

**SCRIVEN EXPLORATION PTY LTD**

**EL24951**

**Partial Relinquishment Report for Muckaty**

**FOR THE YEAR ENDED**

**2<sup>nd</sup> MAY 2015**

*Commodity:* Mn, Au, Cu & Ni

*Compiled by:* Neil Scriven & Maryanne Muir

*Title Holder:* Scriven Exploration Pty Ltd

*Map Sheet:*

1:250,000 Helen Springs SE 53-10

1:100,000 Helen 5661

1:100,000 Muckaty 5660

*Datum:* GDA94, Zone 53

*Compilation Date:* July 2015

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Scriven Exploration

EL24951 Partial Relinquishment Report for Muckaty for the Year Ending 2 May 2015

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## ABSTRACT

EL24951 is part of the Muckaty Project (EL23591 & 24951) and is located approximately 130km north of Tennant Creek and 800km south of Darwin in the Northern Territory. The region is underlain by the Palaeoproterozoic Namerinni Group (Carruthers Formation) in the north east and to the south west the Tomkinson Creek Group (Morphett Creek Formation). These are unconformably overlain by the Mesoproterozoic Renner Group (Powell Formation and Gleeson Formation) which are centrally located placed north west to south east. The region is thought to be highly prospective for several minerals including Manganese, Copper, Lead, Zinc, Silver, Platinum, Paladium and Gold, mention has been made of Barite and Uranium.

Several companies have explored the Muckaty Project area, most recently between 1996-1997 BHP Minerals flew and EM survey over the region and followed up anomalies with ground EM and drilling. The earliest exploration can be traced to the Dillingham Mining Company of Australia where rockchips returned a high of 3050ppm Cu with in EL23591.

Exploration activities conducted by Scriven Exploration during the first year of tenure included a literature review and a Geophysical Survey combined with planning. From years two to four (2012-2015) 76 surface samples were taken within the relinquished ground over two areas and three programmes. The maximum manganese result was 294ppm Mn. The maximum Au result was 0.049ppm Au – this result was not backed up by further sampling.

During 2015 the relinquishment of the mandatory portion of the ELs 24951 saw the Exploration Licence reduce from 22 blocks (63.7 km<sup>2</sup>) to 10 blocks (29.3 km<sup>2</sup>). The ground was partially relinquished because of increasing tenement costs.

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## 1. INTRODUCTION

This report contains details of exploration activities conducted within the relinquished ground of EL24951 (part of the Muckaty Project) for the period 3<sup>rd</sup> May 2011 to the 2<sup>nd</sup> May 2015. EL24951 was partially relinquished at the beginning of fifth year of tenure.

Exploration completed during this period included a geophysical survey and 76 surface samples.

The Muckaty Project is located approximately 130km north of Tennant Creek and 800km south of Darwin in the Northern Territory. The region is underlain by the Palaeoproterozoic Namerinni Group (Carruthers Formation) in the north east and to the south west the Tomkinson Creek Group (Morphett Creek Formation). These are overlain by the Mesoproterozoic Renner Group (Powell Formation and Gleeson Formation) which are centrally located placed north west to south east. The region is thought to be highly prospective for several minerals including Manganese, Copper and Gold.

## 2. PROPERTY DESCRIPTION AND TENURE

EL24951 is part of the Muckaty Project which comprises two granted exploration licences (ELs 23591 & 24951) which cover a combined area of 378 square kilometres. The licences are held 100% by Scriven Exploration. See Table below for further details on grant dates.

**Table 1: Tenement Details**

Title	Status	Grant	Expiry	Original Area (SqKm)	Original Blocks	Remaining Km2	Remaining Blocks
EL24951	Granted	3-5-2011	2-5-2017	63.7	22	29.3	10

During the first half of 2012 Group Reporting was requested and granted by the Department of Resources – Minerals and Energy with the Report dates as follows 3<sup>rd</sup> May to 2<sup>nd</sup> May the following year. The Group Reporting Number is GR250/12.

During May 2015 EL24951 was reduced from 22 blocks to 66 blocks.

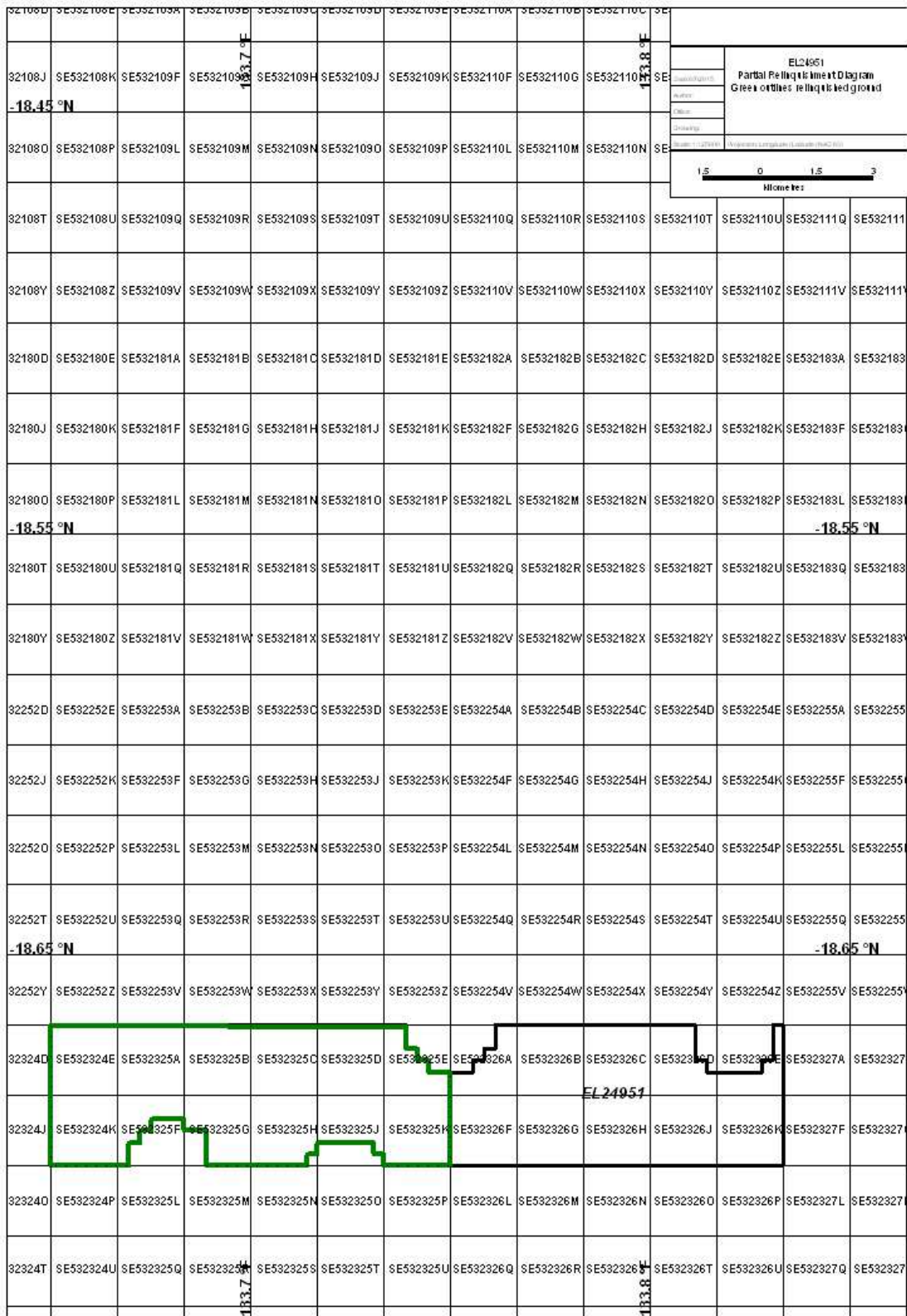


Figure 1: Relinquishment of EL24951

### **3. ACCESSIBILITY AND INFRASTRUCTURE**

The Muckaty Project exploration licences are located approximately 800km south of Darwin and 130km north of Tennant Creek in the Northern Territory. The exploration licences are accessed from Stuart Highway to the west. Accommodation is available at the Renner Springs Road House located some 15km north of the northern most boundary of the EL24951 along the Stuart Highway and at the Bootu Creek Mine. The licence lies within the Muckaty Perpetual Pastoral Lease owned by the Northern Land Council. The underground NT Gas Pipe line runs through the west – south west corner of the Muckaty project areas.

Figure 2: Location of Muckaty Tenements.

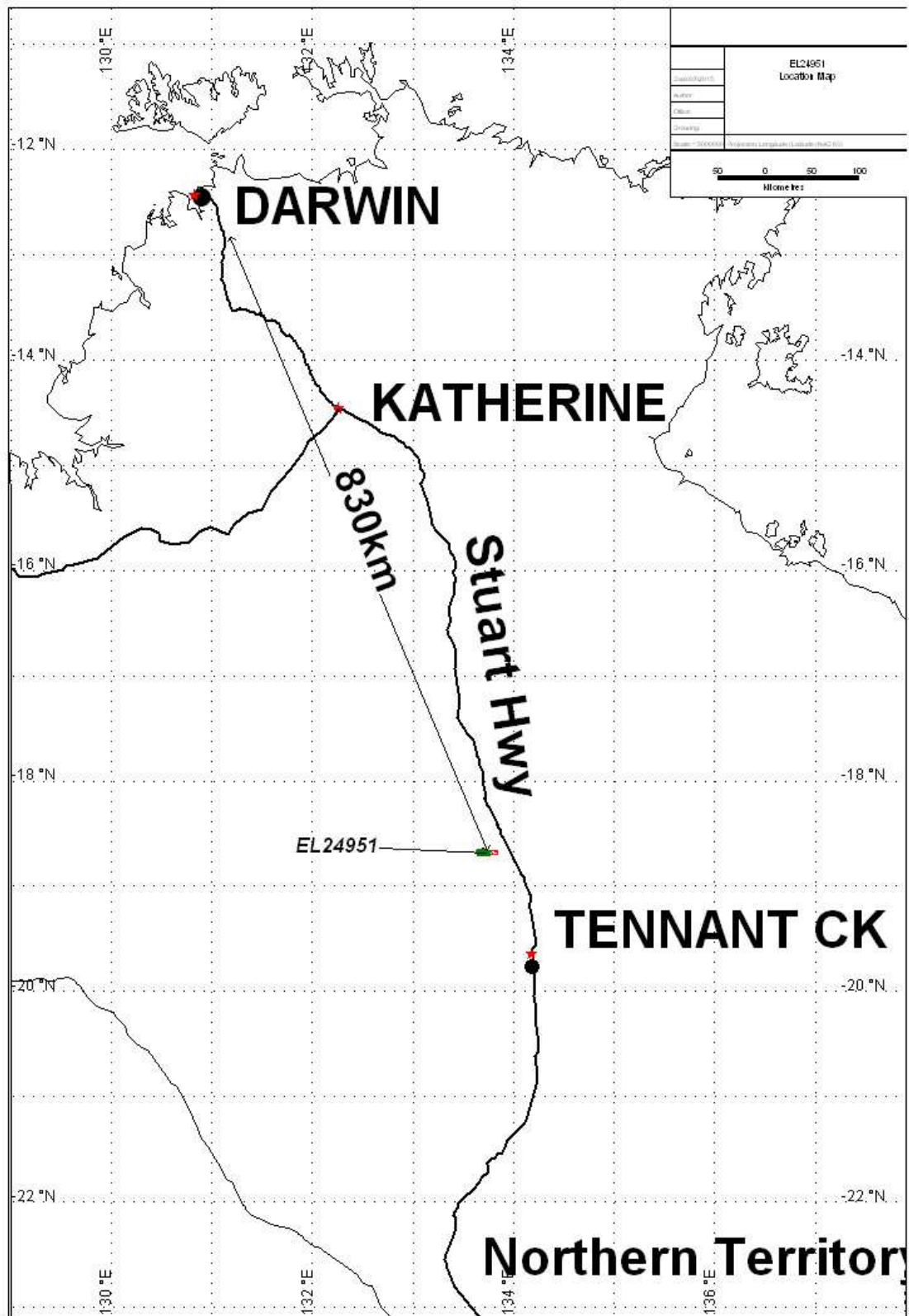
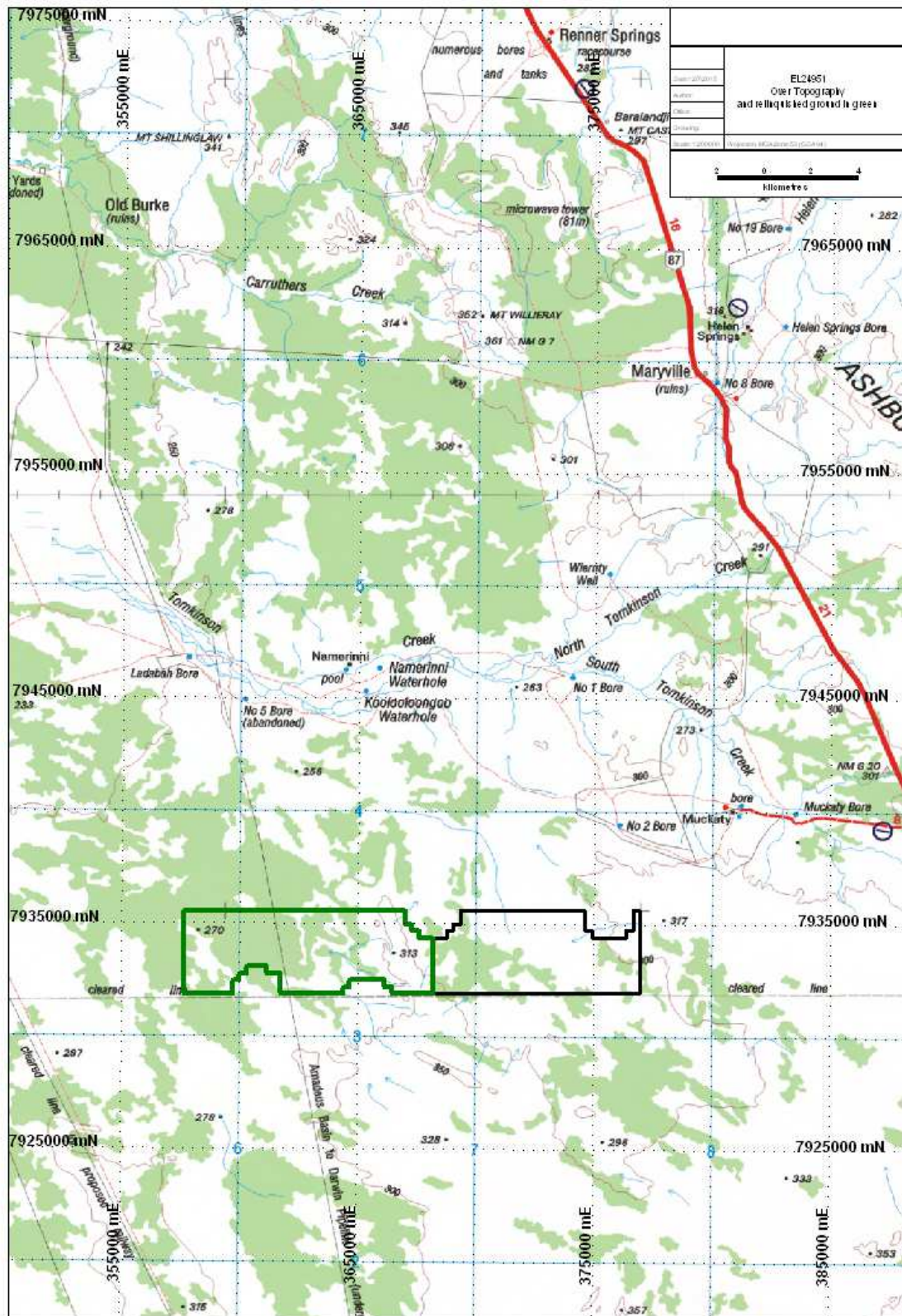


Figure 3: Location of EL24951 over topography



## 4. GEOLOGICAL SETTING

The Muckaty project area is underlain by the Palaeoproterozoic Namerinni Group (Carruthers Formation) in the North East and the Tomkinson Creek Group (Morphett Creek Formation) in the south west. Younger Mesoproterozoic sediments of the Renner Group (mostly Powell Formation and Gleeson Formation) overlie the Palaeoproterozoic sediments. In the east of the exploration licence lies a North South trending dyke that runs over at least 40 km. The region is transected west north west to east south east by the Tomkinson Creek.

The area is covered by the HELEN SPRINGS 1:250,000 map sheet and explanatory notes (SE 53-10). Also the 1:100,000 mapsheets are as follows,

1:100,000	Helen	5661
1:100,000	Muckaty	5660

Within the project area the Palaeoproterozoic Namerinni Group (Carruthers Formation) is concentrated in the northern half of the exploration licences and is described by the Northern Territory Geological Survey as a "interbedded dolostone (including silicified dolostone, chert, dolomitic mudstone, quartzic dolostone, and laminated stromatolitic boundstone and bafflestone), shale, mudstone and sandstone" Hussey 2001. Evaporite pseudomorphs are described as common and include nodular and chert molds after anhydrite, hopper and cube casts and moulds after halite, and bladed or disc shapes after gypsum (Hussey et al 2001). Hussey (2001) states that the Carruthers Formation is characterised by stromatolites. The Carruthers Formation is divided into an upper, mid and lower lithofacies. EL23591 and EL24951 are covered by the upper lithofacies which is characterised by sandstones (thin to medium bedded, fine to coarse grained and rippled, crossbedded, mudstone, pebbly sandstone, dolostone, and stromatolitic bioherms that are ridge forming. The Carruthers Formation shows a conformable and transitional relationship with the underlying Jeromah Formation (predominantly Sandstone).

The Carruthers Formation sedimentary and diagenetic structures indicate a marginal marine setting with occasional emergence, possibly in a coastal to continental supratidal sabkha environment, although alternative settings are such as intertidal lagoon or lacustrine are possible (Hussey et al 2001).

To the southern end of the Exploration licences the Tomkinson Creek Group is prevalent with the Morphett Creek Formation outcropping. The Northern Territory Geological Survey described the Morphett Creek Formation as a “succession of ridge forming sandstones and recessive siltstone and carbonate rocks”. Four distinct lithofacies are recognised in the Formation with the Mitty Member (consisting of mixed siliclastic – carbonate and undifferentiated Morphett Creek Formation outcropping with in EL 23591 & EL24951.

Undifferentiated Morphett Creek Member is described as sandstone, pebbly sandstone, siliclastic mudstone, silicified stromatolitic dolostone and evaporate pseudomorphs. The Mitty Member is usually poorly exposed and the type section is described as thin to medium bedded sandstone, laminated mudstone and green and blue-grey chert (silicified microbial mat) and stromatolites Hussey et al 2001.

The Morphett Creek Formation is described by Hussey (et al) as “representing a transgression from fluvial to very shallow marginal marine settings to shallow water intertidal and marginal marine to sabkha environments. This formation is thought to represent steady subsidence following the wide spread extrusion of continental flood basalts in the Whittington Range Member atop of the Hayward Creek Formation”.

The recorded mineral occurrences on the Muckaty Project area are manganese in close proximity to the Namerinni Waterhole. Manganese has also been recorded in surface samples to 1690ppm in the north east by MIM Exploration. There are Copper occurrences recorded from the 1970s south of Muckaty Station by Dillingham Mining Company.

The NTGS has stated that there is a “clear stratigraphic control evident in the manganese deposits at Bootu Creek and Renner Springs with faults in close proximity” Hussey 2001. The fine grained nature of the mineralisation suggests that it was formed by the replacement of the original rock types (both sandstone and siltstone). The lack of sedimentary textures is suggestive of ‘epigenetic, low temperature hydrothermal fluids’. The Mn rich fluids could be related to basin dewatering or minor hydrothermal activity.

The region may also be prospective for Base Metals and Diamonds with minor exploration having been completed for Uranium in the 1970’s.

Figure 4: Regional surface geology from NTGS 1:250, 000 mapping. Plan in GDA 94

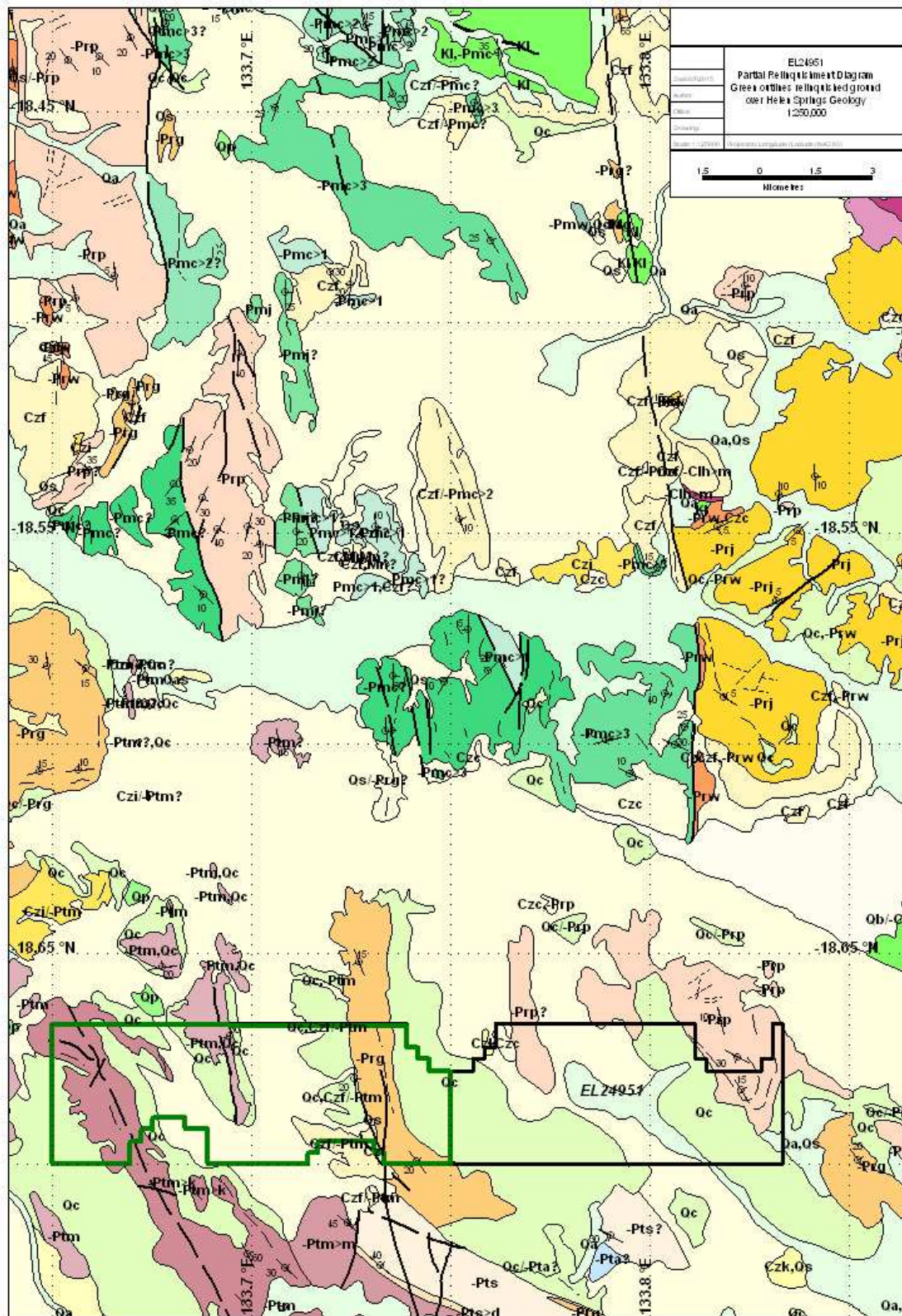
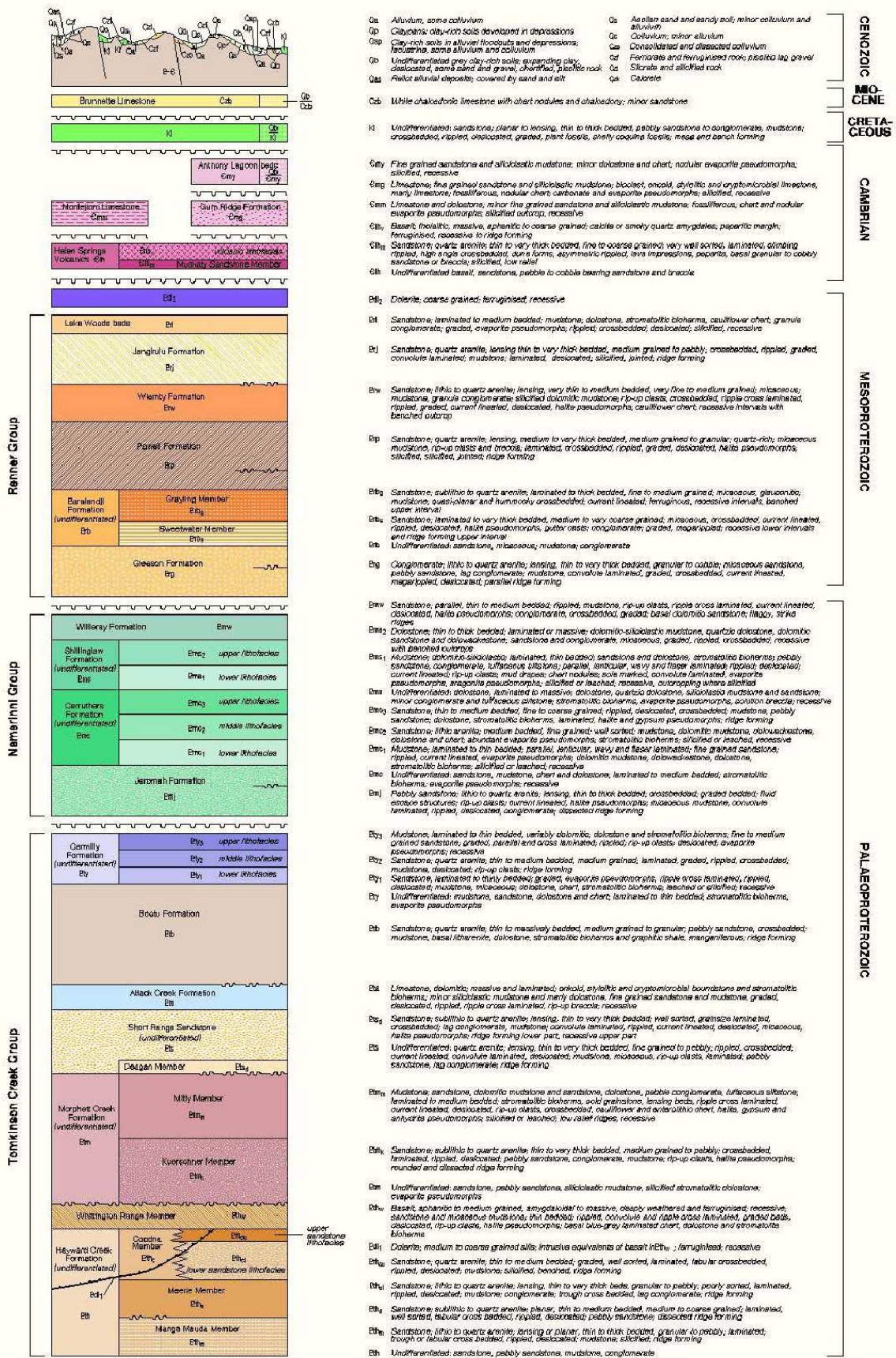


Figure 5: Regional surface geology LEGEND from NTGS 1:250, 000 mapping.



## 5. PREVIOUS EXPLORATION

The Muckaty project area has been the centre of several exploration programmes since the early 1970s through to the late 1990's. Several diamond holes and surface sampling has been completed in the region with a couple of older geophysical studies that were assessed to be far from perfect. The table below provides brief information on historic activities in the project area. BHP Minerals undertook an airborne EM survey followed up by ground EM with targets followed up by drilling to the North. MIM Exploration searched the region for stratiform Base Metals mineralisation similar to McArthur River style mineralisation. Key Resources and Clifford Minerals drilled several holes on the Exploration Licences and extensively to the north in the Renner Springs manganese fields.

**Table 2: Review of Exploration in the Muckaty Region**

<b>Date</b>	<b>Company</b>	<b>Target</b>	<b>Activities</b>
1996-1997	BHP Minerals	Zn, Pb, Zn SEDEX	Zircon Age of 1640 Ma. EM surveys (air and ground). Drilling. Surface sampling. Work completed to the north of EL23591.
1992-1993	MIM Exploration	Stratiform Base Metals Mineralisation	Stream sediment sampling, surface sampling, SIROTEM, Drilling MPD1 & MP2.
1990-1991	Ben Hall and Eupene Exploration	Manganese/Gold/Base Metals	Review of the Bootu Ck Region. Search for JV partner. Stream sediments/rockchips.
1986-1987	Ashton Mining	Diamonds	A couple of diamonds located in the district. None followed up.
1984-1986	Clifford Resources	Shale Hosted base metal deposits	Completed extensive mapping and drilling in conjunction with Key Resources
1981-1988	Key Resources Pty Ltd	Shale Hosted base metal deposits	Completed extensive drilling & RRMIP surveys.
1971	Metals Investment Holdings Ltd		Extensive review of the geology and mineral prospectivity of the region.
1971	Dillingham Mining Company of Australia	Cu/Pb/ Zn/Ag	Review of the region/ Rockchip and stream sediments sampling with the best result Cu-3050ppm.

During the first year of tenure, 2011-2012 Scriven Exploration commenced exploration on EL23591 & EL24951 with the data obtained from the October – December 2011 airborne magnetic and radiometric survey. From the survey several anomalies were identified in conjunction with the Literature review.

From the second to the fourth year of tenure, 2012-2015 Scriven Exploration continued exploration on EL24951 through geochemical sampling of targets generated from the first year of work. Some 76 surface samples were taken over the relinquished ground. No manganese targets were highlighted during this process. A gold result of 0.049ppm Au was pinpointed back not backed up by secondary sampling.

## 6. EXPLORATION COMPLETED OVER THE RELINQUISHED GROUND during the period 3<sup>rd</sup> MAY 2011 to 2<sup>nd</sup> MAY 2015.

Exploration that has occurred over the past four years has included:

- Reporting
- Geophysical Survey
- Soil Surveys & ground reconnaissance

### 6.1 Airbourne Aeromagnetic Surveys

The airborne fixed wing magnetic and radiometric programme commenced 28 November 2011 and was completed by GPX Surveys Pty Ltd using a Fletcher FU-24 aircraft. The survey was not without its difficulties. The processing was completed during December 2011/January 2012 and covered the majority of EL23591 & EL24951 for a total of 3339.4 line kilometres at 100m line spacing at 30m height.

The job specification were as follows

#### Flying Specifications

Nominal ground clearance: 30 m

#### Sample Rates

Magnetometer: 20 Hz

Altimeter: 10 Hz

Base magnetometer: 1 Hz

Spectrometer: 1 Hz

#### Line Specifications

Traverse line spacing: 100 m

Traverse line direction: 090 – 270 degrees

Traverse line numbers: 110501 – 139200

Tie line spacing: 1000 metres

Tie line direction: 000 – 180 degrees

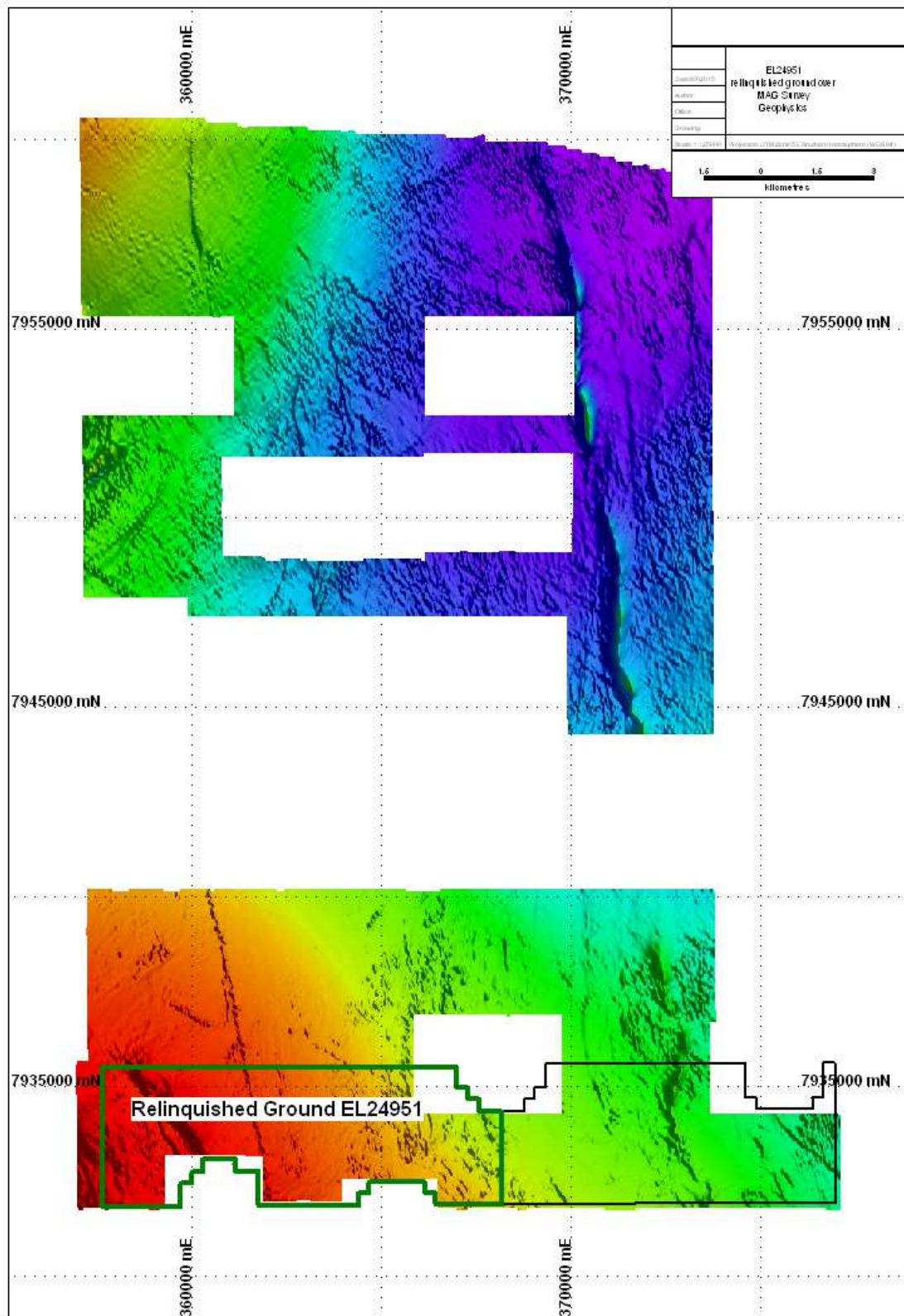
Tie line numbers: 170200 – 172110

The following equipment was used in the survey.

Survey Platform:	Fletcher FU-24 (VH-AFN)
Data Acquisition and Survey System:	Pico Envirotec AGIS PC104
Magnetometer Processor:	Pico Envirotec MMS-4
Magnetometer Sensor:	Geometrics G-822A Cesium Vapour
Fluxgate Magnetometer:	Billingsley Ultra Miniature TFM 100G2
Magnetic Base Stations:	GEM GSM-19W Overhauser
Spectrometer:	Exploranium GR820 (32 litre crystal)
Temperature and Humidity Sensor:	Vaisala HMP233
Barometric Pressure Sensor:	Vaisala PTB220
GPS and DGPS Receiver:	CSI DGPS Max
Radar Altimeter:	Collins ALT-50A
In-field Computer:	Toshiba Notebook
In-field Software:	Pico Envirotec PEIView, ChrisDBF, GPX proprietary software



Figure 6: EL24951 Geophysical Survey – MAG image



## 6.2 Soil Sample Programme

Three soil sampling programmes in two areas were completed over the past four years in the relinquished ground for a total of 76 surface samples. All sample points were collected with a GPS.

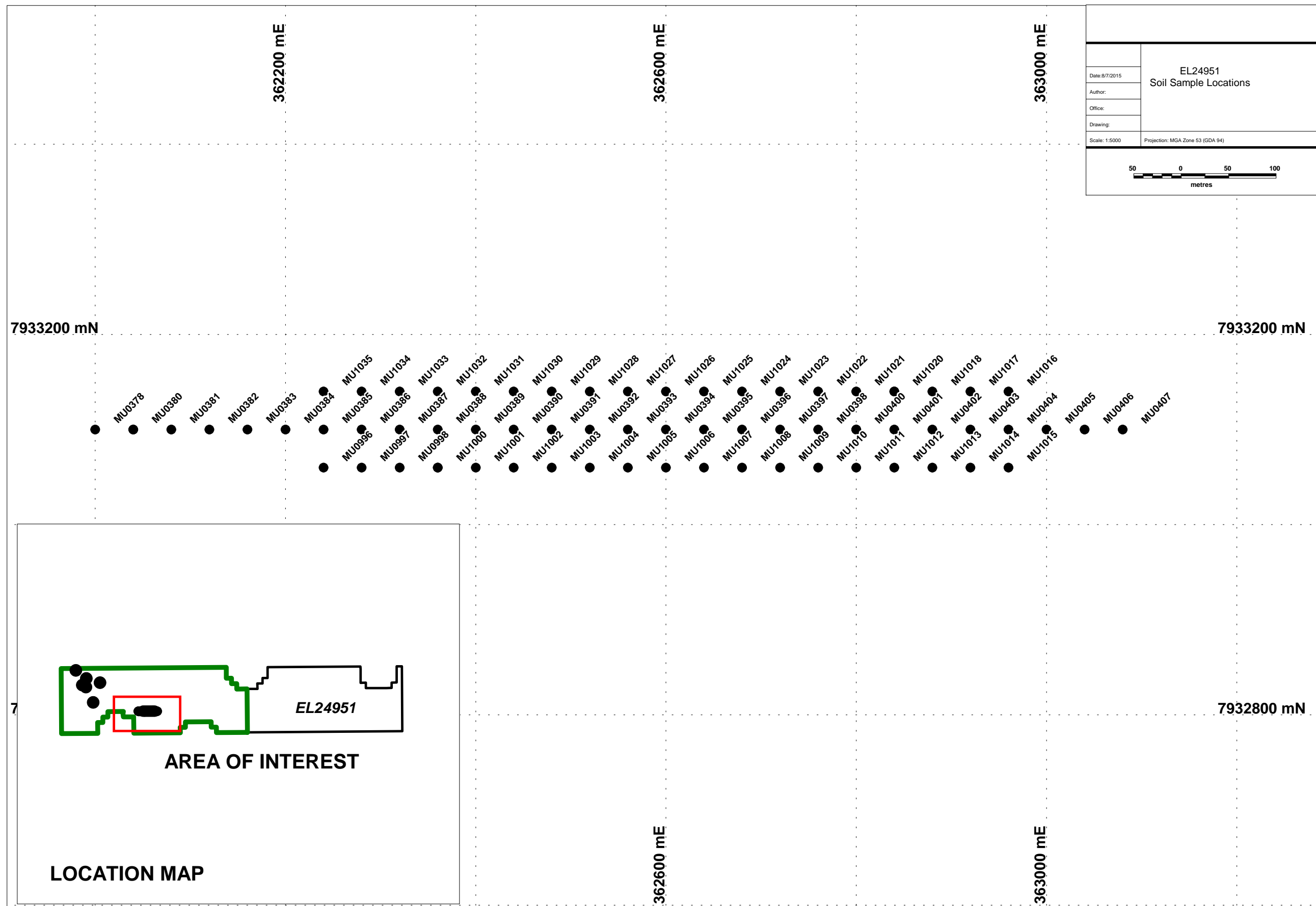
The maximum manganese result was 294ppm Mn. The maximum Au result was 0.049ppm Au – this result was not backed up by a second round of sampling.

See Figures 7 & 8 for sample location maps.

Figure 7: EL24951 Soil Sample Locations



Figure 8: EL24951 June 2014 RC Drilling Hole Locations



## 7. CONCLUSIONS AND RECOMMENDATIONS

EL24951 is part of the Muckaty Project (GR250-12) and is located approximately 130km north of Tennant Creek in the Northern Territory. The region is thought generally to be prospective for several minerals including Manganese, Copper, Lead, Zinc, Silver, Platinum, Paladium and Gold, mention has been made of Barite and Uranium.

Several companies have explored the Muckaty Project area, most recently between 1996-1997 BHP Minerals flew and EM survey over the region and followed up anomalies with ground EM and Drilling. The earliest exploration can be traced to the Dillingham Mining Company of Australia where rock chips returned a high of 3050ppm Cu with in EL23591. These samples have not been repeated.

Exploration activities conducted by Scriven Exploration during the first year of tenure included 76 surface samples were taken within the relinquished ground. The maximum result was 294ppm Mn. The best result for Au was 0.049ppm however these results were not backed up by a second round of sampling.

During 2015 the relinquishment of the mandatory portion of the ELs 24951 saw the Exploration Licence reduce from 22 blocks (63.7 km<sup>2</sup>) to 10 blocks (29.3 km<sup>2</sup>). The ground was partially relinquished because of increasing tenement costs.

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## Appendix 1 –Surface Sample Data

See Folder: 24951\_2015\_P\_02\_Appendix\_1

## Appendix 2 – Geophysical Data

See Folder: 24951\_2015\_P\_03\_Appendix\_2