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PINE CREEK 1:100 000 SHEET AREA, N.T., DATA RECORD

P.G. Stuart-Smith, R.S. Needham, D.A. Wallace & L. Bagas*

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ABSTRACT

This record summarises the results of the 1980 Pine Creek Geological Party (BMR & NTGS), presenting petrographic descriptions and an outline of revised stratigraphy for the Pine Creek 1: 100 000 Sheet area, Northern Territory. The area includes Early Proterozoic metasediments of the Masson Formation, Mundogie Sandstone, Wildman Siltstone, Koolpin Formation, Gerowie Tuff, Mount Bonnie Formation and the Burrell Creek Formation which are unconformably overlain by Middle Proterozoic, Palaeozoic, Mesozoic and Cainozoic sediments. The Early Proterozoic units are intruded and extensively hornfelsed by pre-orogenic dolerite, syn- to post-orogenic granitoids and minor post-orogenic dolerite dykes. The granitoids form the Cullen Batholith which has been subdivided into several plutons.

INTRODUCTION

This record summarises the results of the 1980 field work of the Pine Creek Geological Party of the Bureau of Mineral Resources (BMR) and the Northern Territory Geological Survey (NTGS) in the Pine Creek 1:100 000 Sheet area (Fig. 1). The work was a continuation of geological field work in the Pine Creek Geosyncline, as part of the Pine Creek Project, whose overall objective was to study the geology, geophysics, and mineralisation of the geosyncline; an important subsidiary objective was to produce 1:100 000-scale geological maps of the region. The Pine Creek 1:100 000 sheet was published in 1985 (Stuart-Smith & others, 1985). A detailed account of the geology is given in the Map Commentary (Stuart-Smith & others, 1987).

This record presents a brief petrographic descriptions and an outline of the geology of the sheet area. The locations of all petrographic samples are shown on Plate 1.

Fieldwork was based on 1:25 000-scale colour airphotos in conjunction with 1:89 000-scale panchromatic airphotos. Copies of compilation sheets at their original photo-scale can be obtained from the BMR Copy Service, GPO Box 378, Canberra, ACT 2601 - price on application.

GEOLOGY

The generalised geology of the Pine Creek Sheet area is shown in Fig. 2 and summarised in Table 1.

The area includes tightly to isoclinally folded north-trending Early Proterozoic metasediments which are unconformably overlain by Middle Proterozoic, Palaeozoic, Mesozoic and Cainozoic sediments. The metasediments are intruded by pre-orogenic Zamu Dolerite dykes and sills, syn- to post-orogenic granitoids, and minor post-orogenic dolerite dykes.

The major significant revision of previous work is the reinterpretation of Early Proterozoic units and extension of the stratigraphy established by BMR/NTGS in other parts of the Pine Creek Geosyncline during the late 1970's, and differentiation of the Cullen Batholith into several phases and major plutons (Figs. 3 & 4).

The oldest unit in the area, the **Masson Formation** (Namoona Group), comprises interbedded siltstone, quartzite, carbonaceous phyllite and tremolite marble. It is mostly poorly exposed, in the area northeast of Frances Creek, where it is overlain by the Mundogie Sandstone and intruded by the Zamu Dolerite and Cullen Batholith. It is extensively contact metamorphosed by the Cullen Batholith in an aureole up to 10 km wide.

Quartzite, arkose and minor conglomerate, phyllite and siltstone of the **Mundogie Sandstone** (Mount Partridge Group) crop out as rugged strike ridges in the northeast. The conformably overlying **Wildman Siltstone** has been divided into two units: a lower unit of laminated pyritic carbonaceous phyllite and siltstone -- red and white colour-banded in places; and an upper unit of interbedded siltstone, phyllite and fine to coarse-grained quartz sandstone. The lower unit contains massive hematite lodes (mined at Frances Creek) within fault breccias of oxidised pyritic carbonaceous phyllite. The stratabound breccias probably formed by thrusting prior to folding of the enclosing metasediments.

A conformable sequence of hematitic, carbonaceous and tuffaceous metasediments of the South Alligator Group crops out in the Burrundie area and northwest of Frances Creek where it unconformably overlies the Wildman Siltstone. In both areas the three formations within the group (the **Koolpin Formation**, **Gerowie Tuff** and the **Mount Bonnie Formation**) are well exposed and contain the same rock types as in adjacent areas of the Pine Creek Geosyncline. However, units in the Burrundie area are extensively contact metamorphosed by the Cullen Batholith and have been intruded by at least three sills of **Zamu**

Dolerite, averaging over 100 m thick. The sills comprise medium quartz dolerite which is contact metamorphosed to amphibolite in places.

The **Burrell Creek Formation** (Finniss River Group) is the youngest and most extensive metasedimentary unit in the area, and crops out in a north-trending belt in the central part of the sheet between two lobes of the Cullen Batholith. The formation consists of interbedded phyllite, greywacke, minor conglomerate and volcanics. The rocks are tightly folded about shallow south-plunging axes, well cleaved and contact metamorphosed by the batholith to varying degrees.

The **Cullen Batholith** forms a broad V-shaped mass covering about half of the sheet area. It intrudes the Early Proterozoic geosynclinal metasediments which are extensively contact metamorphosed within an aureole up to several kilometres wide. Nine of the ten granitoid types defined in the batholith (Stuart-Smith, 1985 & 1987), occur within this Sheet area forming parts of sixteen separate or coalesced plutons. Older rafts and xenoliths of monzonitic rocks (**Bludells Monzonite**) and metasediment are also distinguished within the batholith, as are minor felsic (**Lewin Springs Syenite**) and mafic dykes.

The Middle Proterozoic Tolmer Group forms a sandstone tableland running the length of the western side of the sheet area. The group, a conformable sandstone sequence, comprises the **Depot Creek Sandstone** overlain by the **Stray Creek Creek Sandstone**. Both units dip gently to the west and are unconformably ovelain by, or faulted against, Palaeozoic sediments of the Daly River Basin.

Craggy to rubbly low hills of sandstone and sedimentary carbonate rocks along the eastern margin of the Daly River Basin form the **Jindare Formation**, a discontinous unit of probable Cambrian age underlying the Daly River Group. The group, comprising shallow-marine and possibly intertidal carbonate and sandstone, contains the **Tindall Limestone** and conformably overlying **Jinduckin Formation.**

The Palaeozoic and older rocks are covered in places by remnant cappings of **Mesozoic** sediments and an extensive veneer of **Cainozoic** alluvial and colluvial deposits.

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TABLE 1. SUMMARY OF STRATIGRAPHY

	Unit	Main Rock Types	Relationships	Thickness (m)	Remarks*
QUATERNARY	Qa	Silt, sand, clay		<3	Alluvium
	Qf	Black and brown humic soil and clay		<2	Floodplain deposits at upper reaches of drainage courses
TERTIARY TO QUATERNARY	Cz	Sandy to gravelly lithosols	Veneer over Mesozoic and older units	<2	Regolith
	Czt	Sand and rubble of granite and sandstone	Flanks scarps of resistant Middle Proterozoic and Mesozoic rocks	<10	Talus deposits
	Czg	Unconsolidated gravels	Flanks steep ridges of Early Proterozoic hornfels	<3	Older colluvium
	Czs	Unconsolidated sand	Veneer on laterite and older formations	<10	Fan deposits
	Czl	Ironstone	Flat-lying cappings on older formations	<3	In-situ and reworked remnants of laterite profile
CRETACEOUS	K	Ferruginous quartz sandstone and conglomerate	Flat-lying veneer unconformable on older formations	25	Epicontinental deposits
CAMBRIAN TO ORDOVICIAN DALY RIVER GROUP	Jinduckin Formation (€Olj)	Limestone; calcareous sandstone, sandy limestone, quartz sandstone, siltstone and shale	Conformably overlies €mt	950	Shallow marine, possibly intertidal
	Tindall Limestone (€mt)	Massive thinly bedded limestone with chert bands and nodules in places	Disconformably overlies $€lj_1$	<150	Marine, fossiliferous, Öpik (1956)
CAMBRIAN	Jindare Formation ($€lj_2$)	Thinly bedded, fine to medium white quartz sandstone	Conformably overlies $€lj_1$	8	Continental to shallow marine
	($€lj_1$)	Mottled fine to medium and pebbly quartz sandstone, purple micaceous siltstone and silty shale. Silicified carbonate breccia and sandy procellanite at base	Disconformably overlies or faulted against Pts	200	
MIDDLE PROTEROZOIC TOLMER GROUP	Stray Creek Sandstone (Pts)	Laminated to thinly bedded very fine brown quartzite, micaceous sandy siltstone, limonitic micaceous siltstone, minor ferruginous, silicified dolomite and dolomitic siltstone	Conformably overlies Ptd	450	Shallow marine, Noakes (1956) and Walpole & others (1968)
	Depot Creek Sandstone (Ptd)	Laminated to thickly bedded, pink to brown medium to coarse quartz sandstone micaceous siltstone, minor ferruginous, silicified dolomite and dolomitic siltstone	Unconformably overlies Early Proterozoic metasediments and granitoids	450	Continental to shallow marine, Walpole & others (1968)
EARLY PROTEROZOIC CULLEN BATHOLITH	Lewin Springs Syenite (Pew)	Porphyritic microgranite, rhyolite, porphyritic quartz microsyenite and quartz micromonzonite	Numerous dykes intruding granitoids in the south	250	
	(Pgc)	Granite, leucogranite, granodiorite	Numerous coalesced plutons intruding older Early Proterozoic metasediments and dolerite		Highly fractionated suites Stuart-Smith (198)

TABLE 1. SUMMARY OF STRATIGRAPHY (continued)

		Unit	*Main Rock Types*	*Relationships*	*Thickness (m)*	*Remarks**
CULLEN BATHOLITH		Bludells Monzonite (Pgcz)	Grey-green medium equigranular biotite-hornblende-quartz monzonite, coarse porphyritic quartz monzonite, biotite-hornblende-quartz syenite, minor biotite-hornblende-quartz monzodiorite and olivine dolerite	Xenoliths and rafts within Pgc		Fractionated alkaline suite Stuart-Smith (1985)
		(Pgch)	Undivided hornfels	Xenoliths and rafts within Pgc		Blocks of Early Proterozoic metasediments and dolerite
EARLY PROTEROZOIC		Prices Springs Granite (Pgp)	Pink-green or grey coarse equigranular to porphyritic granite	Intrudes older Early Proterozoic metasediments and dolerite		
		McKinlay Granite (Pgk)	Pink-green coarse porphyritic granite	Intrudes older Early Proterozoic strata		
		Zamu Dolerite (Pdz)	Chloritised medium quartz dolerite and amphibolite	Sills intruding (and folded and metamorphosed with) older Early Proterozoic strata	150	Continental tholeiite Ferguson & Needham, (1978)
	FINNISS RIVER GROUP	Burrell Creek Formation (Pfb)	Fine to coarse feldspathic greywacke, shale, slate, phyllite and siltstone; minor volcanilithic conglomerate; rare altered felsic to intermediate volcanics	Conformably overlies or faulted against Pso Intruded by Pgc, Pgp, Pgk and Pdz	1000	Flysch deposits derived from a dominantly volcanic source
	SOUTH ALLIGATOR GROUP	Mount Bonnie Formation (Pso)	Shale, mudstone, phyllite, siltstone, medium feldspathic greywacke, minor tuffaceous chert, glassy black crystal tuff, vitric tuff, lithic crystal tuff, carbonaceous shale, and rare banded iron formation	Conformably overlies Psg	700	Transition between low-energy, shallow-water, reduced environment and deeper water flysch facies
		Gerowie Tuff (Psg)	Brown and grey siltstone, phyllite and argillite, glassy black tuffaceous chert, crystal tuff and vitric tuf	Conformably overlies Psk	300-400	Reworked subaqueous deposits of siliceous ash in a low-energy, reduced environment
		Koolpin Formation (Psk)	Ferruginous and carbonaceous phyllite with chert bands lenses and nodules in places; minor massive limonitic ironstone, silicified dolomite, marl, pyritic and graphitic chiastolite carbonaceous hornfels, marble, para-amphibolite and muscovite-quartz schist	Unconformably overlies Ppw_1 and Ppw_2	200-300	Fresh to brackish shallow, acid and reducing environment Crick & others (1980)
	MOUNT PARTRIDGE GROUP	Wildman Siltstone (Ppw_2)	Siltstone, phyllite, silty phyllite, carbonaceous phyllite and minor laminated fine to coarse quartz sandstone, dolarenite, spotted micaceous hornfels and tremolite–quartz hornfels	Conformably overlies Ppw_1 and unconformably overlain by Psk	350	Transgressive sequence of shallow-water facies transitional with fluvial facies of Ppm
		(Ppw_1)	Phyllite (pyritic and carbonaceous at depth), siltstone, laminated red and white banded phyllite, massive hematite ironstone lenses (pyritic carbonaceous shale breccia at depth) and chiastolite muscovite carbonaceous hornfels	Conformably overlies Ppm Conformably overlain by Ppw_2 and unconformably overlain by Psk	400	

TABLE 1. SUMMARY OF STRATIGRAPHY (continued)

	Unit	*Main Rock Types*	*Relationships*	*Thickness (m)*	*Remarks**
EARLY PROTEROZOIC MOUNT PARTRIDGE GROUP	Mundogie Sandstone (Epm)	Coarse, pebbly feldspathic quartzite, arkose, and micaceous quartzite; minor chert and quartz pebble conglomerate. Red and white banded phyllite; carbonaceous phyllite; sandy siltstone; micaceous hornfels, and chiastolite carbonaceous hornfels	Unconformably? or disconformably overlies Enm	500	Fluvial fans Stuart-Smith & others (1980)
NAMOONA GROUP	Masson Formation (Enm)	Carbonaceous phyllite, slate, silty phyllite, siltstone, sandy siltstone, minor laminated medium to coarse grey quartzite and feldspathic quartzite, and massive ironstone. Rare muscovite tremolite marble	Unconformably? or disconformably overlain by Epm	1000	Low-energy marine environment Stuart-Smith & others (1980)

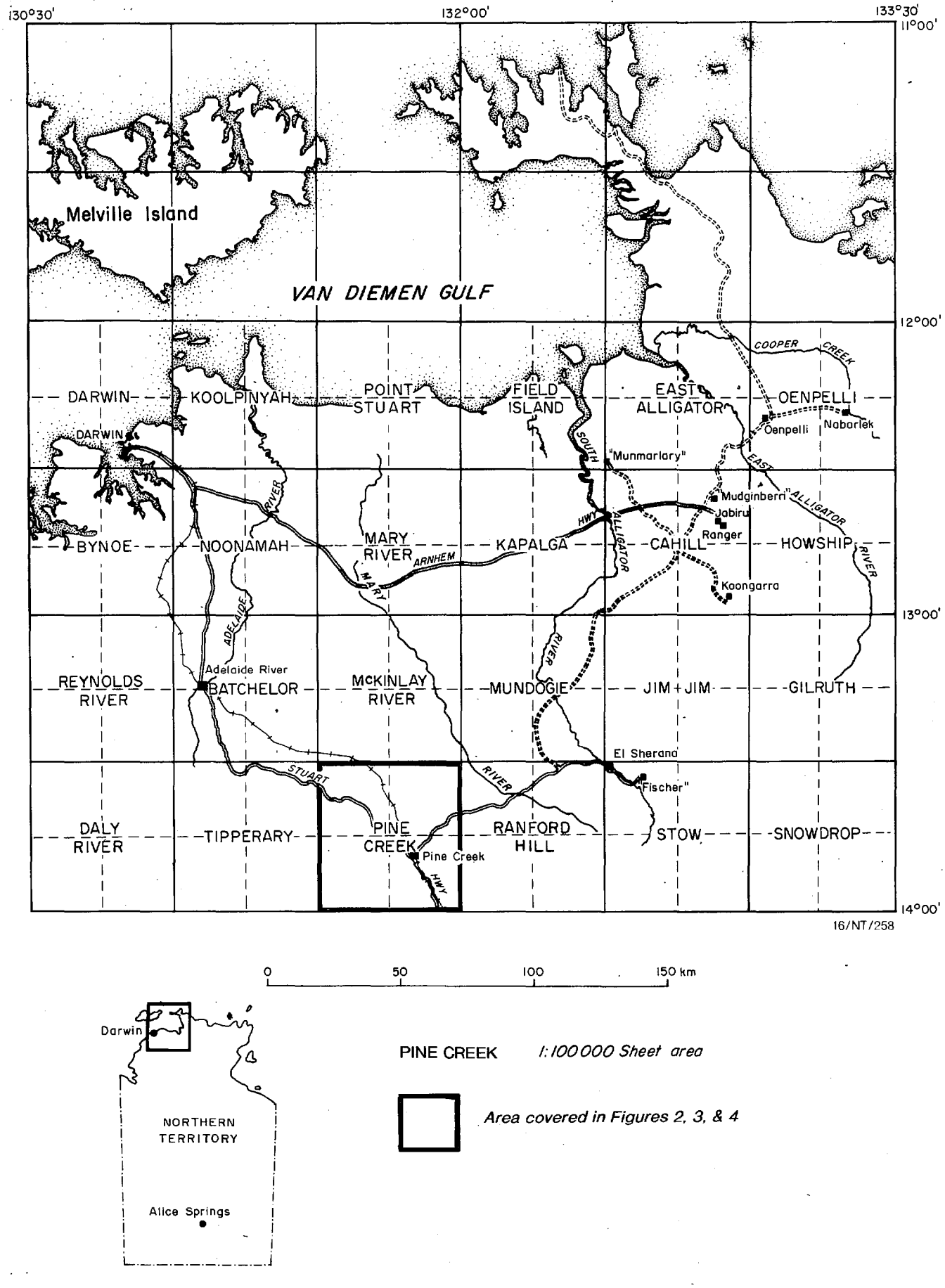


Fig. 1. Locality map

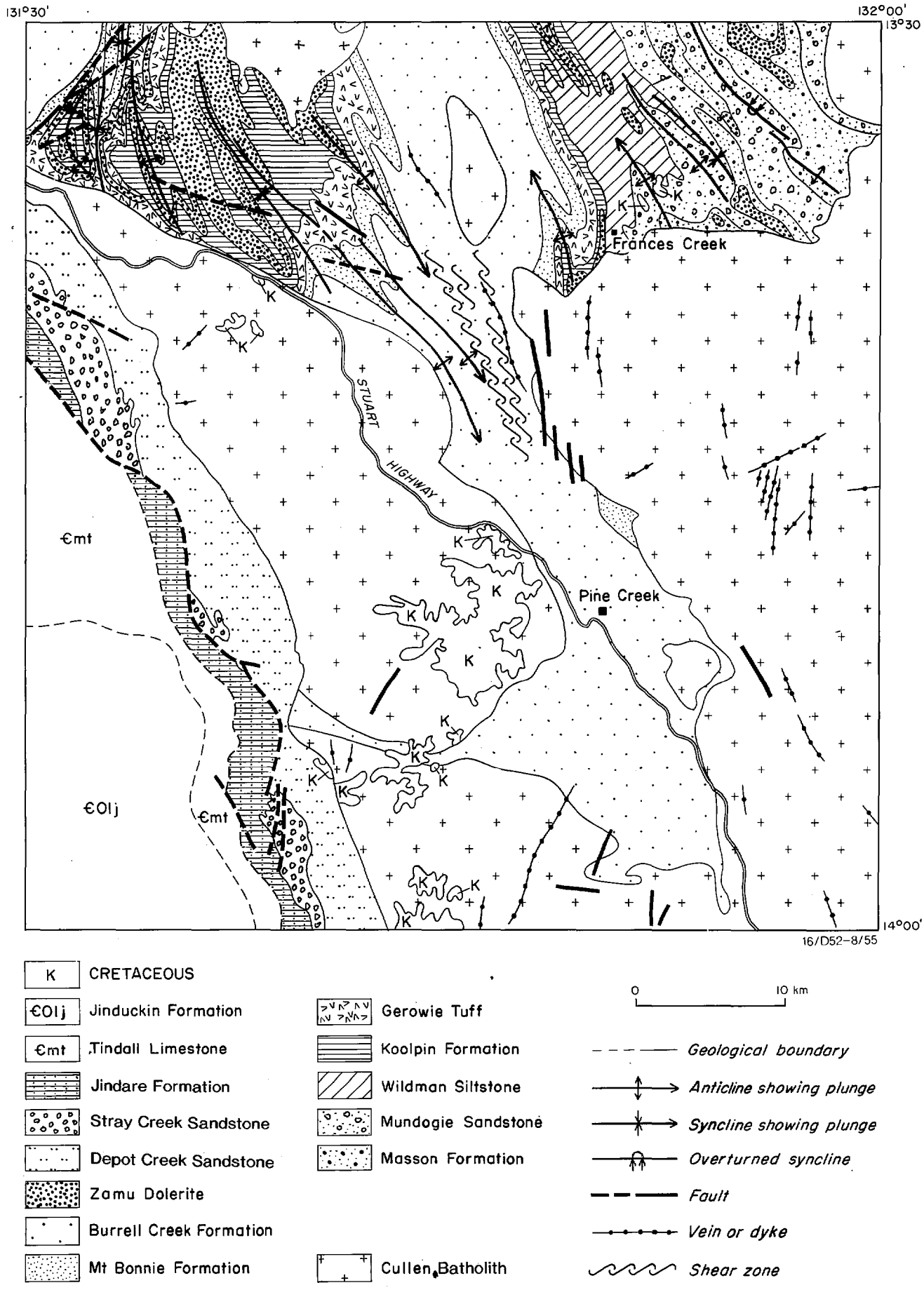


Fig. 2. Generalised geology

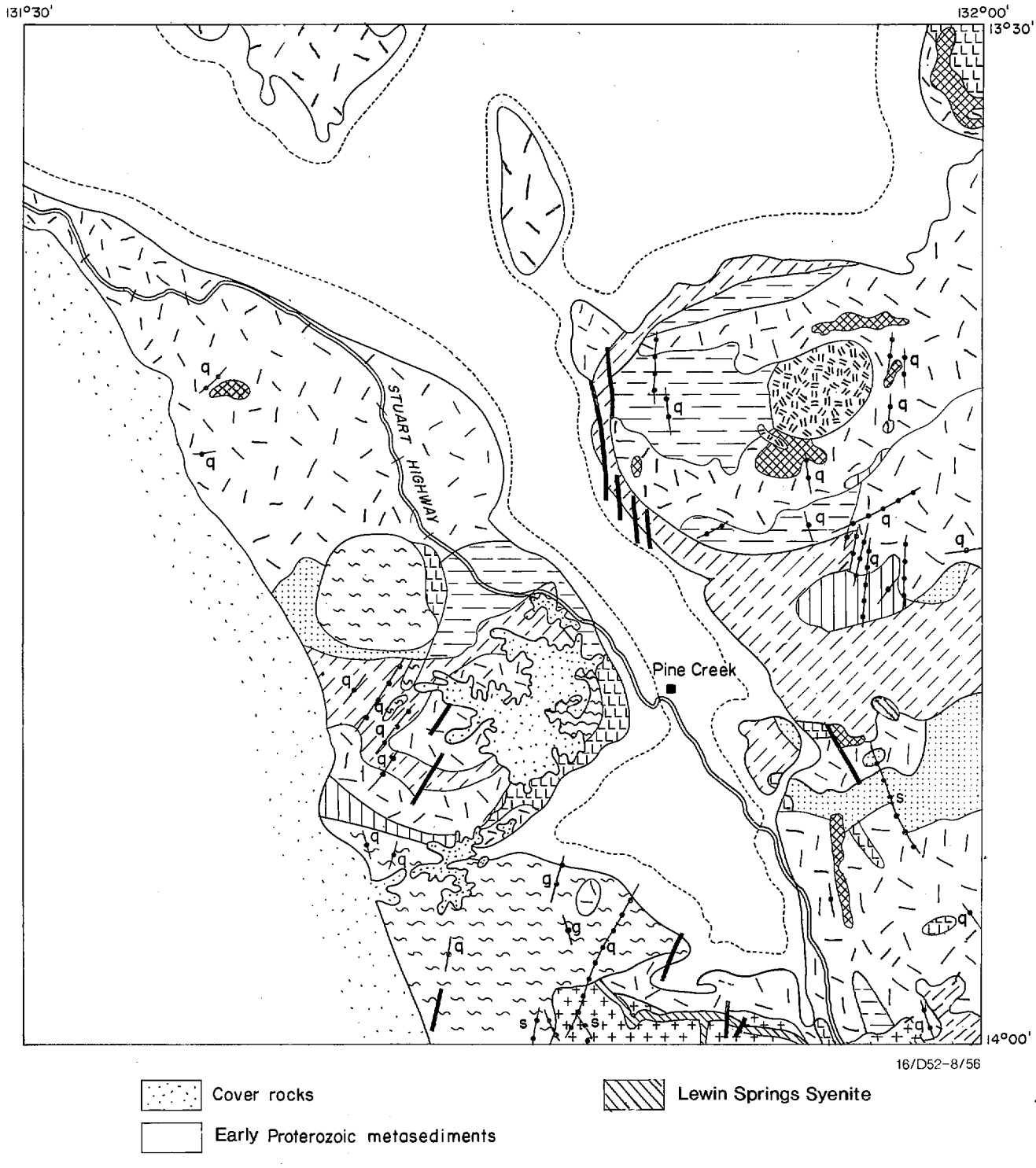


Fig. 3. Granitoid phases of the Cullen Batholith.

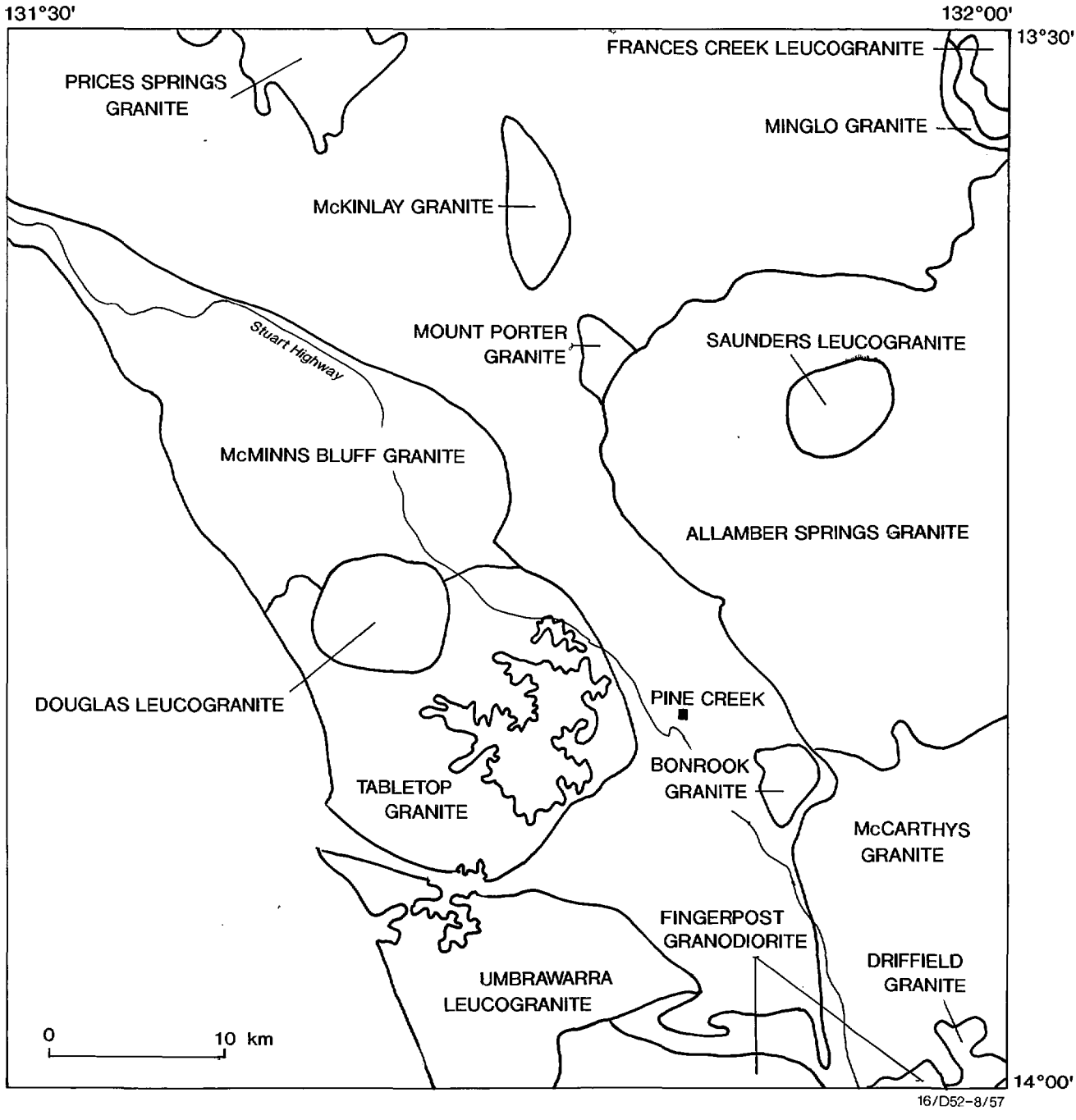
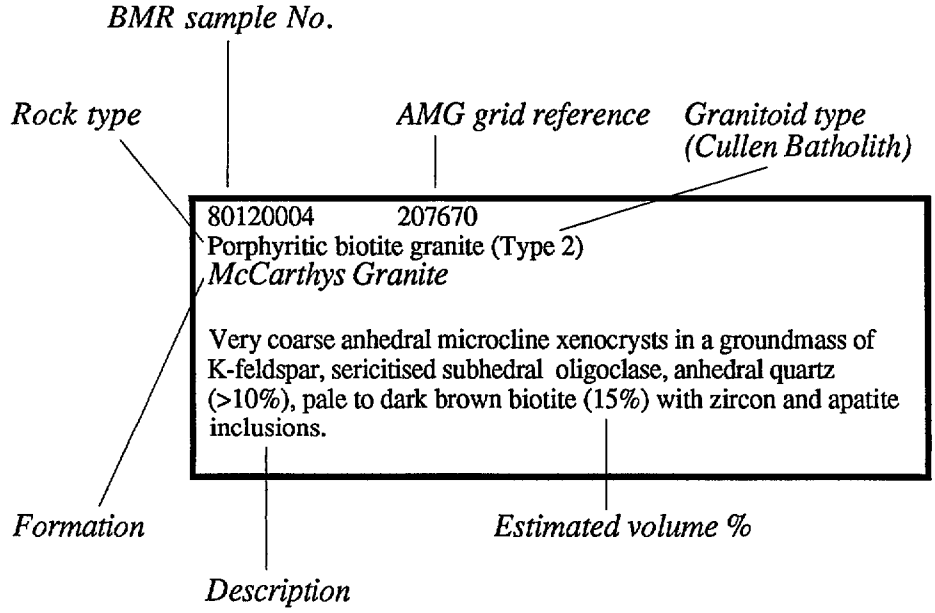


Fig. 4. Plutons of the Cullen Batholith

APPENDIX

PETROGRAPHIC DESCRIPTIONS



79126269 159019
Quartzite
Mundogie Sandstone

Poorly sorted coarse strained subrounded quartz and minor chert in a recrystallised granoblastic quartz matrix with minor muscovite and very fine opaques. Sutured boundaries on quartz grains.

79126270 158015
Quartzite
Mundogie Sandstone

Poorly sorted coarse strained subrounded quartz and minor chert in a recrystallised granoblastic quartz matrix with minor muscovite and very fine opaques. Sutured boundaries on quartz grains.

79126282 109046
Quartzite (?weathered feldspathic quartzite)
Mundogie Sandstone

Poorly sorted, very coarse strained quartz grains in a recrystallised matrix of quartz, muscovite and secondary iron oxides. Minor grains consisting of iron oxide and sericitic mosaic, may be altered feldspar.

79126288 051059
Quartzite
Wildman Siltstone (upper unit)

Poorly sorted strained quartz and minor chert grains in a recrystallised granoblastic quartz matrix. Recrystallised sutured grain overgrowths surround original well rounded boundaries outlined by fine trails of opaques in places.

79126294 833037
Medium porphyritic hornblende-biotite granite
Prices Springs Granite

Subhedral K-feldspar xenocrysts (<1cm) in a medium groundmass of anhedral quartz (30%), K-feldspar, oligoclase (sericite-carbonate alteration), biotite (chlorite-epidote alteration), minor hornblende and trace apatite. Highly strained grains - some polygonal mosaic development.
Total mafics = 5%.
K-feldspar: plagioclase = 2:1.

79126296 861055
Fine equigranular biotite leucogranite
Prices Springs Granite

Fine equigranular anhedral quartz (50%), subhedral K-feldspar (25%), subhedral oligoclase (sericite and epidote alteration), and minor biotite (1%; epidote alteration). Rare sphene, apatite and zircon.

79126307 920059
Muscovite-biotite-microcline-quartz hornfels
Burrell Creek Formation

Metamorphosed, coarse, poorly sorted greywacke consisting of recrystallised irregular and scattered quartz and alkali feldspar grains with fine biotite and larger poikilitic muscovite flakes.

79126317 832038
Amphibolite (quartz dolerite hornfels)
Zamu Dolerite

Medium grained irregular pale green amphibole crystals intergrown with subidiomorphic oligoclase/andesine. Finer recrystallised granuloblastic patches of quartz, plagioclase, K-feldspar, hornblende, zoisite, sphene, carbonate and apatite. Patchy ?diopside.

79126323 077020
Altered quartz dolerite
Zamu Dolerite

Similar to 80120196. Medium grained subidiomorphic pale green to colourless actinolite (probably after clinopyroxene) partly enclose plagioclase laths (altered to zoisite-epidote mosaic and trace carbonate) with interstitial quartz, opaques (which are mostly altered to sphene) and trace apatite and quartz- feldspar graphic intergrowths.

79126324 031056
Altered quartz dolerite
Zamu Dolerite

Medium grained highly altered subidiomorphic colourless clinopyroxene mould completely saussuritised feldspar crystals with minor interstitial quartz, opaques, sphene and trace apatite. Patchy secondary zoisite, muscovite, chlorite, epidote and calcite. Clinopyroxene is mostly preserved as cores in colourless to pale green actinolite.

79126331 794030
Chiastolite? carbonaceous hornfels
Koolpin Formation

Microcrystalline carbonaceous matter with minor quartz and sericite and scattered subidiomorphic altered (sericitised?) porphyroblasts of chiastolite? up to 1cm long.

79126332 837034
Meta-ironstone
Koolpin Formation

Recrystallised silty quartz, brown iron oxides and minor muscovite with coarse randomly orientated poikilitic porphyroblasts of muscovite up to 1mm across.

79126333 897024
Muscovite-quartz hornfels
Koolpin Formation

Coarse, strained granoblastic quartz and kinked poikilitic muscovite. Minor granular Fe oxides along grain boundaries and cleavage planes.

79126334 903027
Ferruginous muscovite-quartz-carbonaceous hornfels (meta carbonaceous siltstone?)
Koolpin Formation

Laminated microcrystalline quartz, opaque carbonaceous matter, brown iron oxides and very minor muscovite with irregular coarse recrystallised patches of granuloblastic quartz and muscovite.

79126337 738016
Tourmalinised argillite
Gerowie Tuff

Randomly orientated, crowded, prismatic pale greenish brown tourmaline crystals in a base of microcrystalline quartz and opaques. Coarser crystallised patches of quartz and tourmaline.

79126338 907031
Argillite hornfels
Gerowie Tuff

Microcrystalline quartz mosaic with minor muscovite and coarser granoblastic patches of quartz and muscovite. Bedding indicated by thin discontinuous trails of sericite and opaques.

79126339 907031
Tuffaceous chert hornfels
Gerowie Tuff

Scattered angular crystal fragments of quartz and feldspar, up to 0.1mm across, in a recrystallised quartz mosaic base with coarser granuloblastic patches of quartz and poikilitic muscovite.

79126240 762037
Ferruginous chert
Mount Bonnie Formation

Microcrystalline quartz mosaic with laminae of platy hematite and secondary brown iron oxides.

79126341 731021
Greywacke
Mount Bonnie Formation

Poorly sorted, fine grained quartz and minor argillite and sericite (after feldspar) grains in a sericitic siliceous and ferruginous matrix. Rarely preserved feldspar and detrital muscovite (deformed).

79126342 919026
Greywacke
Mount Bonnie Formation

Coarse poorly sorted angular grains of quartz, chert, tuffaceous chert, crystal tuff and alkali feldspar in a recrystallised matrix of the same composition with the addition of opaques and undeformed metamorphic biotite (contact metamorphism), rare detrital zircon.

79126347 747015
Tuffaceous greywacke
Gerowie Tuff

Poorly sorted angular fragments of quartz, chert, tuffaceous chert, alkali and sodic feldspar, (plagioclase, microperthite and K-feldspar) in a finer recrystalled matrix of the same composition with the addition of opaques and biotite (indicates some hornfelsing). Some sericitic alteration of feldspar.

79126348 758998
Altered vitric crystal tuff
Gerowie Tuff

Curved, angular and rounded crystal fragments (<0.2mm) of quartz and alkali feldspar in a recrystallised and altered base of quartz, feldspar? and greenish biotite (chlorite?). Common relict devitrified glass shards in base. Slightly hornfelsed.

79126349 750018
Lithic crystal tuff
Mount Bonnie Formation

Coarse, poorly sorted angular crystal fragments (<1mm) of alkali feldspar, oligoclase and minor quartz, with rounded lithic fragments of tuffaceous chert (up to 1cm) in a recrystallised feldspathic matrix containing cloudy opaques, rare euhedral zircon and common secondary biotite and patchy carbonate. Presence of biotite indicative of contact metamorphism.

80120001 976648
Porphyritic biotite granite (Type 2)
Tabletop Granite

K-feldspar xenocrysts (30 - 40%), anhedral undulose quartz (30 -35%), sericitised zoned subhedral tabular albite/oligoclase (15 - 20%), pale to dark golden brown biotite (10 - 15%) with zircon inclusions, and minor graphic quartz/K-feldspar intergrowths.

80120002 952659
Porphyritic hornblende biotite granite (Type 2)
Tabletop Granite

Very coarse, irregular xenocrysts of microcline (perthitic in places) in a groundmass of anhedral K-feldspar, sericitised zoned albite/oligoclase, biotite, undulose quartz (10%), and greenish brown euhedral hornblende (minor epidote alteration). Accessory apatite.
K-feldspar: plagioclase = 3:2

80120003 919621
Porphyritic hornblende biotite granite (Type 2)
Tabletop Granite

Very coarse irregular perthitic K-feldspar xenocrysts in a coarse crystalline groundmass of subhedral zoned and sericitised albite/oligoclase, anhedral quartz (>10%), K-feldspar, K-feldspar/quartz graphic intergrowths, tabular brown biotite and hornblende. Trace apatite inclusions in biotite. Total mafics ~15%.
K-feldspar: plagioclase = 3:2

80120004 207670
Porphyritc biotite granite (Type 2)
McCarthys Granite

Very coarse anhedral microcline xenocrysts in a groundmass of K-feldspar, sericitised subhedral oligoclase, anhedral undulose quartz (> 10%), pale to dark brown biotite (15%) with zircon and apatite inclusions.

80120005 886649
Even grained biotite granite (Type 2)
Tabletop Granite

Anhedral microcline, tabular subhedral oligoclase (carbonate-epidote-sericite alteration), pale to golden brown biotite (epidote alteration), and trace skeletal sphene, apatite, opaques and secondary carbonate.

80120006 181904
Porphyritic hornblende biotite granite (Type 2)
Allamber Springs Granite

Irregular xenocrysts of microcline , microperthite, orthoclase and tabular sericitised and zoned oligoclase in a coarse crystalline groundmass of K-feldspar, plagioclase, undulose quartz (minor graphic intergrowths with K-feldspar), biotite and subhedral dark greenish brown hornblende. Accessory apatite, sphene, opaques and zircon. Total mafics = 10%.

80120007 990771
Porphyritic hornblende granite (Type 2)
Tabletop Granite

Xenocrysts of subhedral microcline and albite/oligoclase (with K-feldspar rims) in a groundmass of anhedral K-feldspar, undulose quartz and minor tabular albite/oligoclase, golden to pale brown biotite (apatite inclusions), and minor greenish brown subhedral hornblende (in clusters with euhedral zircon).

80120008 851861
Porphyritic biotite granite (Type 2)
McMinns Bluff Granite

Very coarse subhedral xenocrysts of perthitic microcline in a coarse groundmass of tabular subhedral sericitised and zoned albite/oligoclase, K-feldspar, chloritised biotite (10%), and anhedral quartz (>10%). Accessory apatite, opaques and skeletal sphene. Minor secondary calcite and muscovite.
K-feldspar: plagioclase = 3:2.

80120009 965785
Equigranular hornblende granite (Type 2)
McMinns Bluff Granite

Irregular K-feldspar, tabular sericitised subhedral oligoclase, anhedral undulose quartz, bluish green to pale brown euhedral hornblende and pale to golden brown biotite. Minor carbonate alteration.

80120011 900722
Porphyritic hornblende granite (Type 2)
McMinns Bluff Granite

Perthitic microcline, and minor orthoclase xenocrysts in a coarse groundmass of K-feldspar, sericitised tabular zoned oligoclase, anhedral undulose quartz (> 10%), green to brown twinned sub-prismatic hornblende, and pale brown, partly chloritised , biotite. Accessory zircon, opaques and apatite.
K-feldspar: plagioclase = 1:1.

80120012 161650
Porphyritic biotite granite (Type 2)
McCarthys Granite

Microcline xenocrysts in a groundmass of K-feldspar, sericitised zoned subhedral albite/oligoclase, anhedral undulose quartz (10%), red brown to pale golden brown biotite (20%). Accessory apatite, zircon and rare primary muscovite and pale brown anhedral garnet.
K-feldspar: plagioclase = 3:2.

80120013 120667
Porphyritic biotite granite (Type 4)
Bonrook Granite

Subhedral perthitic microcline xenocrysts in a groundmass of microcline, subhedral sericitised plagioclase, anhedral undulose quartz (>10%), and dark brown-greenish brown biotite (altering to chlorite). Accessory apatite and zircon. Secondary calcite and epidote.

80120014 929795
Porphyritic biotite granite (Type 2)
McMinns Bluff Granite

Xenocrysts of quartz, subhedral zoned albite/oligoclase, and microcline in a granular groundmass of dominantly anhedral quartz, microcline K-feldspar, and reddish brown to pale golden brown biotite (15%) with zircon and apatite inclusions. Very minor opaques (possibly sulphides and Fe oxides) and muscovite (both primary and secondary).
K-feldspar: plagioclase = 1:1.

80120015 032722
Porphyritic hornblende biotite granite (Type 4)
Tabletop Granite

K-feldspar and subhedral zoned sericitised albite/oligoclase xenocrysts in a groundmass of K-feldspar, plagioclase, undulose anhedral quartz (10%), and dark to pale brown biotite (10%) with zircon and apatite inclusions. Very minor dark greenish brown hornblende.

80120016 178756
Slightly porphyritic biotite granite (Type 6)
Allamber Springs Granite

Equigranular to slightly porphyritic texture. Anhedral K-feldspar (mostly microcline), quartz, minor zoned (sericitised cores) oligoclase, pale to dark brown biotite (chlorite-epidote alteration), some primary and secondary muscovite. Minor subhedral tabular xenocrysts of zoned perthitic microcline. Accessory zircon and opaques. Total mafics = 2%.

80120017 206743
Equigranular biotite granite (Type 6)
Allamber Springs Granite

Coarse equigranular, microcline (perthitic in places), quartz, zoned albite/oligoclase (muscovite - carbonate alteration), pale to dark golden brown biotite (4%) with apatite and zircon inclusions and minor epidote alteration.

80120018 167517
Slightly porphyritic hornblende granite (Type 2)
McCarthys Granite

Slightly porphyritic texture. Xenocrysts of subhedral plagioclase, perthitic microcline and rounded quartz. Groundmass contains mafic clots of intergrown dark to pale golden brown biotite and pale greenish brown anhedral hornblende, scattered anhedral quartz, K-feldspar, minor sericitised subhedral albite/oligoclase and graphic intergrowths of quartz and K-feldspar. Total mafics = 5%.

80120019 968630
Equigranular hornblende granite (Type 6)
Tabletop Granite

K-feldspar, subhedral zoned partly saussuritised oligoclase, quartz (>10%), dark green subprismatic hornblende, biotite aggregates (10%) with zircon and apatite inclusions. Total mafics = 2%.

80120020 125769
Equigranular hornblende biotite leucogranite (Type 6)
Allamber Springs Granite

Subhedral K-feldspar (mostly microcline; perthitic in places), subhedral zoned albite/ oligoclase, anhedral quartz, dark green to pale brown prismatic partly chloritised hornblende and biotite with opaques, apatite and zircon inclusions. Total mafics = 4%.

80120021 988758
Equigranular biotite granite (Type 6)
Tabletop Granite

Coarse anhedral K-feldspar (mostly microcline), subhedral sericitised oligoclase, anhedral undulose quartz and pale brown to dark greenish brown chloritised biotite (4%) with zircon and apatite inclusions.

80120022 210710
Equigranular biotite granite
Allamber Springs Granite

Microcline, orthoclase, subhedral sericitised oligoclase, undulose quartz, pale, dark, golden brown chloritised biotite (2%) with zircon and rare apatite inclusions. Minor, possibly primary, muscovite.

80120023 133757
Slightly porphyritic biotite granite (Type 6)
Allamber Springs Granite

Xenocrysts of subhedral perthitic microcline in very coarse groundmass of subhedral zoned sericitised albite/oligoclase, anhedral quartz and aggregates of dark to pale golden brown biotite (3%) with minor epidote, chlorite, rare zircon, apatite and opaques.

80120024 961762
Equigranular biotite granite (Type 6)
Tabletop Granite

Coarse anhedral perthitic microcline, quartz, minor subhedral albite/oligoclase (sericitised with K-feldspar rims), minor pale to dark greenish brown biotite (2%), trace zircon and muscovite.

80120025 125769
Equigranular biotite granite (Type 6)
Allamber Springs Granite

Anhedral microcline, minor sericitised albite/oligoclase, quartz, aggregates of pale to dark golden brown biotite (4%) with zircon and apatite inclusions. Very minor secondary carbonate.

80120026 067906
Equigranular biotite granite (Type 6)
Allamber Springs Granite

Anhedral orthoclase, microcline, oligoclase (very minor sericitisation and carbonate alteration), undulose quartz, and pale brown to dark greenish brown biotite (2%).

80120028 127657
Leucrocratic equigranular biotite granite (Type 6)
Bonrook Granite

K-feldspar (mostly microcline), oligoclase (sericite and chlorite alteration), undulose quartz, chloritised pale brown biotite (<1%) and trace apatite. Deformed and sutured grain boundaries common.

80120029 141832
Fine equigranular leucogranite (Type 9)
Allamber Springs Granite

Very fine mosaic of anhedral microcline and quartz (25%), commonly graphically intergrown. Minor slightly coarser subhedral albite/oligoclase (minor sericitic alteration), paleto dark golden brown partly chloritised biotite (1%) and rare euhedral zircon, allanite? and opaques. Minor chlorite alteration of biotite.
K-feldspar: plagioclase = 10: 1.

80120030 193843
Medium equigranular leucogranite (Type 9)
Allamber Springs Granite

Medium grained, equigranular, anhedral microcline, sericitised oligoclase, undulose quartz (>20%), pale to dark brown biotite (1%) intergrown with very minor dark green hornblende in places.
K-feldspar:plagioclase = 5:1.

80120031 200875
Medium equigranular leucogranite (Type 9)
Allamber Springs Granite

Medium grained, equigranular, anhedral microcline, sericitised albite/oligoclase, undulose quartz (>20%), pale to dark brown biotite (1%) intergrown with very minor dark green hornblende in places. Very minor secondary calcite.
K-feldspar : plagioclase = 4:1.

80120032 989758
Medium equigranular leucogranite (Type 9)
Tabletop Granite

Medium grained, equigranular, anhedral microcline, sericitised subhedral albite/oligoclase, undulose anhedral quartz (>20%), pale to dark brown biotite (1%) intergrown with very minor dark green hornblende in places.
K-feldspar:plagioclase = 5:1.

80120033 184874
Medium grained porphyritic leucogranite (Type 9)
Saunders Leucogranite

Microcline, quartz and minor plagioclase form irregular xenocrysts in a fine
grained groundmass of undulose quartz, microcline, sericitised plagioclase, pale to foxy brown chloritised biotite (1%) with minor apatite, zircon and opaques. Very minor secondary muscovite and epidote. Strongly deformed fabric with undulose extinction and sutured recrystallised grain boundaries common.
K-feldspar: plagioclase = 3:1.

80120034 120658
Fine grained alkali feldspar granite (Type 9)
Bonrook Granite

Fine uneven allotriomorphic mosaic of quartz, alkali feldspar (microcline) and rare sericitised plagioclase and chloritised biotite (1%). Coarser grained patches of graphically intergrown alkali feldspar, quartz and minor muscovite. Trace apatite. Total quartz > 25%.

80120035 133656
Porphyritic leucogranite (Type 9)
Bonrook Granite

Medium grained K-feldspar (includes some orthoclase), sericitised subhedral oligoclase (alkali feldspar rims), undulose quartz (20%), pale to dark golden brown chloritised biotite (<1%) with apatite and zircon inclusions and very minor secondary epidote. Rare muscovite and carbonate. Minor xenocrysts of quartz and subhedral K-feldspar.
K-feldspar : plagioclase = 3:1.

80120036 244015
Fine equigranular leucogranite (Type 9)
Frances Creek Leucogranite

Fine equigranular allotriomorphic mosaic of quartz (40%), microcline, sericitised albite/oligoclase, chloritised biotite (<1%), and secondary muscovite, carbonate and epidote.
K-feldspar: plagioclase = 1:1.

80120038 244893
Medium leucogranite (Type 9)
Allamber Springs Granite

Medium uneven-grained mosaic of anhedral strained quartz (30%), subhedral microcline and sericitised subhedral albite/oligoclase, pale to dark greenish brown chloritised biotite (<1%), with trace secondary epidote and opaques.
K-feldspar : plagioclase = 4:1.

80120039 151667
Medium leucogranite (Type 9)
Frances Creek Leucogranite

Medium uneven allotriomorphic mosaic of K-feldspar (60%; orthoclase, microcline), anhedral undulose quartz (30%), sericitised oligoclase (10%), chloritised biotite (< 1%; chlorite-epidote alteration).

80120040 922748
Contact between (1): coarse equigranular granite (Type 2)
and (2): medium equigranular alkali feldspar granite (Type 9)
Douglas Leucogranite

(1). coarse equigranular zoned subhedral sericitised albite/oligoclase, anhedral microcline, quartz (20%), pale to dark brown biotite (>5%) with apatite and zircon inclusions, and secondary muscovite,
K-feldspar : plagioclase = 1:2.

(2). medium equigranular anhedral microcline, quartz, with biotite (< 1%). Some graphic intergrowths and rare primary muscovite inclusions in quartz. (2) intrudes (1)?

80120041 203870
Fine-grained equigranular leucogranite (Type 9)
Allamber Springs Granite

Anhedral microcline, oligoclase (mostly altered to sericite), quartz (> 20%), biotite (2%) containing apatite and zircon inclusions, minor secondary calcite, chlorite, opaques, and muscovite.
K-feldspar : plagioclase = 2:1.

80120042 929769
Medium-grained leucogranite (Type 9)
Douglas Leucogranite

Uneven grained. K-feldspar (microcline and minor orthoclase), subhedral sericitised zoned oligoclase, anhedral quartz (40%), and pale to dark brown decussate aggregates of biotite (4%) containing apatite and zircon inclusions. Minor secondary epidote, opaques and muscovite.
K-feldspar : plagioclase = 3:1.

80120043 037700
Medium-grained leucogranite (Type 9)
Tabletop Granite

Uneven medium grained anhedral K-feldspar (graphically intergrown with quartz), undulose quartz (40%), sericitised oligoclase (5%), and dark brown biotite (< 1%) with apatite inclusions and minor chlorite-epidote alteration.

80120044 154671
Medium alkali feldspar granite (Type 9)
Allamber Springs Granite

Uneven granular K-feldspar (microcline and orthoclase), undulose quartz (40%), quartz and K-feldspar graphic intergrowths, sericitised anhedral plagioclase (< 5%) and brown and green biotite containing apatite and zircon inclusions. Minor opaques, chlorite and rare secondary muscovite.

80120045 133757
Medium alkali feldspar granite (Type 6)
Allamber Springs Granite

Uneven anhedral quartz (30%), K-feldspar (mostly microcline with minor orthoclase), minor albite/oligoclase (5%) and pale to dark reddish brown biotite (1%) with apatite inclusions. Minor secondary muscovite.

80120046 189648
Altered coarse quartz monzonite
Bludells Monzonite

Coarse subhedral sericitised plagioclase and ?K-feldspar, interstitial quartz (<10%), patches of fibrous pale to dark bluish green actinolite (15%) after biotite, with apatite and zircon inclusions. Accessory opaques and sphene. Metamorphic calcite, epidote, and chlorite.

80120048 232658
Altered coarse porphyritic quartz monzonite
Bludells Monzonite

Coarse, large subhedral K-feldspar (< 2cm.), with quartz inclusions and carbonate veins, in a recrystallised groundmass of medium-grained K-feldspar, albite/oligoclase, quartz (<10%), secondary radiating muscovite clusters, pale brown to dark green biotite (with apatite and zircon inclusions) and patchy carbonate and limonite. Biotite ~ 10% of groundmass.
K-feldspar : plagioclase = 1:1

80120049 189648
Altered coarse porphyritic quartz monzonite
Bludells Monzonite

Coarse subhedral perthitic microcline xenocrysts in a groundmass of medium grained anhedral albite/oligoclase, minor quartz (< 10%) and clots of pale brown to dark green biotite (10%). Secondary chlorite, patchy carbonate, sphene and minor epidote and muscovite. Trace zircon and apatite.
K-feldspar : plagioclase ~ 1:1

80120050 123696
Pegmatite
Allamber Springs Granite

Medium grained micrographically intergrown microcline and quartz (40%), with very fine subhedral oligoclase (< 5%) and pale to dark brown biotite (<1%).

80120052 144517
Fine porphyritic leucogranite
Lewin Springs Syenite

Strongly porphyritic. Subhedral xenocrysts of deformed K-feldspar, minor quartz and kinked biotite in a fine grained groundmass of quartz, K-feldspar, sericitised plagioclase, and biotite (1%). Accessory apatite and zircon. All crystals strained with undulose extinction, bent twins, and sutured grain boundaries common. Total quartz = 40%.
K-feldspar:plagioclase = 2:1.

80120055 183685
Porphyritic microgranite
Lewin Springs Syenite

Strongly porphyritic. Xenocrysts (up to 1 cm) of tabular K-feldspar (microcline and orthoclase), strained anhedral quartz and minor oligoclase in a microcrystalline groundmass of micrographically intergrown quartz and K-feldspar with biotite aggregates (4%). Common chlorite, muscovite, epidote and sphene alteration. Total quartz = 40%, plagioclase = 5%.

80120057 155673
Biotite-hornblende-quartz monzonite
Bludells Monzonite

Medium grained slightly porphyritic. Minor xenocrysts of zoned and corroded oligoclase (altered to sericite and epidote) and K-feldspar. Groundmass consists of anhedral K-feldspar, mostly microcline and subhedral oligoclase (patchy sericite-epidote alteration), quartz (<10%), golden to dark brown partly chloritised biotite, and anhedral aggregates of pale brown to green amphibole. Accessory apatite, rare sphene, and zircon. Total mafics = 30%.
K-feldspar : plagioclase = 1:1.

80120058 218675
Biotite-hornblende-quartz monzonite
Bludells Monzonite

Medium grained, porphyritic. Xenocrysts of subhedral oligoclase and orthoclase (<1cm), in a fine to medium groundmass of subhedral oligoclase, microcline, anhedral quartz (>15%), scattered subhedral golden to dark brown biotite, and pale to dark green hornblende. Accessory apatite, zircon, and rare opaques. Hornblende also forms aggregates with rare clinopyroxene cores. Patchy sericite alteration of plagioclase. Total mafics = 15%.
K-feldspar: plagioclase = 1:1.

80120059 159592
Altered medium hornblende quartz monzonite
Bludells Monzonite

Medium grained subhedral oligoclase (sericite-epidote alteration), anhedral microcline, quartz (10%) and subidiomorphic hornblende (replaced by finer grained aggregates of pale green amphibole). Accessory apatite and sphene. Total mafics = 30%.
K-feldspar: plagioclase = 1:1.

80120060 238002
Hornblende biotite quartz monzonite
Bludells Monzonite

Medium equigranular anhedral oligoclase, microcline, quartz (15%), pale to dark golden brown biotite and minor brown to green hornblende. Accessory apatite, sphene, zircon and opaques. Patchy sericitic alteration of feldspars. Total mafics = 15%.
K-feldspars: plagioclase ~ 2:1

80120061 142828
Biotite hornblende quartz syenite
Bludells Monzonite

Medium equigranular subhedral microcline, oligoclase (with patchy sericite-epidote alteration), skeletal dark green to brown hornblende, pale golden to dark brown biotite (epidote alteration) and anhedral quartz (10%). Accessory apatite, zircon, sphene, and opaques. Total mafics = 15%.
K-feldspar: plagioclase = 3:1.

80120062 188900
Biotite hornblende quartz monzodiorite
Bludells Monzonite

Medium equigranular subhedral oligoclase/andesine with patchy sericite alteration, minor subhedral K-feldspar, anhedral quartz (10%), subhedral dark green to pale brown hornblende with relict clinopyroxene cores and pale to dark golden brown biotite. Abundant apatite. Total mafics = 25%.
K-feldspar: plagioclase = 1:4.

80120063 789927
Porphyritic biotite granite (Type 2)
McMinns Bluff Granite

Strongly porphyritic. Rounded xenocrysts of pale pink microcline (1.5 cm), sericitised oligoclase (0.5cm), quartz (1cm) and minor chloritised biotite (<2mm) in an equigranular polygonal groundmass of microcline, quartz, minor plagioclase, biotite and patchy secondary carbonate. Accessory zircon, apatite and opaques. Total mafics = 5%.
K-feldspar: plagioclase = 4:1.

80120064 915762
Porphyritic biotite granite (Type 8)
Douglas Leucogranite

Porphyritic. Rounded xenocrysts of alkali feldspar, oligoclase, quartz (<5cm), foxy brown biotite (<2mm) and feldspar aggregates (xenoliths) in a fine groundmass of anhedral quartz, sericitised feldspar (mostly K-feldspar), chloritised biotite, and minor secondary carbonate and epidote. Accessory apatite, zircon and opaques. Total quartz = 30%, total biotite = 10%.
K-feldspar: plagioclase = 3:1.

80120065 160582
Altered biotite actinolite? quartz monzonite
Bludells Monzonite

Medium equigranular subhedral sericitised oligoclase and lesser K-feldspar, anhedral quartz (10%), pale green amphibole (recrystallised fibrous and polygonal aggregates), foxy red biotite (commonly altered to chlorite), pale green amphibole, epidote, minor apatite, zircon and opaques. Total mafics = 25%.
K-feldspar: plagioclase ~1:1.

80120066 162830
Altered fine quartz syenite
Bludells Monzonite

Fine grained, porphyritic. Minor xenocrysts of zoned and sericitised oligoclase crystals and aggregates and rare quartz in an fine even grained groundmass of recrystallised pale green amphibole, pale to dark golden brown biotite, anhedral microcline, quartz, and minor subhedral sericitised plagioclase. Accessory apatite, sphene, zircon and opaques. Total quartz = 10%, total mafics = 30%.
K-feldspar: plagioclase = 3:1.

80120067 225028
Altered dolerite?
Bludells Monzonite

Fine even grained subprismatic to subophitic colourless clinoproxene mostly altered to a very pale green fibrous amphibole and minor pale brown biotite, comprises about 60% and partially encloses subidiomorphic andesine/labradorite, very minor K-feldspar? and opaques.

80120068 188900
Altered fine quartz syenite
Bludells Monzonite

Recrystallised aggregates of fine even grained pale green amphibole, and biotite (epidote alteration), subhedral plagioclase (sericite, carbonate, epidote, sphene alteration), anhedral microcline, and undulose quartz (10%). Trace apatite. Total mafics = 30%.
K-feldspar: plagioclase = 2:1.

80120069 224053
Olivine dolerite
Bludells Monzonite

Medium pale brown clinopyroxene and lesser orthopyroxene crystals mould idiomorphic andesine, fractured olivine with (minor marginal chlorite alteration), minor foxy red biotite, interstitial K-feldspar, trace apatite and opaques.

80120071 161650
Altered porphyritic biotite - hornblende granite (Type 2)
McCarthys Granite

Coarse xenocrysts of saussuritised subhedral oligoclase (sericite-epidote alteration) in a medium equigranular groundmass of altered oligoclase, anhedral microcline, quartz (20%) and irregular recrystallised pale to dark green amphibole and pale to dark brown biotite. Biotite shows some chlorite-epidote alteration. Accessory apatite, sphene, zircon and opaques. Deformed and altered xenolith. Total mafics = 10%.
K-feldspar : plagioclase ~1:2.

80120072 018683
Porphyritic biotite hornblende granite (Type 3)
Tabletop Granite

Coarse zoned orthoclase xenocrysts, up to 1cm across, in a medium groundmass of subhedral orthoclase, oligoclase, quartz (20%), prismatic dark green to brown hornblende (minor chlorite and epidote alteration) and biotite (chlorite alteration). Accessory zircon and rare apatite. Total mafics = 5%.
K-feldspar: plagioclase = 4:1.

80120073 997690
Porphyritic biotite hornblende granite (Type 3)
Tabletop Granite

Coarse zoned orthoclase xenocrysts, up to 1cm across, in a medium groundmass of subhedral orthoclase, oligoclase, quartz (20%), prismatic dark green to brown hornblende (minor chlorite and epidote alteration) and biotite (chlorite alteration). Accessory zircon and rare apatite. Total mafics = 5%.
K-feldspar: plagioclase = 4:1.

80120074 174759
Aplite
Unnamed dyke

Fine equigranular mosaic of anhedral quartz (30%), microcline and albite/oligoclase, minor dark greenish brown to pale green biotite (1%), muscovite (2%) and rare secondary carbonate. Accessory zircon and rare apatite.
K-feldspar: plagioclase = 2:1.

80120075 170521
Porphyritic micro leucogranite
Lewin Springs Syenite

Strongly porphyritic. Xenocrysts of subhedral sericitised oligoclase crystals and aggregates, anhedral undulose quartz, subprismatic pale brown to greenish brown amphibole, minor microperthite, and biotite (chlorite-epidote alteration) in a groundmass of microcrystalline quartz, K-feldspar, and minor plagioclase. Total quartz = 35%, total mafics = 3%.
K-feldspar : plagioclase = 1:1.

80120076 952659
Fine porphyritic micro leucogranite
Lewin Springs Syenite

Strongly porphyritic. Xenocrysts of euhedral oligoclase (mostly altered to epidote, muscovite, carbonate and minor chlorite), embayed quartz, biotite (completely replaced by pale to dark green chlorite and epidote) with apatite and zircon inclusions in a groundmass of fine to microcrystalline subidiomorphic granular quartz (30%), oligoclase and K-feldspar. Minor secondary chlorite, epidote and carbonate. Total mafics = 3%.

80120077 133871
Medium leucogranite (Type 7)
Saunders Leucogranite

Medium grained subhedral microcline, minor sericitised oligoclase and anhedral quartz (25%), biotite (2%; chlorite-epidote alteration). Recrystallised irregular grain boundaries and undulose extinction common. Trace apatite, zircon and opaques.
K-feldspar : plagioclase = 4:1.

80120078 162830
Medium leucogranite (Type 7)
Saunders Leucogranite

Medium, equigranular to slightly porphyritic. Microcline xenocrysts with optically continuous rims in a groundmass of recrystallised polygonal microcline, quartz (25%), subhedral altered oligoclase (sericite-epidote alteration), scattered pale to dark golden brown biotite (5%; chlorite-epidote alteration), Accessory allanite, zircon, opaques and apatite.
K-feldspar : plagioclase = 4:1.

80120079 148870
Medium leucogranite (Type 7)
Saunders Leucogranite

Medium equigranular anhedral, microcline (minor orthoclase), sericitised plagioclase, strained and recrystallised quartz (30%), pale brown to dark greenish brown biotite (3%) altered to chlorite-epidote-opaques. Trace apatite, zircon. K-feldspar / plagioclase swapped rims.
K-feldspar : plagioclase = 3:1.

80120080 165874
Medium leucogranite (Type 7)
Saunders Leucogranite

Medium grained subhedral K-feldspar (mostly microcline with minor orthoclase), minor altered subhedral oligoclase (sericite-epidote-calcite alteration), anhedral quartz (25%) and biotite (3%; altered to epidote-chlorite). Recrystallised irregular grain boundaries and undulose extinction common. Minor allanite and muscovite.
K-feldspar : plagioclase ~4:1.

80120081 188900
Fine porphyritic leucogranite (Type 9)
Allamber Springs Granite

Rounded xenocrysts of microcline, sericitised plagioclase and quartz in a recrystallised fine groundmass of microcline, quartz (30%), plagioclase, biotite (2%; altered to chlorite-epidote), trace apatite, opaques and zircon.
K-feldspar : plagioclase = 5:1.

80120082 911691
Coarse porphyritic biotite leucogranite (Type 5)
Tabletop Granite

Coarse porphyritic. Xenocrysts of tabular perthitic microcline in a groundmass of medium subhedral microcline, zoned sericitised albite/oligoclase, anhedral quartz (30%), irregular pale to dark brown partly chloritised biotite (2%) and rare primary muscovite and zircon.
K-feldspar : plagioclase = 2:1.

80120083 955780
Coarse porphyritic biotite leucogranite (Type 5)
Tabletop Granite

Coarse porphyritic. Xenocrysts of subhedral perthitic microcline in a medium to coarse groundmass of highly strained quartz (40%), microcline, sericitised plagioclase, minor carbonate and altered biotite (2%; lenses of K-feldspar? and epidote). Trace apatite, zircon and ?allanite.
K-feldspar : plagioclase = 4:1.

80120084 923711
Coarse porphyritic biotite leucogranite (Type 5)
Tabletop Granite

Xenocrysts of subhedral perthitic microcline in a medium to coarse groundmass of subhedral slightly sericitised plagioclase, anhedral quartz (40%), microcline and scattered pale to dark golden brown biotite (2%). Trace zircon. Minor growth of secondary biotite on margins of primary grains.
K-feldspar : plagioclase = 4:1

80120085 128913
Coarse porphyritic hornblende biotite leucogranite (Type 5)
Allamber Springs Granite

Subhedral xenocrysts of perthitic microcline in a coarse groundmass of anhhedral microcline, quartz (30%) and altered plagioclase (zoned with microcline exsolution, undulose extinction and polygonal grain growth along grain boundaries), minor prismatic dark green hornblende with pale to dark golden brown biotite (4%), apatite, zircon, sphene and ?allanite. Minor chlorite, epidote and sericite alteration.
K-feldspar : plagioclase = 3:1.

80120086 123875
Coarse porphyritic hornblende biotite leucogranite (Type 5)
Allamber Springs Granite

Subhedral xenocrysts of perthitic microcline in a coarse groundmass of anhhedral microcline, quartz (30%) and altered plagioclase (zoned with microcline exsolution, undulose extinction and polygonal grain growth along grain boundaries), minor prismatic dark green hornblende with pale to dark golden brown biotite (4%), apatite, zircon, sphene and ?allanite. Minor chlorite, epidote and sericite alteration.
K-feldspar : plagioclase = 3:1.

80120087 113757
Coarse porphyritic biotite leucogranite (Type 5)
Allamber Springs Granite

Tabular xenocrysts of perthitic microcline in a coarse groundmass of anhedral microcline, quartz (40%), minor sericitised ?oligoclase and pale to dark golden brown biotite (3%) which occurs in aggregates containing apatite, and zircon and opaque inclusions. Very minor marginal chlorite and K-feldspar replacement of biotite. Trace primary muscovite in quartz.
K-feldspar : plagioclase = 4:1.

80120088 183840
Coarse equigranular leucogranite (Type 6)
Allamber Springs Granite

Coarse equigranular anhedral microcline, sericitised plagioclase and quartz (30%). Very minor altered pale green to brown biotite (1%; chlorite-epidote alteration). Highly strained texture with common undulose extinction and sutured grain boundaries with small unstrained polygonal grain development particularly along quartz grain boundaries.
K-feldspar : plagioclase = 3:1.

80120089 932782
Coarse porphyritic leucogranite (Type 8)
Douglas Leucogranite

Coarse xenocrysts (1cm.) of subhedral orthoclase, sericitised zoned plagioclase (albite?), quartz, and pale to dark brown biotite (<5mm) in a fine groundmass of anhedral microcline, quartz and very minor plagioclase and biotite. Biotite has inclusions of apatite and zircon and shows very minor epidote alteration. Trace opaques. Optically continuous overgrowths on most xenocrysts marked by stringers of quartz inclusions. Total biotite = 4%, total quartz = 40%.
K-feldspar : plagioclase >5:1.

80120090 906731
Coarse porphyritic leucogranite (Type 8)
Douglas Leucogranite

Strongly porphyritic. Coarse xenocrysts of tabular perthitic microcline, anhedral quartz and minor medium zoned plagioclase and pale to dark brown biotite in a fine to medium grained groundmass consisting of quartz, microcline and minor plagioclase, biotite, and trace primary? muscovite. Accessory zircon, apatite and opaques. Minor sericite and chlorite alteration.
Total biotite = 3%, total quartz = 40%.
K-feldspar : plagioclase = 10:1.

80120091 960570
Medium porphyritic leucogranite (Type 8)
Umbrawarra Leucogranite

Medium anhedral xenocrysts of quartz and sericitised plagioclase in a fine to medium groundmass of alkali feldspar, quartz, sericitised plagioclase, pale to dark greenish brown biotite (chloritised) and muscovite (primary? + secondary). Rare apatite and opaque needles in chlorite psuedomorphs after biotite. Rare apatite and secondary carbonate.
K-feldspar : plagioclase = 4:1.

80120092 916737
Coarse porphyritic leucogranite (Type 8)
Douglas Leucogranite

Coarse xenocrysts of perthitic microcline, anhedral quartz, and minor medium sericitised zoned plagioclase (oligoclase?), and biotite in a fine to medium groundmass of quartz, microcline, minor plagioclase, biotite and rare muscovite. Numerous apatite and zircon inclusions in biotite. Optically continuous rims on quartz and feldspar xenocrysts with micrographic intergrowths (with quartz) rims on microcline xenocrysts. Total biotite = 3%, total quartz = 30%.
K-feldspar: plagioclase >5:1

80120093 986528
Coarse porphyritic leucogranite (Type 8)
Umbrawarra Leucogranite

Coarse xenocrysts of quartz, subhedral zoned and sericitised plagioclase and medium irregular pale to dark golden brown biotite in a fine to medium groundmass of orthoclase, quartz, sericitised plagioclase, biotite, muscovite, and minor graphic intergrowths of quartz and alkali feldspar. Total quartz = 30%, total biotite = 2%.
K-feldspar : plagioclase ~ 5:1.

80120094 921799
Coarse porphyritic leucogranite (Type 8)
Douglas Leucogranite

Coarse subhedral xenocrysts of microcline and anhedral quartz in a medium groundmass of microcline, quartz, sericitised plagioclase and minor pale to dark golden brown biotite (1%). Rare zircon, secondary carbonate and chlorite. Total quartz = 40%.
K-feldspar : plagioclase = 10:1.

80120095 029525
Altered biotite hornblende granodiorite (Type 1)
Fingerpost Granodiorite

Coarse grained subhedral oligoclase (sericite - epidote alteration), K-feldspar, anhedral quartz (20%), scattered prismatic dark green to pale brown hornblende partially altered to chlorite and epidote, and pale to dark brown biotite (chloritised). Total mafics = 7%.
K-feldspar : plagioclase = 1:2.

80120097 198928
Porphyritic biotite granite (Type 2)
Allamber Springs Granite

Coarse subhedral microcline xenocrysts in a recrystallised, weakly foliated and deformed groundmass of elongate quartz grains (undulose with sutured grain boundaries), microcline (quartz inclusions common), sericitised anhedral K-feldspar, minor subhedral deformed albite/oligoclase and red brown to golden brown biotite. Accessory zircon.
Deformed and foliated phase close to pluton margin.

80120098 050981
Silicified dolomite
Koolpin Formation

Coarse irregular quartz patches within a matrix of fine grained ribbon quartz and granular opaques altering to goethite.

80120100 879999
Marble
Koolpin Formation

Fine granuloblastic carbonate with rare opaques (sulphides, hematite) up to 0.5mm in size, altered xenoblastic ?grossular garnet (<0.2 mm) and scattered ?spinel.

80120102 796019
Amphibolite
Koolpin Formation

Banded fine grained fibrous colourless to pale green tremolite/actinolite, fine idiomorphic colourless garnet, and minor quartz and biotite. Probably hornfelsed laminated impure carbonate sediment.

80120106 069947
Silicified marl?
Koolpin Formation

Laminated microcrystalline quartz, chlorite? and minor carbonaceous matter. Possibly silicified carbonaceous dolomitic shale.

80120109 041976
Phyllite
Mount Bonnie Formation

Weakly foliated chlorite and microcrystalline quartz with scattered angular silty quartz and opaque grains. Minor rounded aggregates of chlorite may be altered mafic grains.

80120110 908915
Tuffaceous chert
Mount Bonnie Formation

Microcrystalline quartz, sericite and very pale green chlorite mosaic with scattered angular quartz fragments and coarser recrystallised granoblastic patches of quartz and muscovite. Probably contact metamorphosed.

80120113 093978
Quartzite
Mundogie Sandstone

Poorly sorted, recrystallised and undulose coarse quartz and chert grains with minor intergranular sericite and opaques.

80120114 100940
Pebbly quartzite
Mundogie Sandstone

Very coarse to pebbly, poorly sorted quartz and minor chert grains. Most grains have recrystallised sutured grain boundaries, and undulose extinction. Patchy poikilitic muscovite and finer grained brown-stained muscovite patches may reflect original feldspar content. Hornfels texture. Minor opaques and well rounded zircon. Pebbles up to 1cm.

80120116 129043
Pebble conglomerate
Mundogie Sandstone

Poorly sorted subrounded granules and pebbles of quartz and chert in a foliated recrystallised matrix of sericite, quartz and minor brown iron oxides. Grain boundaries show some pressure solution. Undulose extinction common.

80120117 082934
Quartzite
Mundogie Sandstone

Very coarse poorly sorted fractured quartz and minor chert in a recrystallised matrix of quartz and minor muscovite. Rare quartz-muscovite aggregates are probably altered feldspar grains. Most quartz grains show undulose extinction. Random orientation of muscovite grains suggest contact metamorphism.

80120118 062982
Fine quartz sandstone
Wildman Siltstone (upper unit)

Massive, poorly sorted subangular quartz grains (< 0.2mm in size) in a matrix of finer grained quartz, sericite and limonite. Rare detrital muscovite and tourmaline.

80120119 079999
Silty phyllite
Wildman Siltstone (upper unit)

Banded irregular limonite grains in a matrix composed of fine grained quartz, sericite and foliated brown mica (most likely biotite). Variation in the proportion of mica imparts layered appearance. Small rectangular "porphyroblasts" of ?rutile cross cut the foliation but deflect a later weak kink plane.

80120120 073922
Biotite-tremolite-quartz hornfels
Wildman Siltstone (upper unit)

Irregular mosaic of tremolite, sutured very fine quartz, biotite and ?sphene. Probably contact metamorphosed sandy dolomite.

80120121 029620
Volcanilithic pebble conglomerate
Burrell Creek Formation

Poorly sorted angular to subrounded pebbles of dominantly altered volcanic rock fragments and minor greywacke, argillite and amphibolite (tremolite/actinolite?-quartz-epidote rock: carbonaceous meta-dolomitic marl?) in a fine to medium greywacke matrix consisting of angular quartz, chert, alkali feldspar, plagioclase, opaques and volcanic rock fragments in a recrystallised microcrystalline mosaic containing metamorphic carbonate, epidote, tremolite/actinolite. Volcanic rock fragments include rhyolite, pitchstone and tuffaceous chert.

80120122 073922
Calcite-zoisite-tremolite-quartz hornfels
Wildman Siltstone (upper unit)

Zoisite?, subprismatic to fibrous tremolite, carbonate, poorly sorted angular medium grained quartz (60%), and rare rounded zircon in a recrystallised matrix of granoblastic zoisite, tremolite and minor carbonate. Probably contact metamorphosed medium grained calcareous quartz sandstone.

80120123 064986
Very fine quartz sandstone
Wildman Siltstone (upper unit)

Silty to very fine angular quartz grains (< 0.1mm) in a matrix composed of sericite and limonite? and rare detrital zircon.

80120124 999923
Greywacke
Burrell Creek Formation

Poorly sorted medium grained quartz and sericite-chlorite rock fragments (probably altered volcanic) in a matrix of chlorite, sericite, opaques, minor muscovite and rare biotite. Possible hornfels texture.

80120125 026599
Volcanilithic pebble conglomerate hornfels
Burrell Creek Formation

Subrounded pebbles (2cm) of pitchstone, altered rhyolite fragments, crystal tuff, greywacke and mafic volcanics (diopside, actinolite, clinopyroxene), quartz grains, plagioclase, limonite in a matrix of recrystallised quartz, feldspar, actinolite, diopside, carbonate and sphene.

80120126 011861
Greywacke
Burrell Creek Formation

Coarse poorly sorted oligoclase (sericitised), angular quartz, minor deformed detrital muscovite, quartzite, felsic volcanic fragments. Some elongated altered volcanic rock fragments composed of greenish brown mica and limonite (may be altered pitchstone) in a matrix of very fine grained quartz, foliated sericite contact metamorphic biotite (unstrained, randomly oriented).

80120127 077596
Volcanilithic pebble conglomerate
Burrell Creek Formation

Angular to rounded pebbles (up to 2cm across) of dominantly volcanic rock fragments, with massive carbonate, chert, greywacke, and shale clasts in a coarse poorly sorted greywacke matrix composed of angular fragments of quartz, chert and feldspar fragments and recrystallised carbonate, opaques chlorite and sericite. Volcanic rock fragments include:
* brown variolitic rock (pitchstone) consisting of tabular orthoclase and minor plagioclase phenocrysts up to 2mm long in an altered brown glassy groundmass containing radiating crystallites;
* fine tuffaceous chert;
* interlocking slender orthoclase and minor oligoclase crystals in a feldspathic base containing opaques, crystallites and minor interstitial quartz, sericite, and chlorite;
* rhyolite consisting of oligoclase, K-feldspar and quartz phenocrysts in a patchy microcrystalline groundmass containing a little chlorite and opaques.

80120129 997614
Metasiltstone/greywacke contact
Burrell Creek Formation

Greywacke: angular quartz (<0.2mm in size), rare plagioclase and detrital hornblende in a groundmass composed of biotite, quartz and sericite.
Quartz-biotite-cordierite hornfels (metasiltstone): fine mosaic of biotite with patchy irregular poikilitic cordierite porphyroblasts up to 2mm across and relict graded silty laminae of quartz grains.

80120130 128684
Hornblende-diopside-biotite-quartz hornfels (meta volcanilithic pebble conglomerate)
Burrell Creek Formation

Relict recrystallised quartz, chert, greywacke, rhyolite, and altered volcanic rock pebbles, in a recrystallised mosaic of quartz, biotite, ?diopside and hornblende.

80120131 805698
Pebbly quartzite
Jindare Formation

Well rounded medium quartz grains, and subangular quartz pebbles (<1cm) cemented by optically continuous quartz overgrowths.

80120132 839559
Limonitic silicified dolomite breccia
Jindare Formation

Quartz grains (<5mm), chert fragments (<1cm: ghost carbonate rhombs) and minor radial chalcedony fragments cemented by a mixture of limonite, quartz and goethite.

80120133 844582
Sandy porcellanite
Jindare Formation

Poorly sorted fine to coarse well rounded quartz grains and angular fragments, supported in a brown amorphous and isotropic matrix showing broken wavy laminae and polygonal cracks in places. May have been a silica-replaced carbonate mud disrupted and broken by clastic grains.

80120134 839559
Limonitic quartz grit
Jindare Formation

Similar to 80120132. Very poorly sorted angular quartz grit and pebbles up to 1cm across in a porous limonitic matrix containing well rounded coarse quartz sand grains with relict quartz overgrowths (i.e.second cycle).

80120135 728828
Pebbly fine quartzite
Jindare Formation

Moderately sorted fine rounded quartz grains (<0.25mm), minor rounded chert pebbles (1cm), and rare detrital zircon in a brown stained matrix composed of tourmaline and quartz. Optically continuous quartz rims (some second cycle grains).

80120136 801715
Silty shale
Jindare Formation

Silty muscovite and quartz laminae in a limonitic matrix.

80120137 844582
Silty porcellanite
Jindare Formation

Angular silty quartz, minor muscovite and well rounded fine to medium quartz grains in a brown amorphous matrix with wavy laminae and polygonal cracking (suggestion of algal bulbs). May be silica-replaced algal carbonate mud.

80120138 863530
Laminated chert (silicified dolomite?)
Jindare Formation

Alternating laminae of cryptocrystalline quartz and very fine grained quartz mosaic with limonite pseudomorphs after carbonate rhombs.

80120139 866526
Pebbly quartz sandstone
Jindare Formation

Very poorly sorted fine to very coarse and pebbly (<1cm) well rounded quartz and minor chert (silicified dolomite) grains cemented by optically continuous quartz. Grain boundaries outlined by Fe oxides, some grains almost entirely replaced by limonite.

80120140 728828
Fine to medium quartzite
Jindare Formation

Poorly sorted fine to medium well rounded quartz grains and minor chert (<0.3mm) in a matrix composed of quartz (optically continuous) and tourmaline.

80120141 749807
Recrystallised dolomite
Stray Creek Sandstone

Rounded aggregates of fine dolomite mosaic in a matrix of coarser crystalline dolomite, polygonal quartz, limonite, chalcedony and very minor chlorite? Similar to 80120147.

80120142 735841
Limonitic ironstone
Stray Creek Sandstone

Very fine granular limonite with scattered muscovite and silty quartz grains.

80120143 866526
Fine to medium quartzite
Jindare Formation

Poorly sorted well rounded fine to medium grained quartz and minor chert (silicified dolomite) grains cemented by optically continuous quartz overgrowths.

80120144 735841
Silicified carbonate?
Stray Creek Sandstone

Limonite pseudomorphs of carbonate crystals and aggregates surrounded by radial chalcedony and minor granular quartz and chlorite.

80120145 866526
Silicified dolomite breccia
Jindare Formation

Angular clasts of microcrystalline quartz mosaic with ghost carbonate rhombs, in a matrix of yellow limonite-stained quartz mosaic, and patchy coarse polygonal quartz infilling fractures.

80120146 850560
Laminated very fine grained quartzite
Stray Creek Sandstone

Moderately sorted, sub-rounded, very fine grained quartz grains with optically continuous quartz rims. Trace well rounded detrital tourmaline, cloudy K-feldspar and shale clasts. Some laminae rich in sericitic grains may be altered K-feldspar.

80120147 749807
Siliceous recrystallised dolomite
Stray Creek Sandstone

Rounded aggregates of fine dolomite mosaic (algal pisolites?) surrounded by coarser crystalline dolomite and polygonal quartz.

80120148 735841
Laminated sandy siltstone
Stray Creek Sandstone

Sandy laminae: poorly sorted fine to medium well rounded quartz grains cemented by limonite and optically continous quarz. Minor detrital tourmaline and shale clasts.
Silty laminae: quartz, muscovite, chlorite (replaced mafic mineral), sericite, scattered limonite (after carbonate).

80120149 746806
Limonitic ironstone (altered carbonate rock)
Stray Creek Sandstone

Rounded limonite aggregates surrounded and infilled by wavy bands of polygonal chalcedony and minor dark yellow ?chlorite. Similar texture to 80120147.

80120150 749799
Coarse quartzite
Stray Creek Sandstone

Very poorly sorted medium to coarse well rounded grains of quartz, minor limonitic chert, and rare detrital tourmaline cemented by granular limonite and optically continuous quartz (grain boundaries outlined by limonite granules).

80120151 735841
Laminated very fine silty sandstone
Stray Creek Sandstone

Sandstone laminae: very fine grained, poorly sorted, subangular quartz and trace well rounded zircon, tourmaline, chlorite (after mafic mineral), secondary quartz overgrowths and minor limonite.
Siltstone laminae: scattered angular quartz, muscovite flakes, chlorite (after mafic mineral) in microcrystalline matrix of chlorite, sericite, and quartz.

80120152 155590
Deformed and altered coarse granite (Type 2)
McCarthys Granite

Highly strained quartz with granular grain boundaries, sericitised anhedral plagioclase (fractured and reccrystallised), microperthite, minor aggregates of colourless to pale green amphibole, sphene, clinozoisite, and patchy calcite. Brecciated veinlets of above minerals.

80120154 195521
Altered granodiorite (?Type 1)
Fingerpost Granodiorite

Coarse igneous oligoclase (sericite and scapolite alteration) with patchy metamorphic carbonate, scapolite, fine grained K-feldspar, clinozoisite, and sphene.

80120156 936625
Altered granite
Tabletop Granite

Fine mosaic of sphene, carbonate, chlorite, sericite, clinozoisite and polygonal quartz. Sericitised and carbonated igneous plagioclase and rare anhedral zircon.

80120157 983593
Brecciated granite
Umbrawarra Leucogranite

Crush zone in granite. Rounded and broken strained fragments of quartz and polygonal quartz aggregates in a finely crushed matrix of quartz, muscovite, limonite, sericite.

80120158 168519
Muscovite-quartz greisen
McCarthys Granite

Medium grained mosaic of polygonal, mostly unstrained, quartz and fine grained muscovite aggregates (after feldspars?).

80120161 175560
Mylonitic granite
McCarthys Granite

Angular strained quartz fragments and very minor plagioclase and scapolite in a microcrystalline matrix of quartz and ?chlorite. Common scapolite veins.

80120162 023510
Highly altered granite?
Unnamed dyke

Fine grained unstrained mosaic of biotite, irregular quartz, scattered euhedral garnet, very minor sericite, chlorite, euhedral apatite and zircon.

80120163 133518
Sheared coarse porphyritic leucogranite (Type 5)
McCarthys Granite

Xenocrysts of microperthite in coarse groundmass of quartz, plagioclase, K-feldspar, very minor chlorite (pseudomorphs after biotite). Strongly deformed with strained and fractured crystals and curved twinning common. Secondary quartz, carbonate and chlorite infill crosscutting microfractures and cleavage partings in plagioclase.

80120164 161576
Deformed and altered coarse quartz monzonite
Bludells Monzonite

Highly strained ribbon quartz with recrystallised polygonal grain boundaries and feldspar (cloudy sericitic and patchy quartz alteration). Minor aggregates of deformed colourless amphibole, apatite, secondary clinozoisite and sphene probably represent original altered mafic mineral.

80120165 851861
Altered and sheared porphyritic biotite granite (Type 2)
McMinns Bluff Granite

Microcline xenocrysts (cracked, deformed and undulose extinction), quartz (undulose extinction), plagioclase (partly replaced by fine cloudy pink Fe oxides, muscovite, and chlorite), biotite (replaced by muscovite, chlorite, limonite and hematite). Trace apatite and zircon. Veinlets of unstrained polygonal quartz and chlorite.

80120166 922747
Altered medium porphyritic leucogranite (Type 8)
Douglas Leucogranite

Irregular-shaped quartz xenocrysts and tabular microcline, up to 1cm across, in a fine grained mosaic of quartz, microcline and cloudy pink sericitised plagioclase, and minor biotite (completely replaced by muscovite, chlorite and Fe oxides).

80120167 981590
Muscovite quartz greisen
Umbrawarra Leucogranite

Unstrained medium grained mosaic of anhedral quartz (60%) and muscovite, the latter showing minor replacement by fine grained sericite and Fe oxides.

80120171 991011
Porphyritic hornblende biotite granite (Type 2)
McKinlay Granite

Zoned tabular xenocrysts (<1cm) of K-feldspar (mostly orthoclase) in a medium groundmass of anhedral quartz (30%), K-feldspar, subhedral oligoclase (sericitised and carbonated) biotite (foxy reddish brown) and pale green to brown hornblende. Accessory zircon, apatite and allanite. Total mafics = 7%.
K-feldspar: plagioclase = 1:1.

80120174 186045
Biotite-muscovite-quartz hornfels
Masson Formation

Fine grained unstrained biotite, muscovite, recrystallised granoblastic quartz (up to 2mm) and fine opaque granules. Probably meta- silty to fine sandstone. Minor euhedral tourmaline (metamorphic).

80120175 189011
Muscovite-tremolite marble
Masson Formation

Medium granoblastic carbonate with scattered fibrous to prismatic tremolitic crystals and minor kinked muscovite.

80120176 226980
Quartz vein
Masson Formation

Interlocking strained subprismatic quartz crystals with coarser recrystallised patches of granoblastic quartz and fine scattered opaques.

80120177 929890
Recrystallised biotite quartz syenite
?Bludells Monzonite

Coarse fibrous chlorite aggregates (50%) in a fine recrystallised mosaic of quartz, K-feldspar, and minor muscovite, epidote, opaques and apatite. Contact metamorphic fabric. Chlorite probably replaced biotite or hornblende.

80120180 175542
Altered felsite
Unnamed dyke

Porphyritic. Scattered phenocrysts (<1cm) of completely sericitised euhedral feldspar (probably plagioclase) in a microcrystalline groundmass of subhedral K-feldspar?, minor sericitised plagioclase? and chloritised biotite.

80120182 010926
Altered felsite
Unnamed dyke

Porphyritic. Scattered phenocrysts of quartz and sericitised euhedral plagioclase? in microcrystalline groundmass of quartz, sericite and secondary Fe oxides. Undulose extinction and fractured crystals common.

80120184 995903
Metabasite (?trachyandesite)
Burrell Creek Formation

Large tabular phenocrysts of alkali feldspar (some orthoclase), up to 1cm across, and smaller oligoclase (equal proportions) and completely replaced mafic phenocrysts now consisting of chlorite and epidote. Crystal shapes indicate mafic minerals were biotite and clinopyroxene. Groundmass is recrystallised containing microcrystalline quartz, alkali feldspar, chlorite, opaques, epidote, patchy carbonate and euhedral apatite. Alkali feldspars are extensively sericitised and carbonated and commonly contain apatite inclusions.

80120185 237636
Fine quartz biotite hornblende syenite
Bludells Monzonite

Medium grained quartz (15%) and microcline (50%) envelop finer grained chloritised golden brown biotite, granular pale to dark greenish brown hornblende aggregates (replaced by dark green amphibole in places) and sericitised oligoclase laths (20%). Minor secondary epidote, calcite and sphene. Accessory zircon and apatite. Total mafics = 15%.

80120186 164513
Altered dolerite
Unnamed dyke

Microcrystalline and flow banded. Curved slender crystals of andesine and granular to fibrous pale green amphibole (probably replaced clinopyroxene), with minor granular opaque minerals, biotite and rare interstitial quartz. Tapered twins and bent crystals common.

80120188 015516
Fine porphyritic leucogranite
Lewin Springs Syenite

Slightly porphyritic. Medium grained anhedral quartz, K-feldspar and sericitised oligoclase (10%) in a finer grained groundmass of graphically intergrown quartz, K-feldspar and minor biotite and hornblende completely altered to chlorite and epidote and minor carbonate. Total quartz = 25%, total mafics = 3%.

80120190 147516
Porphyritic micro quartz monzonite
Lewin Springs Syenite

Corroded phenocrysts (<1cm) of sericitised oligoclase euhedral crystals and aggregates, minor orthoclase (10%), pale to dark green fibrous amphibole (with sphene and apatite) in a groundmass of microcrystalline quartz (15%), pale greenish brown to dark green amphibole, biotite, sericitised subhedral plagioclase, opaques and apatite. Total mafics = 20%.

80120191 149518
Porphyritic microgranite
Lewin Springs Syenite

Strongly porphyritic with phenocrysts of euhedral crystals and aggregates of plagioclase - (highly sericitised and zoned <1cm), subhedral K-feldspar, pale gold and foxy red biotite (ragged and slightly deformed crystals with opaque inclusions) which forms aggregates with pale greenish brown to dark bluish green hornblende, apatite crystals and sphene, and minor undulose anhedral embayed quartz. Groundmass consists of microcrystalline quartz, subidiomorphic plagioclase, K-feldspar, hornblende, biotite, and apatite. Total quartz = 20%, total mafics = 5%.

80120192 771810
Medium quartzite
Depot Creek Sandstone

Medium grained moderately sorted well rounded quartz grains with optically continuous quartz rims: Fe oxide (limonite) granules outline original grain boundaries.

80120193 749807
Silty shale
Stray Creek Sandstone

Scattered irregular quartz and muscovite grains in a limonitic quartz matrix.

80120194 730839
Dolomitic siltstone
Stray Creek Sandstone

Scattered angular quartz, ?K-feldspar, muscovite and dolomite in a microcrystalline matrix of limonite, dolomite and quartz.

80120195 758840
Coarse quartzite
Depot Creek Sandstone

Poorly sorted medium to coarse quartz (sutured grain boundaries with rare well rounded grain boundaries), minor shale or phyllite fragments.

80120196 069947
Altered quartz dolerite
Zamu Dolerite

Medium grained highly altered subidiomorphic colourless clinopyroxene surround saussuritised feldspar crystals with minor interstitial quartz, opaques, sphene and trace apatite. Patchy secondary zoisite, muscovite, and calcite completely to partly replace feldspar crystals which commonly show albite rims. Clinopyroxene is mostly preserved as cores in colourless to pale green actinolite.

80120197 085999
Altered quartz dolerite
Zamu Dolerite

Medium grained highly altered subidiomorphic colourless clinopyroxene surround saussuritised feldspar crystals with minor interstitial quartz, opaques, sphene and trace apatite. Patchy secondary zoisite, muscovite, and calcite completely to partly replace feldspar crystals which commonly show albite rims.

80120198 751991
Amphibolite (contact metamorphosed fine grained quartz dolerite)
Zamu Dolerite

Similar to 80120200. Subprismatic to irregular pale to dark green amphibole crystals (75%) with subprismatic to xenoblastic andesine/labradorite, minor K-feldspar and granoblastic quartz. Scattered irregular opaques.

80120199 149999
Altered quartz dolerite
Zamu Dolerite

Medium grained pale green to very pale brown subidiomorphic twinned hornblende, with smaller completely saussuritised stout feldspar crystals and minor interstitial quartz, orthoclase graphic intergrowths, opaques, sphene, trace apatite and secondary chlorite, oligoclase and zoisite. Zoisite occurs mostly as stubby crystal aggregates replacing feldspar.

80120200 179935
Amphibolite
Zamu Dolerite

Contact metamorphosed medium grained quartz dolerite consisting of subprismatic to irregular pale green to colourless and very minor pale brown amphibole, relict labradorite laths and interstitial quartz - feldspar intergrowths with secondary colourless to pale brown mica (biotite/phlogopite) carbonate, amphibole crystals, K-feldspar, and altered opaques.

80120201 069930
Amphibolite (hornfelsed quartz dolerite)
Zamu Dolerite

Massive medium grained, with relict subophitic fabric, colourless to very pale green amphibole partially enclose fine granular zoisite and clinozoisite (altered plagioclase laths). Interstitial quartz, quartz - feldspar graphic intergrowths, apatite, irregular opaques and scattered secondary colourless to pale brown biotite?, clinozoisite and amphibole.

80120202 738970
Amphibolite
Zamu Dolerite

Fine grained granuloblastic mosaic of pale to dark green amphibole (50%), quartz, plagioclase, minor pale brown to colourless biotite and fine muscovite, and opaques. Scapolite veins.

80120203 873907
Amphibolite
Zamu Dolerite

Similar to 80120200. Contact metamorphosed medium grained quartz dolerite consisting of subidiomorphic to irregular pale green to colourless and very minor pale brown amphibole, interstitial quartz - feldspar intergrowths with secondary colourless to pale brown mica (biotite/phlogopite), amphibole crystals, K-feldspar, oligoclase/andesine and altered opaques.

80120204 171039
Amphibolite
Zamu Dolerite

Fine grained massive dark green rock composed of acicular crystals and irregular grains of colourless to dark green amphibole, granuloblastic quartz mosaic and minor scattered opaques. Hornfelsed quartz dolerite?

80120205 823937
Amphibolite
Zamu Dolerite

Contact metamorphosed medium grained quartz dolerite consisting of subidiomorphic to irregular pale green to colourless and very minor pale brown amphibole, relict labradorite laths and interstitial quartz - feldspar intergrowths with secondary colourless to pale brown mica (biotite/phlogopite) carbonate, amphibole crystals, K-feldspar, and altered opaques.

80120207 161052
Granophyre
Zamu Dolerite

Fine grained, equigranular, subidiomorphic microcline, oligoclase, ragged biotite (~20%) and minor interstitial quartz and graphic intergrowths of quartz and K-feldspar. Patchy carbonate and trace apatite and opaques.

80120208 103970
Very coarse limonitic quartz sandstone
Undivided Cretaceous

Very coarse poorly sorted, subangular to rounded strained quartz grains cemented by porous limonite.

80120209 791517
Medium quartz sandstone
Undivided Cretaceous

Bimodal fabric. Moderately sorted medium grained well rounded quartz grains cemented by optically continuous rims with scattered very coarse subangular to subrounded quartz and minor tourmaline.

80120210 842878
Very fine limonitic micaceous arenite
Undivided Cretaceous

Angular silty to fine grained quartz and muscovite flakes in a limonitic matrix.

80120211 738931
Coarse quartzite
Depot Creek Sandstone

Medium grained moderately sorted well rounded quartz grains with optically continuous quartz rims: Fe oxide (limonite) granules outline original grain boundaries.

80120212 791517
Medium quartz sandstone
Undivided Cretaceous

Moderately sorted well rounded medium quartz grains cemented by optically continuous quartz rims, minor detrital tourmaline and zircon.

80120213 719556
Oolitic limestone
Jinduckin Formation

Round to rounded oblong carbonate oolites, composed of very fine concentrically banded carbonate, in a medium grained polygonal carbonate matrix which also replaces and infills fractures in the oolites. Minor sandy laminae composed of very fine carbonate and ~ 10% subangular quartz.

80120214 745564
Quartz sandstone
Jinduckin Formation

Moderately sorted, subrounded medium grained quartz with minor chert and rare feldspar, cemented by limonite and secondary quartz overgrowths. Detrital tourmaline. Many quartz grains show abraded secondary quartz overgrowths (i.e. second cycle grains).

80120215 817614
Limestone
Tindall Limestone

Massive microcrystalline carbonate mosaic.

80120216 751533
Calcareous sandstone
Jinduckin Formation

Poorly sorted medium rounded quartz, minor chert (silicified carbonate) and very fine grained brown carbonate grains cemented by clear carbonate and minor quartz overgrowths. Rare detrital tourmaline and muscovite. Minor carbonate laminae. Total quartz >50%.

80120217 748640
Calcareous sandstone
Jinduckin Formation

Very fine subangular quartz, minor muscovite in a carbonate matrix. Suggestion of rounded detrital carbonate grains. Similar to 80120219. Total quartz ~ 50%.

80120218 818638
Limestone
Tindall Limestone

Very fine to medium laminated carbonate mosaic with very minor scattered quartz and laminae of secondary chalcedony.

80120219 717554
Calcareous sandstone
Jinduckin Formation

Very fine subangular quartz, well rounded microcrystalline carbonate, minor muscovite and rare detrital tourmaline cemented by carbonate and quartz overgrowths. Minor microcrystalline carbonate laminae. Total quartz >50%.

80120220 748564
Limestone
Jinduckin Formation

Laminated microcrystalline carbonate mosaic with very minor scattered silty quartz and muscovite.

80120221 733568
Calcareous sandstone?
Jinduckin Formation

Well rounded medium quartz and microcrystalline carbonate grains in a carbonate matrix. Minor quartz overgrowths, very minor chert, chalcedony, and tourmaline. Total quartz = 40%.

80120222 751718
Limestone
Tindall Limestone

Patchy microcrystalline to coarse carbonate mosaic.

80120223 755537
Sandy limestone
Jinduckin Formation

Very fine subangular quartz and very minor chert, tourmaline and muscovite grains supported in a microcrystalline carbonate mosaic. Total quartz ~ 20%.

80120224 830528
Quartz sandstone
Jinduckin Formation

Fine well sorted subangular quartz, minor K-feldspar, plagioclase and rare tourmaline, apatite? and muscovite cemented by quartz overgrowths and minor limonite.

80120225 747564
Calcareous sandstone
Jinduckin Formation

Very fine subangular quartz, very minor tourmaline and muscovite grains in a carbonate matrix with carbonate laminae.

80120226 980890
Phyllitic siltstone
Burrell Creek Formation

Angular silty quartz grains in a strongly foliated matrix of sericite, minor chlorite and angular opaques.

80120227 002928
Volcanilithic granule conglomerate
Burrell Creek Formation

Poorly sorted subangular granules up to 4mm of volcanic clasts (pitchstone, rhyolite, and crystal tuff, tuffaceous chert, and vitric tuff), minor greywacke, chert and quartz grains in a medium to coarse poorly sorted greywacke matrix composed of similar rock fragments and recrystallised actinolite, chlorite, iron oxides, epidote and carbonate. Slightly hornfelsed?

80120228 088602
Greywacke
Burrell Creek Formation

Very coarse greywacke with bimodal fabric, coarse clasts are very angular, unsupported and composed of: variolitic volcanic rock, shale, quartz and rare muscovite and quartz schist. Matrix is composed of fine grained quartz, feldspar (oligoclase), opaques, muscovite, chlorite (after mafic mineral) and sericite. Minor patchy carbonate and epidote. Rare detrital zircon.

80120229 019929
Greywacke
Burrell Creek Formation

Very coarse, poorly sorted, angular fragments of quartz, variolitic volcanic (either orthoclase or sodic plagioclase phenocrysts), felsic volcanic rock (subhedral plagioclase and alkali feldspar) in microcrystalline siliceous base, shale clasts(very fine sericite), oligoclase, alkali feldspar and finer grained greywacke clasts, in a finer grained sericitic matrix of the same composition with the addition of iron oxides and metamorphic biotite, muscovite and epidote.

80120231 128684
Volcanilithic pebble conglomerate hornfels
Burrell Creek Formation

Deformed and recrystallised pebbles of chert, quartz, tuffaceous chert, rhyolite? and amphibolite (diopside cores) in a recrystallised matrix of quartz, microcline, biotite, hornblende, opaques, carbonate and rare diopside and sphene.

80120232 024868
Chlorite-biotite-quartz-muscovite hornfels (meta-pelite)
Burrell Creek Formation

Fine granoblastic mosaic of biotite quartz and muscovite with minor chlorite. Very fine chlorite and biotite form aggregates after cordierite? Muscovite occurs as larger poikilitic porphyroblasts.

80120233 013753
Spotted biotite-muscovite-cordierite-quartz hornfels (meta-siltstone)
Burrell Creek Formation

Small ovoid poikilitic porphyroblasts of cordierite (completely replaced by sericite) in a fine mosaic of quartz, biotite and muscovite.

80120234 002928
Rhyolite
Burrell Creek Formation

Porphyritic rock consisting of scattered stout alkali feldspar, minor oligoclase and rounded and corroded quartz phenocrysts in a microcrystalline groundmass containing irregular patchy alkali feldspar, rare apatite, biotite, and opaques. Very fine secondary greenish brown biotite and rare carbonate.

80120235 725975
Muscovite-cordierite-quartz hornfels (metasiltstone)
Gerowie Tuff

Fine mosiac of quartz and slightly larger muscovite flakes with coarse poikilitic ovoid patches of fine brown Fe-stained sericite (probably after cordierite).

80120236 929882
Biotite-cordierite-quartz-muscovite hornfels (metashale)
Burrell Creek Formation

Fine mosaic of muscovite, biotite, opaques and xenoblastic quartz, intergrown with small ovoid poikilitic cordierite porphyroblasts up to 1mm across.

80120237 098655
Greywacke
Burrell Creek Formation

Coarse poorly sorted angular grains of quartz, minor plagioclase, alkali feldspar and altered variolitic volcanic rock fragments in a recrystallised matrix of sericite, quartz, opaques and dark greenish to brown biotite. Rare secondary tourmaline crystals. Minor sericitic aggregates probably represent altered feldspar fragments. Slightly contact metamorphosed (biotite).

80120238 975792
Magnetite-muscovite-biotite-microcline-quartz-andalusite-cordierite hornfels (metapelite)
Burrell Creek Formation

Large (up to 4mm) subidioblastic and poikilitic colourless to rose pink andalusite porphyroblasts in a base containing intergrown and poikilitic xenoblastic cordierite, microcline, and quartz with scattered biotite, muscovite, magnetite octahedra, and tourmaline.

80120239 085658
Banded calc-silicate hornfels.
Burrell Creek Formation

Fine mosaic consisting of alternating compositional bands of carbonate-sphene-quartz-chlorite-actinolite-zoisite hornfels and muscovite-biotite-quartz hornfels. Probably metamorphosed shale or siltstone containing marl bands.

80120240 097571
Biotite-cordierite-quartz hornfels (metapelite)
Burrell Creek Formation

Large elliptical and irregular poikilitic cordierite porphyroblasts, intergrown with fine xenoblastic quartz and biotite mosaic, with minor microcline, muscovite, magnetite and tourmaline.

80120241 978793
Quartz greywacke
Burrell Creek Formation

Coarse poorly sorted angular grains of quartz, minor alkali feldspar, felsic volcanic, and sericitic rock fragments (altered feldspar), and detrital deformed muscovite in a sericitic siliceous matrix with brown iron oxides.

80120242 772956
Muscovite-albite-microcline-quartz hornfels (meta K-rich -- Al-poor pelite?)
Gerowie Tuff

Fine granoblastic mosaic of quartz, albite, microcline, poikilitic muscovite and minor ?biotite.

80120244 045975
Altered vitric crystal tuff
Mount Bonnie Formation

Curved and angular crystal fragments (up to 0.2 mm) of quartz, feldspar and minor opaques in a foliated, and weakly eutaxitic base of microcrystalline quartz, feldspar, biotite, opaques and ghost glass shards. Minor small unfoliated biotite grains indicate slight hornfelsing.

80120246 061864
Contaminated margin of quartz-microsyenite
Unnamed dyke

Fine grained stubby subhedral cloudy microcline (graphically intergrown with minor quartz) and minor dark green biotite. Rock contains numerous embayed xenocrysts of coarse strained quartz, sericitised plagioclase and microperthite from host granite.

80120248 959721
Altered dolerite
Unnamed dyke

Fine grained subophitic crystals of colourless clinopyroxene, mostly replaced by fibrous pale green amphibole, enclose slender andesine crystals which show patchy sericitic alteration. Very minor interstitial K-feldspar and secondary Fe oxides.

80120249 037528
Porphyritic micro leucogranite
Lewin Springs Syenite

Scattered euhedral crystals and aggregates of oligoclase and minor orthoclase and embayed quartz crystals and minor biotite form phenocrysts (< 0.5cm) in a microcrystalline groundmass of graphically intergrown quartz and feldspar with minor biotite, magnetite and subhedral plagioclase. Graphically intergrown plagioclase and quartz rims around plagioclase phenocrysts. Total biotite < 1%, total quartz = 40%.

80120250 997889
Metabasite (altered ?andesite)
Burrell Creek Formation

Colourless euhedral clinopyroxene phenocrysts, partly altered to fibrous pale green amphibole and calcite, in a groundmass of metamorphic fibrous pale green amphibole, epidote and minor primary biotite (altered to chlorite), sericitised plagioclase laths, and interstitial quartz.

80120252 995903
Altered volcanic
Burrell Creek Formation

Highly altered volcanic rock consisting of fibrous pale green actinolite, epidote, sericite and carbonate with relict sericitised zoned feldspar phenocrysts, up to 2mm across, and tabular clinopyroxene phenocrysts mostly replaced by actinolite. Groundmass - sericitised alkali feldspar, stout orthoclase feldspar and rare interstitial quartz and apatite needles.

80120254 140820
Fine equigranular biotite-hornblende-quartz syenite
Bludells Monzonite

Fine grained equigranular anhedral microcline (60%), subhedral oligoclase (sericitised in part), anhedral quartz (10%), pale brown to dark greenish brown biotite (minor chlorite alteration), dark bluish green to greenish brown hornblende and very minor apatite, opaques and secondary clinozoisite. Total mafics = 20%.

80120256 180815
Garnet-muscovite-biotite quartzite.
Undivided hornfels

Very fine recrystallised mosaic of quartz and minor muscovite, biotite and garnet.

80120257 140820
Altered fine leuco quartz syenite.
Bludells Monzonite

Anhedral to subhedral microcline (65%), anhedral quartz (15%), sericitised subhedral plagioclase (15%) biotite (<5%; completely replaced by sericite), and yellow opaque mineral (?limonite).

80120260 180815
Amphibolite
Undivided hornfels

Coarse poikilitic and polygonal grains of pale green hornblende in a mosaic with K-feldspar, quartz, andesine/labradorite, and very minor biotite (partly replaced by amphibole). Accessory apatite and magnetite.

80120262 011861
Dolerite
Unnamed dyke

Fine grained subophitic colourless augite crystals, showing minor marginal alteration to hornblende, enclose partly sericitised euhedral andesite/labradorite crystals. Very minor interstitial K-feldspar, rare quartz and patchy secondary chlorite, amphibole and epidote. Accessory apatite and magnetite.

80120263 005016
Devitrified vitric tuff or tuffaceous shale
Burrell Creek Formation

Microcrystalline chlorite, sericite and quartz with scattered very fine angular fragments of quartz and K-feldspar. Poorly preserved eutaxitic texture.

80120265 096974
Carbonaceous shale
Wildman Siltstone (lower unit)

Very fine cloudy carbonaceous matter (>50%) with scattered silty quartz grains and sericite. Very weak parting, noticeable in hand specimens, outlined by concentration of carbonaceous matter at 45^{o} to bedding.

80120266 999923
Chloritic phyllite
Burrell Creek Formation

Microcrystalline foliated dark green chlorite with scattered angular to lense-shaped aggregates of quartz and chlorite, and silty quartz bands.

80120267 024868
Muscovite-biotite- K-feldspar-quartz hornfels
Burrell Creek Formation

Metamorphosed, coarse, poorly sorted greywacke consisting of recrystallised irregular and scattered quartz and alkali feldspar grains with fine biotite and larger poikilitic muscovite flakes.

80120270 039661
Muscovite-biotite-cordierite-quartz hornfels
Burrell Creek Formation

Metamorphosed shale consisting of large ovoid poikilitic cordierite porphyroblasts up to 5mm across, in fine biotite-muscovite mosaic containing relict laminae of poorly sorted, medium grained greywacke, consisting of recrystallised sutured quartz and chert grains in a matrix of biotite, quartz, minor feldspar and muscovite and rare tourmaline.

80120272 750972
Tuffaceous chert hornfels
Gerowie Tuff

Microcrystalline mosaic of quartz, opaques and sericite with scattered quartz and rare feldspar fragments. Coarser recrystallised patches of quartz, muscovite and chlorite indicate contact metamorphism.

PINE CREEK

PLATE 1

THIN SECTION LOCALITIES

x80120213 — *Thin section locality with BMR registered number*

5 — *Outline of compilation sheet with reference number*

SCALE 1:100000

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

BATCHELOR	McKINLAY RIVER	MUNDOGIE
TIPPERARY	PINE CREEK	RANFORD HILL
JINDUCKIN	FERGUSSON RIVER	KATHERINE

R9008402

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