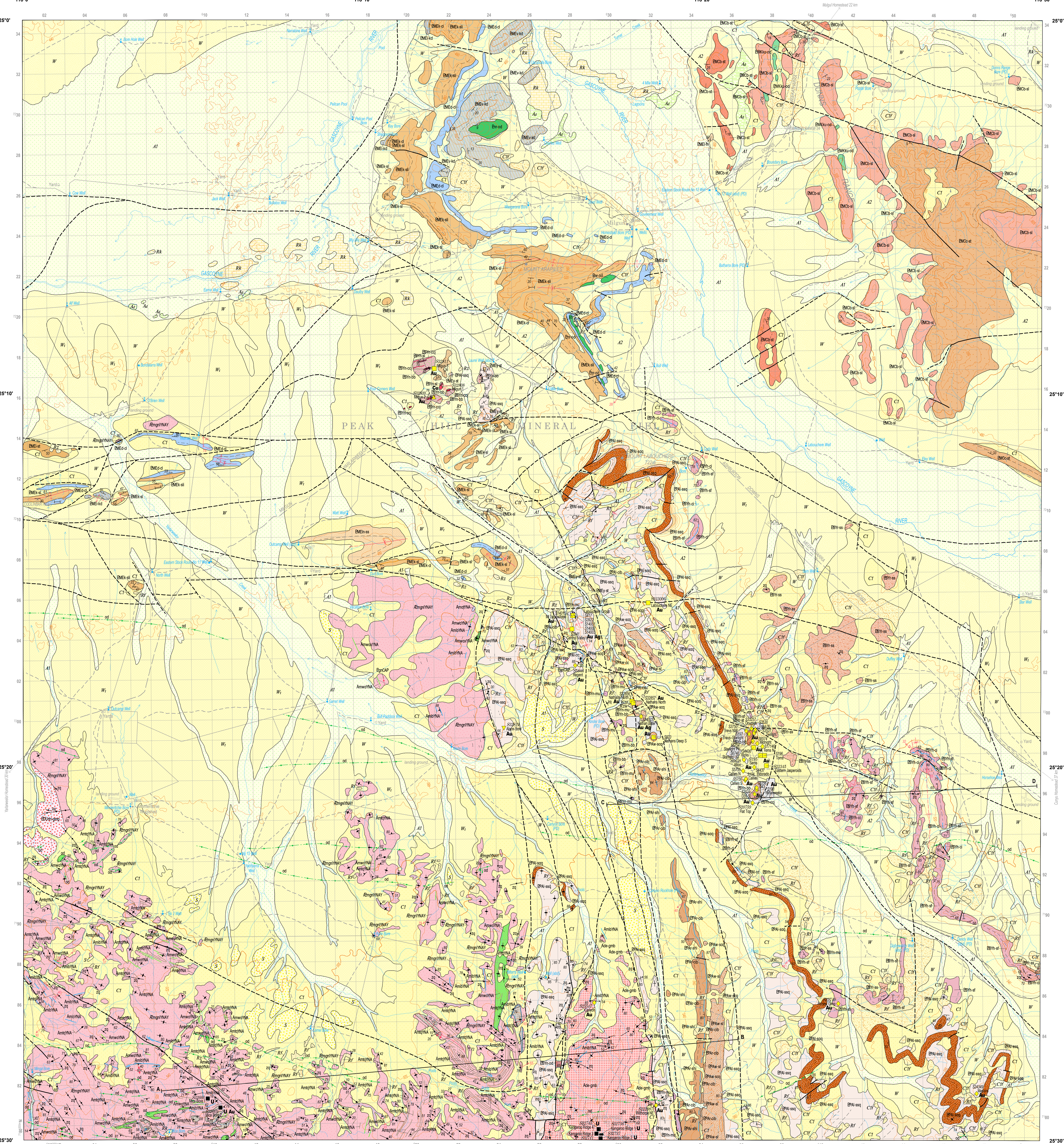
AUSTRALIA 1 : 100 000 GEOLOGICAL SERIES

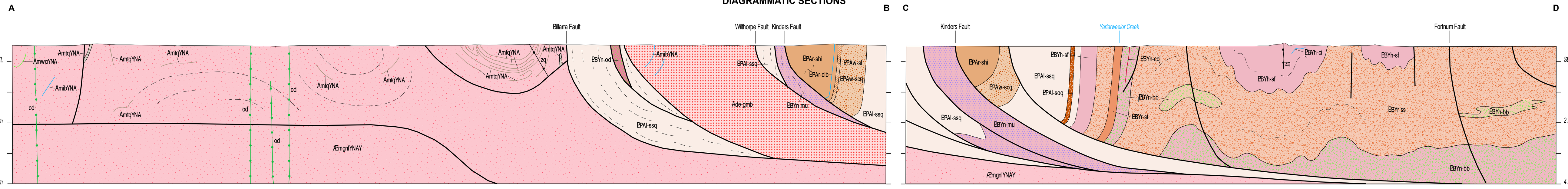
MILGUN

GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

SHEET 2547



DIAGRAMMATIC SECTIONS



PHANEROZOIC — CENOZOIC — QUATERNARY — Unassigned

W | Wt | Ad | S

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)

Alluvial unit
- *Ad* Unconsolidated, fine-grained deposits in alluvial drainage depressions, claypans, perennial lakes, and swamps; low-lying areas with internal drainage; typically thickly vegetated

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

C1 | C1f | A1

Colluvial units, second generation
- *C1* Quartz and rock fragments in an unconsolidated silt and sand matrix; includes ferruginous deposits
- *C1f* Unconsolidated ferruginous rubble and scree

Alluvial unit, second generation
- *A1* Unconsolidated silt, sand, and gravel in active drainage channels and floodplains; includes ferruginous deposits

A2

Alluvial unit, first generation
- *A2* Partly consolidated silt, sand, and gravel; partly dissected by present-day drainage

Rf | Rk | Rz | Rzu

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
- *Rz* Silcrete and brecciated siliceous caprock
- *Rzu* Silica caprock over ultramafic rock

zq | od
- zq Quartz vein or pod; massive, crystalline, or brecciated; age uncertain
- od Dolerite dykes, sills, or plugs; fine- to medium-grained dolerite; age uncertain

PROTEROZOIC — PALEOPROTEROZOIC–MESOPROTEROZOIC

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

c. 1070 Ma — ⱣWKku-od **KULKATHARRA DOLERITE:** dolerite and gabbro sills intruded into Edmund Group and Collier Group

Bangemall Supergroup — Collier Group (COLLIER BASIN)
- ⱣMCc-st **CALYIE FORMATION:** quartz sandstone, siltstone, mudstone, conglomerate, and dolostone
- ⱣMCb-sl **BACKDOOR FORMATION:** siltstone, mudstone, and thin- to thick-bedded sandstone; minor chert and dolostone
  - ⱣMCb-st Thin- to thick-bedded sandstone and siltstone

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

Bangemall Supergroup — Edmund Group (EDMUND BASIN)

c. 1460 Ma
- ⱣMEl-fn Felsic volcaniclastic sandstone and breccia
- ⱣMEln-ss **Nanular Member:** thin- to thick-bedded sandstone and siltstone
- ⱣMEl-sl **ULLAWARRA FORMATION:** siltstone; subordinate fine-grained sandstone, dolostone, and chert; locally intruded by numerous dolerite sills (not on map)
- ⱣMEv-kd **DEVIL CREEK FORMATION:** laminated dolostone and dolomitic siltstone; local thick-bedded dolorudite
- ⱣMEd-cl **DISCOVERY FORMATION:** massive or laminated chert, silicified mudstone, and siltstone; local silicified sandstone and conglomerate
- ⱣMEk-sf **KIANGI CREEK FORMATION:** siltstone, mudstone, and thin- to very thick-bedded quartz sandstone; minor dolostone and conglomerate (not on map)
  - ⱣMEk-cl Chert and siltstone
  - ⱣMEk-sli Ferruginous siltstone; minor fine-grained sandstone; commonly manganiferous
  - ⱣMEk-sl Siltstone; minor fine-grained sandstone
- ⱣMEi-kd **IRREGULLY FORMATION:** stromatolitic and non-stromatolitic dolostone, dolomitic siltstone, quartz sandstone, and conglomerate
  - ⱣMEi-st Sandstone, conglomerate, siltstone, and dolostone
- c. 1620 Ma — ⱣMEy-st **YILGATHERRA FORMATION:** sandstone; subordinate siltstone, conglomerate, and dolostone

Mangaroon Orogeny (1680–1620 Ma)
- Ᵽgn-CAP Granitic dyke; includes muscovite-bearing leucogranite and pegmatite

c. 1620 Ma — Durlacher Supersuite (GASCOYNE PROVINCE)
- ⱣDUdh-gmp **DISCRETION GRANITE:** medium-grained, porphyritic biotite monzogranite; tabular phenocrysts of K-feldspar

Capricorn Orogeny (1815–1770 Ma)

c. 1800 Ma — Moorarie Supersuite
- ⱣMO-g Undivided; granite and minor gabbro and metamorphosed equivalents (Interpreted bedrock geology only)

PALEOPROTEROZOIC

Glenburgh Orogeny (2005–1950 Ma)

Padbury Group (PADBURY BASIN) — <c. 2000 Ma
- ⱣPAr-shi **ROBINSON RANGE FORMATION:** ferruginous shale, siltstone, banded iron-formation, and chert
  - ⱣPAr-cib Banded iron-formation
- ⱣPAw-scq **WILTHORPE FORMATION:** pebble to boulder conglomerate; clasts include vein quartz, minor chert, quartz wacke, and granitoid; quartz wacke and finely bedded siltstone; locally chloritic; graded beds
  - ⱣPAw-cc Chert
  - ⱣPAw-sl Siltstone; finely bedded
- ⱣPAl-ssq **LABOUCHERE FORMATION:** quartz wacke and siltstone with local quartz pebble conglomerate beds. Includes zones of quartz schist, quartz–muscovite schist, and minor biotite–muscovite schist, locally with chloritoid, staurolite, and/or andalusite
  - ⱣPAl-cib Banded iron-formation and ferruginous chert
  - ⱣPAl-sqq Quartz arenite; minor interleaved quartz wacke and siltstone
  - ⱣPAl-cc Chert

Bryah Group (BRYAH BASIN) — <c. 2015 Ma
- ⱣBYh-sf **HORSESHOE FORMATION:** ferruginous, chloritic shale, and quartz–feldspar wacke; partly manganiferous and calcareous; includes iron formation and chert
  - ⱣBYh-ci Iron formation, quartz–magnetite(–stilpnomelane); white chert lenses
  - ⱣBYh-cc Chert
- ⱣBYr-ss **RAVELSTONE FORMATION:** lithic wacke and siltstone; chloritic fragments; graded beds (coeval and interbedded with NARRACOOTA FORMATION)
  - ⱣBYr-st Lithic quartz–feldspar sandstone; interbedded minor siltstone; thinly bedded; chloritic matrix
- ⱣBYn-bb | ⱣBYn-od | ⱣBYn-mu | ⱣBYn-ccj | ⱣBYn-sl
  - ⱣBYn-bb **NARRACOOTA FORMATION:** basalt and mafic–ultramafic schist; locally pillowed and plagioclase-phyric; interbedded with volcaniclastic and sedimentary rock (coeval and interbedded with RAVELSTONE FORMATION)
  - ⱣBYn-od Dolerite; in sills and dykes
  - ⱣBYn-mu Ultramafic and mafic schist; talc–chlorite–quartz(–carbonate) schist and actinolite–chlorite schist
  - ⱣBYn-ccj Jasperoidal chert
  - ⱣBYn-sl Grey to black siltstone; local biotite–chlorite slate; as interflow layers within basaltic rocks

ARCHEAN–PROTEROZOIC — ARCHEAN–PALEOPROTEROZOIC (YILGARN CRATON)
- Ade-gmb **DESPAIR GRANITE:** biotite granite, foliated to locally massive; includes lenses of biotite schist, quartzite, banded iron-formation, amphibolite, and quartzite
- AmtqYNA Foliated quartzite; minor quartz–diopside gneiss
- AmibYNA Metamorphosed banded iron-formation; quartz–magnetite(–hematite) rocks; grunerite abundant locally
- AmwaYNA Amphibolite; fine- to medium-grained hornblende–plagioclase rock, and medium-grained porphyritic hornblende–plagioclase rock; locally includes metagabbro and metaleucogabbro
- AmwaxYNA Amphibolite gneiss; fine- to medium-grained, hornblende–plagioclase–clinopyroxene rock; granoblastic texture
- AmatYNA Fine- to medium-grained serpentine–talc–magnetite–calcite(–tremolite–titanite) rock after peridotite
- 3300–1810 Ma — ÆmgnlYNAY Leucocratic granitic gneiss; derived from 3300–2660 Ma biotite granite and granitic gneiss, intruded by sheets and veins of coarse-grained granite and pegmatite (ⱣMO-mgmp); all deformed and metamorphosed at c. 1810 Ma

Geological boundary
- exposed

Fault or shear
- exposed
- concealed

Fold, showing axial trace
- anticline; exposed, concealed
- syncline; exposed, concealed
- antiform; exposed
- overturned antiform; exposed

Small-scale fold axial surface, showing strike and dip
- inclined
- vertical

Small-scale fold axis, showing trend and plunge
- unspecified
- anticline
- syncline
- M-vergence
- Z-vergence

Bedding, showing strike and dip
- inclined
- vertical
- overturned
- trend of bedding

Trend of bedding or foliation

Igneous layering, showing strike and dip
- inclined
- vertical

Foliation, unspecified
- trend of foliation

Metamorphic foliation, showing strike and dip
- inclined
- vertical
- dip indeterminate
- dip unknown

Gneissic banding, showing strike and dip
- inclined
- vertical
- trend of gneissic banding or layering

Cleavage, showing strike and dip
- inclined
- vertical

Crenulation cleavage, showing strike and dip
- inclined
- vertical

Lineation, unspecified, showing trend and plunge
- inclined

Mineral lineation, showing trend and plunge
- inclined

Axis of crenulation, showing trend and plunge
- inclined

Bedding–cleavage intersection lineation, showing trend and plunge
- inclined

Cleavage–cleavage intersection lineation, showing trend and plunge
- inclined

Flow lineation, showing trend and plunge
- inclined

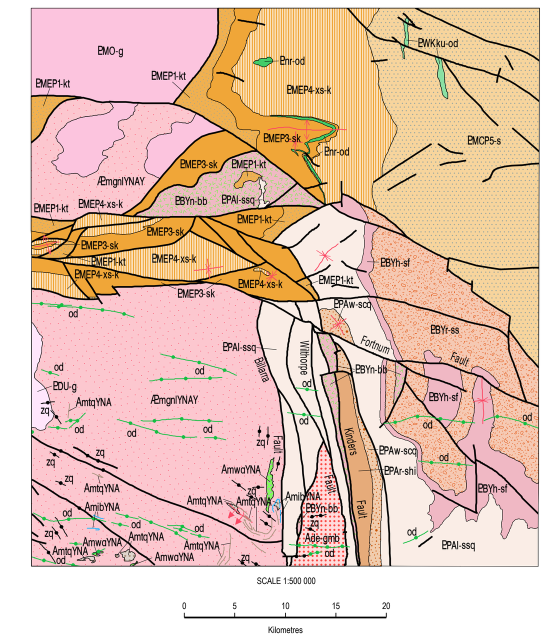
Fracture, joint, or extention vein, showing strike and dip
- vertical

Road, unsealed; Major track; Track; Fence, generally with track; Homestead (Milgun); Building; Yard; Microwave repeater station; Horizontal control; major, minor; Contour line, 20 metre interval

Watercourse with ephemeral pool; Lake; Pool; Rockhole; Bore, well; Windpump; Abandoned (abd); Position doubtful (PD)

Opencut; Made ground; Tailings

INTERPRETED BEDROCK GEOLOGY



- zq / od — Quartz veins; various ages / Dolerite dykes; various ages
- ⱣWKku-od Kulkatharra Dolerite
- Collier Group (COLLIER BASIN): ⱣMCP5-s Depositional Package 5 (Backdoor, Calyie Formations)
- Ᵽnr-od Narimbunna Dolerite
- Edmund Group (EDMUND BASIN): ⱣMEP4-xs-k Depositional Package 4 (Discovery, Devil Creek, Ullawarra Formations); ⱣMEP3-sk Depositional Package 3 (Kiangi Creek Formation); ⱣMEP1-kt Depositional Package 1 (Yilgatherra, Irregully Formations)
- Durlacher Supersuite / Moorarie Supersuite (GASCOYNE PROVINCE): ⱣDU-g Discretion Granite; ⱣMO-g Granite
- Padbury Group (PADBURY BASIN): ⱣPAr-shi Robinson Range Formation; ⱣPAw-scq Wilthorpe Formation; ⱣPAl-ssq Labouchere Formation
- Bryah Group (BRYAH BASIN): ⱣBYh-sf Horseshoe Formation; ⱣBYr-ss Ravelstone Formation; ⱣBYn-bb Narracoota Formation
- YILGARN CRATON: Ade-gmb Despair Granite; AmtqYNA Foliated quartzite; AmibYNA Metamorphosed banded iron-formation; AmwaYNA Metamorphosed mafic igneous rock; ÆmgnlYNAY Leucocratic granitic gneiss

MINERAL SITES

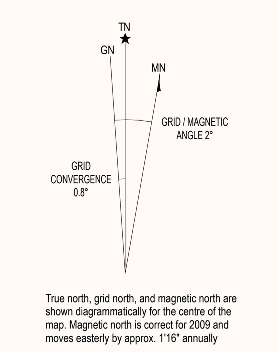
MINERALIZATION STYLES
- Vein and hydrothermal
- Stratabound volcanic and sedimentary
- Stratabound sedimentary
- Regolith hosted
- Undivided

MINERAL AND ROCK COMMODITY GROUPS
- Precious metal
- Base metal
- Energy

OPERATING STATUS AND MINEDEX SITE NUMBER
- Mine, shut — e.g. S33254
- Mineral deposits — e.g. S5846
- Mineral occurrence or 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
- Copper — Cu
- Gold — Au
- Silver — Ag
- Uranium — U



True north, grid north, and magnetic north are shown diagrammatically for the centre of the map. Magnetic north is correct for 2009 and moves easterly by approx. 1'16" annually

SHEET INDEX

PEEDAWARRA 2349	TEANO 2449	MOUNT VERNON 2549	TANGADEE 2649	LOFTY RANGE 2749	ILGARARI 2849
CANDOLLE 2348	MOUNT EGERTON 2448	MULGUL 2548	CALYIE 2648	CARDAWAN 2748	WONYULGUNNA 2848
ERRABIDDY 2347	MARQUIS 2447	MILGUN 2547	JAMINDI 2647	THREE RIVERS 2747	MARYMIA 2847
GOULD 2346	MOORARIE 2446	PADBURY 2546	BRYAH 2646	DOOLGUNNA 2746	THADUNA 2846

1:250 000 sheets: MOUNT EGERTON SG 50-3; COLLIER SG 50-4; ROBINSON RANGE SG 50-7; PEAK HILL SG 50-8

1 : 100 000 maps shown in black
1 : 250 000 maps shown in brown
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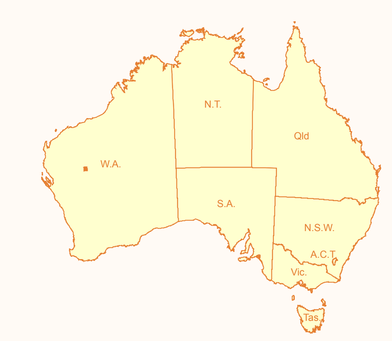

Compiled by AM Thorne 2009

Bangemall Supergroup geology by M Elias 1974–75, PC Muhling 1974–76, CP Swager 1995, and AM Thorne 2007

Gascoyne Province, Bryah and Padbury Basins, and Yilgarn Craton geology by M Elias 1974–75, SJ Williams 1975, RD Gee 1977–80, JS Myers and CP Swager 1995, and S Sheppard 1996

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 www.dmp.wa.gov.au/geoview and on DVD (Compilation of geochronology data — updated as required), or can be downloaded from www.dmp.wa.gov.au/datacentre.

Geochronology by:
(1) Sheppard, S et al. 2007, Journal of Metamorphic Geology, v. 25, p. 477–494

Cartography by AK Jones
Edited by S Martin

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. Phone (08) 9222 3459 Fax (08) 9222 3444
Website <http://www.dmp.wa.gov.au> Email geological.survey@dmp.wa.gov.au

The recommended reference for this map is:
Swager, CP, Myers JS and Thorne, AM 2010, Milgun, WA Sheet 2547 (2nd edition): 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	OCT 2009	Dept of Mines and Petroleum
Mineral sites	MINEDEX *	OCT 2009	Dept of Mines and Petroleum
Horizontal control	GESMAR	JUL 2007	Landgate
Topographic nomenclature	GEONOMA	2007	Landgate
Topography	Landgate and GSWA field survey	2006	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>

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

SCALE 1 : 100 000

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

GDA 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

MILGUN

SHEET 2547 SECOND EDITION 2010

Version 1.0 – May 2010

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