



**MONARCH**

**EPM 12228**

**PARTIAL RELINQUISHMENT REPORT**

**11 MARCH 2017**

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**FOR**

**DEPARTMENT OF MINES AND ENERGY, QUEENSLAND**

**TENEMENT TITLE : TERRITORY MINERALS LIMITED**

**OWNED & MANAGED BY: TERRITORY MINERALS LIMITED**

**MAP SHEETS: 1:250,000 Mossman SE 55-1**

**1:100,000 Mt Mulligan 7864**

**1: 100,000 Rumula 7964**

**AMG CO-ORDS: Min East - 277,700 Max East - 299,300**

**Min North – 8,130,500 Max North – 8,169,100**

**Commodity: Gold, Antimony**

**Key Words: Orogenic, Sulphide Mineralisation**

**Prepared by: Territory Minerals Pty Limited**

**April 2017**

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## **1.0 SUMMARY**

This report covers work completed on 5 sub-blocks relinquished in January 2017 at the request of the Department.

The tenement was purchased by Territory Minerals in a sale agreement from Republic Gold in December 2011 and assignments have been lodged for the 100% to be assigned to Territory Minerals from BHP.

The tenement spanned three stations, Brooklyn, Kondaparinga and Glen Russell Holdings with the relinquished portions lying on Kondaparinga Station.

Activities have included follow-up field work in prospective target areas has included field reconnaissance, soil geochemistry and mining of open file databases.

## 2.0 INTRODUCTION

This report summarises the gold exploration work carried out on EPM 12228 in the Hodgkinson Mineral Province during the tenure of the 5 relinquished sub-blocks.

### 2.1 Location & Access

EPM 12228 is centred approximately 80 km WNW of Cairns, 50 km north-west from Mareeba and 25 km SSW of the Mt Carbine mining centre in Far North Queensland (Figure 1). It covers an area of approximately 82 sq km on the Rumula and Mt Mulligan 1:100,000 topographic sheets. The tenement extends SSE in an elongate fashion from just south of the Mitchell River for some 42 km. It is part of RGL's extensive portfolio of tenements that the company has been actively exploring throughout the region.

Access to the EPM is gained from Mareeba by heading north to Mt Molloy and Mt Carbine then 25km to the Mt Carbine-Hurricane road. Seven kilometres along the gravel road take the T junction to the south and cross the Mitchell River on the Kondaparinga Crossing to Brooklyn Station from Curraghmore on the Kondaparinga Station northern access road, then east along station tracks into the relinquished northern part of the EPM as shown below.

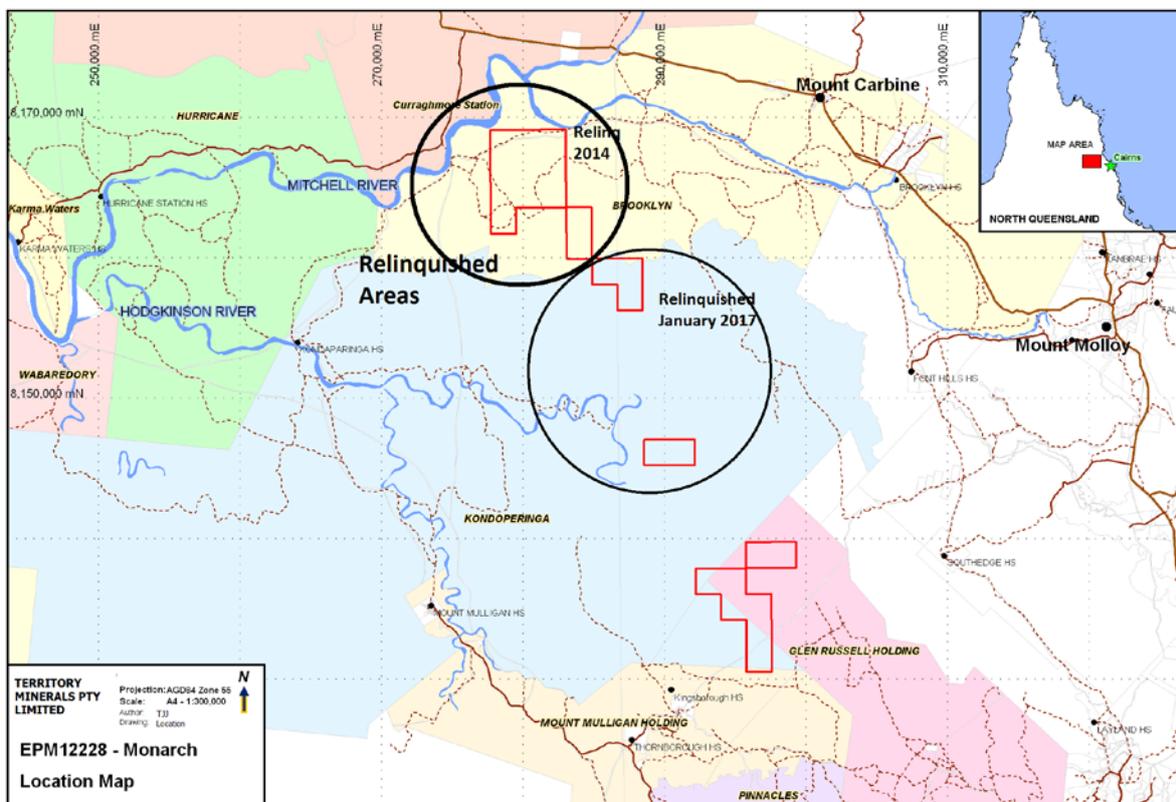


Figure 1 EPM 12228 Location Map c Relinquished areas.

## 2.2 Physiography, Vegetation & Climate

The landscape of the EPM is predominantly shallow colluvium and ridges. The northern extremity of the tenement is more subdued to flat lying on the southern margins of the Mitchell River valley. Vegetation across the area consists largely of stunted eucalypt and spear-grass typical of north Australian savannah woodlands. Large gums, paper barks and tea trees are restricted to the larger creek and river courses.

Rainfall in the area is mainly restricted to the period November to April when summer storms and the north-west monsoonal influence affect the area. The average annual rainfall is approximately 1000mm. Mean monthly temperatures vary from 14° minimum in July to 34° maximum during October-January. Because of the seasonal bias in rainfall, field exploration is severely restricted during the wettest months from December to March.

## 3.0 TENEMENT STATUS

EPM 12228 was granted as 100 sub-blocks to BHP Billiton Minerals Pty Ltd on 16 February 2006. Republic Gold Limited entered into a farm-in agreement with BHP Billiton Ltd under which RGL has earned 100% interest in the tenement which has been purchased by Territory Minerals in December 2011 and assigned to Territory in 2013. Its current status is summarised below. A relinquishment of 12 sub-blocks was processed in 2014.

Title	Date of Grant	Date of Expiry	Current Area	Registered Owner
EPM12228	16/02/2006	15/02/2020	8 sub-blocks	Territory Minerals Ltd

**Table 1 EPM 12228 Tenement Status**

Block	Sub-block
TOWN 517	QV
TOWN 516	U
TOWN661	B C

**Table 2 EPM 12228 Relinquished Tenement Blocks**

## 4.0 GEOLOGICAL SETTING AND MINING HISTORY

### 4.1 Regional Geology

EPM 12228 is situated in the central part of the meta-sedimentary Hodgkinson Province that forms the northern part of the Tasman Fold Belt. The Hodgkinson basin is separated

from the Archean Yambo and Dargalong Metamorphics to the west by the Palmerville Fault.

The Early Silurian to Early Devonian Chillagoe Formation to the east of the Palmerville Fault corridor includes a large proportion of shallow marine facies. The Late Silurian to Late Devonian Hodgkinson Formation further to the east is dominated by laterally discontinuous arenites, siltstones and shales with minor conglomerate, chert, basalt and limestone units. The sedimentary structures and bedding features are diagnostic of turbidity current deposits in a deepwater, submarine fan system

The Hodgkinson formation has been subjected to a complex brittle and ductile structural history in the Late Devonian to Early Permian. At least four deformation phases have been recognised, resulting in a progressive sequence of overprinting structures ranging from early isoclinal folds, with N-S axial planes, and brittle-ductile protomylonite zones, to later more open steeply plunging folds and reverse faults. The dominant regional trend of folding, faulting and shearing is north-west to north, which is also paralleled by various dykes and veins.

Cratonisation of the Hodgkinson Province took place in the Early Permian after numerous granitic plutons were emplaced and several major sub-aerial volcanic sequences were erupted (Bain & Draper, 1997).

### **Mineralisation**

The Hodgkinson is host to widespread mineralisation with several major centres of past production, such as the Herberton Tin Field and the Palmer and Hodgkinson Gold Fields. Tungsten is widespread, mainly as wolfram but also as scheelite in association with gold-quartz veins. Antimony, as stibnite is a frequent minor associate of gold. Base metals have been found in sub-volcanic settings, such as at the OK mine.

Gold within the Hodgkinson Province occurs in several settings including skarn deposits of the Chillagoe area and epigenetic gold-quartz veins in the Hodgkinson and Palmer Gold Fields. The gold-quartz vein deposits are generally hosted within small fissures or larger reverse faults, as laminated veins, stockworks or breccia lodes. The gold is often associated with some pyrite and arsenopyrite and at times galena and sphalerite, chalcopyrite, or stibnite which may occur as late overprinting veins.

## **4.2 Local Geology**

The geology of the EPM area is dominated by the Devonian Hodgkinson Formation, which is a sequence of greywackes, siltstones and mudstones, with some conglomerates and thin basic volcanics and chert horizons. The sequence is tightly folded with steep dips and plunges and NNW structural trends. The regional NNW trending Monarch Fault passes through the tenement.

Early Permian muscovite-biotite granites of the Whypalla Supersuite have intruded the Hodgkinson Formation to the east and north of the project area, the nearest being the Mareeba Granite which outcrops some 4 km to the east of the southern sub-blocks and the Desailly Granite some 7 km to the north of the EPM.

The geological setting and mineralisation of the Hodgkinson is very similar to that of the orogenic gold deposits in Central Victoria. Similarities include the following: -

- Marine turbidite rock sequence.
- Significant past alluvial gold production.
- Proximity to granites.
- Alteration consisting of silicification and sulphide mineralisation.
- Structural control, with plunges to mineralisation being important in developing a gold resource.
- Refractory nature of the gold, occurring in solid solution in pyrite and arsenopyrite.
- An antimony association.

### **4.3 Mining History**

The central part of the Hodgkinson Basin has a history of mineral production extending back to the Palmer River gold rush days in 1873. Since that time gold, tungsten, tin, copper and antimony have all been produced in the region.

Total output of gold from the Palmer River catchment in the north was recorded as 1.335 million oz. More than 90% of this was from alluvial deposits and approximately 10% was from hard rock mining of auriferous quartz reefs near Maytown. Conversely, some 90% of the 300,000 oz production from the Hodgkinson Field in the south has been from hard rock deposits.

Alluvial gold in the Palmer and Hodgkinson Gold Fields has been shed from gold-quartz veins, ranging from stringers to veins up to 2m wide, that commonly also contain some sulphides as noted earlier. The veins are associated with shear zones in the Hodgkinson Formation with numerous, mostly very small scale workings present. Notable hard rock mines in the region that have produced over 10,000 oz, but less than 50,000 oz, have included the Queen of the North and Ida near Maytown in the Palmer Gold Field, the Tyrconnel, General Grant, Flying Pig and Union in the Hodgkinson Gold Field, and the Anglo-Saxon near Groganville in the Limestone Creek area - all of which are now abandoned.

In recent decades, substantial exploration for hard rock gold resources has generally encountered only small to medium sized deposits. Alluvial gold prospecting and exploration activities have led to widespread mining operations throughout the region.

## **5.0 PREVIOUS WORK ON EPM 12228**

### **5.1 Past Work by Previous Explorers**

Considerable exploration has been carried out within, or adjacent to, the borders of EPM 12228 by various explorers in recent decades. This has largely been directed towards finding economic gold and tungsten resources, with a lesser focus on other commodities. The exploration activities have included:-

- Literature research, geological review, data compilation and appraisal.
- Stream sediment, soil and rock chip sampling, laboratory assays and statistical analysis.

- Topographic, aerial photographic and Landsat TM geological-structural interpretations.
- Aerial and ground geological reconnaissance, geological mapping, petrographic studies.
- Prospecting, alluvial heavy mineral/gold panning, gold grain counting, UV lamping of pan concentrate samples, rock chip dollying.
- Bulldozer construction and upgrading of access tracks.
- Alluvial test pitting, trenching, costeaning, channel sampling, bulk alluvial testing.
- Prospect grid surveying, drill site preparation and percussion drilling.

A search of the Q-DEX database lists the reports of relevance to the current EPM area over the past three decades. It may be summarised as follows:

Company Report No.	EPM	Company	Commodity	Year
29749	11098	C.W. Farraway	<b>Au</b>	1996-97
27959, 27635	9989	Cardia Mining NL Spades Excavation Pty Ltd	<b>Au As</b>	1994-96
25151	5859	Saracen Minerals NL	<b>Au As Pb Ag</b>	1990-91
20852	5425	Poseidon Minerals Ltd	<b>Au As Sb Cu Pb Zn Ag Sn W Mo Bi Cr</b>	1988-89
19355	4975	Poseidon Minerals Ltd	<b>Au As Sb Cu Pb Zn Ag Sn W Mo Bi Cr Ni</b>	1987-88
16627, 16626	4105	Nobelex Ltd Salute Investments P/L	<b>Au Ag</b>	1985-87
18519, 16722, 16721, 16720, 16719, 16718.	4029	Norpac Resources NL Ardgold Pty Ltd	<b>Au</b>	1985-88
13682, 12937, 12615, 11812	3334	Amax Australia (Gold) P/L	<b>Au As Sb Cu Pb Zn Ag Mn W</b>	1982-84
12078	3151	Utah Development Co	<b>W Sn Au As Sb Cu Pb Zn Ag Mn</b>	1981-82
11357	2710	Pahminco Pty Ltd	<b>Au Pb</b>	1980-81
9506, 8547	2408	Utah Development Co	<b>W Sn Cu As</b>	1980-81
8865	2217	Ravenshoe Tin Dredging Ltd	<b>Au Sb</b>	1979-81

**Table 2 EPM 12228 List of Reports by Previous Explorers**

## **5.2 2006-2014 Past work on EPM12228.**

### **2006/07**

- Literature research and review of QDEX reports and of historic mining in the area.
- Landsat imagery interpretation.
- Regional geological map compilation and field checking.
- Integration of all available geo-data into RGL's mapinfo GIS database.
- Technical data appraisal to delineate prospective gold target areas.

- Review of RGL's regional geochemical and geophysical data sets in early 2006 for tungsten targets by George Ross of PGN Exploration. No targets were noted in EPM 12228 from the drainage assay data derived from undifferentiated sample types.

#### **2007/08**

- Literature review, compilation, integration and assessment of technical data.
- Regional tungsten geochemistry data analysis for RGL's Hodgkinson Basin tenements, again by George Ross of PGN Exploration, in May 2007, excluding pan-concentrate values. The tungsten assays for pan-con and rock chip samples were then overlain with Sn stream sediment data to locate further targets. None were identified in EPM 12228.
- Appraisal of Hodgkinson regional tenements, by Dr Andy Tomkins from Post Graduate Niche - Geoscience Consulting Services in Nov. 2007, to identify and prioritise key target areas for refractory gold mineralisation associated with lode-style quartz veining and tungsten mineralisation associated with the margins of felsic intrusions. Five target areas were identified for each commodity, however none were present in EPM 12228.

#### **2008/09**

- Literature research, data compilation and review.
- Regional numerical modelling of coupled deformation and fluid flow in a structural study of the Hodgkinson Province by the CSIRO in association with the Geological Survey of Qld, towards which RGL contributed funding. The study was completed by July 2008. It was undertaken to improve the understanding of the physical conditions that led to the localisation of gold bearing fluids within known deposits across the province and to optimise and rank targets within known mineralised areas as well as predicting new sites of potential mineralisation in the region. The four southernmost sub-blocks of EPM 12228 lie within a target zone centred on the Northcote deposits.
- Soil geochemical sampling comprising a total of 385 samples collected in the north of the tenement, across the Monarch Shear and in the vicinity of old shallow gold workings. Generally low order results were recorded apart from the Golden Eye prospect which yielded a few moderately anomalous assays, of 58 to 76 ppb Au, from shallow colluvial covered ground, adjacent to and slightly down-slope from old diggings on a weakly auriferous 0.3-1.5m wide quartz vein.
- Rock chip sampling comprising ten samples of vein quartz and quartz mullock from four old shallow gold workings in the Monarch North area. This yielded best results of 1.26 to 2.95ppm Au.

#### **2009/17**

- Ongoing review of QDEX reports and GIS database.
- Technical data compilation and target assessments.
- Data integration and planning of future work.

## **6.0 KEY ACTIVITIES UNDERTAKEN DURING TENURE**

CSIRO/GSQ maps of conceptual gold targets indicate that none of the newly defined areas of interest in the region was found to lie within EPM 12228.

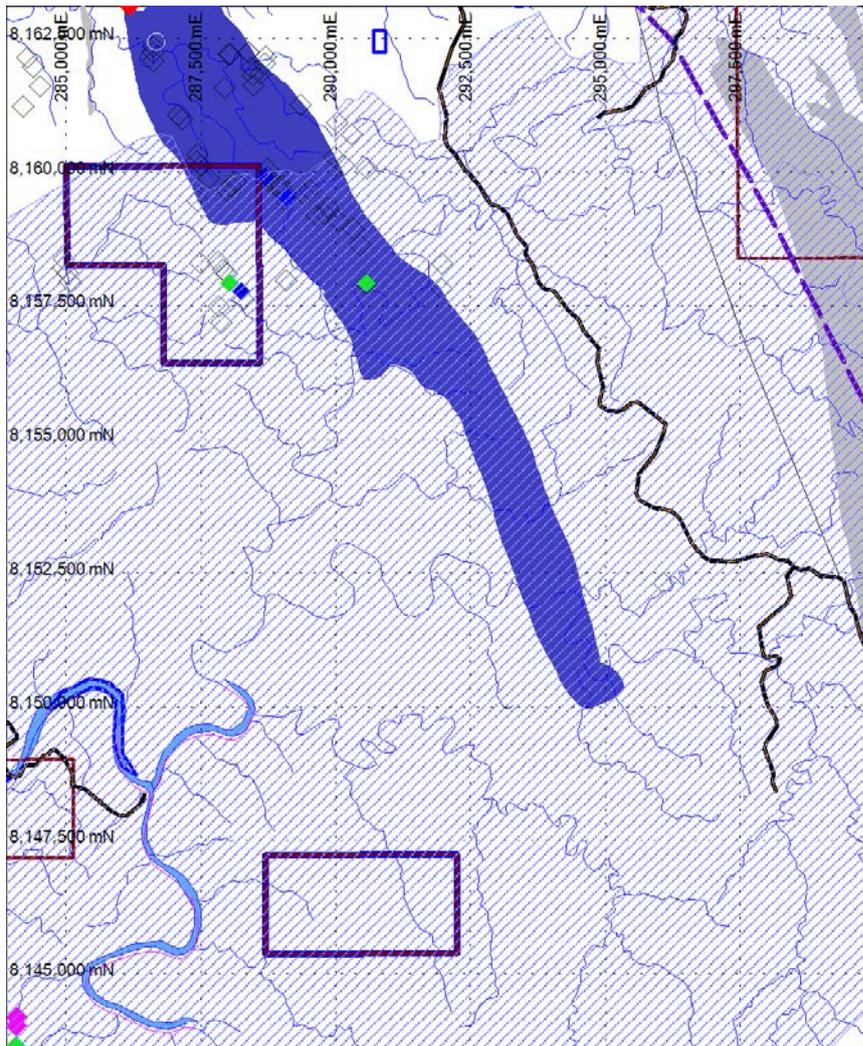


Figure 2 Relinquished sub-blocks EPM12228

## 7.0 CONCLUSIONS

Historical results appear to have downgraded mineralisation, there was generally insufficient strike to rate the target as suitable for exploitation.

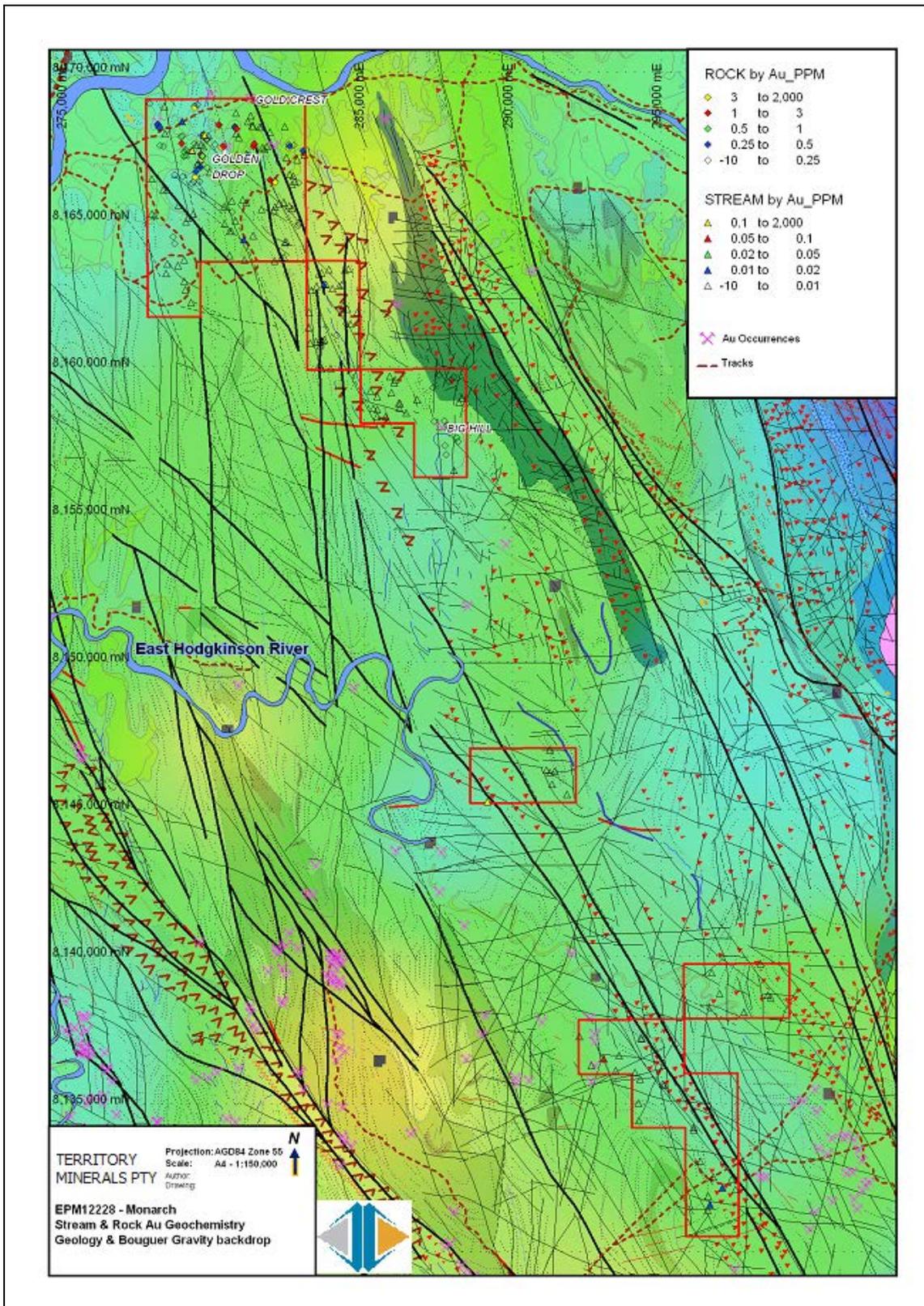


Figure 3 EPM 12228 Regional Geochemistry, Geology & Gravity

## 8.0 REFERENCES

Bain JHC & Draper JJ 1997: North Queensland Geology. AGSO & Queensland Department of Mines & Energy.

Jelonek CJ 2010: Annual Report to 15 February 2010, Monarch EPM 12228. Republic Gold Ltd Company Report.

Cochrane DE 2008: Annual Report to 15 February 2008, Monarch EPM 12228. Republic Gold Ltd Company Report.

Jackson T & Belcher J 2007: Annual Report to 15 February 2007, Monarch EPM 12228. Republic Gold Ltd Company Report.

Robinson J et al 2008: Final Report, Geological Survey of Queensland Hodgkinson Province Numerical modelling project, CSIRO Report: P2008/1799. Predictive Mineral Discovery, Cooperative Research Centre.

Ross G. 2007: Review of RGL Regional Geochemistry and Geophysical Data Sets for Tungsten Targets. Republic Gold Ltd Internal Report

Tomkins A. 2007: Prospectivity of Exploration Leases in the Hodgkinson Basin, North Queensland. PostGraduate Niche – Geoscience Consulting Services: Geological Report for Republic Gold (Unpublished).

Wilson IJM & Jackson TJ 2009: Annual Report to 15 February 2009, Monarch EPM 12228. Republic Gold Ltd Company Report.

Wilson IJM 2011: Annual Report to 15 February 2011, Monarch EPM 12228. Republic Gold Ltd Company Report.