

- Qa Alluvial deposits in active channels and on floodplains.
- Qr Red earth soils; may have ferruginous pisoliths.
- Qar Alluvial/red soil plains.
- Qs Sheet and dune sand, sandy soil.
- Qas Relict fluvial system, sand covered.
- Qc Colluvium; scree.
- Qcq Quartz-rich colluvium and scree.
- Qp Claypan; clay soil in poorly drained depression.
- Czs Sheet sand or sandy soil on rise overlying subcrop.
- Czc Dissected colluvial fan deposits.
- Czq Quartz-rich dissected colluvial fan deposits.
- Czk Calcrete.
- Czb Black soil.
- Ts Silcrete/silicified rock.
- Tf Ferricrete/ferruginised rock; laterite.
- Ta Deeply weathered rock.

Kl Sandstone and interbedded siltstone; medium bedded and cross-laminated; plant macrofossils.

Emp Brown and white claystone, red to white micaceous sandstone, red-brown and white micaceous siltstone and claystone; minor local conglomerate; fossiliferous.

Emm Grey bioclast, stylonitic, onkoid, mottled, ribbon and cryptomicrobial limestone and dolostone, minor maroon siliclastic and yellow-grey dolomitic mudstone; chert and evaporite nodules; local basal breccia; chertified at surface; fossiliferous.

Eln Weathered vesicular basalt; minor felsic volcanic and volcanoclastic rocks; pebble conglomerate and lithic arenite.

Eur Conglomerate and sandstone; monomictic and polymictic orthoconglomerate; channel cross-bedded. Quartz arenite; predominantly medium bedded, parallel, or cross-bedded.

Eur<sub>s</sub> Quartz arenite; unfossiliferous.

Emy Chertified limestone or dolostone including ooid and flat-pebble intraclast limestone, calcimudstone, quartz sandstone.

Emg Chertified bioclast, onkoid and cryptomicrobial limestone, marly calcimudstone, minor siliclastic mudstone; carbonate and evaporite nodules; basal maroon-purple sandstone and maroon-brown siliclastic mudstone; fossiliferous.

Egw Granite: Two-mica, corundum-bearing, granite and granodiorite; coarse grained, equigranular, massive. Pegmatitic segregations, greisenisation; quartz-biotite metamorphic aureole.

Egp Lamprophyre.

D<sub>2</sub>/D<sub>2</sub>'

- Etb Quartz arenite and sublithic arenite; medium to coarse grained, parallel, or cross-bedded; thin to medium bedded; rippled. Siltstone. Ridge forming.
- Eta Undifferentiated, dolostone and limestone, siltstone, quartz arenite, and sublithic arenite.
- Eta<sub>d</sub> Dolostone and limestone; cryptomicrobial boundstone and stromatolitic bioherms; ooid and pisoid dolostone; laminated and cross-laminated sandy dolostone.
- Eta<sub>2</sub> Siltstone and cherty siltstone; cross-laminated quartz arenite; laminated mudstone.
- Ets Undifferentiated, quartz arenite; sublithic and lithic arenite; feldspathic sublitharenite; siltstone.
- Ets<sub>2</sub> Quartz arenite, sublithic and lithic arenite; feldspathic sublitharenite; beds in thick to massive sets; trough cross-bedding near base; predominantly planar, laterally persistent bedding; laminated and cross-laminated; minor ripples increasing in abundance towards top of unit.
- Ets<sub>3</sub> Quartz arenite; sublithic arenite and feldspathic sublitharenite; siltstone. Thin to medium bedded; beds in medium sets; abundant ripples.
- Ets<sub>4</sub> Quartz arenite and minor pebbly sandstone; planar, grain size laminated and bedded, tabular; abundant weathered-out shale clasts.
- Ets<sub>2d</sub> Siltstone; thin bedded with subordinate interbedded sandstone.
- Ets<sub>3c</sub> Conglomerate; local, laterally persistent; pebble-, cobble- and boulder-orthoconglomerate; predominantly monomictic; sandstone and rare black chert clasts. Coarse grained to granular, pebble-bearing quartz arenites.
- Etm Sublithic and lithic arenite; feldspathic litharenite; siltstone; dolostone and sandy dolostone. Arenite, coarse to fine grained, thin, medium and minor thick to massive beds; moderately sorted and rounded. Dolostone and siltstone thin bedded and laminated, including cryptomicrobial dolostone.
- Etm<sub>c</sub> Conglomerate.
- Etw Interbedded leached white and pink calcareous shale and fine grained arenite; quartz arenite; green mudstone; chertified stromatolitic bioherms; deeply weathered volcanic rocks including vesicular lava. Predominantly lateritised.
- Eth<sub>3</sub> Sublithic arenite; fine to medium grained, well sorted and rounded; medium to thick bedded or massive, becoming thinner bedded towards top of unit; pebbly arenite; minor conglomerate locally at base of unit; silicified; ridge forming. Intermediate volcanic rocks, lateritised and recessive.
- Eth<sub>v</sub> Acid to intermediate volcanic rocks; deeply weathered and ferruginised; recessive.
- Eth<sub>2</sub> Lithic and sublithic arenite; volcanic arenite; feldspathic sublitharenite; pebbly arenite. Medium to coarse grained; thin to medium bedded; planar, and shallow angle cross-bedded; rippled; dissected and discontinuous ridges.
- Eth<sub>1</sub> Shale and siltstone; thin, planar bedded; recessive.
- Eth<sub>1</sub> Lithic to sublithic arenite; volcanic arenite; pebbly arenite. Fine to medium grained; medium to thick bedded; planar, and shallow angle, cross-beds. Ridge forming. Minor thin, planar bedded fine grained sandstone and siltstone (particularly at top of unit). Recessive.
- Eth Undifferentiated lithic and sublithic arenite; feldspathic sublitharenite; pebbly arenite; shale; deeply weathered, acid to intermediate volcanic rocks.
- Eth<sub>0</sub> Polymictic orthoconglomerate, in local channels.

Eth<sub>w</sub> Interbedded leached white and pink calcareous shale and fine grained arenite; quartz arenite; green mudstone; chertified stromatolitic bioherms; deeply weathered volcanic rocks including vesicular lava. Predominantly lateritised.

Eth<sub>3</sub> Sublithic arenite; fine to medium grained, well sorted and rounded; medium to thick bedded or massive, becoming thinner bedded towards top of unit; pebbly arenite; minor conglomerate locally at base of unit; silicified; ridge forming. Intermediate volcanic rocks, lateritised and recessive.

Eth<sub>v</sub> Acid to intermediate volcanic rocks; deeply weathered and ferruginised; recessive.

Eth<sub>2</sub> Lithic and sublithic arenite; volcanic arenite; feldspathic sublitharenite; pebbly arenite. Medium to coarse grained; thin to medium bedded; planar, and shallow angle cross-bedded; rippled; dissected and discontinuous ridges.

Eth<sub>1</sub> Shale and siltstone; thin, planar bedded; recessive.

Eth<sub>1</sub> Lithic to sublithic arenite; volcanic arenite; pebbly arenite. Fine to medium grained; medium to thick bedded; planar, and shallow angle, cross-beds. Ridge forming. Minor thin, planar bedded fine grained sandstone and siltstone (particularly at top of unit). Recessive.

Eth Undifferentiated lithic and sublithic arenite; feldspathic sublitharenite; pebbly arenite; shale; deeply weathered, acid to intermediate volcanic rocks.

Eth<sub>0</sub> Polymictic orthoconglomerate, in local channels.

En Undifferentiated, felsic ignimbrite, tuff, lapilli tuff, and lava; chert (silicified tuff?); lithic and sublithic arenite, lithic wacke, shale and mudstone; minor pebble beds, conglomerate and breccia.

Enr Lithic and volcanic arenite; heavy mineral-bearing quartz arenite; granule and pebble beds; felsic tuff. Arenite, fine to coarse grained; thin to medium bedded.

Enw Sublithic and lithic arenite, siltstone, shale. Medium to thick bedded. Minor thin to medium bedded tuff; chert (silicified tuff?).

Enw<sub>v</sub> Rhyolitic lava and ignimbrite, tuff and silicified tuff (chert).

Eno Chert (silicified tuff?); tuff, white weathering siltstone and shale; fine grained sublithic arenite; thin to medium bedded; laminated.

Enb Felsic crystal-lithic tuff, ignimbrite, lapilli tuff, and lava (?); chert. Siltstone, shale and fine grained lithic arenite and wacke; thin bedded and laminated.

Enw<sub>v</sub> Lithic arenite; siltstone and shale; medium to coarse grained sandstone, pebble beds and granule conglomerate; thin to thick bedded or massive; heavy mineral-bearing laminae; cross-laminated or cross-bedded, trough cross-bedded, rippled.

Enm Rhyolitic and rhyodacitic tephra, tuffaceous sandstone and siltstone; chert; shale. Thin to medium bedded; parallel, or cross-laminated.

Ehe Quartz arenite, lithic/feldspathic arenite.

Ehe<sub>c</sub> Conglomerate.

Ehb Amygdaloidal massive basalt with minor interlayered arenite.

Ehc Quartz arenite, lithic/feldspathic arenite; minor siltstone.

Ehd Lithic/feldspathic/micaceous arenite; greywacke; siltstone.

Ehs Quartz arenite and lithic/feldspathic arenite, commonly pebbly.

Enj Lithic arenite and volcanic arenite with interbedded laminated siltstone and mudstone; cross-bedded, thin to thick bedded. Rhyodacitic lava, crystal-lithic tuff and lapilli tuff, and ignimbrite. Volcanic breccia in drill core.

Eny Undifferentiated, lithic arenite including volcanic arenite; siltstone and shale; felsic lava and minor tuff.

Eny<sub>s</sub> Quartz-magnetite (heavy mineral-bearing) lithic to sublithic arenite and volcanic arenite, siltstone and shale; medium to coarse grained sandstone, pebble beds with rhyolitic clasts; thin to thick bedded or massive; magnetite laminae; cross-laminated and cross-bedded. Interbedded felsic tuff; siltstone and fine grained volcanoclastic rocks; thin to medium bedded, parallel and cross-laminated.

Eny<sub>v</sub> Welded and non-welded felsic crystal-lithic tuff and lapilli tuff; minor felsic volcanic lava and ignimbrite.

Eny<sub>w</sub> Felsic crystal-lithic tuff and lapilli tuff. Rhyolitic and rhyodacitic lava; foliated to massive and porphyritic. Felsic ignimbrite. Volcanic arenite with interbedded siltstone. Medium to thick bedded.

Egz Monzonite and quartz monzonite intersected in drill core; quartz diorite forming small plutons or dykes.

Eel Dolerite and minor lamprophyre.

Eep Felsic porphyry; quartz and/or feldspar phenocrysts in a felsic aphanitic groundmass; massive to foliated.

Egt Granite: Biotite-bearing; seriate porphyritic to equigranular, medium to coarse grained and massive. Rapakivi texture, and blue ovoid quartz. Foliated to sheared in part, locally gneissic. Locally abundant porphyritic granite enclaves, minor metasediment, and dolerite xenoliths. Marginal alteration including silicification and tourmalinisation (minor luxullianite) and alkali metasomatism. (Egt, Tennant Creek Granite at Red Bluff).

Egg Granite: Biotite-bearing; seriate porphyritic to equigranular, medium to coarse grained and massive. Rapakivi texture. In drill core, foliated to sheared in part, locally gneissic. Minor metasediment xenoliths.

Egc Granite: Biotite-bearing; seriate porphyritic to equigranular, medium to coarse grained and massive. Minor rapakivi texture. Minor metasediment and dolerite xenoliths, rare porphyritic enclaves. Alteration including silicification, albittisation and tourmalinisation (minor luxullianite).

Egm Granodiorite; ranges from tonalite to granite: Biotite-bearing; megacrystic, seriate porphyritic to equigranular, coarse to very coarse grained and massive. Strongly foliated to sheared in part. Locally abundant porphyritic enclaves with rapakivi texture and blue ovoid quartz. Abundant metasediment xenoliths. Localised alteration including silicification, albittisation, and tourmalinisation.

Eg Undifferentiated granite.

D<sub>1</sub>

Ew Undifferentiated, lithic arenite including volcanic arenite ('metagreywacke'), siltstone, shale, slate and terrigenous mudstone; 'haematite shale'; minor phyllite; chert including jasper.

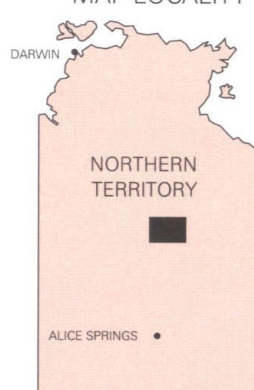
Ew<sub>s</sub> Lithic arenite including volcanic arenite ('metagreywacke'); coarse grained; medium to thick bedded or massive; predominantly graded and parallel bedded. Subordinate fine grained sandstone; siltstone and terrigenous mudstone including 'haematite shale'; slate; medium or thin bedded, parallel, or cross-laminated. Sole and ripple marks. Chert including jasper. Partial or complete Bouma sequences.

Ew<sub>m</sub> Fine to medium grained lithic arenite including volcanic arenite ('metagreywacke'), siltstone, shale, slate and terrigenous mudstone; minor phyllite; red, green and purple weathering shale; pencil slate; thin to medium bedded, parallel- or cross-laminated. Lithic arenite subordinate or subequal to siltstone and shale. 'Haematite shale'. Partial Bouma sequences.

## GEOLOGICAL SYMBOLS

- Geological boundary, position approximate
- Fault; solid line, observed; broken line, approximate; short dashes, concealed; queried, inferred (all concealed faults are inferred, q-quartz infill)
- Thrust-fault showing dip of fault plane (recent earthquake scarp)
- Fault showing relative horizontal displacement
- Strike and dip of strata
- Strike of vertical strata
- Strike and dip of inverted strata
- Horizontal strata
- Vein or dyke; predominantly quartz unless otherwise specified; Ep-felsic porphyry, Edl-dolerite, Elp-lamprophyre, apl-aplite
- Strike and dip of cleavage (slaty, crenulation or fracture cleavage)
- Strike of vertical cleavage
- Strike and dip of platy alignment
- Strike and dip of foliation
- Strike of vertical foliation
- Strike and dip of strata, dip 5° to 15° (photo-interpreted bedding)
- Strike and dip of strata, dip greater than 45° (photo-interpreted bedding)
- Shearing showing latest stage of movement in map view
- Shear zone
- Anticline, position accurate; position approximate
- Syncline, position accurate; position approximate; concealed
- Minor anticline showing plunge
- Minor syncline showing plunge
- Kink fold showing plunge
- Minor fold showing plunge and vergence to left (first folding episode or episode not specified)
- Minor fold showing plunge and vergence to left (second episode folding)
- Minor fold showing plunge and vergence to right (first folding episode or episode not specified)
- Minor fold showing plunge and vergence to right (second episode folding)
- Plant fossil locality; macrofossil locality and reference number, respectively
- Unconformity (legend only)
- Facies change (legend only)

## MAP LOCALITY



## INDEX TO ADJOINING MAPS

SE 53-9 SOUTH LAKE WOODS	SE 53-10 HELEN SPRINGS	SE 53-11 BRUNETTE DOWNS
Thing 5567	Muckaty 5680	Brunchly 5760
Lee 5559	Short Range 5659	Flynn 5759
Billat 5558	Billat 5658	Bonny 5659
	TENNANT CREEK	Finnis 5659
	SE 53-14	SE 53-15
	Green Swamp Well	ALROY
	Hanson 5557	Charuba 5657
	Bonny 5757	Corrididge 5657
	SF 53-1	Epanema 5657
	LANDER RIVER	SF 53-2
	BONNEY WELL	SF 53-3
		FREW RIVER

Geology : First edition: BMR  
Second edition: NTGS  
1989 N. Donnellan, K.J. Hussey, D.I. Scott  
1990-1993 N. Donnellan, R.S. Morrisson, K.J. Hussey  
Palaeozoic : 1991 P.D. Kruse, N. Donnellan  
Compiled : 1994-1996 N. Donnellan  
Design : 1997 J. Lambton-Young  
Digital Cartography : 1994-1997 J. Lambton-Young, D.A. Lambton-Young, A.B. Brook  
Colour Separations : 1997 Australian Geological Survey Organisation  
Printed : 1998 Mercury-Walch Pty Ltd, Hobart, Australia

Published by the Department of Mines and Energy  
Issued under the authority of the Minister of Mines and Energy  
the Honourable Eric Poole MLA  
Base map compiled by the Division of National Mapping  
in 1973, with additions in 1995 by NTGS.



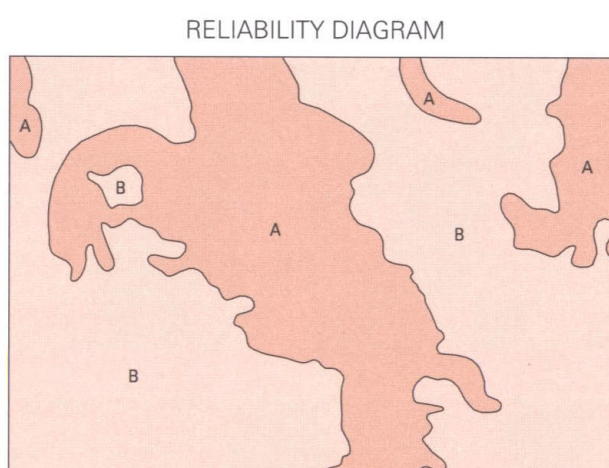
C. A. Mulder, Director, Northern Territory Geological Survey

## TENNANT CREEK

SHEET SE 53-14

SECOND EDITION 1998

© CROWN COPYRIGHT RESERVED



A : Detailed traverses

B : Airphoto interpretation with limited traverses: generally poor outcrop