siltstone or clay fragments. The depositional currents were probably milder than, or the environment of deposition was different from, those in the red member.

The western flank of the Punkerri Hills includes a thin pebble conglomerate (J.E. Johnson, S.A.D.M. unpublished field notes) and examples of the Precambrian Ediacara-type fauna in the upper member.

Stratigraphic relations, and regional extent

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Type Section Diagrammatic

Scale 1mm = 2 metres

Total (metres)	Unit (metres)	
200	68	Top not seen
		White medium- to very coarse-grained kaolinized feldspathic quartzite
		White iron-stained medium-grained friable kaolinized feldspathic sandstone with laminae of coarse grains. Minor siltstone pellets.
		Minor red micaceous siltstone - fine-grained sandstone in a matrix of secondary calcareous material
		Purple medium-grained kaolinized feldspathic sandstone. Siltstone pellets.
		White medium- to coarse-grained kaolinized feldspathic sandstone with laminae of very coarse to granule-sized quartz grains. Some pebbles of milky quartz. Cross-bedded. Forms low cliffs.
		Clean white friable medium-grained sandstone. Some pellets of siltstone. Bedding 5 - 10 cm. Flaggy in places.
		Pebble conglomerate 8 cm thick. Pebbles (1cm) of quartz, feldspar and black oolitic chert. Sandy matrix. Not in type section but on west flank of the Dunkerri Hills)
		Ridge of white medium-grained kaolinized feldspathic sandstone
		Cross bedded. Surface silicification
		Hard pink medium-grained flaggy quartzite with many pellets of purple siltstone. Flute casts and irregular scour marks, some ripple marks
		Hard red pink medium-grained flaggy quartzite with many moulds of siltstone pellets, scour marks and ripple marks
		Red brown friable medium-grained kaolinized feldspathic sandstone.
		Hard purple medium-grained flaggy feldspathic quartzite. Many moulds of siltstone pellets, some scour marks
		Hard purple medium-grained flaggy quartzite with flute casts and irregular scour marks, some bedding lineation.
		Purple friable medium grained flaggy feldspathic sandstone with pellets of siltstone, irregular scour marks and bedding lineation
		Red brown friable feldspathic sandstone with small lumps on weathered surface.
		Purple brown friable feldspathic flaggy sandstone
		Purple brown friable feldspathic sandstone with thin flaggy layers
0		Base not seen

Mainly white sandstone with some interbedded red sandstone

Red sandstone with some interbedded white sandstone

Mainly

Upper member

Lower member

No outcrop - only grassed slopes

Scale

0 20 40 60 80 100 metres

Scale 1mm = 2m