Australian Ilmenite Resources Pty Ltd

ABN 55093419311

Fifth Annual Technical Report

GR274/17

Incorporating ELs 26524, 28342, 28343, 28870, 28892, 29040, 29041, 29631, 29632, 29633, 29634, 29635 & 29659

for the Period 09-02-2016 to 08-02-2017

Titleholder:	Australian Ilmenite Resources Pty Ltd.
Operator:	Australian Ilmenite Resources Pty Ltd.
Target Commodities:	Heavy Minerals
Project:	Roper Heavy Mineral Project
Date Granted:	22nd September 2013
Datum/Zone:	GDA94/53
1:250,000 Sheet:	Mt. Marumba, Urapunga, Katherine
1:100,000 Sheet:	Mainoru, Marumba, Waterhouse, Flying Fox, Throsby, Mataranka, Moroak, Chapman and Urapunga
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Copyright Statement

1 SUMMARY

Australian Ilmenite Resources Pty Ltd (AIR) is an independent ilmenite developer focused on the ilmenite and titanomagnetite-bearing regolith derived from the weathering of dolerite sills in the Roper Gulf Shire. Its primary asset is the Roper Heavy Minerals Project (the "Project") that straddles the Roper Highway about 120km east of Mataranka, and 475km south-east of Darwin, in the Northern Territory (NT), Australia.

The Project comprises 14 Exploration License Applications ('ELA'), 26 Exploration Licenses ('EL'), 2 Access Authority Applications (AAA), 1 Auxiliary Mining Lease Application (MLA), and 2 Mineral Leases ('ML'), covering a total area of 15063.69 square kilometers spanning the Roper River Basin. The two MLs, covering part of the SILL80 resource where trial mining and processing are in progress, are located on Namul Namul Station immediately south of the Roper Highway.

There are three reporting groups within the AIR's tenements portfolio: GR274, 275 and 276. GR274 lies in the central and northern parts of the Project area and is accessed by road from Darwin via the Stuart, Central Arnhem and Roper Highways a trip of 550km.

This is the fifth GR274 Annual Group Technical Report that covers the activities for EL26524, EL28342, EL28343, EL28870, EL28892, EL29040, EL29041, EL29631, EL29632, EL29633, EL29634, EL29635, and EL29659 for the period 09/02/16 to 08/02/17.

The Project lies in Mesoproterozoic sediments of the Roper Group in the central-western Bauhinia Shelf of the McArthur Basin that has been previously explored for heavy minerals, iron ore, base metals, uranium and diamonds. Sediments of the Maiwok Subgroup in the Project area have been extensively intruded by flat lying late Proterozoic sills of Derim Derim Dolerite containing minor amounts of primary accessory ilmenite, titanomagnetite and magnetite. During prolonged weathering these heavy minerals have been released from the dolerite sills as they became exposed. They are now concentrated at or near the surface within pisolitic, clay-rich ferruginous regolith and black soils in potentially economic concentrations.

AIR has undertaken little exploration throughout the GR274 tenements compared with its predecessor ERD, and instead has focused expenditure on mining infrastructure, process plant and trial mining located within the 2 MLs surrounded by EL28291.

In early 2014 AIR received additional funding to undertake further exploration throughout its tenements and in May 2014 AIR reaffirmed with DME its intention to rationalise its land holdings by prioritizing areas for further exploration and relinquishing others. By late July 2014 AIR had undertaken a desktop analysis and commenced planning for reconnaissance field work on tenements of GR274.

On 28th July 2014 Janna Robertson and Scott Kershaw of KordaMentha were appointed as Receivers and Managers of AIR ('the Receivers'). This placed the Regional Exploration and Resource Assessment Program and expenditure on hold although the Receivers continued to manage AIR on a business as usual basis and continue to liaise with the DME. Exploration was subsequently confined to office studies for GR274 that have been continued during the current reporting period and are summarized in this report.

AIR was purchased by MacMines in April 2016 and the company has concentrated its resources on refurbishing and recommissioning the heavy mineral wet plant on MLs27422 and 29042 and prioritised reconnaissance mapping and regolith sampling on the surrounding EL28291 of GR275 in advance of more comprehensive resource definition work to develop additional economic ilmenite resources.

Additional 5m resolution satellite imagery was purchased this period with the same acquisition date as for that area of EL28291 purchased during the previous reporting period. It covers parts or all of ELs 29040, 29041, 28892, 28342, 28343, 26524 and 29659 of Group 274 and proves useful with geological interpretation and determining the extents of prospective dolerite regolith and alluvium.

There was no on-ground exploration by AIR of GR274 tenements this reporting period.

AIR has now expanded its exploration programs to include all commodities and although the conclusions and recommendations for exploration as proposed previously are essentially unchanged they have been updated to include this.

2 INTRODUCTION

2.1 Background

Group 274 includes EL26524, EL28342, EL28343, EL28870, EL28892, EL29040, EL29041, EL29631, EL29632, EL29633, EL29634, EL29635, and EL29659 covering the central and northern parts of the Roper Heavy Minerals Project. It covers regolith-hosted heavy mineral deposits containing ilmenite and titanomagnetite derived from the weathering of dolerite sills emplaced into Proterozoic sediments of the Roper Group in the upper part of the McArthur Basin between Mataranka and Roper Bar in the NT.

Sherwin Member is also present and may be prospective for oolitic iron ore.

2.2 Location and Access

The GR274 exploration licenses are located approximately 80 km to 140 km east to northeast of Mataranka in the Roper River region of the Northern Territory, (Figure 1).

The northern tenements are easily accessed by the unsealed Central Arnhem Road but only during the dry season. To the south access is by the sealed Roper Highway. Unsealed, dry weather station fence lines and tracks provide further access within these areas. Sealed airstrips at Ngukurr to the east and Minyerri to the south provide all weather access for fixed wing and helicopter medivac and survey operations

2.3 Climate

The project area has a humid monsoonal climate, with mild dry winters and hot humid summers often with heavy monsoonal rains rarely associated with tropical cyclones. The average annual rainfall is approximately 950 millimeters with most falls between November and April. The wet season renders portions of the area inaccessible for exploration activities.

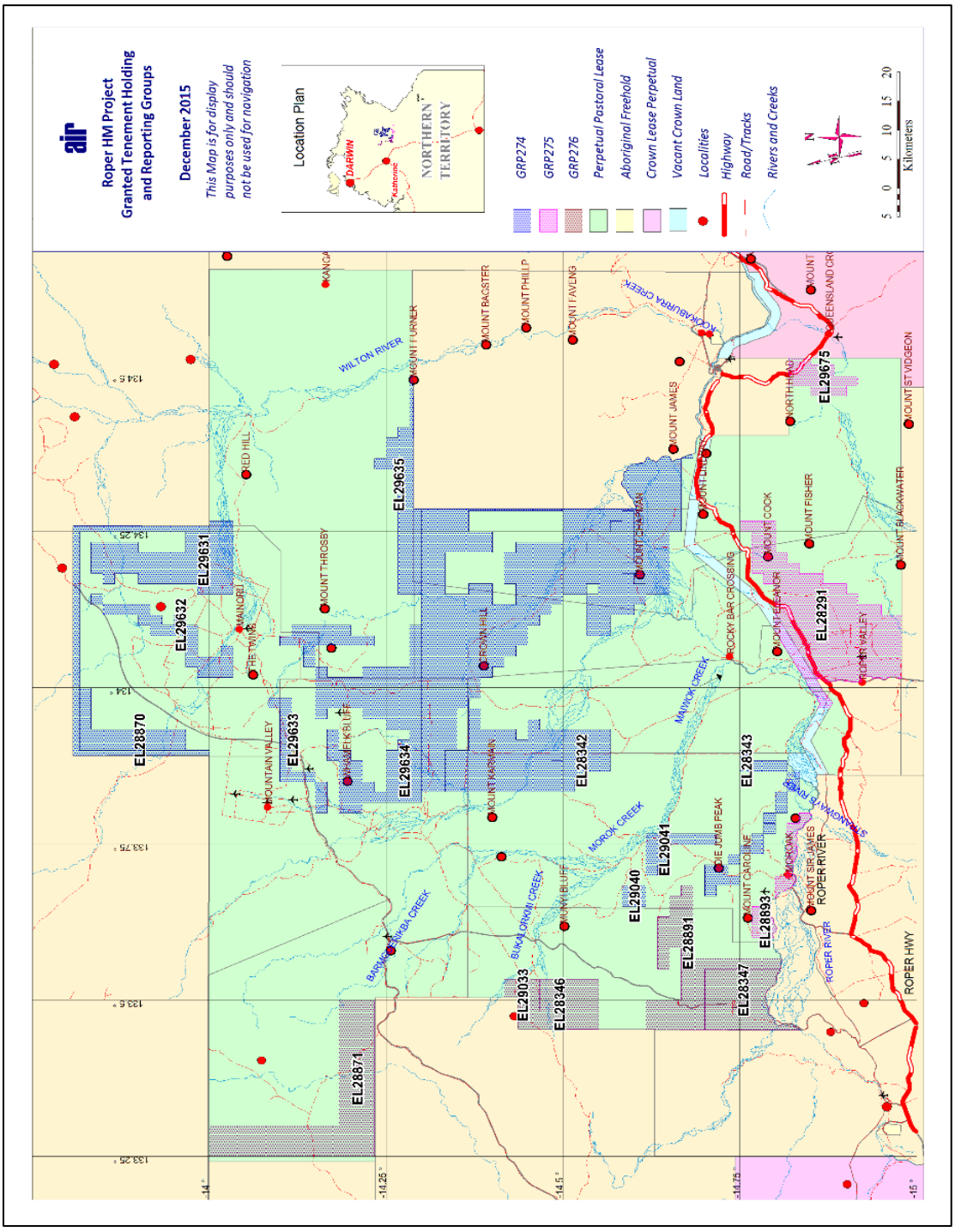

Figure 1: AIR Group 274 Tenement Locations

2.4 Topography, Vegetation and Water Resources

GR274 lies within the Gulf Fall physiographic province which is part of the Arnhem Land Plateau. Dissection of Proterozoic sediments have produced an undulating topography of low hills and rubble covered ridges with broad areas of alluvial and colluvial plains.

Vegetation consists of open savannah Eucalyptus woodland with Spinifex common in sandy and higher ground. The creek beds and water holes of the tributaries of the Roper River (including Flying Fox Creek and Maiwok Creek) extend through the area and are associated

with paperbark and larger Eucalyptus trees. Dense thickets of lancewood occur in higher ground particularly on the steep slopes adjacent to Cretaceous mesas and sandstone plateaux in often ferruginous soils.

The Roper River catchment represents some 82,000 square km. It extends from Arnhem Land and Wilton River Plateau regions in the north, to the Carpentaria Highway in the south. It borders the Daly River Basin to the west near Mataranka and drains the large Sturt Plateau region located in the south-western section of the catchment

Thirteen significant rivers and creeks drain the system of which the Roper, Hodgson, Wilton, and Waterhouse Rivers and Flying Fox and Elsey Creeks are perennial.

2.5 Tenure

GR274 comprises 13 granted Exploration Licenses on Pastoral Perpetual Leases covering 693 sub blocks (Table 1, Figure 2).

Tenement	Type	Land Tenure	Tenement Applied	Tenement Granted	Tenement Year	Current Sub Blocks
26524	EL	PPL	15/11/2007	23/07/2008	9th	100
28342	EL	PPL	13/10/2010	17/06/2011	6th	22
28343	EL	PPL	13/10/2010	17/06/2011	6th	10
28870	EL	PPL	4/07/2011	9/02/2012	5th	22
28892	EL	PPL	25/07/2011	20/02/2012	5th	11
29040	EL	PPL	3/10/2011	13/04/2012	5th	4
29041	EL	PPL	3/10/2011	13/04/2012	5th	11
29631	EL	PPL	31/08/2012	24/04/2013	4th	95
29632	EL	PPL	31/08/2012	24/04/2013	4th	22
29633	EL	PPL	31/08/2012	24/04/2013	4th	14
29634	EL	PPL	31/08/2012	24/04/2013	4th	96
29635	EL	PPL	31/08/2012	24/04/2013	4th	41
29659	EL	PPL	10/09/2012	24/04/2013	4th	245

Table 1: GR274 Tenement Details

Details of the Pastoral Leases involved are as follows, (**Error! Reference source not found.**).

Tenement	Property	Parcel No.	Owner	Perpetual Pastoral Lease
26524	Moroak	01288	Moroak Pastoral Company Pty Ltd	PPL01067
26524	Flying Fox	04775	Flying Fox Pty Ltd	PPL01179
26524	Mountain Valley	06518	Mountain Valley Station (NT) Pty Ltd	PPL01188
26524	Lonesome Dove	04972	Colin Edward Crossley	PPL01185
26524	Big River	04973	Daniel Tapp	PPL01160
28342	Moroak	01288	Moroak Pastoral Company Pty Ltd	PPL01067
28342	Flying Fox	04775	Flying Fox Pty Ltd	PPL01179
28343	Moroak	01288	Moroak Pastoral Company Pty Ltd	PPL01067
28343	Flying Fox	04775	Flying Fox Pty Ltd	PPL01179
28343		00916	Vacant crown land	
28870	Mainoru	05108	Colin Edward Crossley	PPL01167
28892	Moroak	01288	Moroak Pastoral Company Pty Ltd	PPL01067
29040	Moroak	01288	Moroak Pastoral Company Pty Ltd	PPL01067
29041	Moroak	01288	Moroak Pastoral Company Pty Ltd	PPL01067
29631	Mainoru	05108	Colin Edward Crossley	PPL01167
29631	Wongalara	05109	Australian Wildlife Conservancy	PPL01168
29632	Mainoru	05108	Colin Edward Crossley	PPL01167
29633	Mainoru	05108	Colin Edward Crossley	PPL01167
29633	Mountain Valley	06518	Mountain Valley Station (NT) Pty Ltd	PPL01188
29634	Mountain Valley	06518	Mountain Valley Station (NT) Pty Ltd	PPL01188
29634	Mainoru	05108	Colin Edward Crossley	PPL01167
29634	Wongalara	05109	Australian Wildlife Conservancy	PPL01168
29635	Wongalara	05109	Australian Wildlife Conservancy	PPL01168
29635	Big River	04973	Daniel Tapp	PPL01160
29635	Lonesome Dove	04972	Colin Edward Crossley	PPL01185
29659	Big River	04973	Daniel Tapp	PPL01160
29659	Lonesome Dove	04972	Colin Edward Crossley	PPL01185
29659	Flying Fox	04775	Flying Fox Pty Ltd	PPL01179
29659	Mt McMinn	04971	Joe Cahill (Vic) Pty Ltd	PPL01180
29659	Mountain Valley	06518	Mountain Valley Station (NT) Pty Ltd	PPL01188

Table 2: Properties Affected by GR274 Tenements

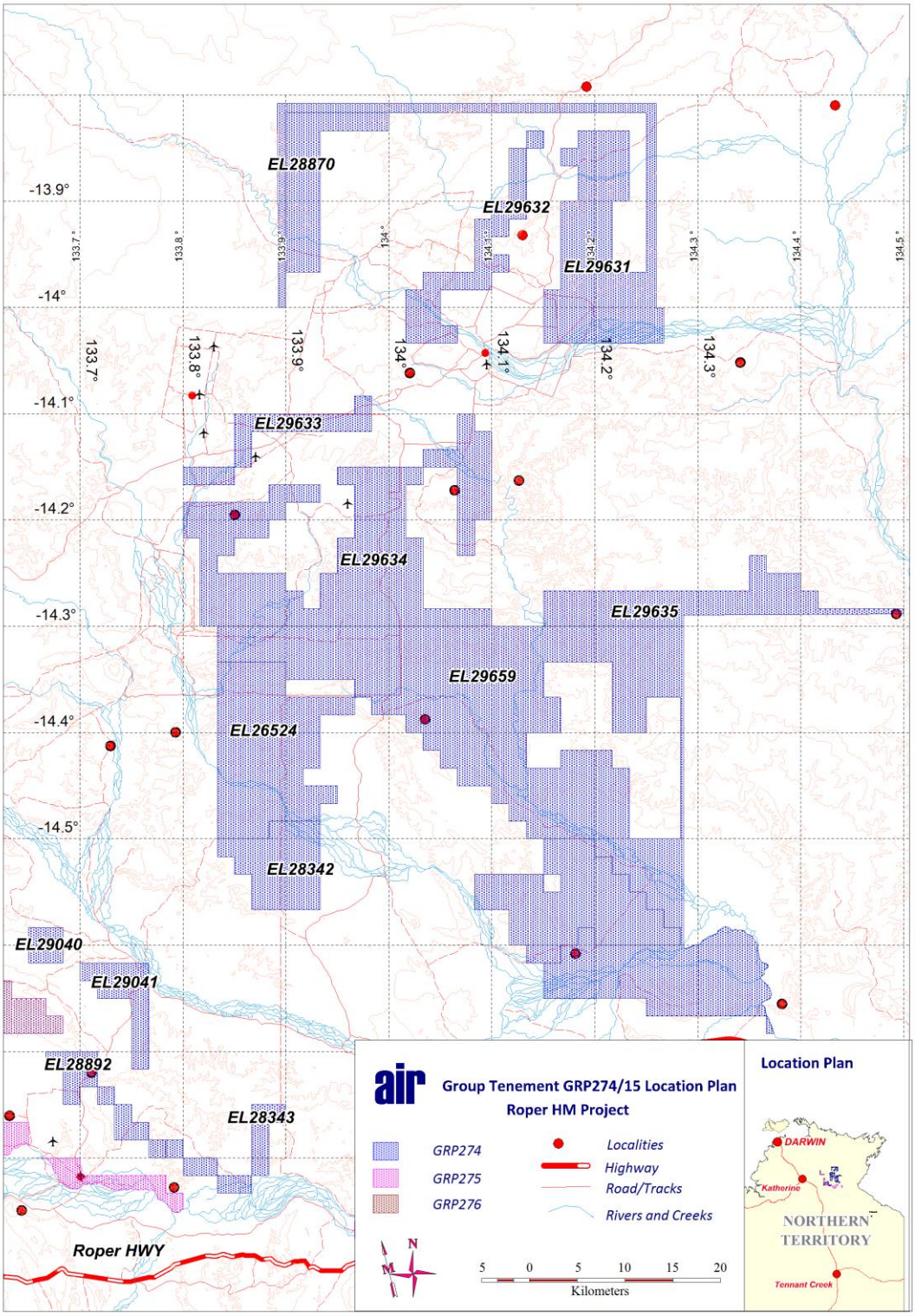

Figure 2: GR274 Tenement Location Plan

2.6 Native Titles

There are four Native Title claims which affect GR 274/14, (Figure 3).

- DC 01/11 Mountain Valley
- DC 01/14 Goondooloo/Moroak1
- DC 01/66 Goondooloo/Moroak2
- DC 01/63 Mountain Valley/Mainoru

2.7 Aboriginal Sacred Sites

There are known Aboriginal Sacred Sites amongst the northern and southern tenements of the Group. No archaeological surveys have been carried out during the current tenure. If ground disturbing exploration is planned then AAPA clearances will be conducted.

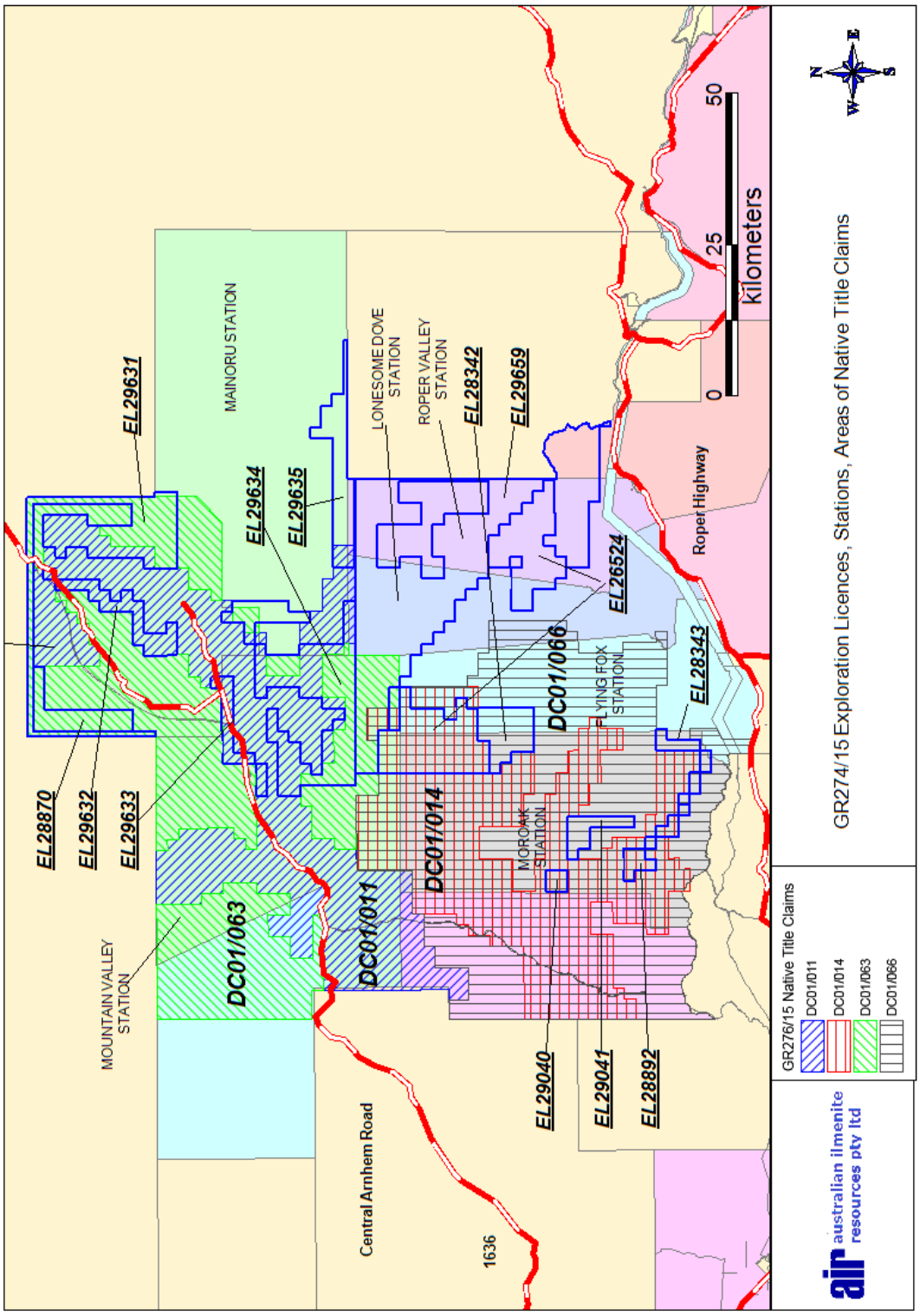

Figure 3: Native Titles Affecting Project Area

3 REGIONAL GEOLOGY

The Roper Heavy Mineral (HM) Project lies in the central-western Bauhinia Shelf of the southern part of the McArthur Basin, in the northeast of the Northern Territory, (Figure 4). The McArthur Basin comprises an unmetamorphosed and relatively undeformed succession of marine clastic and carbonate sedimentary rocks, interspersed with extrusive volcanics and intrusive igneous sills of Palaeoproterozoic-Mesoproterozoic age, up to 10 km thick. It correlates with the highly mineralised Isa Superbasin to the southeast and contains occurrences and resources of base metals, gold, uranium, iron ore, manganese, diamonds, platinum group elements and petroleum.

The Basin represents a passive series of sedimentary cycles developed in response to basement growth faults and accommodation structures represented now by the north-south trending Batten and Walker Troughs and northwest trending fault zones that include the Urapunga Fault Zone that passes through the southern part of the Project area.

The Roper HM Project area is underlain by sediments of the Roper Group comprising quartz sandstones, micaceous siltstones, mudstones black shales and glauconitic sandstones. Ironstones are present in the Sherwin Member of this subgroup that is the target for iron ore exploration and development in the region, (

Stratigraphy	Sym	Lithology	Sill Groups & HM-Bearing Alluvials
Undifferentiated Alluvium	**Qa, Cz**	Elluvial, alluvial, sand, silt, gravel	**Buka, Big Banana Alluvials**
		ROPER GROUP	
MAIWOK SUBGROUP			
Chambers River Formation	Prc	Siltstone, mudstone, fine sandstone	
			Strangways, Buka NNE, Buka
Bukalorkmi Sandstone	Prl	Quartz sandstone	Buka South, Strangways, BMC East, SILL80 South
			SILL80, Buka NE, Buka East
Kyalla Formation	Pry	Siltstone, mudstone, fine sandstone	Conways West, Allungalugi, Mt Karmain, Maiwok South, Big Banana South, Tor Ridge
			Allungalugi, Fitzer, Stow Hill, Mt Cook, Tapp 2, Lower Fox, Maiwok North, Mt Karmain, Fitzer
Moroak Formation Sherwin Member	Prk Prkz	Quartz sandstone Sandstone, siltstone, mudstone & ironstone	Maiwok North, Fox Central
			Fox Central
Velkerri Formation	Prv	Mudstone, siltstone (organic in part)	Velkerri, SIL046, Big Banana
Bessie Sandstone	Pre	Quartz sandstone	SIL046, SIL053, Big Banana, SIL055,Mt Caroline
			Chapman East, Conways East,
Corcoran Formation Munyi Member	Pro Prom	Siltstone lower, with sandstone upper Fe sandstone and siltstone	Conways East, Strangways
			Jalboi, Conways East, Accident

COLLARA SUBGROUP			
Hodgson Sandstone	Prh	Quartz sandstone	Jalboi East
			Jalboi East, Wilton West, Wilton
Jalboi Formation	Prj	Fine sandstone, siltstone	Jalboi East, Wilton East, Wilton West, Accident West
Arnold Sandstone	Prx	Quartz sandstone	
Crawford Formation	Prr	Fine sandstone, siltstone	Mountain Valley, Accident West
			Accident West, Chapman West, Mainoru South, Mountain Valley,
Mainoru Formation Showell Member Wooden Duck Member Mountain Valley Limestone Nullawun Member	Pru Prus Pruw Prut Prun	Undifferentiated Calcareous mudstone, limestone Mudstone-siltstone-sandstone Mudstone, limestone Mudstone	Wooden Duck Creek, Mainoru North
Limmen Sandstone	Pri	Quartz sandstone	
Mantungula Formation	Prn	Mudstone, fine sandstone, dolostone	
Phelp Sandstone	Prp	Quartz sandstone	

Table 3: Roper Group Stratigraphy, Dolerite Sills, Sill Groups , Figure 5, Table 4). This Group is of Mesoproterozoic age, 1429-1324 million years old, and varies from 1.5 to over 3km thick. Within the Roper Group the Maiwok Subgroup has been intruded extensively by mafic dikes and sills of Derim Derim Dolerite, dated at 1324 million years that were emplaced soon after deposition and which ceased before regional deformation. This occurred at various stratigraphic levels within and between formations ranging from the Mainoru Formation up to Chalmers River Formation, (Table 3). This is a continental tholeiite than varies from aphanitic basalt to holocrystalline microgabbro/gabbro in texture and composition. It comprises plagioclase feldspar varying in composition between andesine and labradorite, clinopyroxene (pigeonite) and minor (up to about 3-5%) iron-titanium oxides (magnetite, titanomagnetite and ilmenite). The sills exhibit weak deuteric alteration to chlorite, epidote, clay and carbonate. Regional exploration shows that the relative abundances of magnetite-titanomagnetite and ilmenite varies amongst the sills and that the ilmenite-rich sills predominate in the upper parts of the stratigraphy. Although mostly gently dipping to flat-lying, this sequence is locally folded into broad folds and tightly folded domes, (1:250,000 Urapunga Geological Map Sheet SD53-10).

Lower Palaeozoic rocks unconformably overlie the Proterozoic succession comprising Cambrian Antrim Basalts in the far western part of the project area and a strongly dissected sheet of Upper Palaeozoic Cretaceous conglomerates, sandstones, siltstones and claystones are preserved as outliers and mesas throughout. Cambrian and Ordovician sediments are recorded in the Katherine district to the west but evidence of these or other intervening Palaeozoic lithologies is missing from the project area. It is assumed that they have either been eroded off or were never deposited here suggesting that the Palaeozoic was a period of extensive denudation here.

The following Cenozoic period, starting from the end of the Cretaceous 65 million years ago, was an extensive period of regolith development including the formation of laterite, calcrete and ferricrete. During the Quaternary to Recent extensive deposits of regolith comprising highly ferruginous pisolitic loams and clays and clayey black soils formed on the gentle slopes and floodplains overlying exposed dolerite sills, and unconsolidated gravels, sands and silts accumulated as valley fills and floodplain deposits that reflect material derived from prolonged weathering and erosion of Cretaceous and pre-Cretaceous rocks during the Cenozoic.

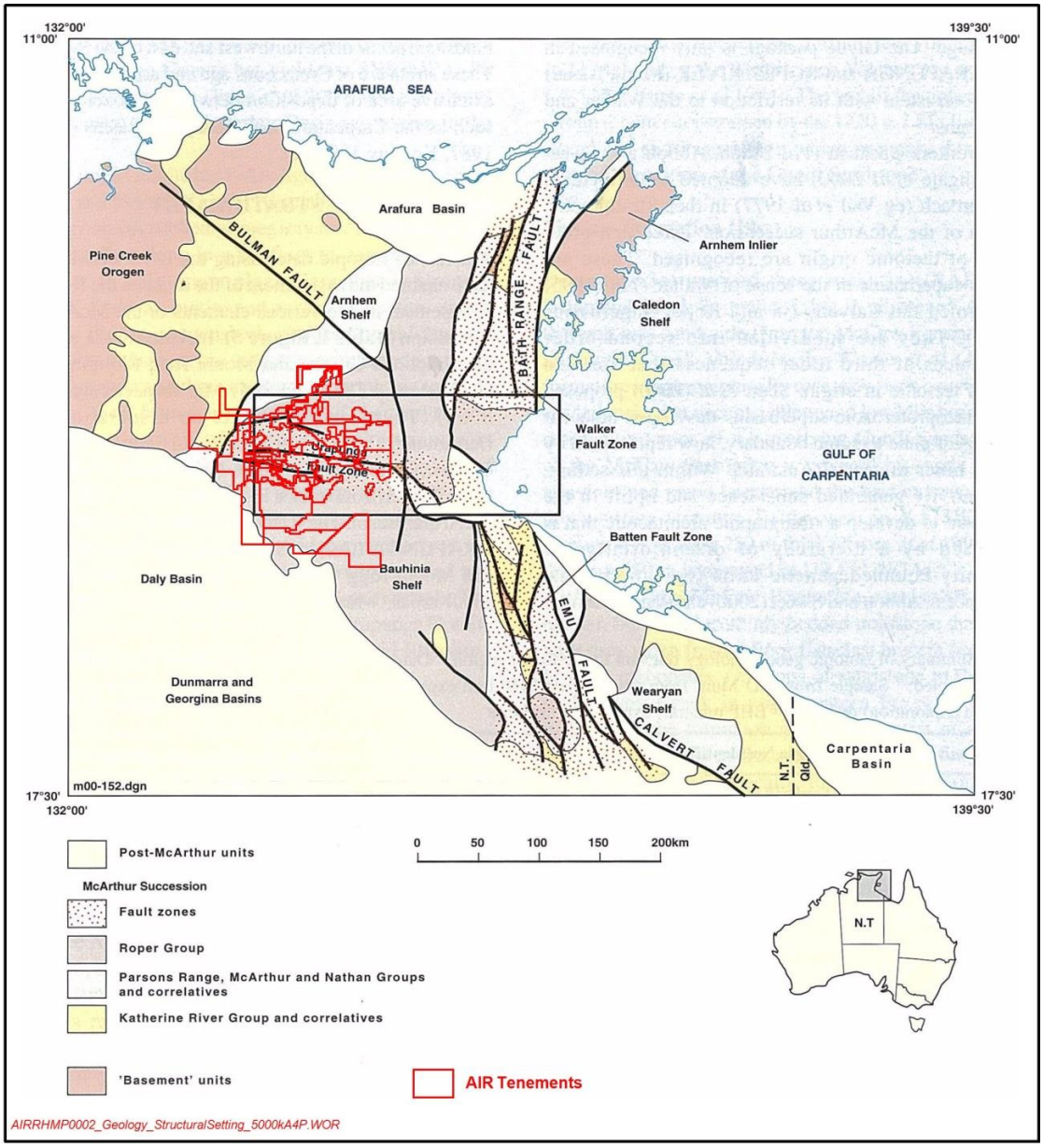

Figure 4: Regional Geology & AIR Heavy Mineral Project Location

Stratigraphy	Sym	Lithology	Sill Groups & HM-Bearing Alluvials
Undifferentiated Alluvium	**Qa, Cz**	Elluvial, alluvial, sand, silt, gravel	**Buka, Big Banana Alluvials**
		ROPER GROUP	
MAIWOK SUBGROUP			
Chambers River Formation	Prc	Siltstone, mudstone, fine sandstone	
			Strangways, Buka NNE, Buka
Bukalorkmi Sandstone	Prl	Quartz sandstone	Buka South, Strangways, BMC East, SILL80 South
			SILL80, Buka NE, Buka East
Kyalla Formation	Pry	Siltstone, mudstone, fine sandstone	Conways West, Allungalugi, Mt Karmain, Maiwok South, Big Banana South, Tor Ridge
			Allungalugi, Fitzer, Stow Hill, Mt Cook, Tapp 2, Lower Fox, Maiwok North, Mt Karmain, Fitzer
Moroak Formation Sherwin Member	Prk Prkz	Quartz sandstone Sandstone, siltstone, mudstone & ironstone	Maiwok North, Fox Central
			Fox Central
Velkerri Formation	Prv	Mudstone, siltstone (organic in part)	Velkerri, SIL046, Big Banana
Bessie Sandstone	Pre	Quartz sandstone	SIL046, SIL053, Big Banana, SIL055,Mt Caroline
			Chapman East, Conways East,
Corcoran Formation Munyi Member	Pro Prom	Siltstone lower, with sandstone upper Fe sandstone and siltstone	Conways East, Strangways
			Jalboi, Conways East, Accident
COLLARA SUBGROUP			
Hodgson Sandstone	Prh	Quartz sandstone	Jalboi East
			Jalboi East, Wilton West, Wilton
Jalboi Formation	Prj	Fine sandstone, siltstone	Jalboi East, Wilton East, Wilton West, Accident West
Arnold Sandstone	Prx	Quartz sandstone	
Crawford Formation	Prr	Fine sandstone, siltstone	Mountain Valley, Accident West
			Accident West, Chapman West, Mainoru South, Mountain Valley,
Mainoru Formation Showell Member Wooden Duck Member Mountain Valley Limestone Nullawun Member	Pru Prus Pruw Prut Prun	Undifferentiated Calcareous mudstone, limestone Mudstone-siltstone-sandstone Mudstone, limestone Mudstone	Wooden Duck Creek, Mainoru North
Limmen Sandstone	Pri	Quartz sandstone	
Mantungula Formation	Prn	Mudstone, fine sandstone, dolostone	
Phelp Sandstone	Prp	Quartz sandstone	

Table 3: Roper Group Stratigraphy, Dolerite Sills, Sill Groups

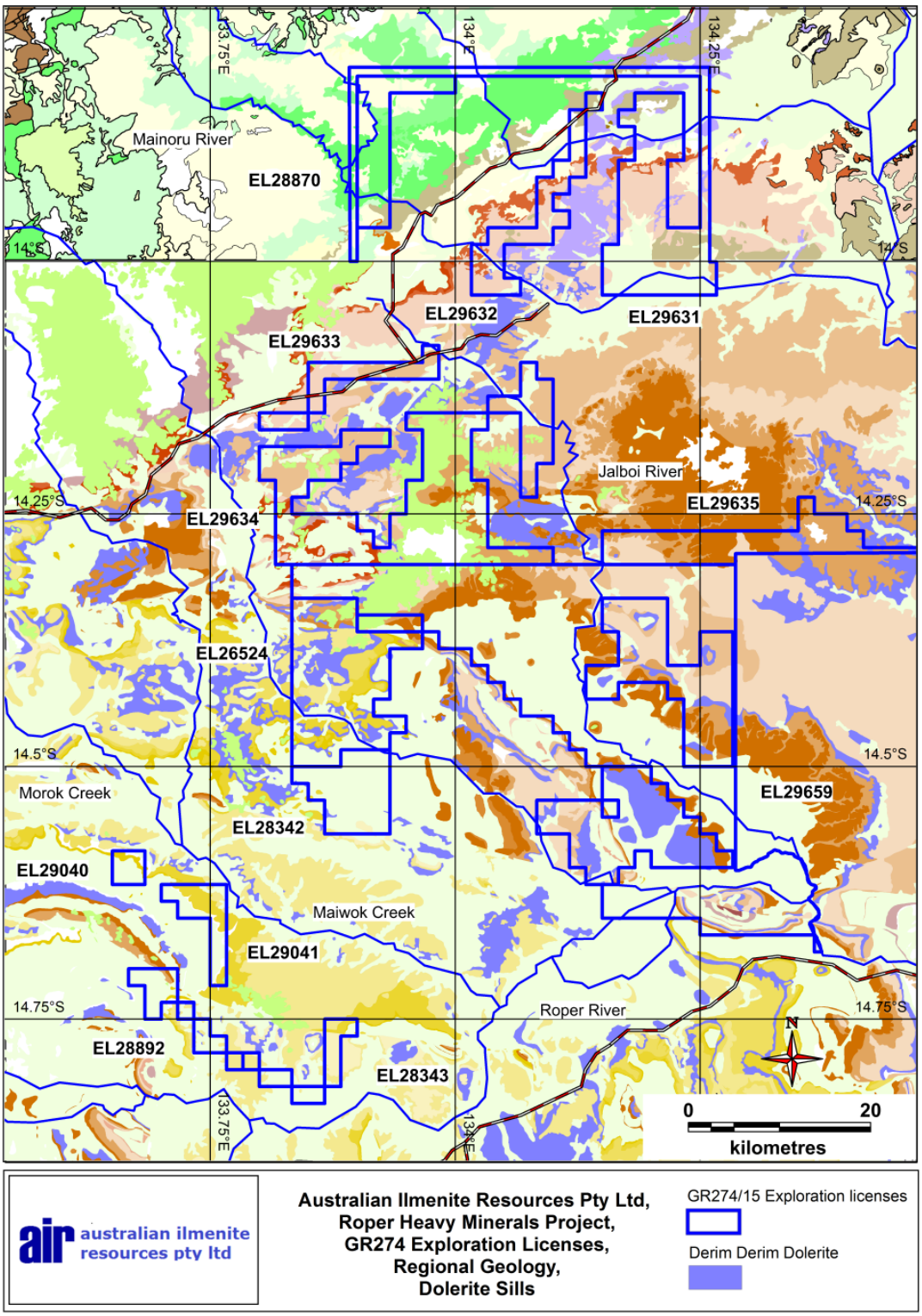

Figure 5: GR274 Regional Geology

Unit, Thickness and Age	Map Code	Lithology	Depositional Environment	Stratigraphic Relations	Derim Derim Sills
Derim Derim Dolerite 1324 ± 4 Ma	Pdd	Medium to coarse- grained dolerite/ gabbro		Sills and some dykes intrude Roper Group	
MAIWOK SUBGROUP					
Chambers River Fm <300 m	Prc	Thinly to medium bedded, laminated micaceous siltstone and mudstone; minor very fine sandstone	Storm-dominated shelf	Probably conformable on Bukalorkmi Sandstone	Dolerite
Bukalorkmi Sandstone 10–20 m	Prl	Thinly to medium bedded, trough cross-stratified, well sorted, fine quartz sandstone	Coastal tidal platform	Contact with Kyalla Formation is sharp and probably erosional (disconformable)	Dolerite
Kyalla Fm ca 250 m	Pry	Interbedded siltstone, sandstone and mudstone	Storm-dominated shelf	Gradational and conformable on Sherwin Member	Dolerite
Sherwin Member Up to 100 m	Prz	Interbedded sandstone, siltstone and mudstone; local pisolitic ironstone lenses	Fluvial to marginal marine	Gradational and conformable on Moroak Sandstone	Dolerite
Moroak Sandstone 2.5–420 m	Prk	Thinly to medium bedded, medium to fine quartz sandstone; coarse-grained and quartz granule intervals	Coastal tidal platform	Disconformable on Velkerri Formation	Dolerite
Velkerri Fm 330 m	Prv	Grey and black mudstone and siltstone; minor fine glauconitic sandstone	Distal shelf	Conformable on Bessie Creek Sandstone	Dolerite
Bessie Creek Sandstone ca 20–56 m	Pre	Fine to medium, locally coarse and granule-rich quartz sandstone	Coastal tidal platform	Disconformable on Corcoran Formation	Dolerite
Corcoran Fm ca 180–225 m	Pro	Laminated green-grey to black mudstone and siltstone; minor fine sandstone	Distal shelf, and storm-dominated shelf	Grades up from Munyi Member	Dolerite
Munyi Member 13–23 m	Prom	Red to brown ferruginous sandstone, siltstone, mudstone, conglomerate and pisolitic ironstone	Shallow-marine to fluvial	Disconformable to conformable on Hodgson Sandstone	Dolerite
COLLARA SUBGROUP					
Hodgson Sandstone, 30-130m	Prh	White to pink, fine to coarse, strongly trough cross-bedded quartz sandstone	Coastal tidal platform	Overlies Jalboi Formation with gradational, or in some areas, erosive contact	Dolerite
Jalboi Formation 117–230 m	Prj	Interbedded fine sandstone and siltstone, alternating with medium to thick beds of medium quartz sandstone	Storm-dominated shelf	Disconformable on Crawford Formation	
Arnold Sandstone 0 – 123 m	Prx	White cross-bedded quartz sandstone	Coastal tidal platform	Overlies Crawford Formation with minor disconformity; overlain unconformably by Jalboi Formation	
Crawford Formation 0–235 m	Prr	Thickly bedded, fine micaceous and glauconitic sandstone; thinly interbedded sandstone, siltstone and mudstone; minor trough cross-bedded medium quartz sandstone	Storm-dominated shelf	Conformable on Showell Member of Mainoru Formation; overlain by Arnold Sandstone with sharp, probably erosive contact, or by Jalboi Formation with disconformable contact	
Mainoru Formation 1492 ± 4 Ma 1493 ± 4 Ma	Pru	Shale and siltstone, glauconitic and micaceous sandstone, micritic and intraclastic limestone, calcareous and non-calcareous mudstone			

Table 4: Stratigraphy of Upper Roper Group (McArthur Basin Field Guide 2014, NTGS)

4 PREVIOUS EXPLORATION

4.1 Mining History

There has been no previous mining carried out on GR274 tenements. Sherwin Iron has extracted a large bulk sample from its nearby Roper River Iron Ore Project and a trial operation by AIR has mined ilmenite from SILL80 to the south.

4.2 Exploration by Previous Companies

The AIR HM Project area has been explored previously for iron ore, base metals, diamonds and uranium.

Evaluation of the oolitic ironstones of the Sherwin Member by BHP in the 1950's identified potential for large tonnage (>400Mt) low to moderate grade (30%-60% Fe) iron deposits largely to the south and southeast of the Project area. More recently Sherwin Iron Ltd undertook exploration in the southwest, east and northeast of EL28291 and carried out a bulk sampling program in the Sherwin Creek area east of EL28291.

Exploration for uranium was undertaken by Kratos Uranium NL in the early 1970's with little success.

Normandy Poseidon explored the area for base metals (Pb, Zn and Cu) culminating in the discovery of a number of small low-grade deposits of sandstone-hosted base metals including disseminated galena in Roper Group sediments at Galena Cliffs and Wongalara.

Stockdale Prospecting and Ashton Mining carried out extensive diamond exploration during the 1980's and 1990's involving regional stream sediment sampling, loam sampling, airborne magnetic surveys and drilling. While a few kimberlitic indicator minerals including micro and macro diamonds were reported, most could not be traced to a source with the exception of two thin (<2m) steeply dipping kimberlitic dykes (Packsaddle and Blackjack 1) located by Stockdale west of EL28291.

CRA Exploration undertook a reconnaissance evaluation of the heavy mineral content of lateritic soils associated with dolerite sills. Eight hand-held auger holes were completed to test the upper soil profile at several isolated locations. The best assay of 1.0m @3.0% ilmenite was reported and the tenements were subsequently surrendered in 1996.

Exploration and Resource Development Pty Ltd ('ERD'), the forerunner of AIR, explored large areas in the headwaters of the Roper River, including the areas of GR274, between 2001 and 2004 for regolith-hosted heavy minerals associated with the dolerite. Intensive drilling and bulk pit sampling campaigns were carried out at Buka, BMC, Big Banana, and various "resources" were reported from EL29033 in GR276.

A comprehensive summary of all past exploration can be found in the Explanatory Notes for the Roper Region: Urapunga and Roper River Special Sheet (Abbott, S.T., et al. 2001) and Appendix 1:.

5 ILMENITE EXPLORATION BY ERD, AIR

5.1 Previous Years

This is the fifth annual technical report for GR274. All previous reporting prior to the approval for group reporting on 23rd January 2013 was covered under former tenement holdings held by ERD.

Exploration by ERD in the Roper Basin was guided by two exploration models that considered that ilmenite and titanomagnetite were liberated from dolerite sills by weathering and concentrated in the regolith and that subsequent erosion of the regolith into ancient to current drainage channels could also concentrate these heavy minerals in sedimentary traps.

The early exploration programs comprised reconnaissance mapping and soil and lag sampling to identify concentrations of primary heavy minerals in the lateritised dolerite soils derived from sills emplaced at different levels in the Roper Group stratigraphy. Areas reporting encouraging concentrations of ilmenite were then targeted for further work.

Areas of ilmenite concentrations were then tested with reconnaissance auger drilling in 2001 and follow-up grid-based drilling in 2002. Trenching and bulk pitting followed that lead to the identification of the Buka resource on EL29033 in GR276. Since then no further field work except annual visits and minor sampling programs has been undertaken.

Other mineral commodities were also considered. In previous years geophysical data sets were acquired and a consultant geophysicist (GeoDiscovery Group) assessed the uranium potential of the area. Although a number of anomalies were identified and further assessment was undertaken for the purposes of an exploration joint venture, the arrangement was never finalised. An assessment was also undertaken for diamonds but it was concluded that there was little economic potential for either uranium or diamonds

An airborne radiometric/magnetic survey was flown that comprised 5 tiles, two of which covered parts of GR274. This was followed with a helicopter reconnaissance mapping and sampling program that also targeted iron ore. Several sites were visited and assays of 39 rock chip samples included high grade Fe values. Results have been previously reported.

A later review by AIR of data resulted in work plans being finalised mainly for helicopter based exploration sampling during the 2013-2014 reporting period but funds were instead dedicated to trial mining and processing activities on ML27422 and there was no significant exploration work done. The mining and processing activities ceased in July 2013 and the plant was placed in care and maintenance.

5.2 2014-2015

There was only limited exploration on GR274 during the 2014-2015 reporting period, (Johnstone, 2015). Funding was sourced from an international bank in 2014 to support the SILL80 Mine Development and Exploration Program. This Program was expected to rationalise and prioritise AIR's tenement portfolio with decisions to continue exploration or recommendations for partial area reductions, full relinquishments and joint ventures.

An internal review of previous exploration was undertaken and planning commenced for a helicopter based reconnaissance mapping and sampling program to identify possible drilling sites for resource definition work. Consideration was also given to identifying the iron ore potential on part of EL26524.

A series of presentations were made to the DME in May 2014 on AIR's intentions to rationalise its current holding with the understanding that this may contribute towards attaining EPA (Exploration Project Area) status for AIR's Roper Heavy Minerals Project.

A further review of tenement holdings and previous exploration work undertaken by AIR and earlier explorers was completed by AIR later in mid-2014 and a plan was developed for selected reconnaissance sampling. A full evaluation of all tenements within GR274 was conducted considering likely resource potential as well as economic considerations such as proximity to infrastructure and environmental factors. This work was also directed to rationalising AIR's tenement portfolio. This began with helicopter reconnaissance sampling and recommendations for partial reduction of EL26524.

The appointment of KordaMentha as Receivers and Managers in late July 2014 placed all further exploration expenditure on hold and no on-ground exploration work conducted.

Recommendations on tenement positions proposed by AIR were further investigated by TZMI who in late 2014 were contracted to provide an independent assessment of all AIR tenements based on their experience and review of AIR data sets. Except for the partial reduction of EL26524 before TZMI were engaged, no decisions were made on the other tenements.

On 4 February 2015, the Department of Mines and Energy approved an application by AIR for all the granted exploration tenements to be included under an Exploration Project Area ('EPA'). The EPA allowed for pooling of the minimum covenant expenditures enabling prioritised systematic exploration of the more prospective tenements.

5.3 2015-2016

The Receivers continued to manage AIR's business, and liaise with the DME until 12th April 2016 when MacMines completed the purchase of the shares of AIR and became owner of the company and its assets.

A draft report of the results from the TZMI review of AIR tenements was available and reported previously. The moratorium on AIR tenements stalled the tenement management reduction process, and under receivership only limited funds were made available to continue low level field work on GR275 and much of the year was devoted to office studies and data compilation that included GR274. That work comprised:

- Compilation and consolidation of various exploration datasets from work carried out on the regolith by ERD throughout the AIR Project area, including tenements of GR274, and classification of sill and sill group types based on available mineral processing data from overlying regolith samples,
- An interpretation of the positions of the dolerite sills throughout the stratigraphy of the Roper River Basin, including those from GR274, comparison of their sill types

and ranking of the areas of heavy mineral-bearing regolith for their ilmenite potential,

- Planning follow up work programs.

AIR did not meet its expenditure covenant under EPA status for the 2015-2016 reporting year and relief from DME was provided.

5.4 CURRENT YEAR GROUP 274

No on-ground exploration work was carried out on any of the tenements of this Group and MacMines instead elected to concentrate its resources on refurbishment and recommissioning of the processing plant and facilities located on MLs27422 and 29042, and limited geological mapping and broad-spaced hand auger sampling of the regolith of the surrounding EL28291 of Group 275.

Additional 5m resolution Rapid Eye satellite imagery was purchased to assist with geological interpretation and planning of exploration programs that covered all or parts of the licenses of GR274

AIR did not meet its expenditure covenant under EPA status for the current reporting year and relief from DME has been sought.

5.5 EL26524

5.5.1 Geology of EL26524

EL26524 now comprises 2 separate blocks following partial relinquishment, (Figure 6).

In the North Block the oldest sediments belong to the Jalboi Formation that outcrop in the northernmost part of the area and are overlain successively by Hodgson Sandstone, and the Corcoran Formation including the Munyi Member of the Corcoran Formation. They are unconformably overlain by Cretaceous sediments. This sequence is terminated against an east-west fault to the south. South of this fault lies a younger sequence of Velkerri Formation overlain successively by Moroak Formation, Sherwin Member and Kyalla Formations. The eastern and southern limits of the area comprise Undifferentiated Alluvium.

The Hodgson Formation in the older sequence north of the fault is intruded by an unidentified Derim Derim Dolerite sill. In this stratigraphic position it is probably of titanomagnetite type although there has been no regolith sampling here. South of the fault the younger sequence is intruded by the Mt Karmain and Fox Central Sill Groups. Fox Central Group comprises SILL51 and SILL52 intruding the Moroak-Velkerri Formations contact and the overlying Moroak Formation. Reconnaissance regolith, pit and trench sampling by ERD identified these sills as ilmenite and sub-ilmenite types. The Mt Karmain Group comprises SILL47, SILL49 and SILL50 that intrude the Moroak-Kyalla Formations contact and the overlying Kyalla Formation. Reconnaissance sampling by ERD west of EL26524 identified SILL47 as a titanomagnetite type, SILL49 as sub-ilmenite and SILL50 as titanomagnetite type.

Sills in the North Block of EL26524 are extensively exposed with regolith development. Airborne magnetic surveys including those by ERD give a noisy response over the sills and adjacent areas of Sherwin Member as expected however some outliers of Cretaceous sediments are similarly magnetic suggesting that more detailed mapping is required.

The South Block of EL26524 is underlain by an older sequence of lower Roper Group sediments. The lowermost unit, Mainoru Formation, is overlain by a succession of Crawford, Jalboi, Hodgson and Corcoran (including Munyi Member) Formations and Bessie Creek Sandstone. The Chapman West Sill intrudes the Mainoru-Crawford Formations contact and the Chapman East Sill intrudes the Munyi Member-Bessie Creek Sandstone contact. The airborne magnetics is noisy throughout in response to the sills showing that they are continuous subsurface within the stratigraphy, as expected.

5.5.2 Previous Exploration EL26524

There are no known mineral occurrences in the North Block. Previous geochemical sampling is limited to stream sediment sampling in 1992 by Stockdale Prospecting Ltd in the North Block that found a gold anomaly of 17ppb Au, and low order base metal anomalies of 39.7ppm Pb, 50ppm Ni and up to 104ppm Zn, (Appendix 2:). These have not been followed up. There was limited regional regolith sampling by ERD.

There are no known mineral occurrences in the South Block and prior to work by ERD there had been no geochemical sampling.

Although the sills are extensively exposed with regolith, reconnaissance sampling by ERD is limited to 1 soil auger hole from Chapman West and 6 soil auger holes from Chapman East. Results from these suggest that both are of titanomagnetite type, consistent with their lower stratigraphic position.

5.5.3 Prospectivity of EL26524

EL26524 North Block received a ranking of 4 from TZMI since the dolerite appears to be of titanomagnetite type. They ranked the South Block higher with a 2 since they thought these sills are similar to SILL80.

AIR however ranked North Block with a 3 recommending reconnaissance mapping of the extent of potential regolith for broad-spaced shallow hand auger sampling and mapping and rock chip sampling of the extent of oolitic iron-bearing rocks of the Sherwin Member.

Although the sills in the South Block appear to be of titanomagnetite type the extent of sampling is negligible. These sills are of large extent, lying within 45km of the SILL80 plant and AIR has recommended broad-spaced systematic hand auger sampling to determine whether zones of ilmenite-bearing regolith exist that could contribute additional resources for the SILL80 plant.

5.5.4 Exploration of EL26524

Although no on-ground exploration work was carried out on EL26524 this report period, 5m resolution Rapid Eye satellite imagery covering South Block was purchased that assisted with the interpretation of the regolith and planning for broad-spaced hand auger sampling and geological mapping, (Appendix 3:). Purchase of the remaining coverage for North Block is recommended that will assist with interpretation of the geology, and regolith and planning for hand auger sampling and follow-up of the stream sediment anomalies.

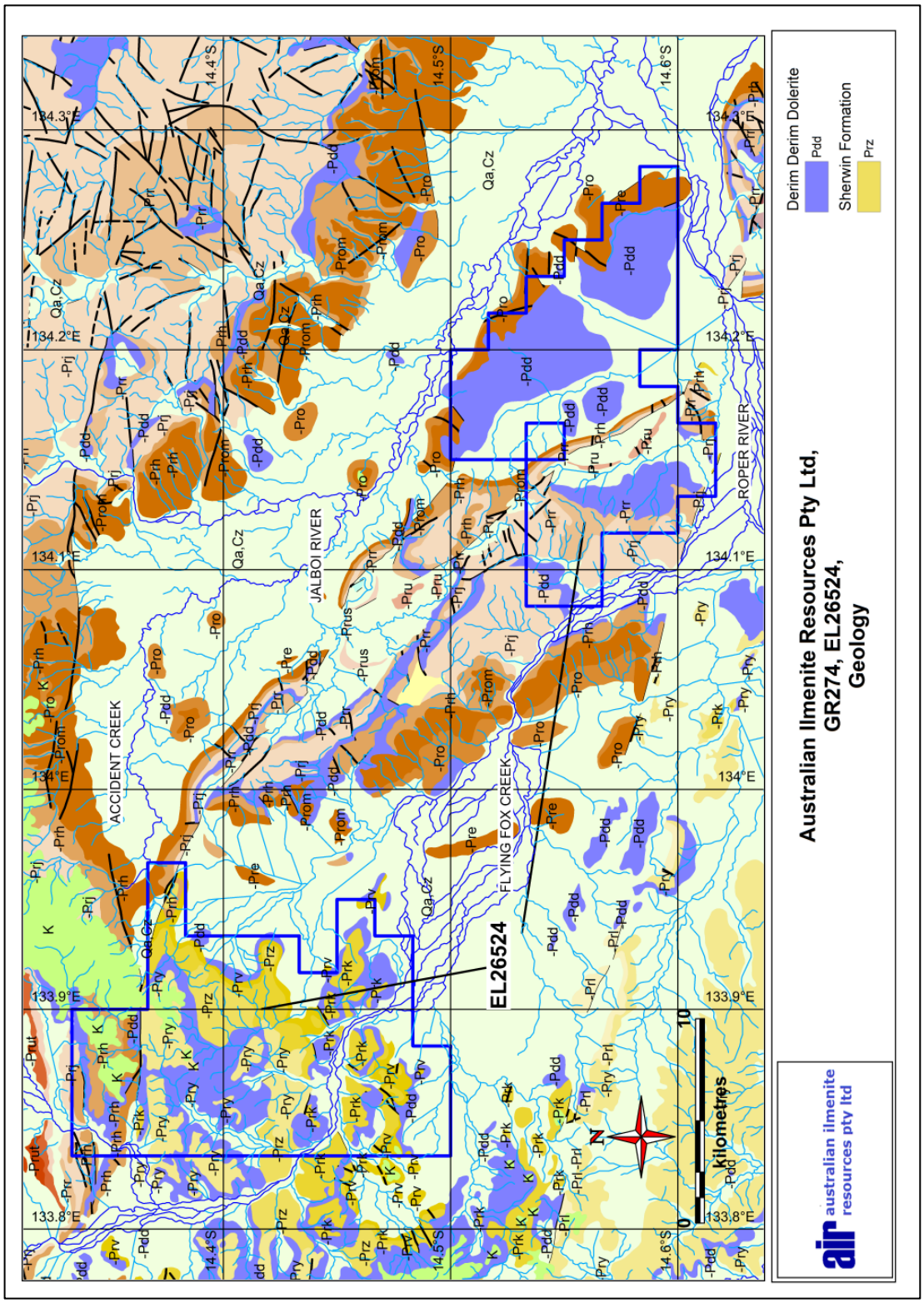

Figure 6: Geology EL26524

5.6 EL28342

5.6.1 Geology of EL28342

EL28342 is underlain almost entirely with Unconsolidated Alluvium. Bukalorkmi Sandstone overlying Kyalla Formation outcrops on a small ridge in the south and a small area of dolerite has been mapped in the west, (Figure 7). It appears to be part of the Maiwok North Sill Group that is known to intrude the Moroak Formation and the contact between Moroak and Kyalla Formations. There has been no sampling here by ERD for heavy minerals and reconnaissance sampling by ERD of the Maiwok Sill Group to the west is limited to one surface and one trench sample results from which suggest it is a titanomagnetite type. However its stratigraphic position in the upper part of the stratigraphy suggests that it has potential for ilmenite bearing heavy minerals. The airborne magnetics, including the ERD surveys, have detected the continuation of the Maiwok North sill beneath the alluvium and a north-south trending dolerite dike. A prominent U radiometric anomaly overlies an area of low relief in the central part of the license otherwise mapped as alluvium. It warrants field checking.

5.6.2 Previous Exploration EL28342

There are no known mineral occurrences here nor has there been any previous geochemical sampling by earlier explorers including ERD.

5.6.3 Prospectivity of EL28342

TZMI gave the area a rating of 5 commenting that existing sampling does not indicate good ilmenite potential and that there is no outcropping dolerite here.

AIR also gave the area a low rating of 5 noting the absence of dolerite. Upper tributaries of Flying Fox Creek draining from areas of dolerite sills in the Fox Central area immediately to the north and Maiwok North to the west pass through the northern and western parts of EL28342 and there is unexplored potential here for heavy minerals accumulations in the alluvium.

5.6.4 Exploration of EL28342

Although no on-ground exploration work was carried out on EL28342 this report period, 5m resolution Rapid Eye satellite imagery covering only the eastern and southern parts of the area was purchased that assisted with the interpretation of the regolith and planning for broad-spaced hand auger sampling and geological mapping. This was not sufficient to assist with understanding the radiometric anomaly and the alluvium for heavy mineral potential.

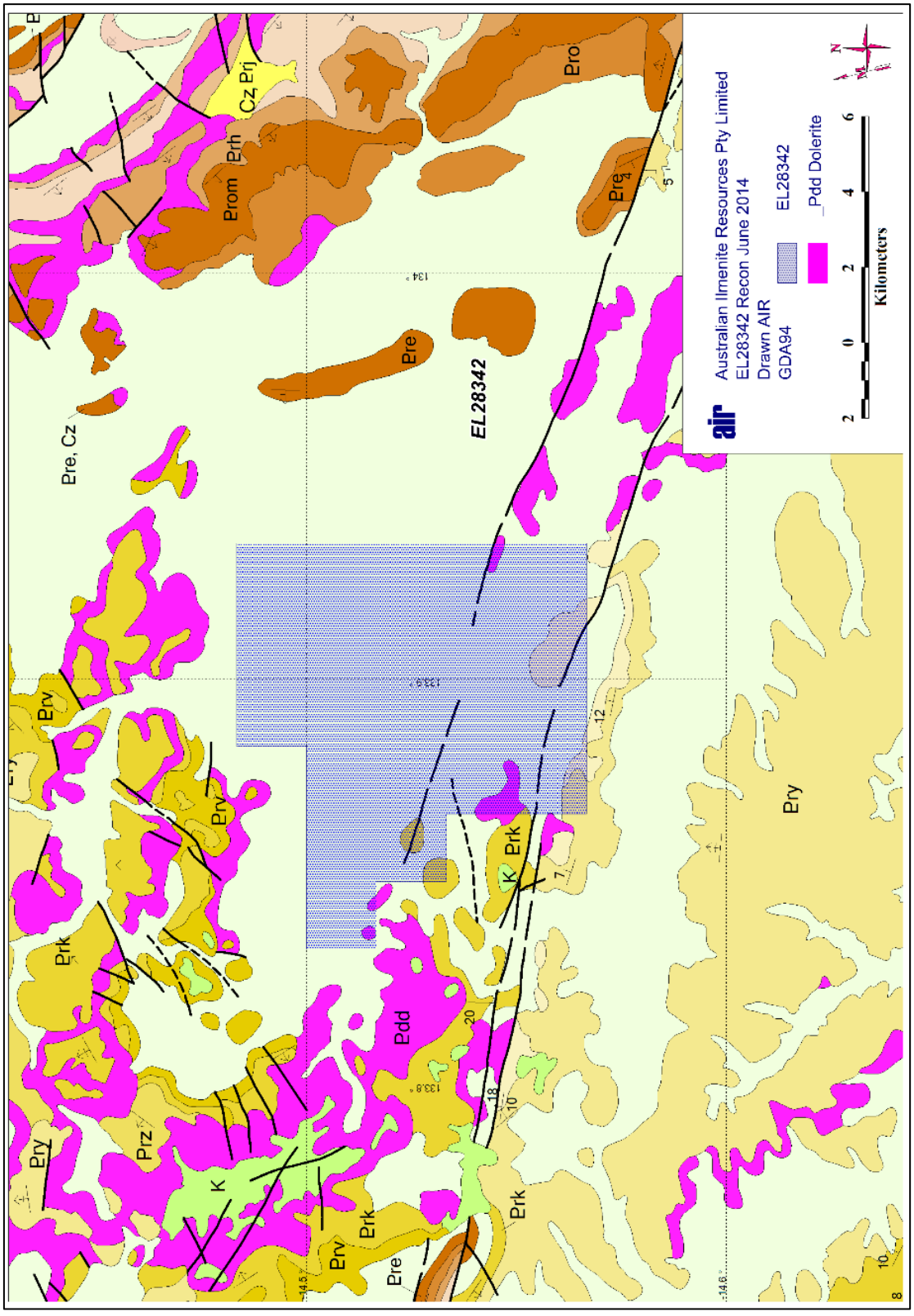

Figure 7: Geology EL28342

5.7 EL28343

5.7.1 Geology of EL28343

The oldest rocks exposed in EL28343 consist of Velkerri Formation overlain by Moroak Formation in the northeast corner of the tenement, (Figure 8). They terminate against an east-west fault to the south. Bukalorkmi Formation overlies Kyalla Formation south of the fault and the southern sub-blocks of the area comprise Undifferentiated Alluvium. The BMC and BMC East ilmenite regolith deposits are associated with SILL58, SILL59 and BMC East lying immediately north of EL28343 but the airborne magnetics clearly shows that the outcrop of the sills represents the full extent of the dolerite and that it does not continue at depth south into EL28343. They intrude the Bukalorkmi Sandstone and the underlying contact with Kyalla Formation and are of ilmenite type, consistent with this stratigraphic position. They lie about 25km from SILL80 and are possibly an outlier of that sill. Tributaries of the Roper River drain south from these sills through EL28343 so that the alluvium here has good potential for the accumulation of heavy minerals. A reconnaissance line of auger holes by ERD south from BMC across the alluvial area confirmed the presence of alluvium but there are no heavy mineral data from the drill holes.

5.7.2 Previous Exploration EL28343

There are no known mineral occurrences on EL28343 and there has been no previous geochemical sampling, except for a limited number of auger drill holes by ERD to test the alluvium downstream of the BMC ilmenite deposit for heavy minerals.

5.7.3 Prospectivity of EL28343

TZMI gave this license a high ranking of 1 on the basis of close proximity to the BMC ilmenite deposit and the potential for alluvial heavy mineral accumulations.

AIR gave the area a ranking of 2 based on the prospective stratigraphy and proximity to the SILL80 plant. Reconnaissance mapping and regional stream sediment sampling were recommended to explore for any unmapped sills. A structure identified from Google Earth in the northeast of the area is possibly a quartz reef that should be chip sampled and covered with the regional stream sediment sampling.

5.7.4 Exploration of EL28343

Although no on-ground exploration work was carried out on EL2843 this report period, purchase of 5m resolution Rapid Eye satellite imagery covered all of EL28343. This identified very limited potential for extension of ilmenite-bearing regolith from BMC East into the northern part of the area but highlighted the potential for the accumulation of heavy minerals in alluvium in the southwestern part of the area draining from the BMC prospect north of this tenement.

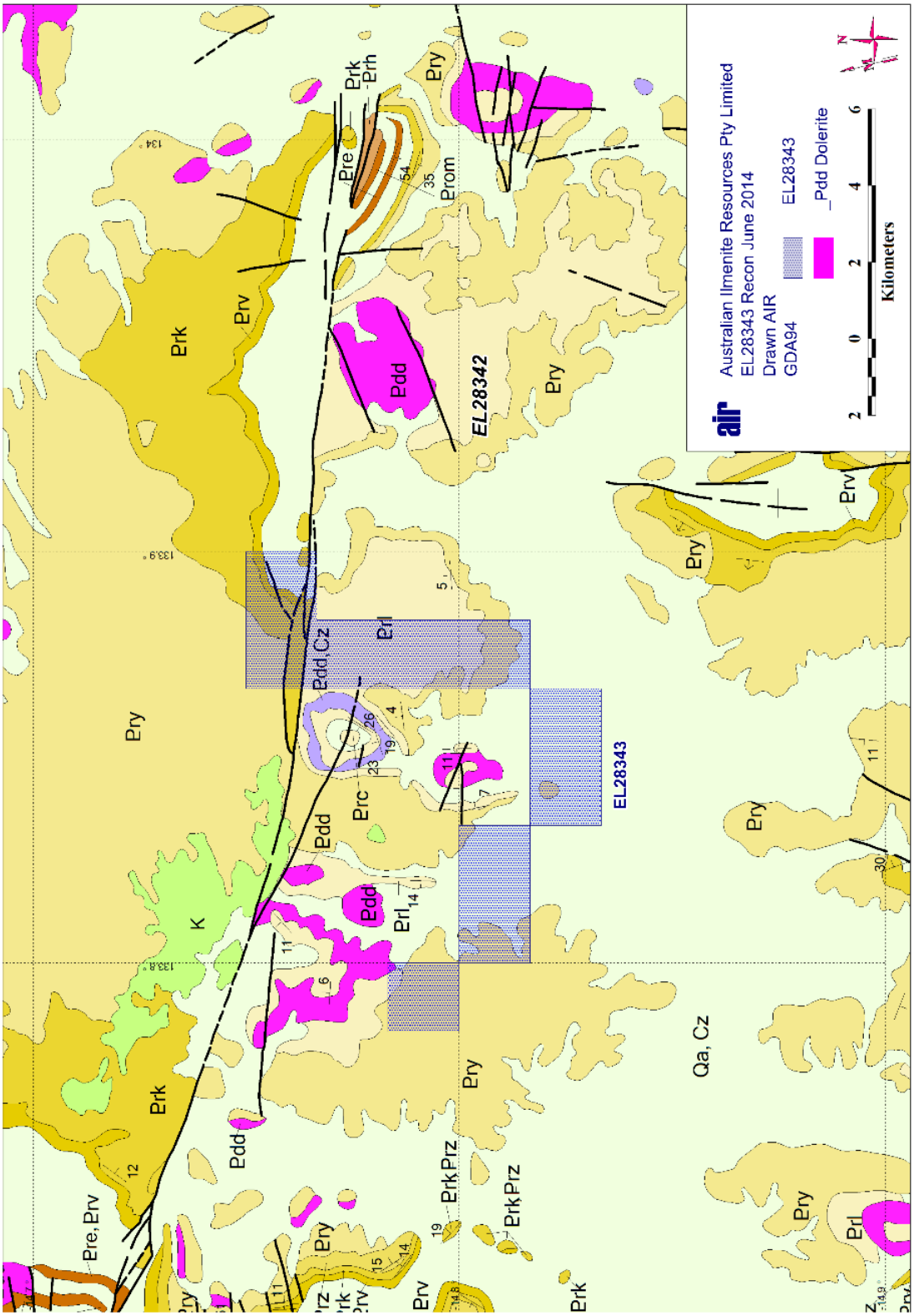

Figure 8: Geology EL28343

5.8 EL28870

5.8.1 Geology of EL28870

EL28870 is amongst the northernmost licenses held by AIR in the Roper Basin, (Figure 9). The oldest units comprise Limmen Sandstone overlain by Mainoru Formation in the southeast corner of the license. The central part is underlain by stromatolitic and oolitic dolostones, cherts and sandstones of the Dook Creek Formation from the Mesoproterozoic Mt Rigg Group. Outliers of Cretaceous sediments overlie these rocks in the southern and central parts. Undifferentiated Cainozoic soils and transported materials are present in the north. Dolerite sills are absent and there is no ilmenite potential here. There are no airborne magnetic or radiometric anomalies here.

5.8.2 Previous Exploration EL28870

There are no known mineral occurrences and there has been no geochemical sampling by ERD or previous explorers. The area is considered to have little exploration potential.

5.8.3 Prospectivity of EL28870

TZMI gave this tenement a low ranking of 5 based on the absence of dolerite.

AIR concurred with this assessment and it was recommended that the area be relinquished.

5.8.4 Exploration of EL28870

There was no on-ground exploration here by AIR this reporting period and this area lay beyond the limits of 5m resolution Rapid Eye satellite imagery. Because AIR is now interested in exploring for all commodities it is recommended that 5m resolution rapid eye satellite imagery is purchased to cover the area that would also assist with planning for a regional stream sediment survey.

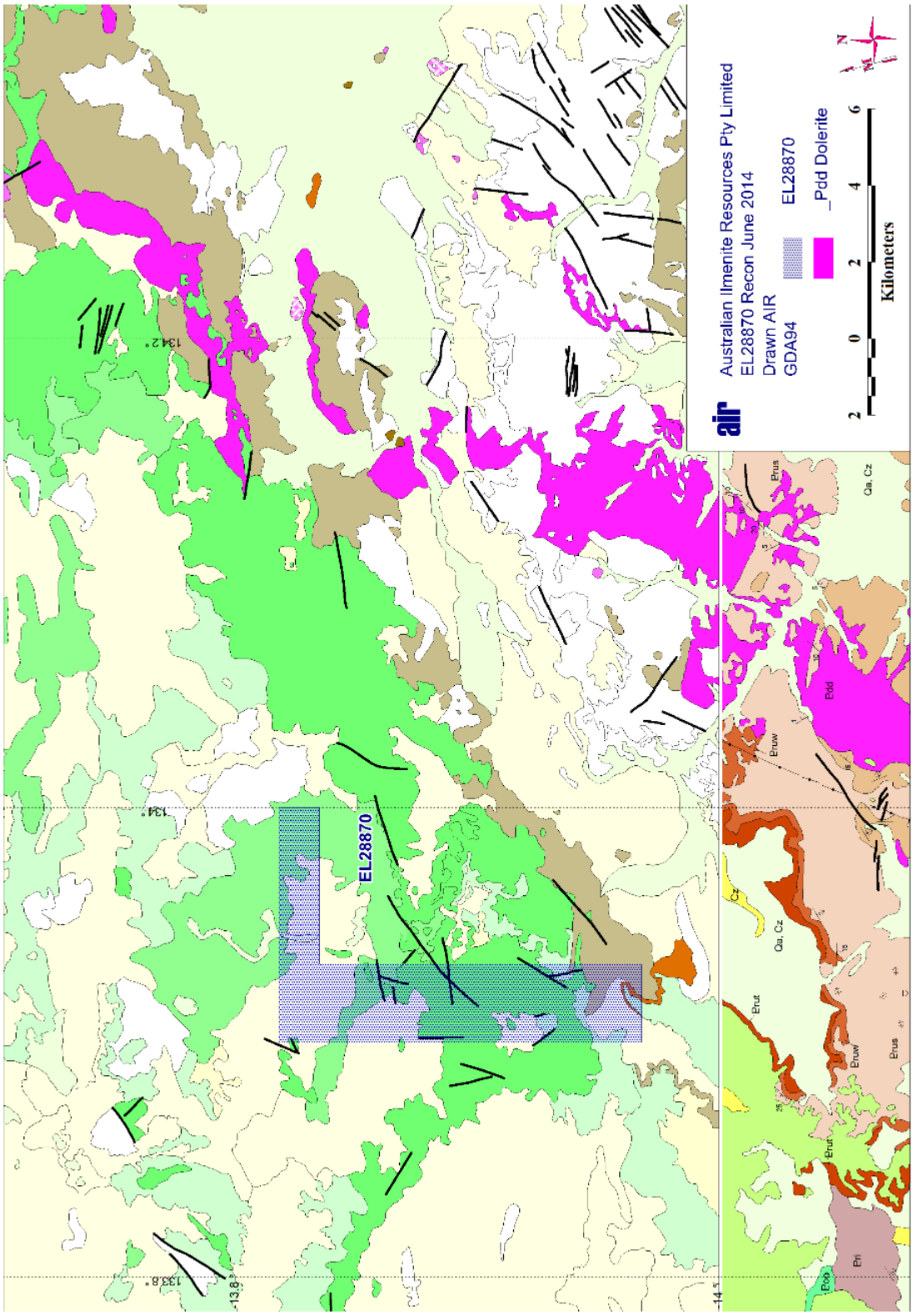

Figure 9: Geology EL28870

5.9 EL28892

5.9.1 Geology of EL28892

EL28892 is located between the Big Banana and BMC prospects and is largely underlain by Undifferentiated Alluvium, (Figure 10). The oldest sediments to outcrop consist of Hodgson Sandstone, the Munyi Member of the Corcoran Formation and Bessie Creek Sandstone that outcrop in the northeast of the area. Corcoran Formation is probably recessive beneath the alluvium. These sediments terminate to the south against an east-west fault. South of the fault a folded sequence comprising Velkerri Formation is overlain by Sherwin Member and Kyalla Formations. Throughout the remainder of the area Kyalla Formation outcrops mostly as small outliers in low ridges except in the most south-eastern sub-block where it underlies the entire area. Dolerite sills are limited to small bodies intruding Kyalla Formation that are correlated with SILL58 of ilmenite-type. The airborne magnetic signature is very subdued and the small outcrops of dolerite are indistinguishable. SILL55, of titanomagnetite-type that outcrops north of Mt Caroline west of the northern part of EL28892, is apparently extensive at depth below the alluvium and probably within the Proterozoic sediments below the northern part of the license area.

5.9.2 Previous Exploration EL28892

There are no known mineral occurrences here and the only previous geochemical sampling is that by Stockdale Prospecting Ltd who undertook regional stream sediment in 1992 that included this area. This identified a very low order Au (2ppb)-Cu (68ppm)-Pb (22.5ppm)-As (8ppm) anomaly draining from the Hodgson Formation. This has not been followed up. There was no ERD sampling here.

5.9.3 Prospectivity of EL28892

TZMI gave this EL a ranking of 1 based on its close proximity to the BMC prospect.

AIR ranked it with a 2 because of the sills present, proximity to BMC and the very weakly anomalous stream sediment geochemistry. However there is apparently little regolith or alluvial heavy mineral potential. Air recommended regional stream sediment sampling to follow up the Stockdale anomalies.

5.9.4 Exploration of EL28892

The 5m resolution Rapid Eye satellite imagery covered EL28892 entirely. Small areas of dolerite regolith are confirmed in the presence of mapped dolerite but more extensive than mapped.

Although there was no on-ground follow-up this period, AIR now plans to explore for all commodities and regional stream sediment sampling is recommended that would now include the original Stockdale anomalies.

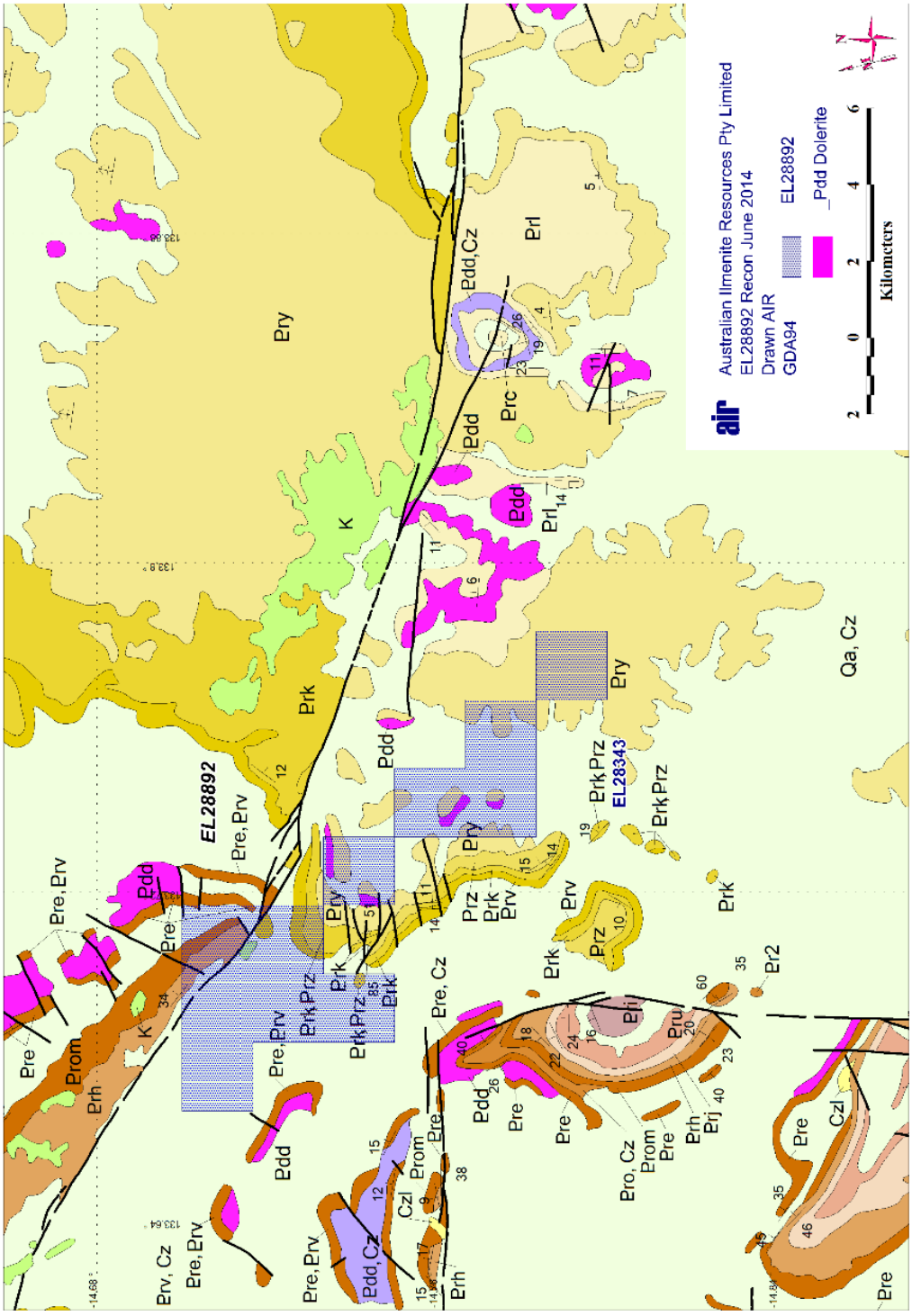

Figure 10: Geology EL28892

5.10 EL29040

5.10.1 Geology of EL29040

EL29040 is a small license located immediately north of the Big Banana Prospect. In its northern part it is underlain by a shallowly north dipping sequence of Velkerri Formation overlain by Moroak Formation and in part Sherwin Member, (Figure 11). This sequence is offset by a north-south fault immediately beyond the eastern boundary of the license that is clearly identified in the airborne magnetics. The remaining southern part of the tenement is underlain extensively by Undifferentiated Alluvium, referred to as the Big Banana Alluvials Prospect. This is interpreted to overlie entirely recessive Velkerri Formation but a prominent linear U radiometric anomaly trends parallel with the axis of this recessive trough coincident with outcropping bedded sediments visible in Google Earth. There is no dolerite mapped and no evidence for dolerite near-surface from the airborne magnetics that was also surveyed in part by ERD.

5.10.2 Previous Exploration EL29040

There are no known mineral occurrences here and the only previous geochemical sampling is that by Stockdale Prospecting Ltd who undertook regional stream sediment in 1992 that included this area. This identified a low order Au (28ppb)-Cu (56ppm)-Pb (106ppm)-As (10ppm)-Zn (109ppm)-Ni (99ppm)-Co (176ppm) anomaly draining from the area of the Big Banana Alluvials and Big Banana Ridge south of EL29040 that is underlain by Bessie Sandstone and Velkerri Formation intruded by the Big Banana dolerite, SILL08. ERD undertook an extensive broad-spaced 500mx200m auger drilling program throughout the Big Banana Alluvials that included EL29040 the results from which showed that most of the alluvium contains less than 1% heavy minerals.

5.10.3 Prospectivity of EL29040

TZMI gave EL29040 a ranking of 1 on the basis that the area needs revisiting as part of the Big Banana exploration program.

AIR gave the EL a rank of 2 because of the presence of the Big Banana Alluvials. It was recommended that AIR retain EL29040 until further auger drilling of these alluvials east and southeast of the tenement has been completed. There has been no exploration of the Moroak Formation in the northern part of the area to determine the extent of potential iron-bearing Sherwin Member.

5.10.4 Exploration of EL29040

Purchase of 5m resolution Rapid Eye satellite imagery, that included EL29040, has helped with interpretation of the Proterozoic stratigraphy and potential for iron ore-bearing Sherwin Member, planning for the evaluation of the alluvials for heavy minerals and follow-up of the anomalous stream sediment geochemistry. There was no on-ground work this period.

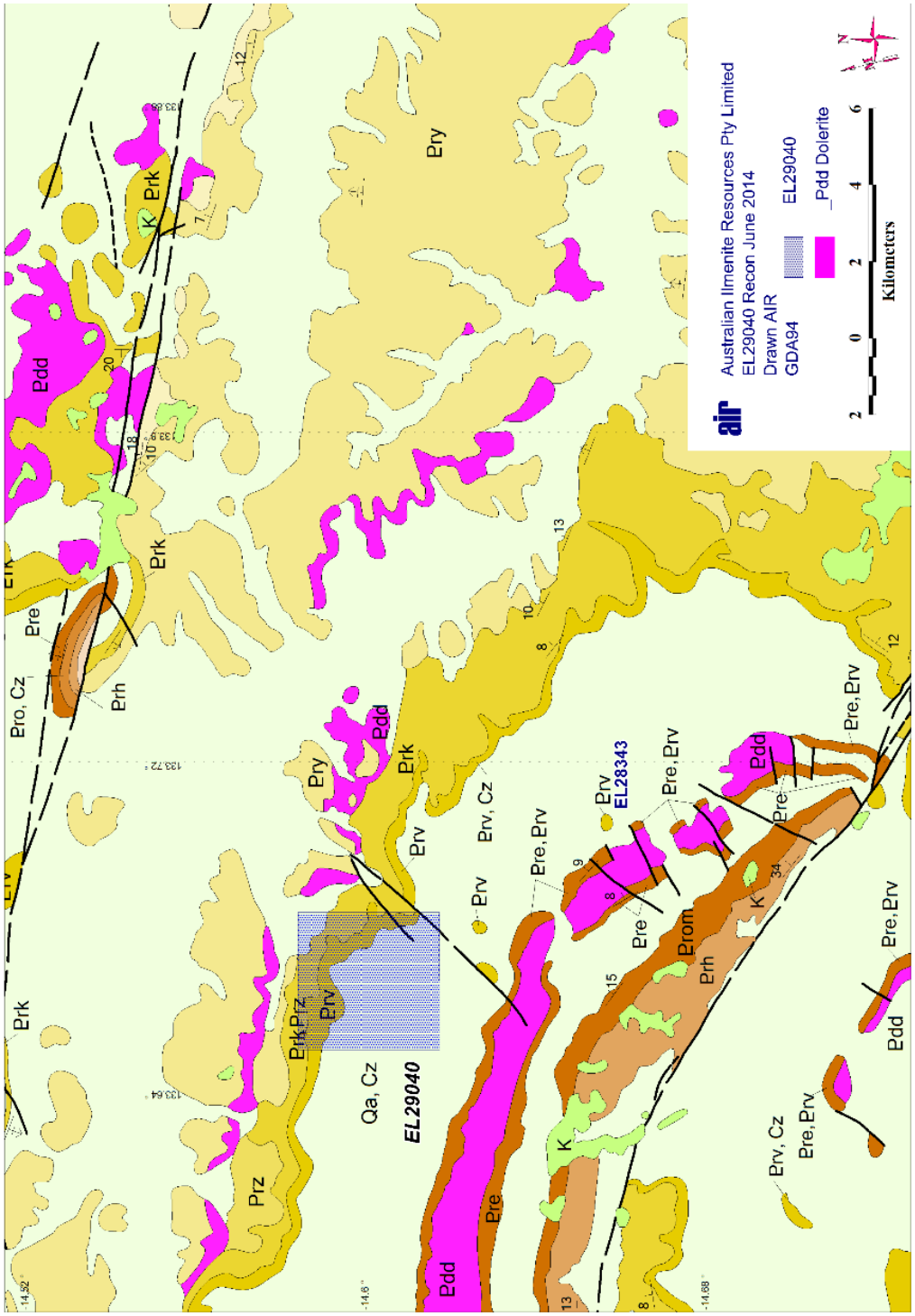

Figure 11: Geology EL29040

5.11 EL29041

5.11.1 Geology of EL29041

EL29041 lies east of the eastern extremity of the Big Banana Prospect, east of EL29040. Most of the area comprises a gently northeast dipping sequence of Velkerri Formation overlain successively by Moroak and Kyalla Formations, (Figure 12). Neither Sherwin Member nor Derim Derim Dolerite have been mapped here although a small area in the northeast corner of the tenement, mapped as Kyalla Formation, appears in Google Earth to be possible Sherwin Member instead. The western parts of EL29041 are underlain by a narrow strip of the eastern margin of Undifferentiated Alluvium of the Big Banana Alluvials.

The airborne magnetics, including the ERD survey, indicate that there are no near-surface sills but there is a significant circular magnetic anomaly associated with the area of possible Sherwin Member in the northeast of the tenement.

5.11.2 Previous Exploration EL29041

There are no known mineral occurrences here and there had been no previous geochemical sampling by other explorers or exploration by ERD for heavy minerals.

5.11.3 Prospectivity of EL29041

TZMI gave the license a rating of 3 based on the area being surrounded by dolerite sills of ilmenite-type with the potential for heavy mineral accumulation in sedimentary traps.

AIR gave it a similar rating because of its proximity to the Big Banana prospect and the potential for heavy mineral accumulations in the Big Banana Alluvials that have not been tested here. Follow up of the magnetic anomaly over possible Sherwin Member is also warranted.

5.11.4 Exploration of EL29041

Purchase of 5m resolution Rapid Eye satellite imagery included EL29041 that has helped with interpretation of the Proterozoic stratigraphy and potential for iron ore-bearing Sherwin Member. There was no on-ground work this period.

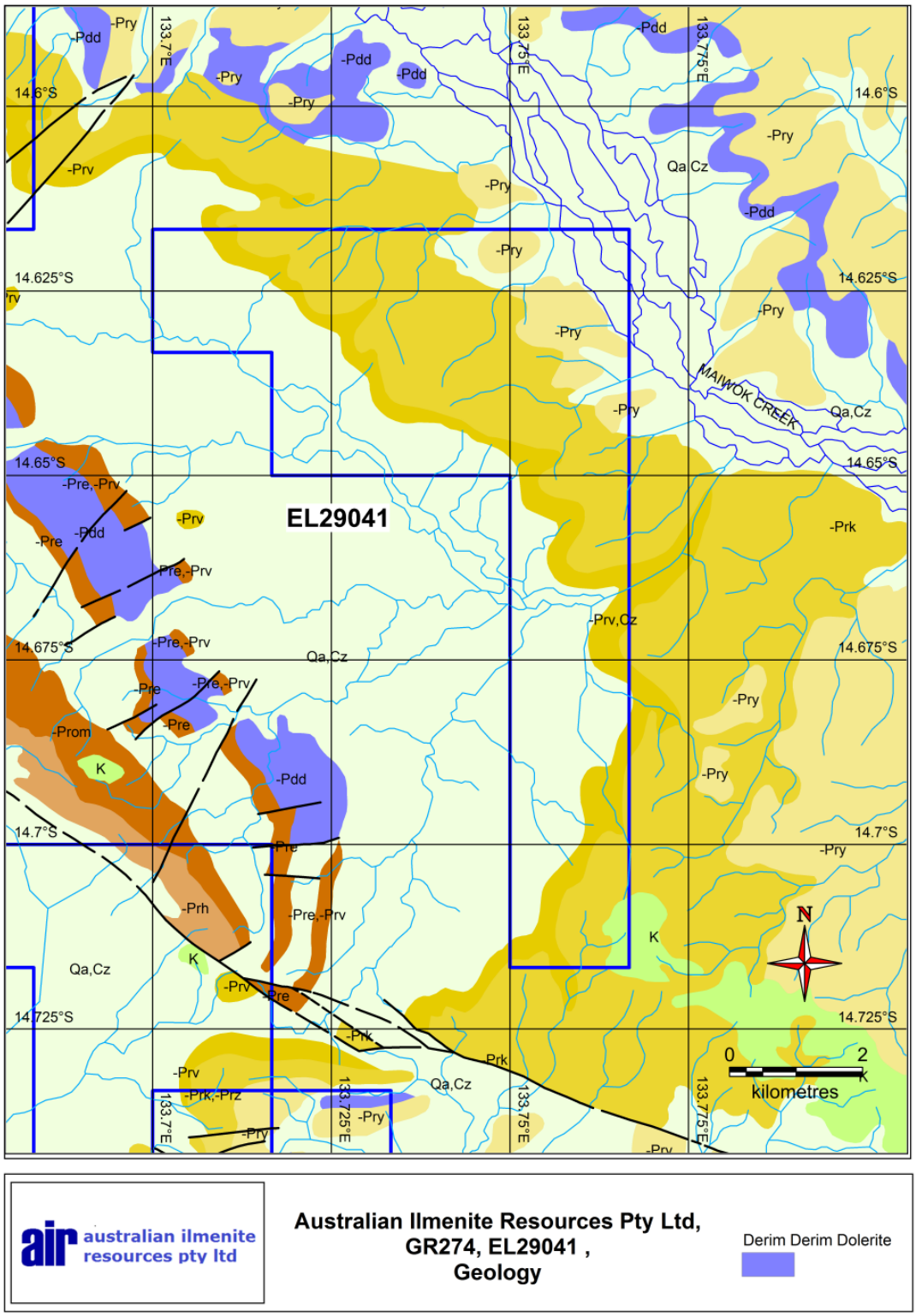

Figure 12: Geology EL29041

5.12 EL29631

5.12.1 Geology of EL29631

EL29631 is also amongst the northernmost licenses held by AIR, (Figure 13). In the north of the eastern part outliers of Limmen Sandstone are surrounded by Undifferentiated Alluvium. Further south the area is underlain by a southwards younging sequence of Mainoru Formation units, comprising the Wooden Duck Member overlain by Showell Member and Crawford Formation. The Mainoru River passes eastwards through the southern part of the license with extensive areas of alluvium.

Mainoru Sill Group, comprising SILL19 and SILL20, intrudes the Showell Member. Reconnaissance sampling by ERD between EL29631 and EL29632 is limited to one surface sample, one soil sample, one stream sediment sample and one rock chip sample that indicate that these 2 sills are of titanomagnetite type, consistent with their stratigraphy position. However the exposure of these sills is extensive regionally and the sampling is not representative of their entire extent. The airborne magnetics is noisy throughout most of the eastern part and it is inferred from this that the sills are at shallow depths within the Proterozoic stratigraphy and beneath alluvium.

The narrow western strips of EL29631 surrounds EL28870 and the geology is similar, comprising stromatolitic and oolitic dolostones, cherts and sandstones of the Dook Creek Formation from the Mesoproterozoic Mt Rigg Group, locally unconformably overlain by Cretaceous sediments. Undifferentiated Cainozoic soils and transported materials are also present. Dolerite sills are absent and there is no ilmenite potential here. There are no airborne magnetic or radiometric anomalies here.

5.12.2 Previous Exploration EL29631

Throughout EL29631 there are no known mineral occurrences and there has been no geochemical sampling by ERD or previous explorers. The western part of the tenement is considered to have little exploration potential and since it comprises a narrow strip only 1km wide it is difficult to explore by conventional regional methods whereas the heavy mineral potential of the eastern part is unknown.

5.12.3 Prospectivity of EL29631

TZMI gave this tenement a low ranking of 5 based on the absence of dolerite.

AIR also ranked this license with a 5.

5.12.4 Exploration of EL29631

Purchase of 5m resolution Rapid Eye satellite imagery was recommended but not actioned that would have included EL29631 to assist with the search for prospective dolerite regolith and the mapping of the alluvials for their potential for accumulations of heavy minerals from SILL19 and SILL20. No ground work was carried out here this period.

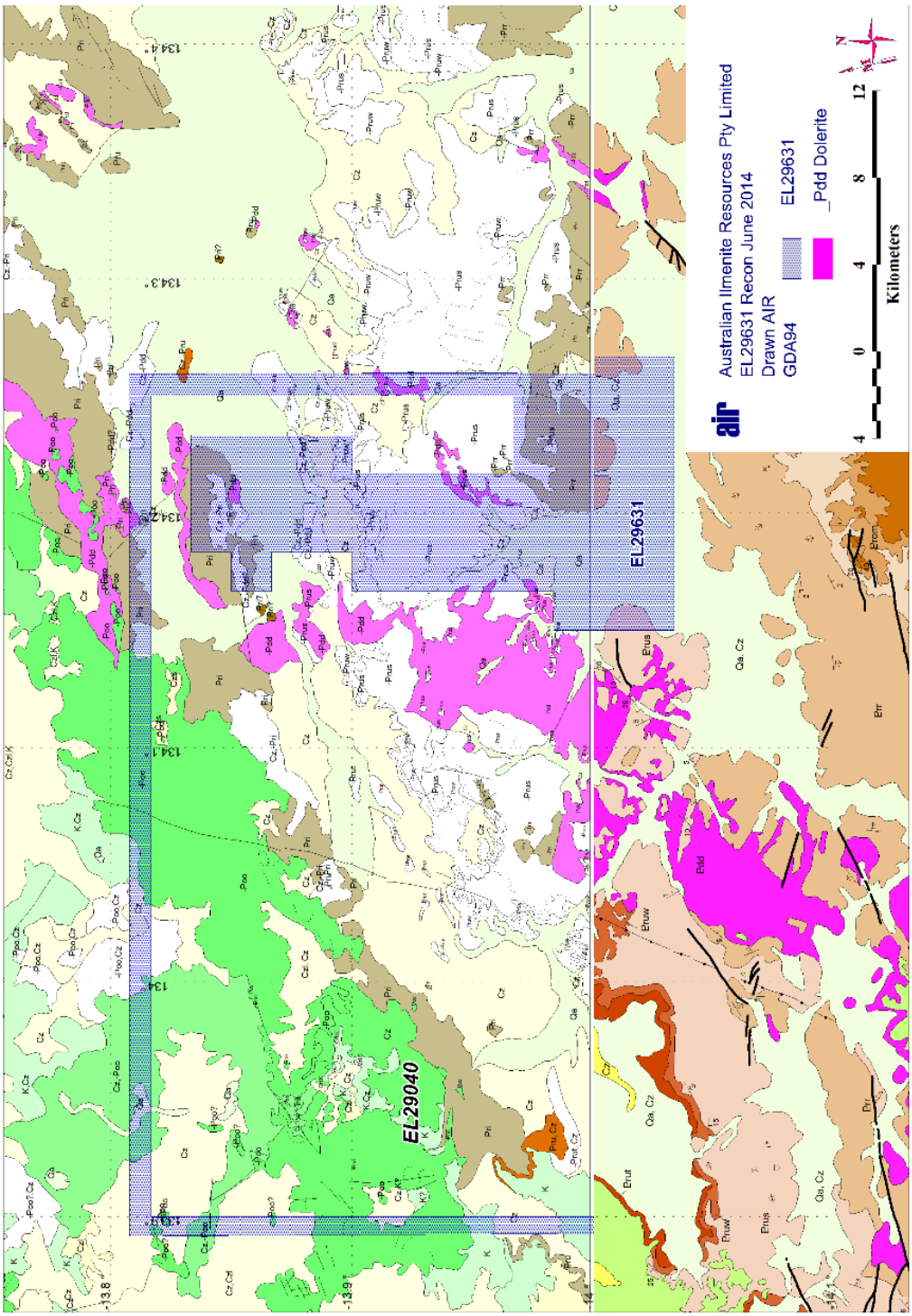

Figure 13: Geology EL29631

5.13 EL29632

5.13.1 Geology of EL29632

EL29631 is also amongst the northernmost licenses held by AIR, (Figure 14). The oldest Proterozoic sediments present are of Limmen Sandstone outcropping in the northernmost part of the tenement. A south-eastwards younging sequence of Mainoru Formation consisting of the Wooden Duck and Showell Creek Members outcrops throughout the remainder of the area, overlain locally with Cainozoic soils and transported materials and Undifferentiated Alluvium.

SILL19 and SILL21 of the Mainoru North Group intrude the Showell Member in the south. Reconnaissance sampling by ERD between EL29631 and El29632 is limited to one surface sample, one soil sample, one stream sediment sample and one rock chip sample that indicate that these 2 sills are of titanomagnetite type, consistent with their stratigraphy position. However the exposure of these sills is extensive regionally and the sampling is not representative of their entire extent.

The typical noisy signature of the dolerite sills in the airborne magnetics is limited here to the south where dolerite has been mapped and the sills do not appear to extend under cover. A north-northeast trending dike of Derim Derim Dolerite is prominent in the magnetics passing the through the southwest corner of the tenement but has not been mapped.

5.13.2 Previous Exploration EL29632

There are no known mineral occurrences and there has been no geochemical sampling by ERD. Stream sediment sampling by Stockdale Prospecting Ltd in 1992 from the region of Showell Member sediments in the southern part of the area assayed up to 36ppm Cu 102ppm Pb and 1430ppm Mn. This unit comprises calcareous and non-calcareous mudstone and limestone with thin interbeds of glauconitic siltstone and sandstone. These low order geochemical anomalies may be evidence of syngenetic base metal mineralization and follow up is recommended.

5.13.3 Prospectivity of EL29632

TZMI gave this tenement a low ranking of 5 based on the absence of dolerite.

AIR also ranked this license with a 5.

5.13.4 Exploration of EL29632

Purchase of 5m resolution Rapid Eye satellite imagery was recommended but not proceeded with that would have included EL29632 to assist with the search for prospective dolerite regolith.

Follow up of the anomalous base metal geochemistry is warranted.

There was no ground work this period.

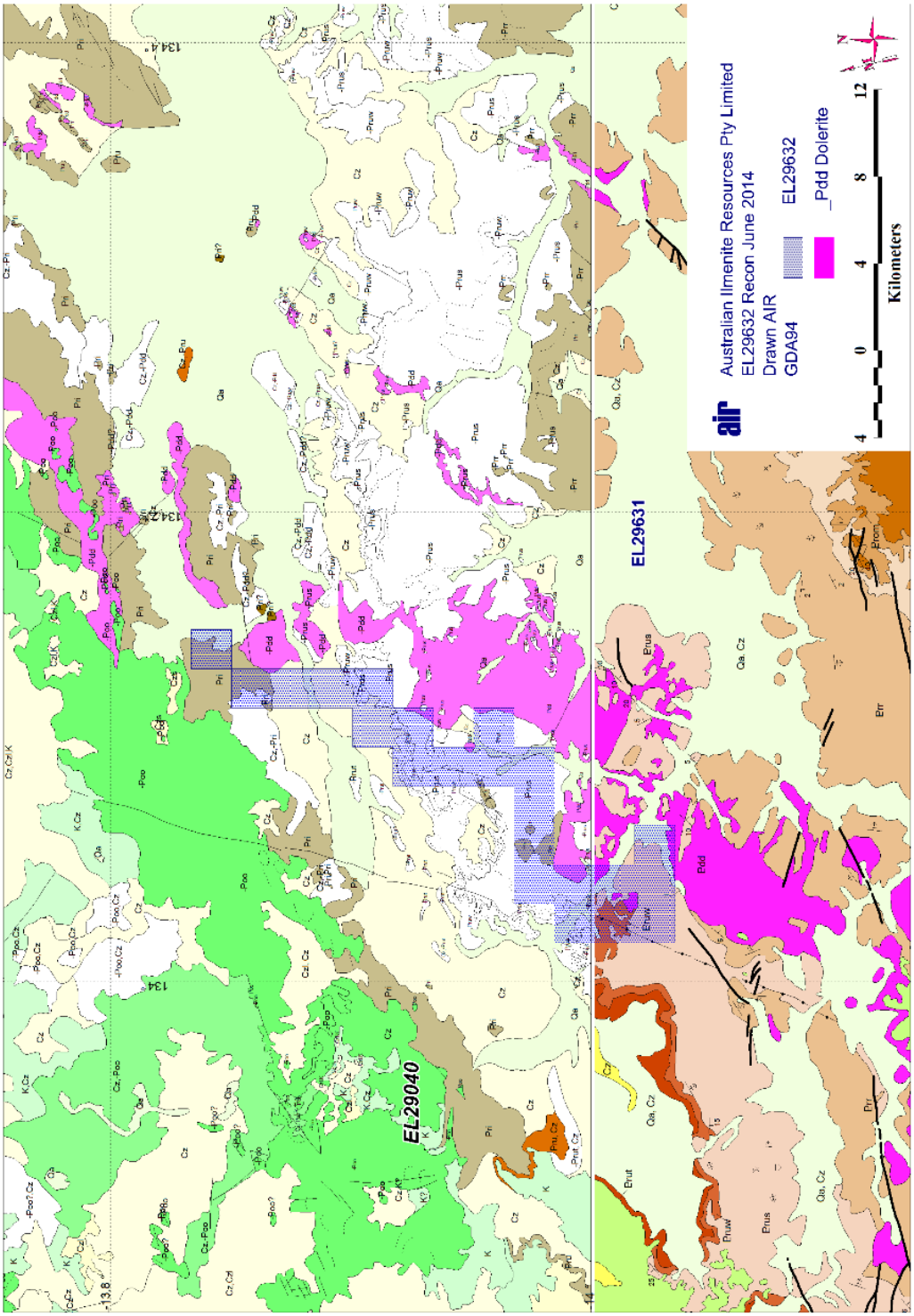

Figure 14: Geology EL29632.

5.14 EL29633

5.14.1 Geology of EL29633

EL29633 straddles the Arnhem Highway in the northern part of GR274, (Figure 15). Units of the Mainoru Formation consisting of Mountain Valley Limestone overlain successively by the Wooden Duck Creek and Showell Members outcrop in the western part of the tenement. These are overlain by Crawford Formation in the central and eastern parts of the area. A small area of SILL29, part of the Mountain Valley 1 Group of sills, intrudes the Showell Member-Crawford Formation contact zone. Assays from seventeen trenches over an area of about 1 sqkm by ERD immediately south of EL29633 showed that this sill varies from ilmenite type to sub-ilmenite type to titanomagnetite type and is one of the few sills low in the stratigraphic sequence of ilmenite type. The airborne magnetics is flat throughout most of the area except for SILL29 but it is apparent that this sill extends only a short distance below cover.

5.14.2 Previous Exploration EL29633

There are no known mineral occurrences here and there has been no previous geochemical sampling except for the work carried out by ERD.

5.14.3 Prospectivity of EL29633

The area was ranked with a 5 by TZMI and AIR on the absence of dolerites and that the dolerites to the south were potentially of titanomagnetite type.

5.14.4 Exploration of EL29633

Purchase of 5m resolution Rapid Eye satellite imagery was recommended but not carried out that would have included EL29633 to assist with the search for prospective dolerite regolith.

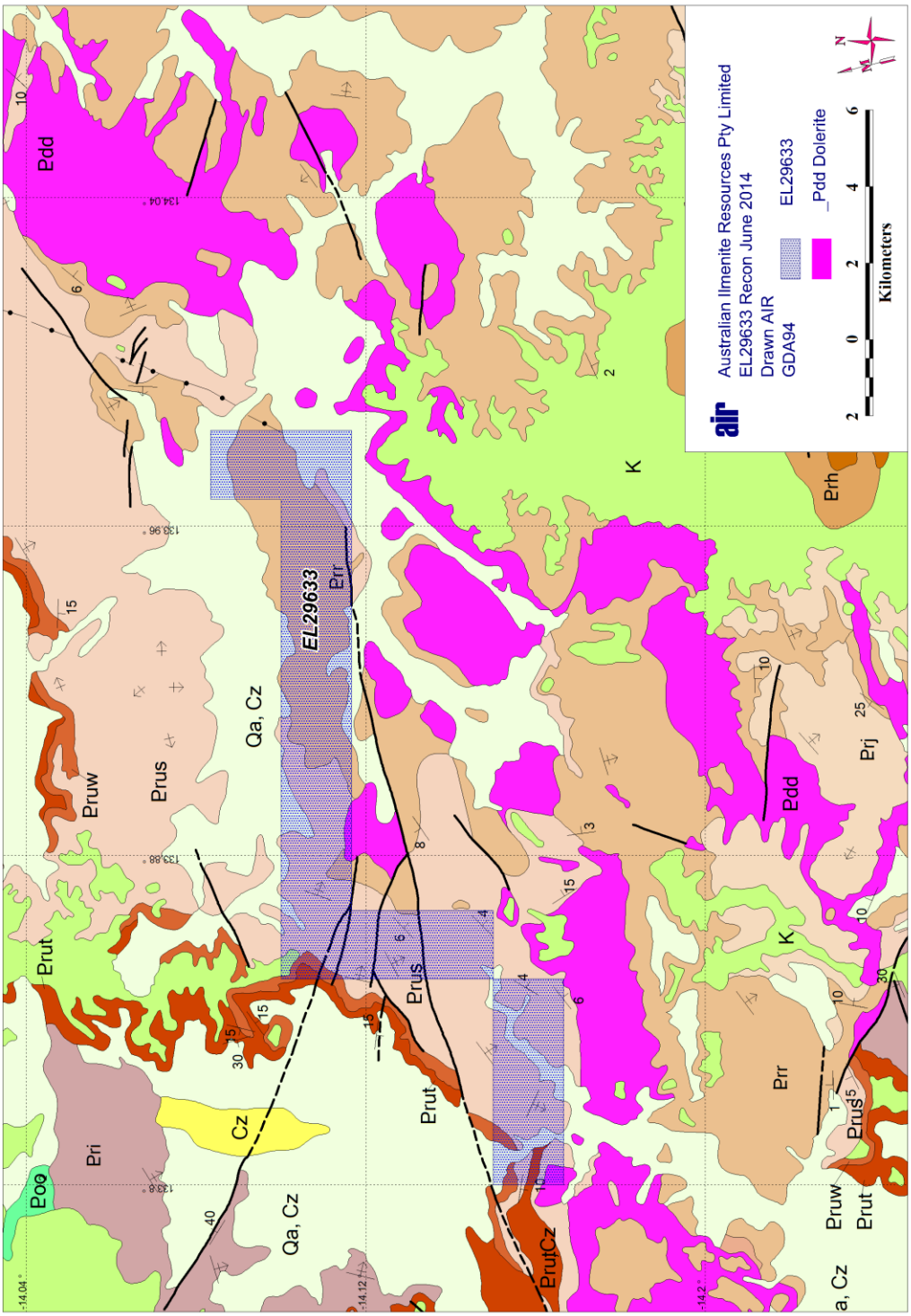

Figure 15: Geology EL29633

5.15 EL29634

5.15.1 Geology of EL29634

EL29634 covers a large area in the central part of GR274, (Figure 16). The area is largely underlain by sediments of the Collara Subgroup, the oldest of which, Limmen Sandstone, outcrops in the southwest part of the area. These rocks are successively overlain by the Mountain Valley, Wooden Duck and Showell Members of the Mainoru Formation. This sequence is separated in part by a northwest trending fault north of which lies a younger sequence of Crawford, Jalboi, Hodgson and Corcoran Formations, including the Munyi Member of the Corcoran Formation. The Proterozoic sequence is unconformably overlain extensively in the central part of the area by Cretaceous sediments and in the west by outliers of these sediments. The Cretaceous rocks are overlain with deposits of Cainozoic material. Tributaries for Flying Fox Creek in the southwest are underlain by extensive Undifferentiated Alluvium.

EL29634 is virtually devoid of mapped dolerite sills except for several small outliers of either SILL26, SILL27, SILL31, SILL32, SILL34 or SILL35 from the Mountain Valley Group in the northwest part of the area. These sills intrude the Crawford Formation, the boundaries between the Crawford and Jalboi Formations and the Crawford and Showell Member of the Mainoru Formation. ERD completed limited broad-spaced surface soil sampling of these sills, there are no assay data available, but they are interpreted as titanomagnetite-type on the basis of a field magnet.

The airborne magnetics, including that by ERD, indicates that these sills are extensive at depth within the stratigraphy beneath EL29634 from the surrounding areas where they are exposed. A northeast trending dike is prominent in the magnetics passing through the centre of the tenement, beneath the Crawford and Hodgson Formations and the Cretaceous cover.

5.15.2 Previous Exploration EL29634

There are no known mineral occurrences here. Stream sediment sampling by Stockdale Prospecting Ltd in 1992 in the northwest part of the area identified a stream sediment anomaly with up to 3ppbAu, 149ppm Pb, 241ppm Zn, 2360ppn Mn and 3ppm Ag from Crawford Formation sediments that should be followed up. There was no sampling from here by ERD.

5.15.3 Prospectivity of EL29634

TZMI gave EL29634 a rank of 5 on the basis of the absence of dolerites and that the dolerites to the west were potentially of titanomagnetite type.

AIR also ranked it as a 5 since there is no significant dolerite present.

5.15.4 Exploration of EL29634

Five-meter resolution Rapid Eye satellite imagery for this area was recommended but not purchased that would have assisted with the search for prospective dolerite regolith.

The stream sediment anomalies warrant follow up for sediment-hosted mineralization.

There was no on-ground exploration here this period.

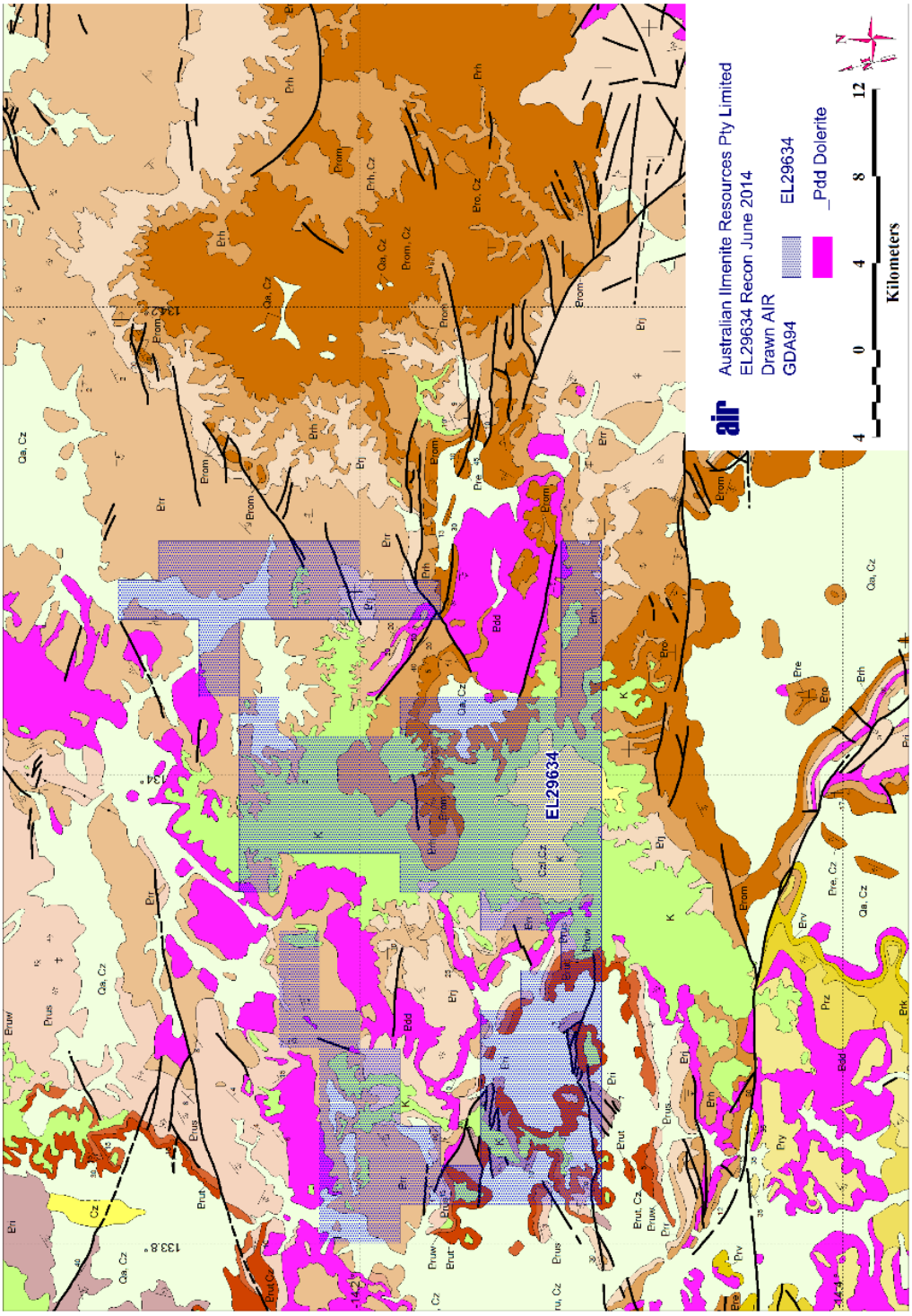

Figure 16: Geology EL29634

5.16 EL29635

5.16.1 Geology of EL29635

EL29635 lies in the eastern part of GR274. It is underlain by a relatively flat-lying sequence of Jalboi Formation, successively overlain by Hodgson Sandstone and the Munyi Member of the Corcoran Formation, (Figure 17). Much of the central part comprises Cainozoic soils and transported materials overlying the Munyi Member. A small outlier of Cretaceous sediments unconformably overlies Hodgson Sandstone in the east.

Dolerite sills of the Wilton West Group including SILL15, SILL17 and SILL18 intrude the Jalboi Formation and the contact with the overlying Hodgson Formation in the east and an outlier of the Jalboi Group sill that intrudes the Corcoran Formation and the contact between the Hodgson Sandstone and overlying Munyi Member outcrops in the west.

ERD undertook very broad spaced sampling of the Wilton West Group in adjacent areas involving 4 surface samples and 5 shallow auger holes. On the basis of assays from the auger holes and the use of a hand magnet on the surface samples it is apparent that these are of titanomagnetite type although there are insufficient samples to confirm this.

The airborne magnetics in the eastern part of the area confirms the continuation of the dolerite at depth beneath the Hodgson Sandstone. Sills are apparently absent at depth beneath the western part although this is traversed by a pair or orthogonal dikes that have not been mapped at surface.

5.16.2 Previous Exploration EL29635

There are no known mineral occurrences here and there has been no previous geochemical sampling by earlier explorers or ERD.

5.16.3 Prospectivity of EL29635

TZMI ranked this tenement with a low 5 since it was too remote and it had little ilmenite potential. AIR ranked the area similarly noting that no significant dolerite is mapped there.

5.16.4 Exploration of EL29635

Purchase of 5m resolution Rapid Eye satellite imagery was recommended but not undertaken for this area. It would have assisted with the search for prospective dolerite regolith. If this is found then reconnaissance systematic sampling for heavy minerals is recommended.

There was no on-ground exploration here this period.

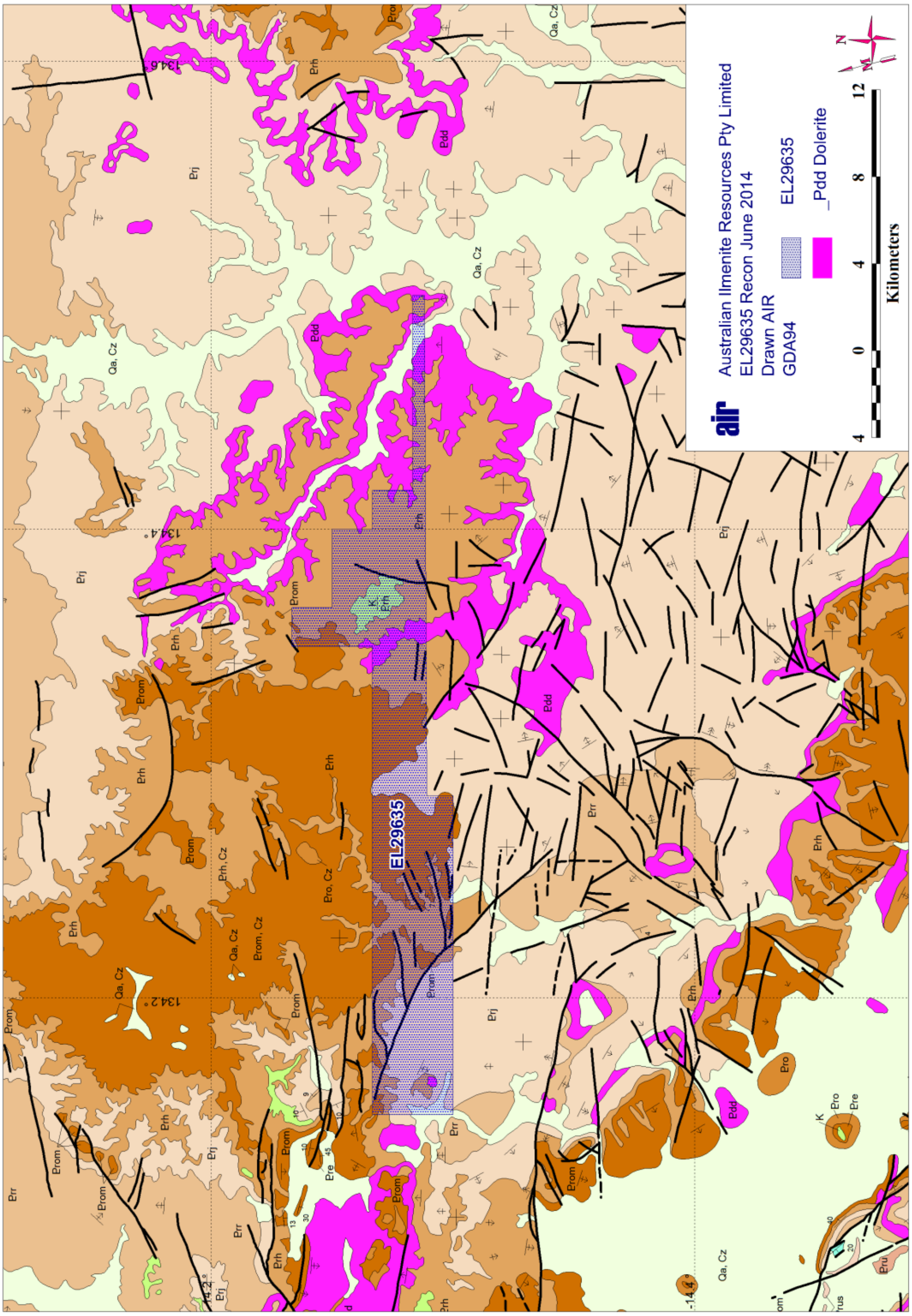

Figure 17: Geology EL29635

5.17 EL29659

5.17.1 Geology of EL29659

EL29659 is a large tenement in the southern part of GR274, (Figure 18), the central part of which is underlain by Undifferentiated Alluvium in the floodplain of Jalboi Creek. The lowermost Proterozoic sediments consist of Limmen Sandstone overlain by a sequence of Mountain Valley, Wooden Duck and Showell Members of the Mainoru Formation outcropping in the northwest of the EL. The next highest unit in the stratigraphy is the Crawford Formation outcropping in the northeast of the license. These sediments are successively overlain by Jalboi Formation, Hodgson Sandstone and the Munyi Member of the Corcoran Formation in the northeast, north and central-eastern parts of the area. Inliers of Corcoran Formation overlain by Bessie Creek Sandstone occur as isolated outcrops in the central part of the area surrounded by alluvium that probably overlies recessive Corcoran Formation. A structural dome, surrounded by alluvium and truncated by a regional southwest trending fault, underlies the southeast comprising a northern sequence of Crawford and Jalboi Formations, overlain by Hodgson Sandstone and Munyi Member and a southern sequence of Phelps Sandstone overlain by Limmen Sandstone. Cretaceous sediments unconformably overlie an extensive area in the northwest of the tenement.

Dolerite sills are exposed in the northwest and southeast parts of the area. In the northeast an identified sill of the Jalboi East, Wilton (East, West) or Accident West Groups intrudes the contact region between the Jalboi Formation and overlying Hodgson Sandstone and possibly as a ramp between the Showell Member of the Mainoru Formation and the overlying Jalboi Formation. Limited very broad-spaced surface soil and hand auger sampling of these sills elsewhere indicates that they are of titanomagnetite type, consistent with their stratigraphic position, however a few of these samples appeared to be of ilmenite-type. ERD did not sample the sill in the northwest of EL29659 and their sampling of the Jalboi East, Wilton (East, West) or Accident West Groups is insufficient to adequately characterise them.

In the southeast of EL29659 two sills intrude the northern part of the dome at the contacts between the Crawford and Jalboi Formations and between the Jalboi and Hodgson Formations. One sill intrudes between the Crawford and Jalboi Formations in the south. They do not belong to a sill group but their stratigraphic position and proximity would identify them with the Accident West, Jalboi East or Wilton (East, West) Groups. ERD did not sample the sills from the dome and their sampling of the Jalboi East, Wilton (East, West) or Accident West Groups is insufficient to adequately characterise them, as noted above.

The airborne magnetics, including the ERD survey, indicate that the sill in the northwest extends beneath the Cretaceous cover. Sills are also apparently extensive beneath the alluvium throughout the length of Jalboi Creek, but the magnetics suggests that the sills in the dome in the southeast are virtually confined to their outcrop in the dome.

5.17.2 Previous Exploration EL29659

There no known mineral occurrence here. Stream sediment geochemistry by previous explorers is confined to the northwest corner where Stockdale Prospecting Ltd located anomalies of 17ppb Au, 3ppb Au, 41ppm Pb 104ppm Zn, 50ppm Ni, 320ppm Cr, 250ppm V, 8ppm Bi, and 2730ppm Mn in 1992. They have not been followed up. There was no sampling here by ERD.

5.17.3 Prospectivity of EL29659

TZMI gave EL29659 a rating of 4 on the absence of outcropping dolerite and the remoteness of the area.

AIR ranked the area with 5 on the absence of any significant dolerite.

5.17.4 Exploration of EL29659

Five-meter resolution Rapid Eye satellite imagery was recommended but not purchased for EL29659 that would have assisted with the search for prospective dolerite regolith. If this is found then reconnaissance systematic sampling for heavy minerals is recommended. Follow-up of the geochemical anomalies is recommended.

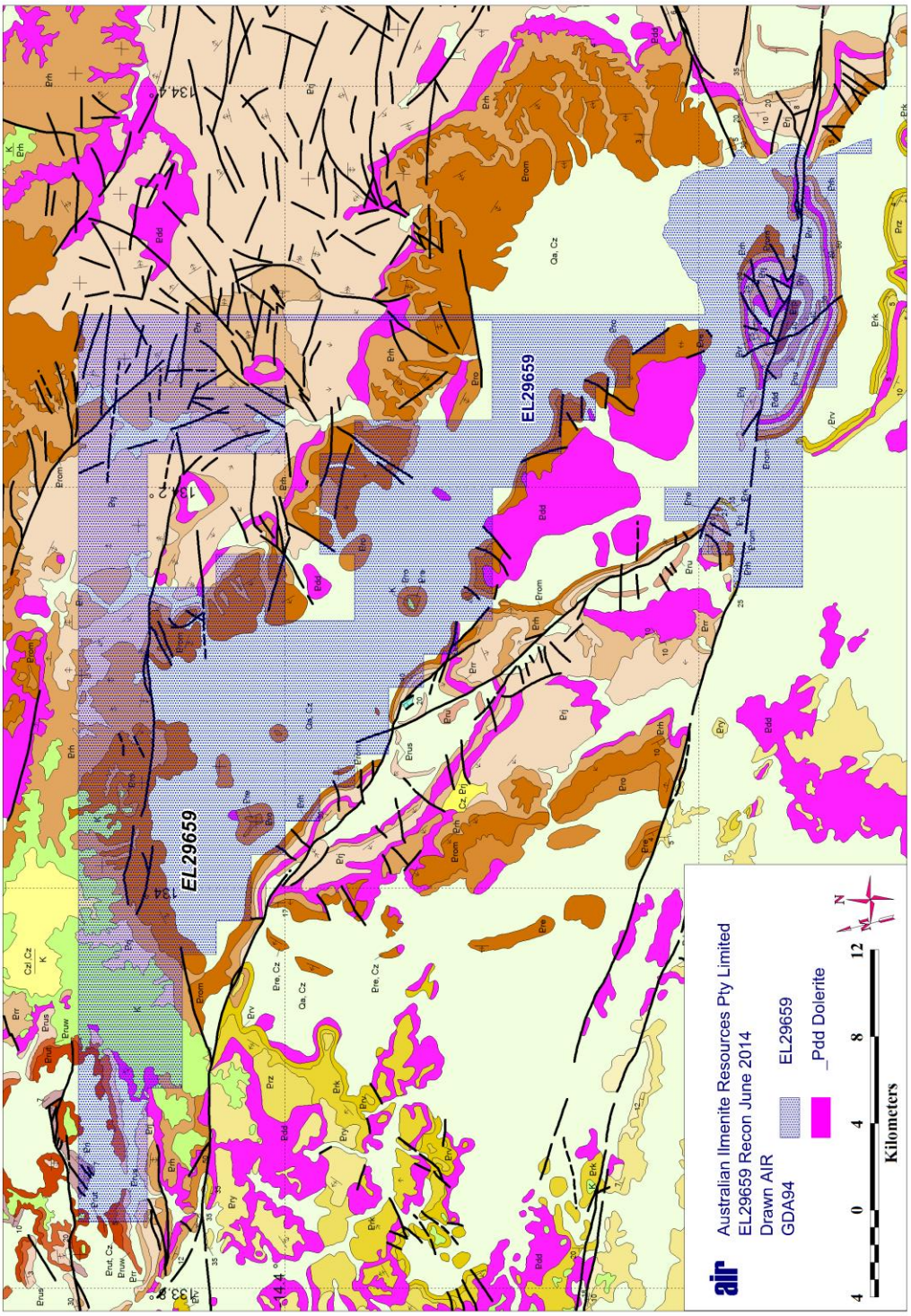

Figure 18: Geology EL29659

6 CONCLUSIONS AND RECOMMENDATIONS

AIR was acquired by MacMines in April 2016 but has focused its resources on the recommissioning of the heavy mineral wet plant located on MLs27422 and 29042. A minor amount of reconnaissance work has also been completed on the surrounding EL28291 in advance of further resource definition work.

Office studies, largely completed during the previous reporting period, of open file exploration data and former ERD regional regolith exploration data throughout the AIR tenement portfolio continued to support the earlier conclusion that the various sills and sill groups could be classified into ilmenite-type (>70% ilmenite in HM fraction), sub-ilmenite (50-70% ilmenite in HM fraction) and titanomagnetite-type (<50% ilmenite in HM fraction) and identify multi-element stream sediment anomalies for follow up.

The ilmenite-rich sills, appear to be concentrated in the upper part of the Maiwok Subgroup stratigraphy and this is thought to reflect evolution of the magma(s) feeding the dikes and sills and changes in the oxygen fugacity with crystallisation history. This suggests that regolith derived from sills in the upper parts of the stratigraphy, intruding the contacts amongst the Kyalla, Bukalorkmi and Chambers River Formations, are more prospective for ilmenite than those lower in the stratigraphy.

AIR has broadened its exploration targets and office studies have identified multi-element stream sediment anomalies in ELs 26524, 28892, 29040, 29632, 29634 and 29659 of GR274 for follow up. The NTGS database of stream sediments also shows that large areas of the licenses of this Group have not been sampled and further regional sampling is now recommended

Further 5m resolution satellite imagery was purchased with the same acquisition date as for that area of EL28291 purchased during the previous reporting period. It covered parts or all of ELs 29040, 29041, 28892, 28342, 28343, 26524 and 29659 of GR274 and proved useful in geological interpretation and determining the extents of prospective dolerite regolith and alluvium. It has also proved useful in planning for exploration for Sherwin Member and regional stream sediment sampling and further acquisition is recommended to complete the coverage of GR274 tenements.

There was no on-ground exploration by AIR of GR274 tenements.

Conclusions and recommendations for exploration are essentially unchanged and summarized in Table 5.

License	TZMI Rank	AIR Rank	Conclusions	Recommendations
EL26524 North Blk	4	3	Ilmenite, sub-ilmenite, titanomagnetite sills, poorly sampled. Au-Pb-Ni-Zn stream sediment anomalies. Sherwin Member iron ore.	Broad-spaced shallow hand auger regolith sampling. Follow-up mapping and stream sediment sampling of geochemical anomalies. Mapping, sampling of Sherwin Member.
EL26524 South Blk	2	3	Titanomagnetite sills, poorly sampled.	Broad-spaced shallow hand auger regolith sampling.

EL28342	5	5	Limited extent of dolerite of uncertain type. HM potential of Alluvium untested	Broad-spaced shallow hand auger regolith sampling. Exploration of alluvials in Flying Fox Ck for heavy minerals. Regional stream sediment sampling for all commodities.
EL28343	1	2	No dolerite known although stratigraphy is prospective for ilmenite-type sills. Potential of Alluvium downstream from BMC sills for HM.	Assess area for dolerite regolith. Assess alluvium for HM potential. Regional stream sediment sampling for all commodities.
EL28870	5	5	No dolerite. Unknown prospective stratigraphy.	Regional stream sediment sampling for all commodities.
EL28892	1	2	Small exposures of ilmenite-type dolerite. Au-Cu-Pb-As stream sediment anomaly.	Assess regolith potential. Follow -up stream sediment sampling and mapping.
EL29040	1	2	No dolerite known. Potential for Sherwin Member iron ore. Includes part of Big Banana Alluvials that have not been fully assessed regionally for HM. Au-Cu-Pb-Zn-As-Ni-Co stream sediment anomaly.	Assess for dolerite regolith and iron ore. Assess alluvium for HM potential. Follow-up mapping, stream sediment sampling of geochemical anomaly.
EL29041	3	3	No dolerite known. Magnetic-Google Earth imagery anomaly possibly Sherwin Member. Includes undrilled part of Big Banana Alluvials.	Assess for dolerite regolith. Determine origin of magnetic anomaly, assess alluvium for HM. Regional stream sediment sampling for all commodities.
EL29631	5	5	Western part non-prospective, difficult to explore. Titanomagnetite type sills in eastern part, poorly sampled. Alluvium untested.	Reconsider western part. Assess sill types with broad-spaced shallow hand auger sampling. Evaluate alluvium in eastern part. Regional stream sediment sampling for all commodities.
EL29632	5	5	Minor extents of dolerite of inferred titanomagnetite type but poorly sampled. Low-order Cu-Pb-Mn stream sediment anomaly.	Assess extent of dolerite regolith, test with broad-spaced shallow hand auger sampling. Follow-up stream sediment anomaly. Regional stream sediment sampling for all commodities.
EL29633	5	5	Ilmenite-sub ilmenite-titanomagnetite type sill on southern boundary.	Assess extent of dolerite regolith extending into license with broad-spaced shallow hand auger sampling. Regional stream sediment sampling for all commodities.
EL29634	5	5	Minor extents of dolerite, inferred titanomagnetite type. Au-Pb-Zn-Mn-Ag stream sediment anomaly.	Assess area for extent of dolerite regolith. Follow up stream sediment anomaly. Regional stream sediment sampling for all commodities.
EL29635	5	5	Minor extents of dolerite, inferred titanomagnetite type.	Assess area for extent of dolerite regolith. Regional stream sediment sampling for all commodities.
EL29659	4	5	Dolerite sills of titanomagnetite and ilmenite type, poorly sampled. Au, Pb, Zn, Ni, Cr, V, Bi, Mn stream sediment anomalies.	Assess extent of dolerite regolith, test with broad-spaced shallow hand auger sampling. Follow up steam sediment anomalies. Regional stream sediment sampling for all commodities.

Table 5: Summary Conclusions & Recommendations, GR274

7 PROPOSED ACTIVITIES NEXT REPORTING PERIOD

Exploration of EL26524 is ranked highly for regolith hosted heavy minerals and iron ore and its proximity to the current ilmenite wet plant site. Access to most areas is poor and this license has been included in the EOMMP for 2017 because of the extent of bulldozer access track clearing required. AIR proposes to carry out reconnaissance geological mapping and broad-spaced (from 0.8 to >3km) shallow hand auger sampling of prospective regolith through parts of the Mt Karmain, and Fox Central Sills in the northern part of the license and throughout the Chapman East and Chapman West Sills in the southern part of the tenement, (Figure 19).

In the north there are 34 proposed sites irregularly distributed according to the extents of the sill outcrops and therefore the distribution of prospective regolith. Although most sites are within walking distances of existing stations tracks up to 15km of new tracks will need to be cleared for access to the remote locations.

In the south some 109 sample sites have been planned on a regular grid at 1km spacings. Existing station tracks afford good access for Chapman West and no new tracks are required but at Chapman East there is no access into what appears to be a flat and densely vegetated area and up to 40km of new grid lines will be required.

Access for the remaining areas of GR274 is generally good. Reconnaissance exploration for dolerite-derived regolith with potential for heavy minerals, exploration for Sherwin Member with potential for iron ore, assessment of extensive areas of alluvium for heavy minerals, follow-up stream sediment sampling of the anomalies in ELs28892 and 29040 and regional stream sediment sampling of the remaining licenses of GR275 is proposed for 2017 in accordance with the priorities of Table 5.

Purchase of the 5m resolution Rapid Eye satellite imagery is strongly recommended to assist with this work.

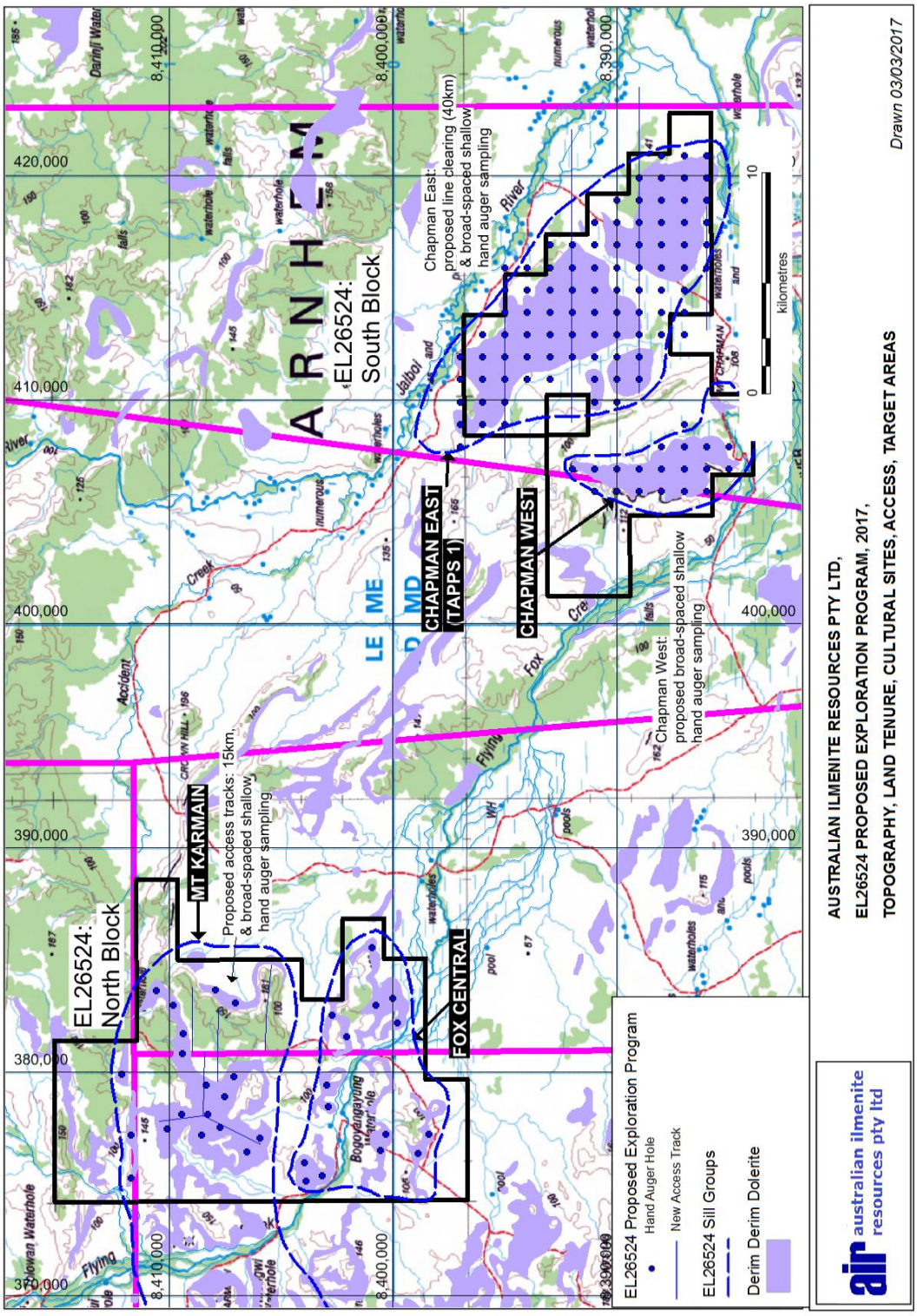

Figure 19 EL26524 Proposed Work Areas, 2017

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10 APPENDICES

Appendix 1: NTGS Open File Reports of Previous Exploration in the Region

Appendix 2: AIR NTGS Stream Sediment Database Roper Region, Stream Sediment Anomalies

Appendix 3: SATELLITE IMAGERY: RoperHeavyMineral_RE_5m_2014Mosaic_NC_x1

Appendix 1:

NTGS Open File Reports of Previous Exploration in the Region

PREVIOUS REGIONAL EXPLORATION INCLUDING SEL28291, MLs27422, 29042

Tenure	Report No	Report Title	Year	Author	Company
EL 8275	CR1996-0013	Final report EL 8275 24-11-1993 to 13-11-1995	1995	Ong N	Ashton Mining | Australian Diamond Exploration | Aberfoyle Resources
EL 8275	CR1995-0016	Annual report EL 8275 24-11-1993 to 23-11-1994	1995	Reddicliffe TH	Ashton Mining
EL 22339	CR2005-0030	Annual report on exploration activities for EL 22339 Roper Valley" year three of tenure period ending 24 February 2005"	2005		Gravity Diamonds | Diamond Mines Australia | Ashton Exploration Australia
EL 22339	CR2004-0137	Annual report on exploration activities for EL 22339 Roper Valley" year two of tenure period ending 24th February 2004"	2004		Gravity Capital | Diamond Mines Australia | Ashton Exploration Australia
EL 22339	CR2005-0456	Final report on exploration activities for EL 22339 Roper Valley Hodgson Basin Region	2005		Gravity Diamonds | Diamond Mines Australia | Ashton Exploration Australia
EL 22339	CR2005-0197	Relinquishment report on blocks dropped at the conclusion of year three of tenure period ending 24 February 2005 EL 22339 Roper	2005		Gravity Diamonds | Diamond Mines Australia | Ashton Exploration Australia
EL 6296	CR1992-0178	Partial relinquishment report for ELs 6288 6289 6292 6293 and 6296-6298 Roper River	1992	Podolsky MH	Stockdale Prospecting | Normandy Exploration
EL 6296	CR1991-0329	Final report on ELs 6286 6294 6295 6300 6301 and partial relinquishment report on ELs 6291 6292 6293 6296 6297 Roper	1991	Podolsky MH	Stockdale Prospecting
EL 6296	CR1990-0060	ELs 6286 to 6301 (Roper River) common report to 31-01-1990	1990	Podolsky MH	Stockdale Prospecting
EL 6296	CR1993-0252	Final report on exploration activities for EL 6292 EL 6293 EL 6296 EL 6297 EL 6298 and EL 6299 Roper River 1 December 1988 to 28	1993	Price LA	Poseidon Exploration | Stockdale Prospecting
EL 6296	CR1992-0179	Common report to 31 January 1992	1991	Podolsky MH	Stockdale Prospecting | Poseidon Exploration
EL 6296	CR1991-0213	ELs 6286 to 6301 (Roper River) common report to 31-01-1991	1990	Podolsky MH	Stockdale Prospecting
EL 4483	CR1990-0068	Partial relinquishment report EL 4483 Roper River area	1990	Podolsky MH	Stockdale Prospecting
EL 4483	CR1985-0174	Annual report to 31-05-1985 Roper River area NT	1985		Stockdale Prospecting
EL 4483	CR1986-0212	Annual report Roper River area NT	1986		Stockdale Prospecting
EL 4483	CR1990-0572	Final report Roper River area year ending 31 May 1990	1990	Fried TR	Stockdale Prospecting
EL 4483	CR1988-0241	Stockdale EL 4483 partial relinquishment report	1988	Vercoe SC	Stockdale Prospecting
EL 4483	CR1987-0084	Parial relinquishment report on EL 4483 Roper River area Northern Territory period ending 12-02-1987	1987	Scott LP	Stockdale Prospecting
EL 4483	CR1988-0166	Report for Els Roper River area 1988	1988		Stockdale Prospecting
EL 4483	CR1989-0421	Roper River area NT common report 01-07-1989	1989	Podolsky MH	Stockdale Prospecting
EL 4483	CR1987-0128	Common report on ELs Roper River area NT period ending 01-07-1987	1987		Stockdale Prospecting
EL 3359	CR1983-0058	Final report on exploration 12-01-1982 to 26-01-1983	1983		Ashton Mining | Aberfoyle Exploration
AP 2583	CR1972-0036	Uranium exploration Mount Chapman area NT 1971	1972		Kratos Exploration | Kratos Uranium
EL 23048	CR2004-0708	Combined partial relinquishment report for EL 23047 and EL 23048 for period ending 02/12/2002 to 01/12/2004	2004	Roiko HJ	ERD
EL 23048	CR2007-0857	Partial relinquishment report for EL 23048 Roper Project for period ending 2 December 2002 tp 1 December 2007	2007	Johnstone IK	ERD
EL 24655	CR2009-0601	Background on Australian Ilmenite Resources Pty Limited (AIR) tenements McArthur Basin	2009	Johnstone I	Australian Ilmenite Resources

Appendix 2:

AIR NTGS Stream Sediment Database Roper Region, Stream Sediment Anomalies

Appendix 3:

SATELLITE IMAGERY: RoperHeavyMineral_RE_5m_2014Mosaic_NC_x1

(See separate attachment)