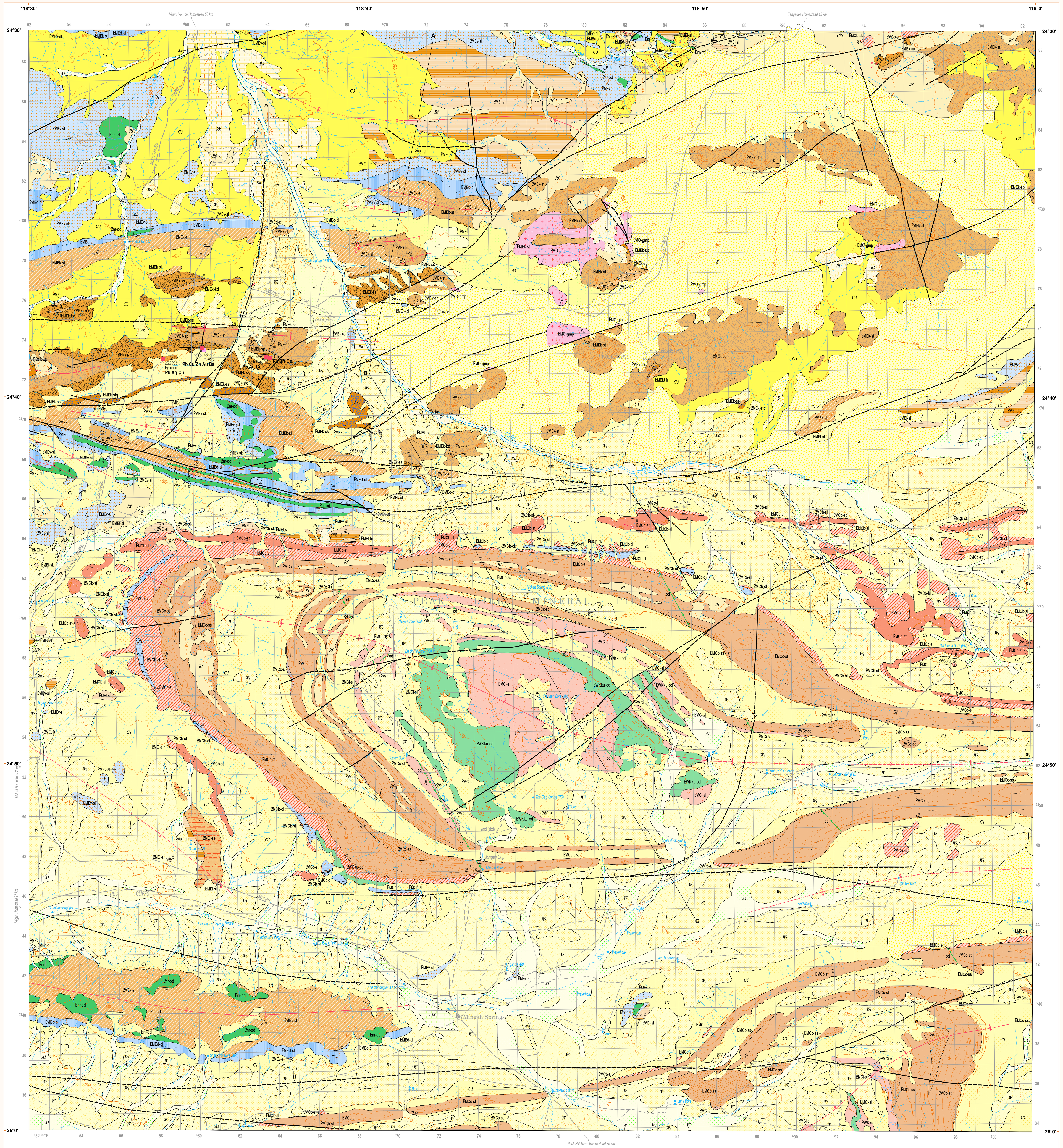
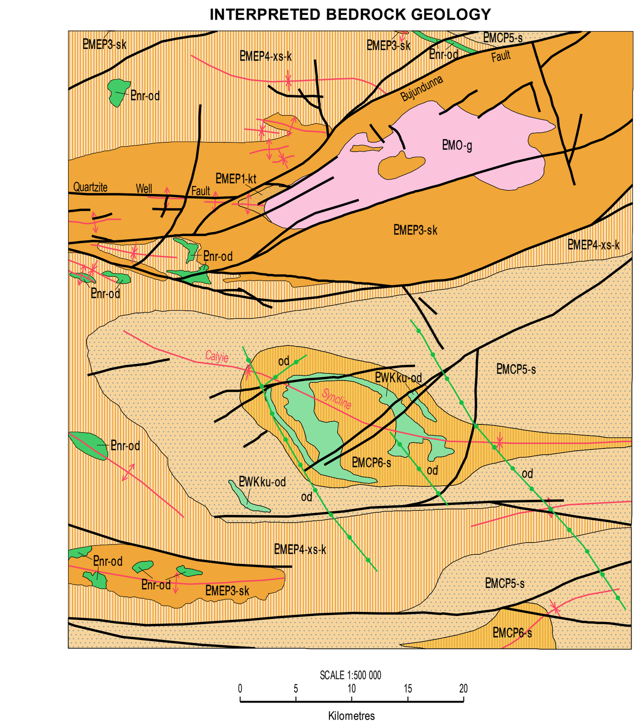
AUSTRALIA 1 : 100 000 GEOLOGICAL SERIES

CALYIE

GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

SHEET 2648





Symbol	Description		
od	Dolerite dykes; sills or plugs		
EWKku-od	Kulkatharra Dolerite	Warakurna Supersuite	WARAKURNA LARGE IGNEOUS PROVINCE
EMCP6-s	Depositional Package 6 (Ilgarari Formation)	Bangemall Supergroup, Collier Group	COLLIER BASIN
EMCP5-s	Depositional Package 5 (Calyie , Backdoor Formations)	Bangemall Supergroup, Collier Group	COLLIER BASIN
Enr-od	Narimbunna Dolerite		
EMEP4-xs-k	Depositional Package 4 (Ullawarra, Devil Creek, Discovery Formations)	Bangemall Supergroup, Edmund Group	EDMUND BASIN
EMEP3-sk	Depositional Package 3 (Kiangi Creek Formation)	Bangemall Supergroup, Edmund Group	EDMUND BASIN
EMEP1-kt	Depositional Package 1 (Irregully Formation)	Bangemall Supergroup, Edmund Group	EDMUND BASIN
EMO-g	Moorarie Supersuite		GASCOYNE PROVINCE

For further details refer to main reference

Legend

PHANEROZOIC — CENOZOIC

QUATERNARY — Unassigned

Sheetwash units
W Sandy and clayey distal sheetwash and slope deposits, no clearly defined drainage
Wt Silt and sand, surface is characterized by shallow depressions aligned perpendicular to the slope; supports banded mosaic vegetation ('tiger bush')

Sandplain unit
S Quartz sand of mixed origin; includes residual and eolian sands

Colluvial unit, third generation
C1 Quartz and rock fragments in an unconsolidated silt and sand matrix; includes ferruginous deposits

Alluvial units, third generation
A1 Silt, sand, and gravel in active drainage channels and on floodplains; includes ferruginous deposits
A1k Carbonate-rich silt, sand, and gravel in active drainage channels and on floodplains

Alluvial units, second generation
A2 Partly consolidated silt, sand, and gravel; partly dissected by present-day drainage
A2f Partly consolidated ferruginous silt, sand, and gravel; partly dissected by present-day drainage

Colluvial units, first generation
C3 Quartz and rock fragments in a weakly cemented and compacted silt and sand matrix; deeply dissected valley-fill deposits
C3f Ferruginous rubble and scree in a weakly cemented and compacted silt and sand matrix; partly dissected

Alluvial unit, first generation
A3 Weakly cemented and compacted silt, sand, and gravel; deeply dissected by present-day drainage

Residual or relict units
Rf Ferruginous deposits, including lateritic, ferruginous, and manganiferous duricrust
Rk Calcrete, developed in and adjacent to alluvial channels; carbonate and vuggy opaline silica; dissected by major present-day drainage
Rl Saprolite and saprock of uncertain protolith

od — Dolerite dykes, sills, or plugs; fine- to medium-grained dolerite; age uncertain

Mulka Tectonic Event (*c.* 570 Ma)
Edmundian Orogeny (1030–950 Ma[1])

PROTEROZOIC — MESOPROTEROZOIC

c.1070 Ma — Warakurna Supersuite — WARAKURNA LARGE IGNEOUS PROVINCE
EWKku-od — **KULKATHARRA DOLERITE:** dolerite and gabbro sills intruded into **Edmund Group** and **Collier Group**

Bangemall Supergroup — Collier Group — COLLIER BASIN
EMCi-sl — **ILGARARI FORMATION:** siltstone, mudstone, and fine-grained sandstone
EMCi-cl — Chert and silicified siltstone
EMCc-st — **CALYIE FORMATION:** quartz sandstone, siltstone, mudstone, conglomerate, and dolostone
EMCc-sl — Siltstone and minor sandstone
EMCc-ss — Thin- to thick-bedded sandstone and siltstone
EMCb-sl — **BACKDOOR FORMATION:** siltstone, mudstone, and thin- to thick-bedded sandstone; minor chert and dolostone
EMCb-cl — Chert and siltstone
EMCb-st — Thin- to thick-bedded sandstone and siltstone

Mutherbukin Tectonic Event (1280 –1250 Ma)

c.1465 Ma
Enr-od — **NARIMBUNNA DOLERITE:** dolerite and gabbro sills intruded into **Edmund Group**

PALEOPROTEROZOIC – MESOPROTEROZOIC — Bangemall Supergroup — Edmund Group — EDMUND BASIN

c.1465 Ma
EMEl-sl — **ULLAWARRA FORMATION:** siltstone; subordinate fine-grained sandstone, dolostone, and chert; locally intruded by numerous dolerite sills
EMEl-fn — Felsic volcaniclastic sandstone and breccia
EMEl-ss — Sandstone and siltstone
EMEv-sl — **DEVIL CREEK FORMATION:** siltstone, dolomitic siltstone, and dolostone
EMEd-cl — **DISCOVERY FORMATION:** massive or laminated chert, silicified mudstone, and siltstone; local silicified sandstone and conglomerate
EMEk-sf — **KIANGI CREEK FORMATION:** siltstone, mudstone, and thin- to very thick-bedded quartz sandstone; minor dolostone and conglomerate (not on map)
EMEk-sl — Siltstone; minor fine-grained sandstone
EMEk-kd — Dolostone, siltstone, and sandstone
EMEk-sp — Thin- to very thick-bedded sandstone and conglomerate
EMEk-sc — Conglomerate, pebbly sandstone, and sandstone
EMEk-ss — Sandstone and siltstone
EMEkt-fr — Massive or flow banded rhyolite: locally porphyritic
EMEkt-fn — Felsic volcaniclastic sandstone and siltstone: abundant accretionary lapilli locally
EMEk-st — Medium- to very thick-bedded quartz sandstone and siltstone
EMEk-stq — Silicified, feldspathic quartz sandstone, siltstone, and minor conglomerate
< 1620 Ma
EMEi-kd — **IRREGULLY FORMATION:** stromatolitic and non-stromatolitic dolostone, dolomitic siltstone, quartz sandstone, and conglomerate

Mangaroon Orogeny (1680–1620 Ma[2])
Capricorn Orogeny (1820–1770 Ma[3])

1817–1776 Ma — Moorarie Supersuite — GASCOYNE PROVINCE
EMO-gmp — Massive, medium-grained, porphyritic biotite monzogranite; round phenocrysts of K-feldspar up to 5 cm in diameter; minor fine- to medium-grained, sparsely porphyritic biotite monzogranite

Map symbols

Geological boundary
- exposed
Fault or shear
- exposed
- concealed
Fold, showing axial trace
- anticline; exposed, concealed
- syncline; exposed, concealed
Small-scale fold axial surface, showing strike and dip
- inclined
- vertical
Small-scale fold axis, showing trend and plunge
- anticline
- syncline
Bedding, showing strike and dip
- inclined
- vertical
- overturned
Trend of bedding
Metamorphic foliation, showing strike and dip
- inclined
Cleavage, showing strike and dip
- inclined
- vertical
Fracture, joint, or extension vein, showing strike and dip
- inclined
- vertical
Isotopic age determination site with identification number — 91591

Road, unsealed
Major track
Track
Fence, generally with track
Homestead — Mingah Springs
Building
Yard — Yard
Horizontal control; major, minor

Sand dune crest
Contour line, 20 metre interval — 620
Watercourse with ephemeral waterhole
Pool — Pool
Waterhole — Waterhole
Spring — Spring
Bore, Well — Bore, Well
Windpump, solar pump
Abandoned — (abd)
Position doubtful — (PD)
Mineral deposit or prospect — Abra

MINERAL SITES

MINERALIZATION STYLES
Stratabound sedimentary

MINERAL AND ROCK COMMODITY GROUPS
Base metal
Industrial Mineral

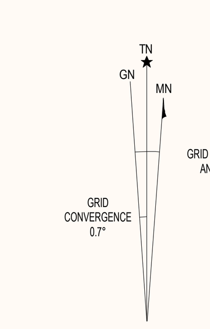
OPERATING STATUS AND MINEDEX SITE NUMBER
Mineral deposit — e.g. S5846
Mineral prospect — e.g. S25547

In the MINEDEX database the formal Site ID consists of 'S' followed by seven numbers. Site numbers shown on this map are abbreviated for clarity by removing the leading zeros (0). To search for the site numbers in the MINEDEX database you need to insert sufficient leading zeros (0).

e.g. S1234 = S0001234 or S12 = S0000012

MINERAL AND ROCK COMMODITIES

Commodity	Symbol
Barium	Ba
Copper	Cu
Gold	Au
Lead	Pb
Silver	Ag
Zinc	Zn



True north, grid north, and magnetic north are shown diagrammatically for the centre of the map. Magnetic north is correct for 2010 and moves westerly by approx. 1' annually

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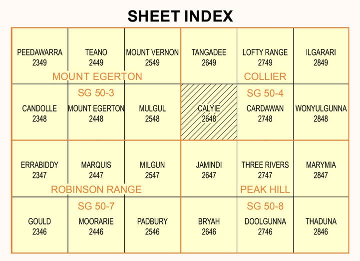
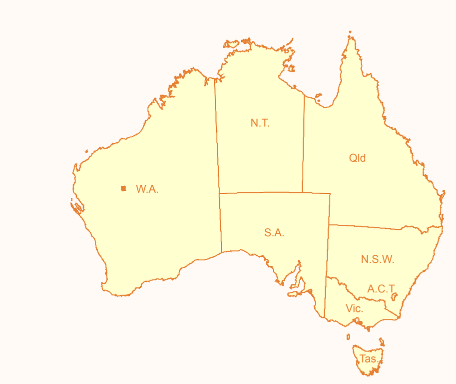


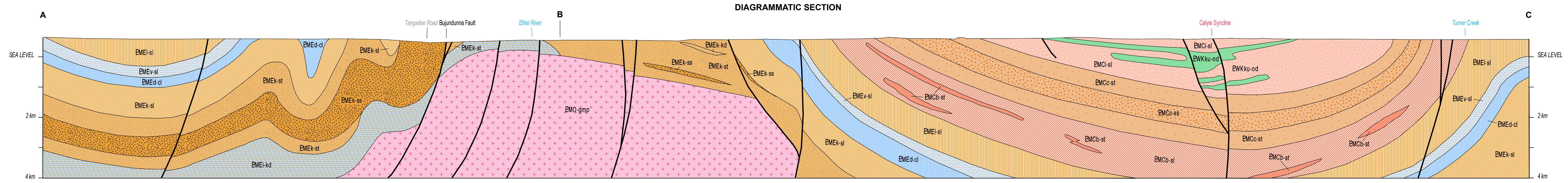
1 : 100 000 maps shown in black
1 : 250 000 maps shown in brown
Search for current GSWA map products online <http://www.dmp.wa.gov.au/GSWApublications>



Government of Western Australia
Department of Mines and Petroleum
HON. NORMAN MOORE, M.L.C.
MINISTER FOR MINES AND PETROLEUM

Geological Survey of Western Australia
RICK ROGERSON
ACTING EXECUTIVE DIRECTOR

DIAGRAMMATIC SECTION



Compiled by HN Cutten and AM Thorne, 2010

Bangemall Supergroup geology by AT Brakel, M Elias, and PC Muhling, 1974–75, J Vogt 1982–83, HN Cutten and AM Thorne, 2008

Gascoyne Province geology by S Sheppard, 2009

Geochronology from GSWA data (published and in preparation) and interpreted from external sources (listed below). Some GSWA geochronology may come from samples obtained on adjoining map sheets. GSWA geochronology data are available online at <http://www.dmp.wa.gov.au/geoview> and on DVD (Compilation of geochronology data – updated as required), or can be downloaded from <http://www.dmp.wa.gov.au/datacentre>.

Geochronology by:
(1) Sheppard, S, et al. 2007, Journal of Metamorphic Geology, v. 25, p. 477–494
(2) Sheppard, S, et al. 2005, Australian Journal of Earth Sciences, v.52, p. 443–460
(3) Evans, DAD, et al. 2003, Australian Journal of Earth Science, v. 50, p. 853–864

Cartography by AK Jones and I Lesiak
Edited by B Striewski and B Williams

Published by the Geological Survey of Western Australia. Digital and hard copies of this map are available from the Information Centre, Department of Mines and Petroleum, 100 Plain Street, East Perth, WA, 6004.
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Website <http://www.dmp.wa.gov.au/gswa> Email geological.survey@dmp.wa.gov.au

The recommended reference for this map is:
Cutten, HN, Thorne, AM and Sheppard, S 2010, Calyie, WA Sheet 2648: Geological Survey of Western Australia, 1:100 000 Geological Series.

DATA DIRECTORY

Theme	Data Source	Data Currency	Organization
Geology *	GSWA	2010	Dept of Mines and Petroleum
Structural data	WAROX	JUN 2010	Dept of Mines and Petroleum
Mineral sites *	MINEDEX	JUN 2010	Dept of Mines and Petroleum
Horizontal control	GESMAR	JUN 2010	Landgate
Topographic nomenclature	GEONOMA	2010	Landgate
Topography	Landgate and GSWA field survey	2010	Landgate
Contours	NASA SRTM 90m Digital Elevation Data	2000	Consultative Group for International Agriculture Research — Consortium for Spatial Information

* DMP data can be viewed online <http://www.dmp.wa.gov.au/geoview>, and related datasets can be downloaded from the GSWA Data and Software Centre <http://www.dmp.wa.gov.au/datacentre>

SCALE 1 : 100 000

1000 0 1 2 3 4 5 6 7 8 9 10
Metres Kilometres

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
HORIZONTAL DATUM: GEOCENTRIC DATUM OF AUSTRALIA 1994
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM

Grid lines indicate 1000 metre interval of the Map Grid Australia Zone 50

The Map Grid Australia (MGA) is based on the Geocentric Datum of Australia 1994 (GDA94)
GDA94 positions are compatible within one metre of the datum WGS84 positions

CALYIE

SHEET 2648 FIRST EDITION 2010

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