



**EPM 26174  
Prickly Bush**

**Final Report  
for the period 4 August 2017 to 3 August 2022**

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## **SUMMARY**

### **Aim of Project**

Exploration Permit for Minerals (EPM) 26174, Prickly Bush, for 33 sub-blocks was obtained to explore for phosphate mineralisation in the Phanerozoic sediments, and iron oxide copper gold (IOCG), gold and Pb-Zn-Ag mineralisation in the Proterozoic basement. There is potential for rare earth element (REE) accumulation in phosphorite deposits in the Cambrian limestones.

### **Object of Report**

This Activity Report documents the results of exploration on EPM 26174 from 4 August 2017 to 3 August 2022.

### **Location**

EPM 26174 is centred approximately 120 km southeast of Mount Isa.

### **Datum**

Data are presented in GDA94 Map Grid of Australia Zone 54 datum.

### **Summary of Work**

Work completed from 4 August 2017 to 3 August 2022 included a desktop prospectivity study for the EPM, a desktop study of previous exploration and a review of exploration targets that may support Chinova's Osborne and Mount Dore mining operations. This work concluded there is little potential for EPM 26174 to host economic copper - gold mineralisation that could support the mining operations.

EPM 26174 was surrendered 3 August 2022.

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## 1. INTRODUCTION

This Final Report documents exploration activities on Exploration Permit for Minerals (EPM) 26174 from 4 August 2017 to 3 August 2022.

All data detailed in this report are presented in GDA94 Map Grid of Australia Zone 54 datum.

### 1.1 Resource Authority Information

EPM 26174, Prickly Bush, covering 33 sub-blocks was granted to Chinova Resources Cloncurry Mines Pty Ltd (CRCM) on 4 August 2017 for a term of five years.

CRCM is a 100% owned subsidiary of Chinova Resources Pty Ltd (Chinova) formerly Inova Resources Limited (IVA) and Ivanhoe Australia Limited (IAL).

The Chinova tenement interests are 26 granted EPMs and 25 granted mining leases covering a total of 2,865 square kilometres south of Cloncurry, Northwest Queensland. EPM 26174 is being explored with EPM 26180 in the western tenement package (Figure 1).

EPM 26174 consists of 33 sub-blocks listed below and shown in Figure 2.

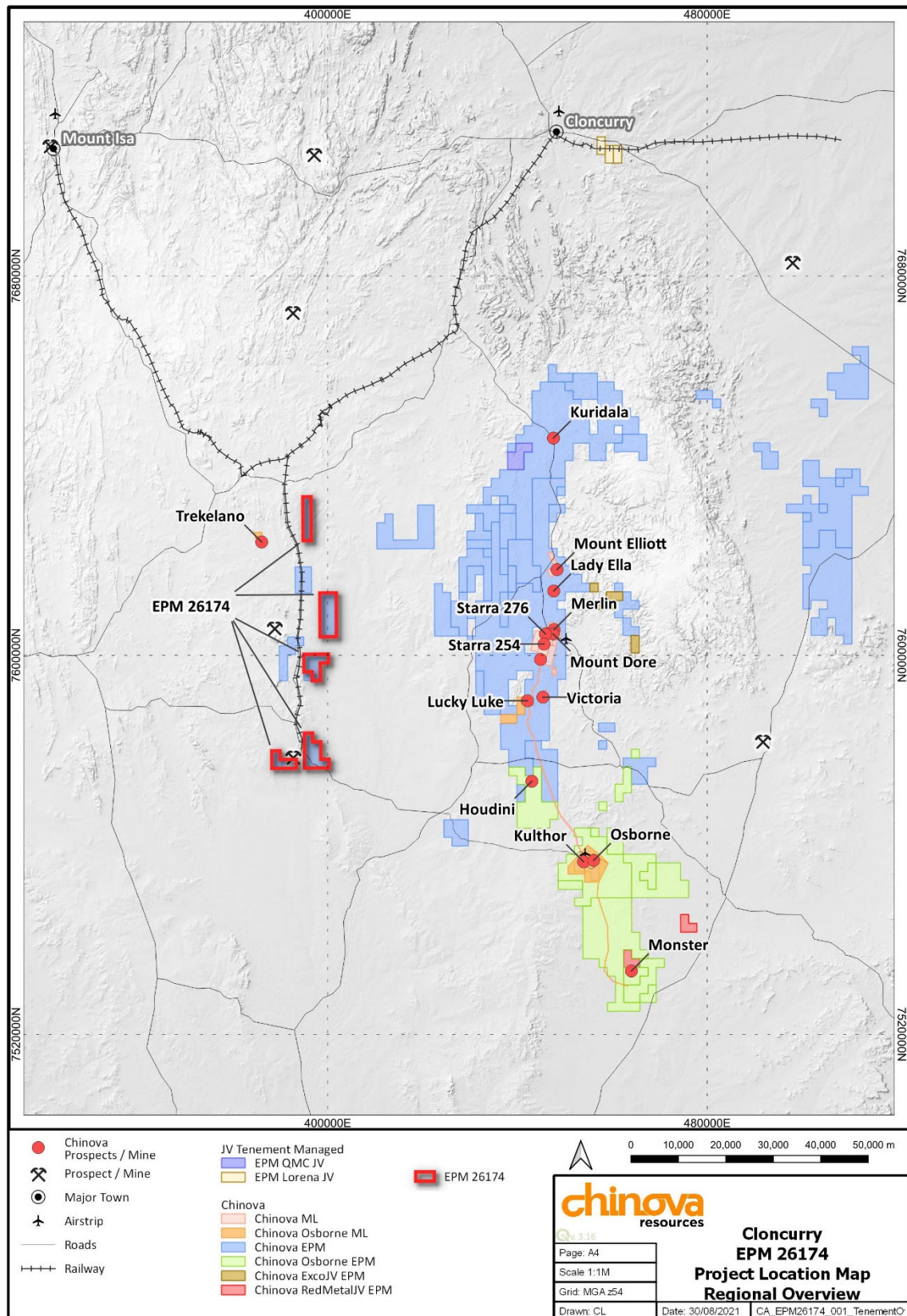
<b><u>BIM</u></b>	<b><u>Block</u></b>	<b><u>Sub-blocks</u></b>
Clon	1176	z
Clon	1248	e k p u
Clon	1393	b c g h m n r s w x
Clon	1464	p u
Clon	1465	l m q v
Clon	1608	k p q u v w x z
Clon	1609	l q v w

**Total = 33 sub-blocks**

#### 1.1.1 Location and access

EPM 26174 consists of five non-contiguous groups of sub-blocks surrounding the Phosphate Hill mining leases. The tenement is centred approximately 120 km southeast of Mount Isa (Figure 1). EPM 26174 sub-blocks are situated within the Pilgrim, Chatsworth and Trekelano Pastoral Holdings.

Vehicle access to the tenement is by the sealed Cloncurry-Duchess Rd from Cloncurry to Duchess then via the sealed road south of Duchess towards Phosphate Hill. Road access is good from March to December with intermittent closure due to flooding and heavy rains possible from January to March. Limited existing tracks may be used by four wheel drive vehicles for access within the tenement.



**Figure 1: EPM 26174 regional location.**



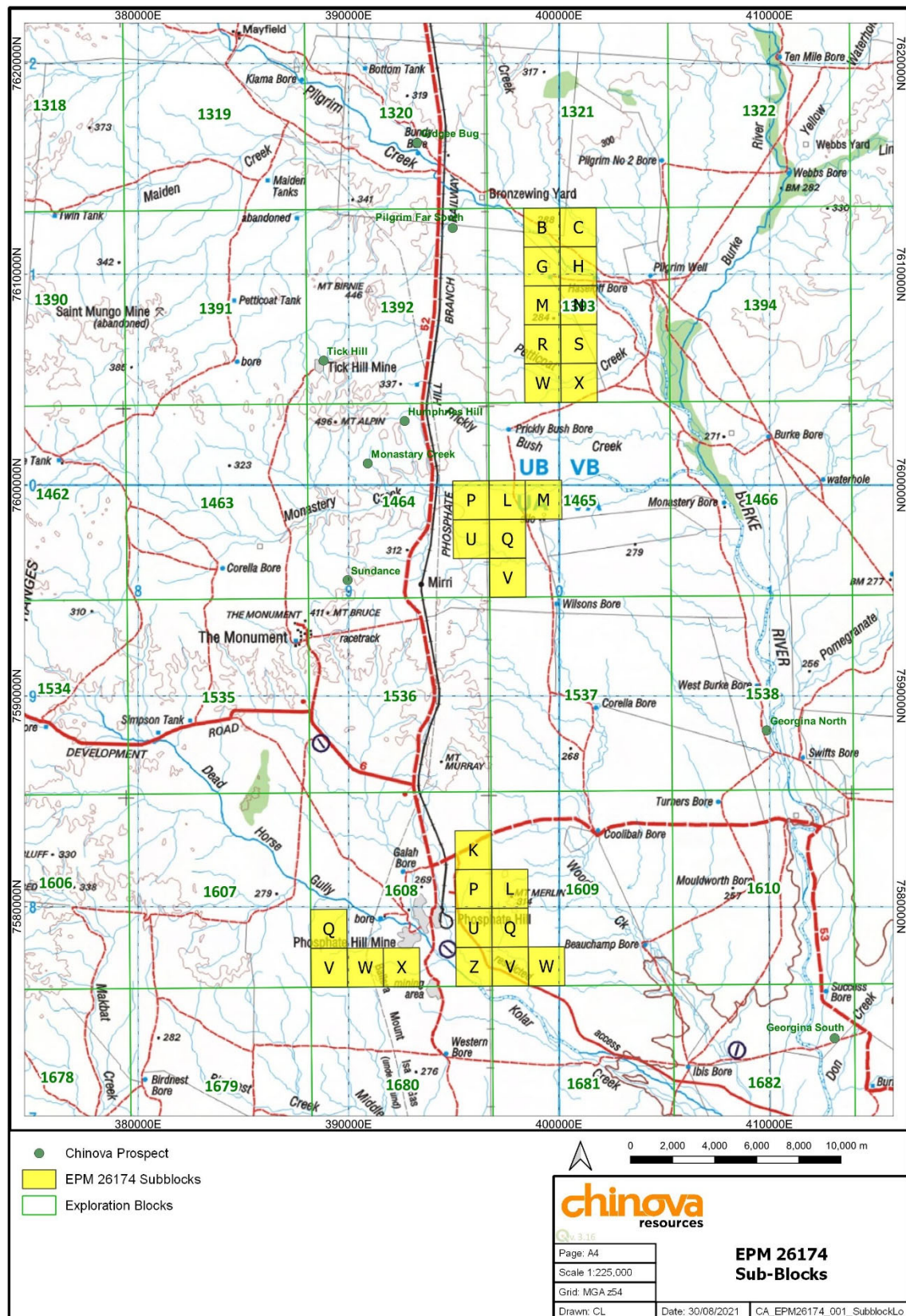


Figure 2: EPM 26174 sub-block location.

## **1.2 Exploration Rationale**

EPM 26174 is one of three tenements located in the western part of Chinova's Cloncurry Project that lie within the Cambrian Georgina Basin. Collectively, the tenements have been explored for roll-front type uranium in Mesozoic paleochannels, phosphate mineralisation in Cambrian limestone and base metal mineralisation both within the Georgian Basin and the underlying Proterozoic Mount Isa Inlier. Following a shift in policy away from uranium mining in Queensland Chinova abandoned its uranium exploration in 2015 to focused on phosphate and base metal mineralisation within the project area.

The main exploration targets in EPM 26174 are phosphate mineralisation in the Phanerozoic sediments and iron oxide copper gold (IOCG), and gold mineralisation in the Proterozoic Mount Isa Inlier. Exposed lithologies within the tenement consist of Cambrian limestone that unconformably overly the Proterozoic rocks.

### **1.2.1 Regional Geology**

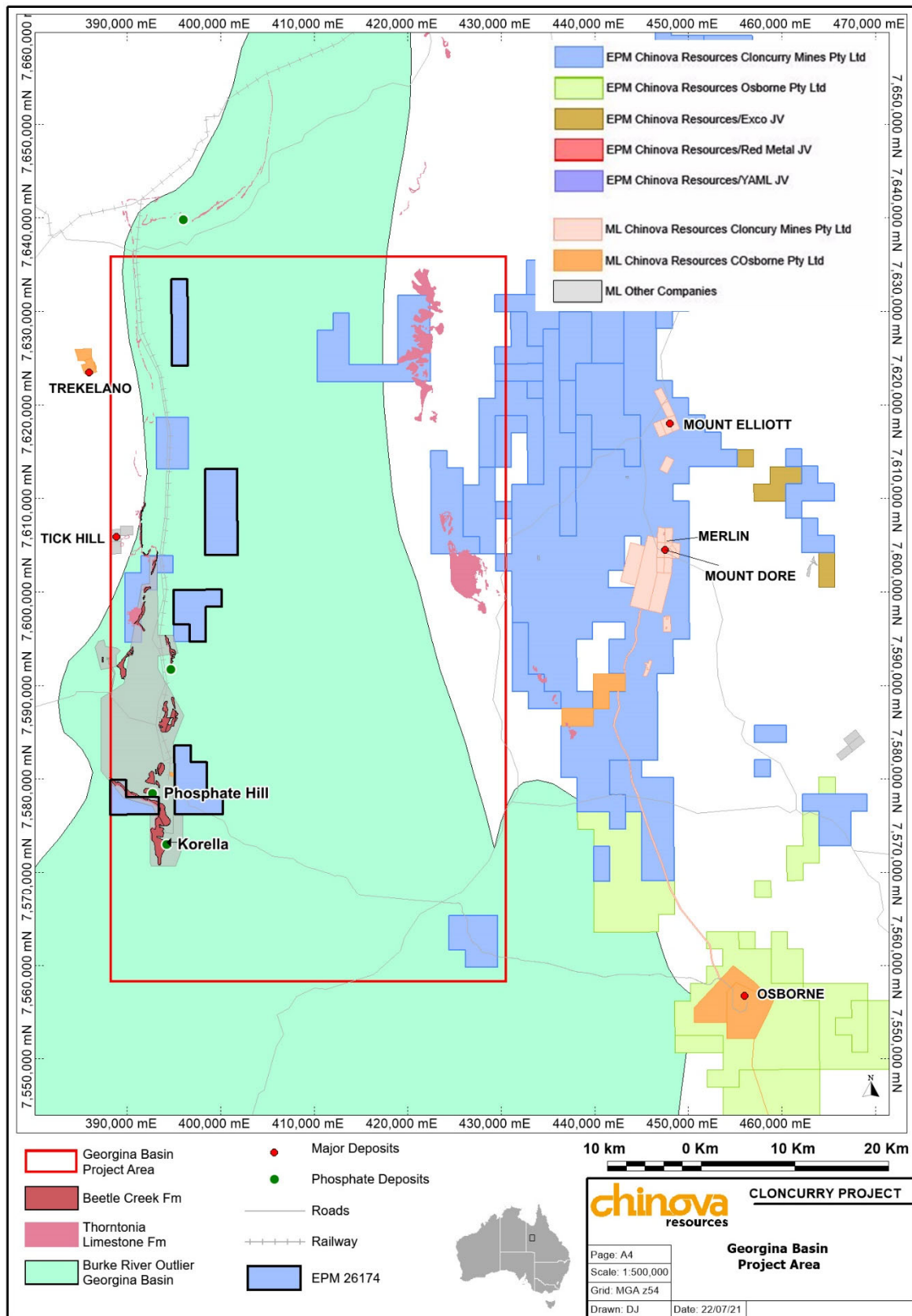
EPM 26174 is located immediately adjacent to, to approximately 40 km north of the Phosphate Hill Mine (168.6 Mt @ 25.5%  $P_2O_5$ ) within the Burke River Outlier. The Burke River Outlier, approximately 60 km x 20 km in area, is a small fault-bounded depositional sub-basin of the Phanerozoic Georgina Basin that extends northwest from Boulia into the Northern Territory. The Basin primarily comprising Cambrian and Ordovician marine sediments with the Cambrian and Lower Ordovician sequence consisting predominantly of carbonate rocks.

The Basin hosts numerous phosphorite deposits which occur on its margins, primarily within the Middle Cambrian Beetle Creek Formation. This formation is divided into the Lower Siltstone Member and the Monastery Creek Phosphorite Member. The latter hosts significant phosphate mineralisation as both calcareous phosphorite with phosphatic and fetid cherty limestones and chert beds; and siliceous phosphorite beds with intercalated cherty phosphorite, phosphatic cherty limestone, chert and minor phosphatic shale (Russell, 1971). The Thornton Limestone unit which underlies the Beetle Creek Formation in the Burke River area is reported to be phosphatic, and is the host to several significant  $P_2O_5$  resources in the north and northeast parts of the Georgina Basin.

### **1.2.2 Tenement Geology**

EPM 26174 is located along the western edge of the Burke River Outlier. Cambrian-aged limestone and Mesozoic sediments which unconformably overlie Proterozoic age basement rocks cover the entirety of the of the tenement (Figure 3). The prospective Beetle Creek Formation unit is mapped within the southern part of the tenement, however this falls within the Phosphate Hill mining lease (ML5543). The Georgina Basin in general has experienced very little deformation with breaks in sedimentation attributed to uplift and erosion (Smith, 1972).

Proterozoic rocks outcrop only a few kilometres to the west of EPM 26174 and form part of Cover Sequence 2 Mary Kathleen Group, which are prospective for IOCG and gold mineralisation, evident from economic occurrences of both commodities at the Trekelano and Tick Hill deposits, respectively. These deposits are located within 10 km of the tenement (Figure 3).



**Figure 3: Georgina Basin Project area.**



## **1.3 Previous Exploration**

### **1.3.1 Other Companies**

A significant amount of rotary and percussion drilling, as part of work conducted over the Phosphate Hill deposit, has been completed within the tenement by Broken Hill South Limited (BHS), Western Mining Corporation (WMC) and Queensland Phosphate Limited (QPL) between 1971 and 1990. A total of 172 percussion / rotary holes have been identified from open file data with drilling generally shallow, ranging from 1.5 m to 87 m within EPM 26174. These drilling campaigns delineated significant phosphate resources, ultimately leading to the commission of the Phosphate Hill mine now under ML 5543. More regional exploration within the area of EPM 26174 has been completed by BHS and WMC, but no additional drilling has been identified within these parts of the tenement.

## **2. WORK PROGRAM**

### **2.1 Work Completed**

#### **2.1.1 Desktop Studies**

In 2019 Chinova Resources Cloncurry Mines (CRCM) completed a desktop prospectivity review for EPM 26174. The tenement was assessed for Cambrian phosphate mineralisation, roll-front uranium mineralisation and potential Proterozoic targets beneath the Georgina Basin cover sequences. The review included recovery of legacy datasets and assessment of previous work completed by CRCM in adjacent relinquished or current tenure. Areas of the tenement which fall directly under a non-CRCM ML (ML5543) were excluded from review.

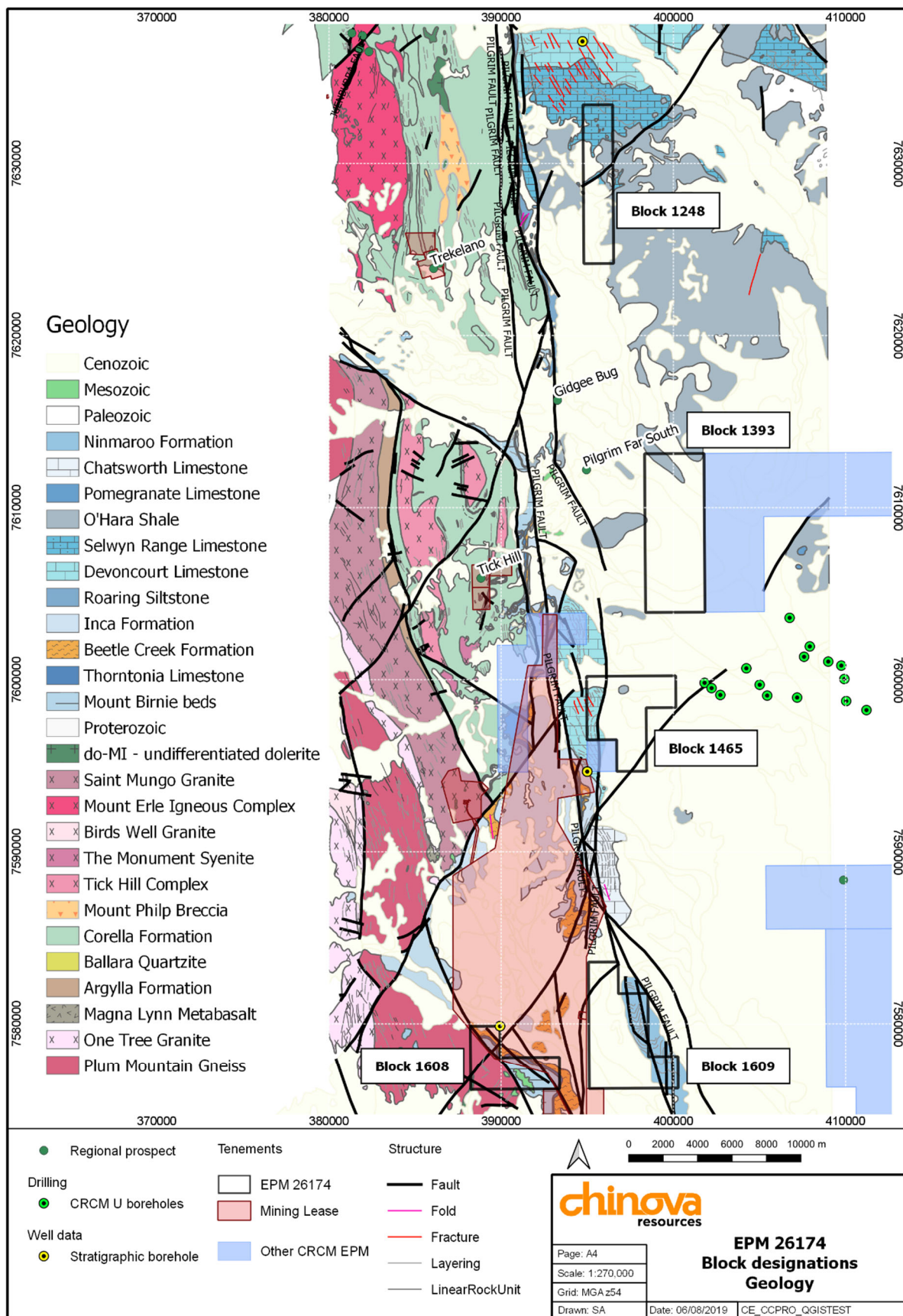
For the purposes of the review, each of the discrete components of the tenement were assessed individually and designated a name based on the dominant block identification; from north to south 1248, 1393, 1465, 1608 and 1609, encompassing all 33-subblocks of the tenement (Figure 4).

#### **Block 1248**

Block 1248 consists of 5 sub-blocks striking N-S over the northern margin of the Georgina Basin. GSQ mapping shows the block is situated over (in stratigraphic order) the O'Hara shale and Selwyn Range limestone of the Georgina Basin. Inferred solid geology beneath the Georgina Basin is designated as the Wimberu Granite, a ~1510Ma member of the Williams Supersuite. The block is transacted by a NE striking fault which has been interpreted from air-photo by GSQ. This fault appears to offset Georgina Basin units and is considered late (post-Georgina Basin).

#### **Post-Proterozoic Mineralisation Review**

Available datasets have been reviewed with a focus on drilling; however, no drilling data within the block exists. A stratigraphic borehole (BMR Duchess 15A) 3.8km north of the block was completed between 1978-1980. The hole was drilled to a maximum depth of 105m and intersected Devoncourt Limestone and Roaring Siltstone units only (Gibson, 1984); both which overly the prospective phosphate unit the Beetle Creek Formation. This borehole was drilled to the north of the CRCM held block in shallower part of the basin. Based on these results it is estimated that phosphate horizons would be intersected at depths >150m assuming the unit thickness of the Roaring Siltstone is ~70m (Jell, 2013). This therefore limits the economic potential for phosphate within this block (Krauss, et al, 1986).



**Figure 4: EPM 26174 regional geology.**

### **Proterozoic Mineralisation Review**

The block lies ~8,5km east of the CRCM held Trekelano deposit; however, the relationship between block 1248 and Trekelano is spatial only as they are each within a separate structural domain of the eastern succession, Mary Kathleen domain (Trekelano) and Mitakoodi domain respectively, separated by the Pilgrim Fault and within different geological units. The Proterozoic basement is interpreted as being between 150-250m beneath Palaeozoic cover (un-tested). The solid geological mapping completed by GSQ shows the underlying basement as the Wimberu Granite. This granite has mineralisation associated with specular hematite breccias further to the east in outcropping parts of the unit with drilling intersections of 23m @ 97ppm Mo in AST002 and 5m @ 0.34% Cu, 0.12g/t Au, 382ppm Mo in hole AST003, drilled by ActiveX in 2012 over the 'Sterling' prospect (Young, 2012). This block is therefore considered prospective for Proterozoic granite-hosted/related and IOCG mineralisation. It is suggested a single deep RC or diamond borehole is drilled to gain stratigraphic control over the block and test depth of basement, with a follow-up geophysics program to penetrate cover units and assist in target generation beneath cover.

### **Block 1393**

Block 1393 is located wholly within the Georgina Basin, consisting of 10 sub-blocks, orientated north-south. The block is located ~6,000m east of the major structural boundary defined by the Pilgrim Fault. Underlying Proterozoic units would fall within the Mitakoodi Domain of the eastern succession.

### **Post-Proterozoic Mineralisation Review**

The phosphate potential for this block has been assessed and is considered sub-economic to non-existent. The Georgina Basin over the block sharply deepens eastwards into a >1000m depo-centre associated with the Burke River Structural belt. The potential for intersection of phosphate horizons is unlikely at economic depths. The mapped geological unit at surface is the O'Hara shale, which has a maximum thickness of 85m, which overlies the Devoncourt Limestone and Inca Formation with thicknesses of 215m and 150m respectively (Jell, 2013), totalling an estimated 450m of cover sequences before intersecting potential phosphate horizons of the Beetle Creek Formation.

At the adjacent relinquished CRCM tenement EPM 17417, CRCM completed a 15-hole air-core drilling program targeting paleo-channels for roll-front uranium mineralisation. The drilling was funded under a CDI grant and completed in 2015. The drilling targeted AEM defined conductive channels, with holes drilled between 6-78m depth. Results of the drilling showed that these conductors were not associated with paleo-channel sands and uranium mineralisation, but rather highlight a conductive clay layer above fully consolidated Georgina Basin units. Some of these conductive channels are within block 1393 but based on these results, it is not considered prospective.

### **Proterozoic Mineralisation Review**

The modelled depth of cover in both SEEBASE and GSQ contoured examples indicate the Georgina Basin overlying this block is between 600-1000m deep (Connors et al, 2018). Without other indicators of mineralisation, this block is not considered prospective for economic Proterozoic mineralisation beneath cover.

### **Block 1465**

Block 1465 consists of 6 sub-blocks which straddle mapped easterly splays of the N-S striking Pilgrim Fault. The mapped geology at surface is part of the lower Georgina Basin and underlying Proterozoic geology is unknown but most likely falls within the Mitakoodi Domain.

### **Post-Proterozoic Mineralisation Review**

As with Block 1393 (discussed above), the potential for roll-front uranium mineralisation has been extinguished by drilling completed by CRCM in 2015 in adjacent tenements. Adjacent to the tenement is the mining lease ML 5543 which includes the Phosphate Hill deposit. This ML has been strategic in its placement and sits over the mapped surface expressions of the Beetle Creek Formation which is favourable for phosphate mineralisation. The mapped units at surface within the block include the Devoncourt Limestone, an overlying unit to the Beetle Creek Formation. The down-dip potential for intersecting the phosphate horizons beneath this unit has been untested. It is recommended a borehole is drilled within block CLON 1464 U on the western side of the Pilgrim Fault splay to obtain stratigraphic control on the depth of phosphate horizons. The Georgina Basin to the east of this splay appears to deepen dramatically and the potential for economic phosphate mineralisation is not considered high given the expected depth of the Beetle Creek Formation (>200m).

### **Proterozoic Mineralisation Review**

The modelled depth of cover in both SEEBASE and GSQ contoured examples indicate the Georgina Basin overlying this block is between 300-1000m deep (Connors et al, 2018). Without other indicators of mineralisation, this block is not considered prospective for economic Proterozoic mineralisation beneath cover. True depth of cover has not been tested though; it is recommended the borehole proposed to test for phosphate mineralisation also drills to basement.

### **Block 1608**

Block 1608 consist of 4 sub-blocks, with a generally east-west orientation. The sub-blocks straddle the south west boundary of the Phosphate Hill mining lease ML 5543. The ML overlaps with all 4 sub-blocks and for the very northern and western most (block Q and X) covers more than 50% of the sub-block.

### **Post-Proterozoic Mineralisation Review**

As mentioned above ML 5543 overlaps substantially with the 4 sub-blocks of block 1608. The ML also lies directly over the prospective Beetle Creek Formation. These blocks without an overlapping ML would be very prospective for phosphate mineralisation; however, CRCM does not have authority to explore over ML 5543 and therefore must exclude this area from the prospectivity review. The Georgina Basin geology in the remaining area of block 1608 are not prospective for phosphate. The Georgina Basin dips to the north-east and the remaining surface geology outside the ML are stratigraphic units below the Beetle Creek Formation (Mount Bernie Beds) and pre-date any favourable depositional environment during the Cambrian for phosphate formation.

### **Proterozoic Mineralisation Review**

The Proterozoic geology in block 1608 is dominated by the Plum Mountain Gneiss. This intensely metamorphosed unit is the most easterly mapped extent of the pre-Barramundi basement units and is ~1900-1880Ma. The unit lies within the Kalkadoon-Leichardt domain and is not considered part of the Eastern Succession within the Mt Isa Inlier (Withnall & Hutton, 2013). The unit consists of quartzo- feldspathic gneiss, augen gneiss, weakly foliated to gneissic equigranular and porphyritic granite; minor calc-silicate rocks, meta-arenite, mica schist, amphibolite; aplite and pegmatite veins.

The prospectivity of the unit has not been assessed fully, from the datasets available, there is very little to no sampling or drilling completed by CRCM or previous explorers over this area of outcropping basement. It is recommended a reconnaissance field mapping program is completed over the area excluding the ground overlapping with ML 5543 to delineate any possible surface expressions of mineralisation within the



unit. Although not yet defined as a mineralisation style in the Mt Isa Inlier, similar aged gneissic terranes in Proterozoic orogenic belts elsewhere in Australia have been found to be very prospective for Au mineralisation despite being discarded as non-prospective previously (Reid et al, 2007; Doyle, 2014).

### **Block 1609**

Block 1609 is composed of 8 sub-blocks which are immediately east of ML 5543 and the small loading facility held by CRCM under ML 90068. The underlying geology is noted as only Cainozoic sediments and the Ninmaroo Formation (Georgina Basin) along the very eastern side of the block.

### **Post-Proterozoic Mineralisation Review**

This block is not considered prospective for phosphate or roll-front uranium mineralisation. The underlying Georgina Basin units are mapped as the Ninmaroo Formation a late-Cambrian to early Ordovician calcareous sedimentary package noted between 350-950m thick (Jell, 2013). The main target stratigraphy immediately west of the block is held under ML 5543 and is not expected to continue into the block. Previous drilling and mapping by Western Mining Corporation (WMC) under EPM 4184 concluded that there was no phosphate potential within this area and mapped the block as part of the Swift and Ninmaroo Formation. The phosphate mineralisation immediately west of the block are separated by the Russell and Creek faults (as mapped by WMC) and interpreted this area as a graben/half-graben downthrown block, which has structural juxtaposed unrelated sedimentary packages at surface (Rogers, 1987).

### **Proterozoic Mineralisation Review**

The modelled depth of cover in both SEEBASE and GSQ contoured examples indicate the Georgina Basin overlying this block is between 200-500m deep (Connors et al, 2018). Without other indicators of mineralisation, this block is not considered prospective for economic Proterozoic mineralisation beneath cover. True depth of cover has not been tested though; it is recommended a borehole be planned to obtain stratigraphic control within the block. The expected basement unit is mapped by GSQ as the St Mungo Granite, a Wonga aged felsic intrusion which possibly is associated with mineralisation along structural features associated with the Pilgrim Fault.

In 2021, Chinova reviewed the exploration targets for EPM 26174 based on the interest in New Economy Metals and the potential of the tenement to host Rare Earth Element (REE) accumulations in the phosphorite deposits. The Korella phosphate-REE deposit, located 4 km south of the EPM, was reviewed. Korella has a published inferred phosphate and REE resources (phosphate-yttrium) of 4.2 Mt @ 746 g/t Y (Krucible Metals Limited, 2011). Nd and Dy are also reported to be present at Korella, but their resources have not been estimated.

In 2022, a desktop review of previous exploration and exploration targets in support of Chinova's current mining projects was undertaken. Chinova had minimised regional activities to focus on near mine exploration in proximity to its bases of operation at Osborne and Mount Dore. Work for the EPM had been focussed on the phosphate potential along the margins of the Cambrian Georgina Basin, and base metal mineralisation within the Proterozoic basement in areas with less than 200 m of Phanerozoic sediments. Chinova had shifted to focus only on copper and gold mineralisation that would support the Osborne Mill operations. Due to the perceived depth to the target basement rocks, the EPM was considered to possess little potential for economic copper and / or gold mineralisation that could support the Osborne mining operations.

### 3. CONCLUSIONS

EPM 26174 for 33 sub-blocks was obtained to explore for base metal mineralisation in the Proterozoic Mt Isa Inlier basement rocks and phosphate mineralisation in the overlying Phanerozoic limestones. The tenement has the potential to host roll-front type uranium in Mesozoic paleochannels. However, State Government policy is for no uranium mining in Queensland.

The main exploration targets in EPM 26174 are phosphorites in the exposed Georgina Basin limestones, and iron oxide copper gold (IOCG) and gold mineralisation in the Proterozoic Mount Isa Inlier basement rocks. The Phosphorite deposits may also host Rare Earth Element (REE) accumulations, which is evident at the Korella deposit located 4 km south of the EPM. The Korella deposit has a published inferred phosphate and REE resources (phosphate-yttrium) of 4.2 Mt @ 746 g/t Y (Krucible Metals Limited, 2011). Nd and Dy are also reported to be present at Korella, but their resources have not been estimated.

#### 3.1 Reasons for Surrender

EPM 26174 was surrendered on 3 August 2022.

A desktop review of potential exploration targets in support of Chinova's current mining projects was undertaken. The inherent exploration risk of investigating beneath potentially thick Cambrian cover over the basement geology downgrades the EPM.

EPM 26174 is considered to possess little potential for economic copper and / or gold mineralisation to support the current mining operations at Osborne.

#### 3.2 Drillhole Summary

No drilling was commenced.

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