



SANDFIRE RESOURCES NL

**MINERAL EXPLORATION
PARTIAL SURRENDER REPORT
BORROLOOLA PROJECT EL24401
Year 6**

**Tenement Holder: SANDFIRE RESOURCES NL
Operator: SANDFIRE RESOURCES NL
Reporting Period: 3 June 2005 to 2 June 2011**

**1:250,000: MT YOUNG (SD5315)
1:100,000: BING BONG (6166)
Commodities: Cu, Pb, Zn, Mn**

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Author(s): Wynne, A.

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Level 1, 31 Ventnor Avenue WEST PERTH WA 6005
PO Box 1495, WEST PERTH WA 6872 ABN 55 105 154 185
T: +61 8 6430 3800 F: + 61 8 6430 3849
email: documentcontrol@sandfire.com.au web: www.sandfire.com.au



TITLE PAGE AND BIBLIOGRAPHIC DATA SHEET

Project Name	Borrooloola Project
Combined Reporting Number	121/09
Tenement Numbers	EL24401
Tenement Operator	Sandfire Resources NL
Tenement Holder	Sandfire Resources NL
Report Type	Partial Surrender
Report Title	Mineral Exploration Partial Surrender Report Borrooloola Project EL24401 Year 6
Report Period	3 June 2005 to 2 June 2011
Author	Wynne, A.
Date of report	9 September 2011
1:250,000 map sheet	MT YOUNG (SD5315)
1:100,000 map sheet	BING BONG (6166)
Map Projection	MGA94 Zone 53
Target Commodity	Cu, Pb, Zn, Mn
Keywords	Airborne Magnetics-Radiometric, Airborne TEMPEST.
Prospects drilled	
List of Assays	
Contact - Technical	A. V. Wynne Compliance Officer aw@sandfire.com.au
Contact - Expenditure	A. V. Wynne Compliance Officer aw@sandfire.com.au

ABSTRACT

Location	Borrooloola, NT
Geology	Middle Proterozoic sediments of the Tawallah, McArthur and Roper Groups of the McArthur Basin, the Scrutton Volcanics, and Cretaceous and Tertiary cover sediments.
Work done	Review and collation of historical exploration, including geochemistry, geophysical and drilling datasets. Collation and re-processing of historical Airborne Magnetics-Radiometric Survey data. Acquisition, processing and interpretation of Airborne TEMPEST Geophysical Survey. Air Photographs acquisition.



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DETAILS OF TENEMENT GRATICULE BLOCKS

SURRENDERED AND RETAINED

APPENDIX B:

BORROLOOLA, NORTHERN TERRITORY TEMPEST GEOPHYSICAL SURVEY ACQUISITION AND PROCESSING REPORT FOR SANDFIRE RESOURCES NL PREPARED BY M. LAWRENCE AND L. STENNING SURVEY FLOWN MAY -JUNE 2007 FUGRO AIRBORNE SURVEYS FAS JOB # 1880 FUGRO AIRBORNE SURVEYS AREA 5 DIGITAL DATA – LOCATED DATA AND CDI IMAGES.

APPENDIX C:

BORROLOOLA, NORTHERN TERRITORY TEMPEST GEOPHYSICAL SURVEY

CSIRO INTERPRETATION AREA 5 DIGITAL DATA –GEOTIFF AND CDI IMAGES

1. SUMMARY

This partial surrender report details mineral exploration conducted on thirty graticule blocks surrendered from Borrooloola Project Exploration Licence EL24401 at the sixth anniversary on 2nd June 2011. Sandfire Resources NL acquired the tenement from Finching Pty Ltd on 5th June 2007, and considered the area surrendered to have been prospective for base metals: copper, lead and zinc, and manganese. Prior activities undertaken by Golden Cross Operations on EL24401 during its first two years in an agreement between Finching Pty Ltd and Golden Cross Resources NL were photogeological interpretation and sampling for diamond indicator mineralogy. During the period of tenure by Sandfire Resources NL up to the date of partial surrender, exploration activities targeted potential for both base metals (copper, lead and zinc), and manganese. Specific activities were: review and collation of historical surface geochemistry, geophysics and drilling datasets, project – wide re-processing of historical airborne magnetics – radiometrics surveys, the acquisition, processing and interpretation of an airborne TEMPEST Geophysical Survey, and the acquisition of digital aerial photography.

Exploration Activity on EL24401	Year	Activity Period
Photogeological interpretation of 1:50,000 stereo Landsat 7 Imagery (GCR)	1	2005 - 2006
Reconnaissance mapping and bulk stream sediment sampling (GCR)	2	2005 - 2006
Research and collation of historical surface geochemistry, geophysics and drilling datasets	2 – 3	2006 - 2007
Re-processing of historical airborne magnetic – radiometric surveys data	2 - 3	2006 - 2007
Acquisition, Processing and Interpretation of an airborne TEMPEST Geophysical Survey	2 - 3	May – June 2007
Acquisition of digital aerial photography to process to orthophotos	3	2008
CSIRO Interpretation of airborne TEMPEST Geophysical Survey	3 - 4	2008
Review of potential for Manganese mineralisation	5	2009 - 2010
Review of historical surface geochemistry, geophysics and drilling datasets and re-processed geophysics datasets utilising GIS	6	2011

Table 1 Exploration Activities

2. LOCATION

The Borroloola Project is centred about 660 km southeast of Darwin in the “Gulf Country” of the Northern Territory, Australia. On the eastern boundary are the township of Borroloola and the McArthur River (HYC) Mine. To the south is Cape Crawford and to the northwest is Roper Bar. Figure 1 shows the project location and tenement status as at 5th August 2011.

Access is good to some parts via bitumen and unsealed roads. From Darwin access can be gained by travelling about 590 km southwards along the Stuart Highway to Daly Waters and then eastwards along Carpentaria Highway to Cape Crawford (270 km). The unsealed Nathan River Road and Ryan’s Bend road cross some tenements. Access deteriorates significantly in the northern parts of the project area.

EL24401 lies north of Borroloola town site, and adjacent to the Gulf of Carpentaria (Figure 2). Access through the tenement area is via seasonal tracks to the coast. The sealed Robinson Road passes along the eastern margin of EL24401 to Bing Bong.

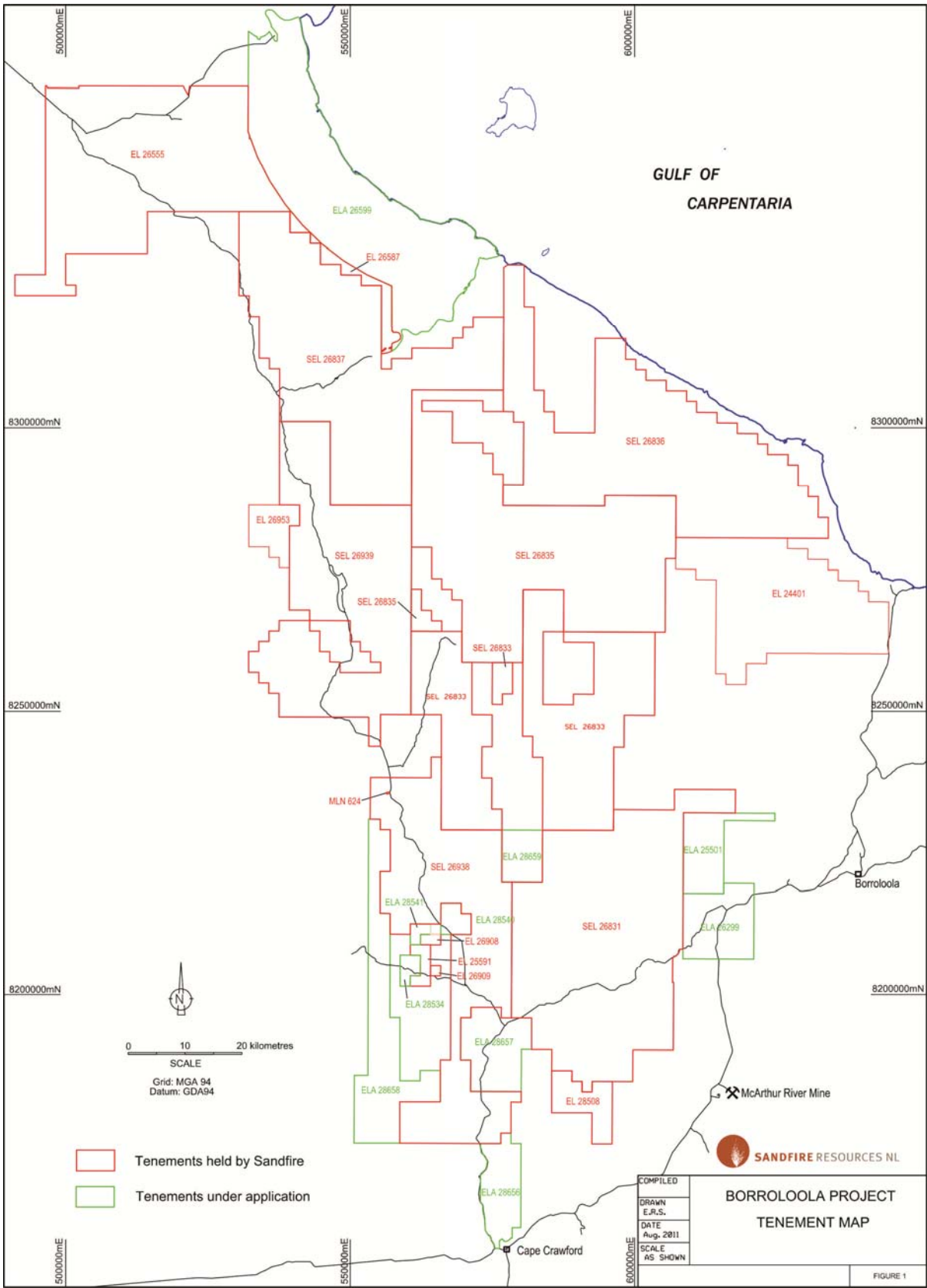


Figure 1 Tenement Location

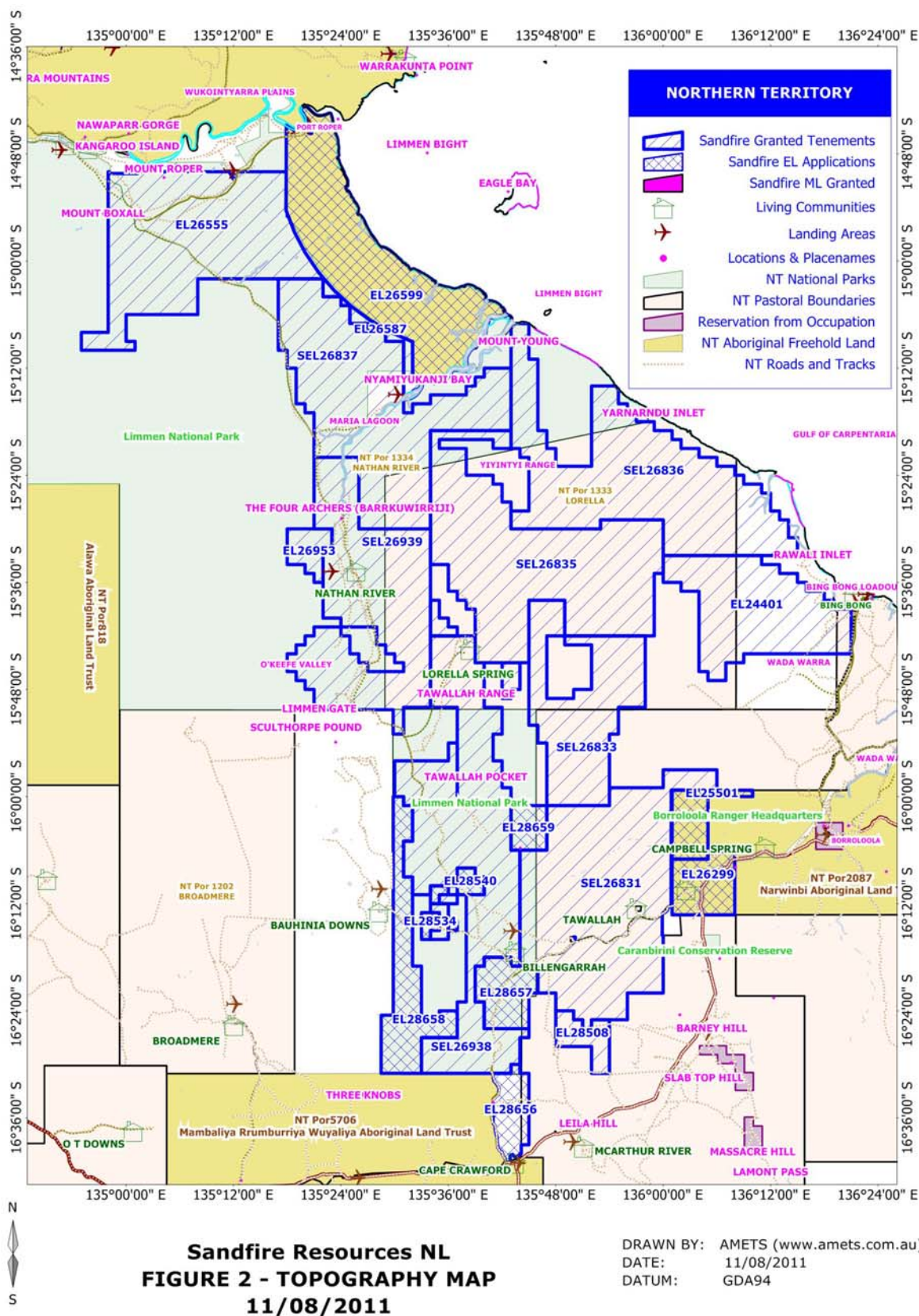


Figure 2 Stakeholders, Cadastre and Native Title



3. STAKEHOLDERS AND NATIVE TITLE

The Borroloola project area tenements lie across several pastoral leases, the proposed Limmen Bight National Park area and are subject to several Native Title Claims that have been scheduled and registered with the Federal Court. The distribution and extent of these is shown in Figure 2.

4. TENURE

EL24401 was applied for on 22nd September 2004 by Finching Pty Ltd and granted on 3rd June 2005 for a period of six years. Golden Cross Resources NL had entered into an option agreement with Finching Pty Ltd over granted ELs 24401, 24402, 24664, 24700 and 24778. During 2007, an agreement for acquisition of tenements for the Borrooloola Project was negotiated with Mr. D. Muller for the group of seven granted Exploration Licenses: EL24401, 24402, 24664, 24700, 24778, 24942 and 24943, titles for which were transferred to Sandfire Resources NL on 5th June 2007 (Dealing No. 92394).

Of these seven ELs all except EL24401 were cancelled in lieu of Substitution Exploration Licenses SEL26831, 26833, 26835, 26836, 26837, 26938 and 26939 on 9th June 2009. Tenure for EL24401, being a large tenement of 413 blocks situated east of the central tenement group, was continued in its own right. EL24401 was previously incorporated into the Borrooloola Project Reporting Group 068/09. After granting of the Substitution Exploration Licenses, the Reporting Group was updated to 121/09, as from 15th July 2009.

Two hundred and six graticule blocks were surrendered, effective from the fifth anniversary, 2nd June 2010, as detailed in the 2010 Year 5 Partial Surrender Mineral Exploration Report for Borrooloola Project EL24401 (Wynne, 2011).

At the sixth anniversary, 2nd June 2011, a renewal for two years was submitted, concurrent with partial surrender of thirty graticule blocks (gazettal on 6th June 2011), as indicated on Figure 3. Table 2 summarises the current status of EL24401, and Appendix A contains details of the blocks surrendered at this anniversary.

Tenement	EL24401
Application Date	22/09/2004
Date Granted	3/06/2005
Blocks Granted	413
Blocks Surrendered 2/06/2010	206
Blocks Retained Year 6	207
Blocks Surrendered 2/06/2011	30
Blocks Retained Years 7-8	177

Table 2 Tenement Status

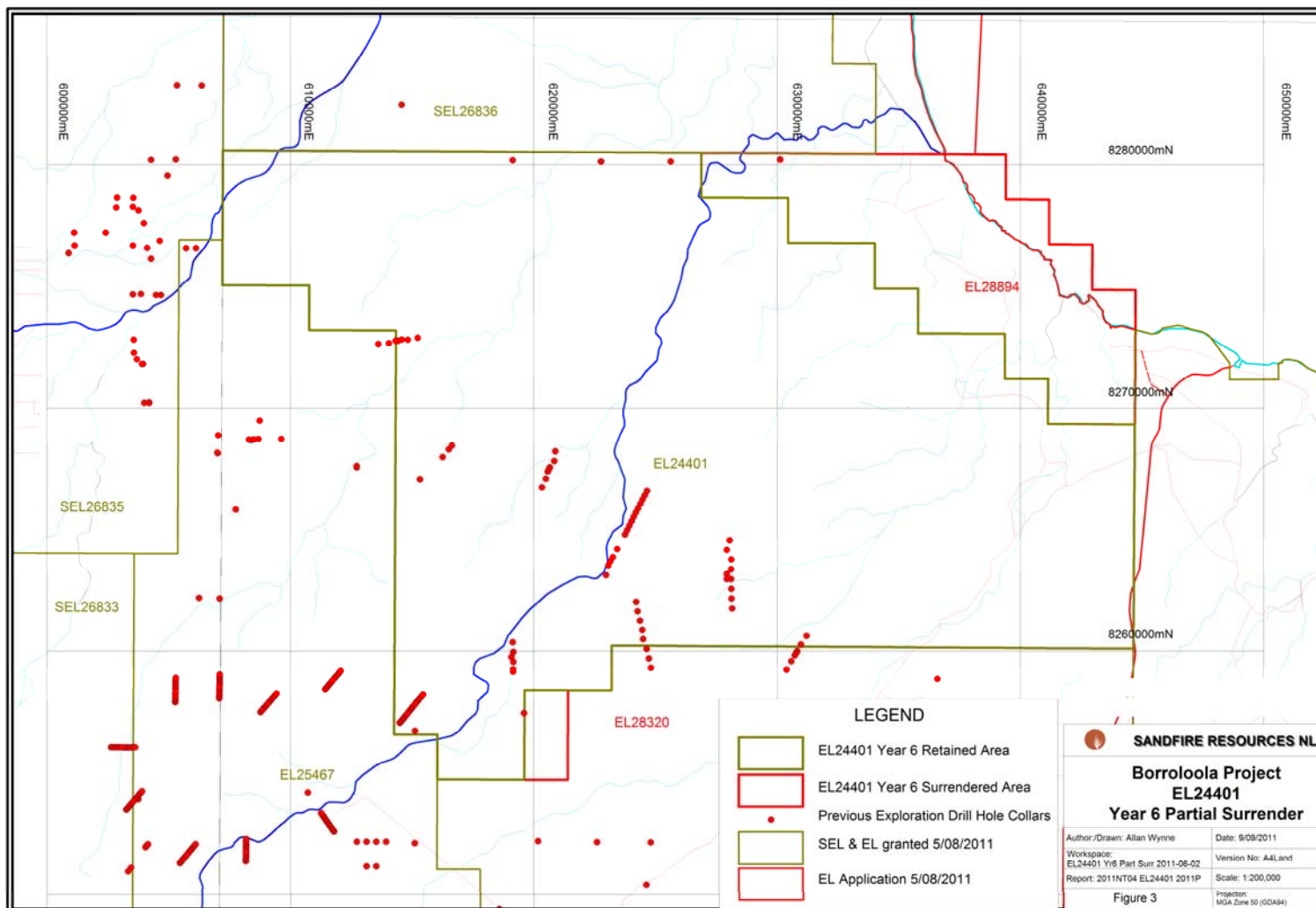


Figure 3 EL24401 Yr6 Partial Surrender Areas

5. REGIONAL GEOLOGY

The McArthur Basin is a large sedimentary basin with an exposed area of about 180,000 km². Most of it lies within the northeastern Northern Territory, and it extends over the border into the state of Queensland. Thick marine and non-marine sedimentary rocks were deposited from the late Palaeoproterozoic to the early Mesoproterozoic (1800-1430 Ma). The basin also contains volcanic rocks and related intrusive igneous rocks and is a prime target area for SEDEX type economic sulphide deposits. This type of deposit hold 50% of the world's zinc and lead reserves, and make up around 25% of world zinc and lead production. In particular the McArthur Basin hosts the world-class McArthur River (HYC) zinc-lead-silver deposits.

The geology of the Borroloola Project area consists of middle Proterozoic sediments of the Tawallah, McArthur and Roper Groups of the McArthur Basin, as on EL24401 where these units are mapped on the MT YOUNG and BAUHINIA DOWNS 1:250,000 Geological Sheet Areas. Further north these units are unconformably overlain by Cretaceous arenaceous and argillaceous sediments containing fossils, and undifferentiated Cainozoic alluvial, colluvial and elluvial deposits.

During the Cretaceous Period, the coastal areas along the Gulf of Carpentaria were inundated by a shallow sea in which Manganese accumulations were formed a series of episodes of deposition in embayments close to the shoreline. The largest of these is on Groote Eylandt, a large island located within the Gulf of Carpentaria, 130kms northeast of. Smaller occurrences occur on the mainland, e.g., at Rosie Creek on SEL26835, west of EL24401. This style of Manganese occurrence is the target of exploration in the northern tenements of the Sandfire Resources' Borroloola Project tenements.

6. EXPLORATION UNDERTAKEN ON EL24401

6.1 Golden Cross Resources NL

Exploration work carried out during the first year of tenure of EL24401 for Golden Cross Resources was photogeological interpretation and sampling for diamond indicator mineralogy, as reported in the Joint Annual Report to July 2006 EL's 24401, 24402, 24664, 24700 & 24778 to July 2006 by Vladimir David Golden Cross Operations Pty Ltd Report GCO 453 (David, 2006). During the second year of tenure, consultants were engaged by Finching Pty Ltd to reconnoitre and assess a manganese targets on these tenements, as reported in the Combined Annual Report EL 24401, 24402, 24664, 24700, 24778 for Exploration Licence Year ending 2 June 2007 (Algie and Muller, 2007).

6.2 Sandfire Resources NL

Work carried out by Sandfire Resources after acquiring the tenement from 5th June 2007 up until the fifth anniversary, 2nd June 2010 had started in the previous year with the review and collation of historical surface geochemistry, geophysics and drilling datasets, and the project – wide re-processing of historical airborne magnetics – radiometrics surveys digital datasets. At the time of the tenement transfer, the acquisition, processing and interpretation of an airborne TEMPEST survey by Fugro Airborne Surveys had begun; this survey was completed during the second half of 2007. Further interpretation by the CSIRO of the TEMPEST survey data was carried out during 2008 and reported in digital formats only. Acquisition of project-wide digital aerial photography to be processed to orthophotos began early in 2008.

6.2.1 Airborne Geophysical Surveys

Open file airborne magnetics-radiometrics survey data obtained from the NTGS was collated during 2006, and re-processed by Southern Geoscience Consultants early 2007. This data was in turn re-processed by Baigent Geosciences in 2008 to provide better levelling between survey lines of the different historical surveys, as detailed in the 2007 – 2008 Combined Annual Report (Street, et. al. 2008A). Figure 4 shows the Batten Trough TMI with 45° illumination on EL24401.

Review of open file airborne EM survey data identified QuesTEM and GeoTEM surveys which covered regions west of the Emu Fault Zone, with no comparable survey data to the east and north-east towards the coast over EL24401. It was recommended that Sandfire Resources acquire its own EM data over this region.

During May – June 2007, an airborne TEMPEST Survey was flown by Fugro Airborne Surveys as Job No. 1880 over five regions of the Borroloola Project tenement area. Area 5 extended along the coastal strip from around 8.8 km north of Borroloola to Limmen Bight, including EL24401. A total of 1,044 line km of 25Hz TEMPEST was flown on nominal east – west orientation at 110m nominal terrain clearance, with variable line spacing up to 5,000m, as shown on Figure 5.

The eastern end of these lines was usually shortened due to expectation of high conductivity in coastal marsh areas. Field results suggested some deeper anomalous areas but in most cases on reprocessing these appear to be probably due to the TEM system “seeing” near surface conductors to the side of the line.

The Acquisition and Processing Report for the entire survey by Fugro Airborne Surveys is included in Appendix B. The digital data and interpretation by FAS for Area 5, as Located Data and CDI images, is also included.

Further interpretation of parts of the TEMPEST Survey by CSIRO during 2008 resulted in CDI grids, GeoTIF images and emflow data. Digital data for Area 5 is included in Appendix C.

6.2.2 Aerial Photography and Orthophotography

For the area of the Borroloola Project tenements, four hundred and thirty aerial photographs with a nominal scale of 1:40,000 captured in 2005 were scanned at high quality to create colour digital images. These were georeferenced to the published 1:50,000 scale topographic surveys using a softcopy photogrammetric system.

Using terrain elevations stereoscopically measured across the area, orthophotographs and hill-shaded relief visualisations were produce as rectified compressed images and algorithms in MGA94 Zone 53 to aid geological and terrain landform interpretation across the tenements and general logistics including access. As of May 2009, orthophotographs and hill-shaded landform images had been produced for some 60% of the Borroloola Project tenement areas, including EL24401, as detailed in the 2009 Group C121/09 Annual Mineral Exploration Report (Lewis, et. al. 2009). No orthophotographs fall within the area of EL24401 surrendered at this anniversary.

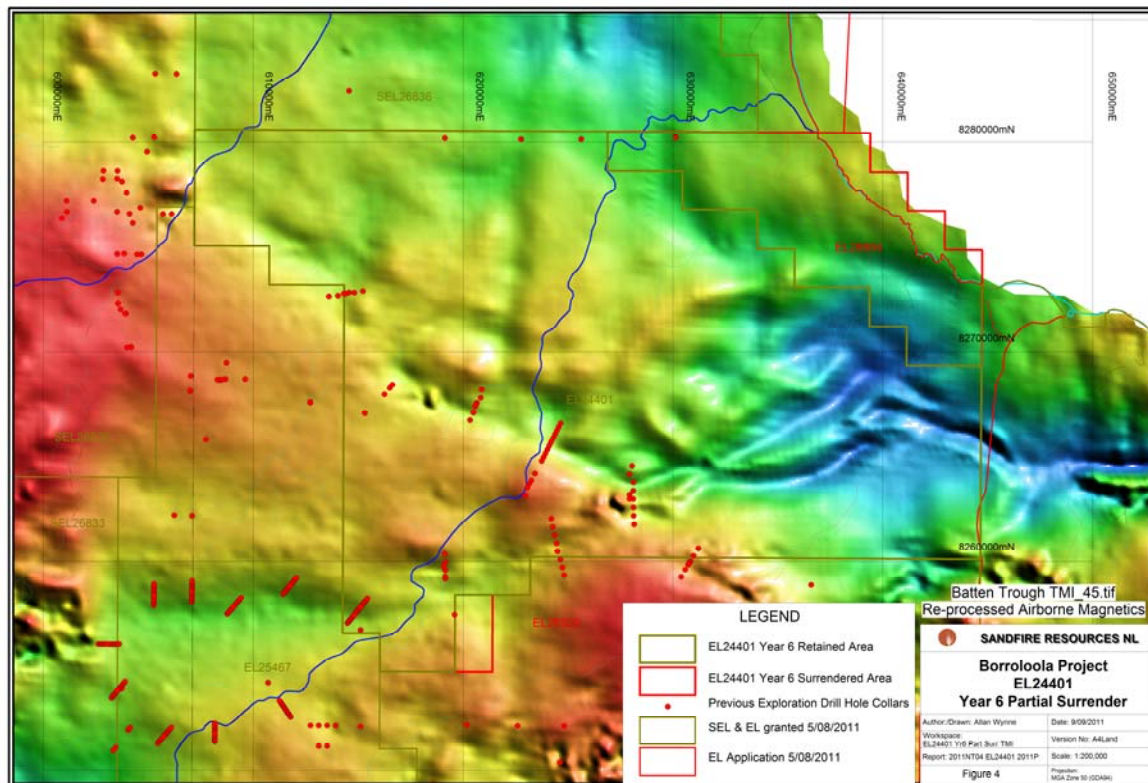


Figure 4 EL24401 Yr6 Partial Surrender TMI

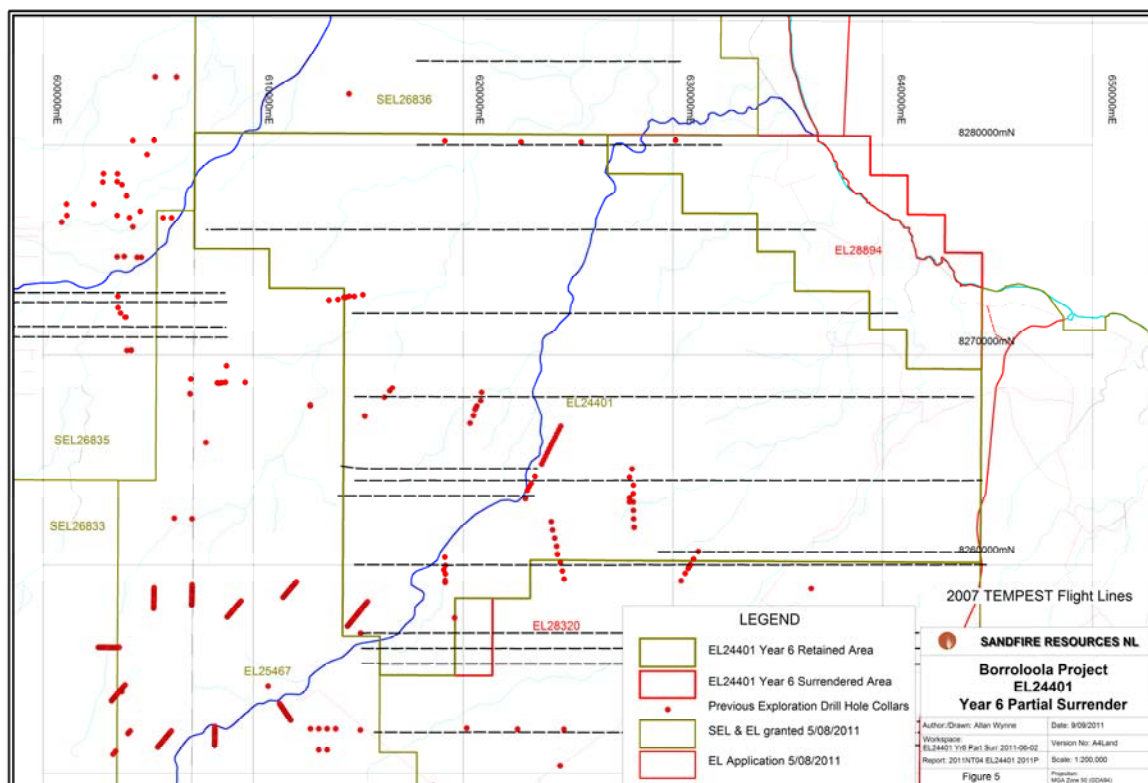


Figure 5 EL24401 Yr6 Partial Surrender AEM

7. CONCLUSIONS AND RECOMMENDATIONS

Exploration work carried out during the first year of tenure of EL24401 for Golden Cross Resources was photogeological interpretation and sampling for diamond indicator mineralogy, as reported in the Joint Annual Report to July 2006 EL's 24401, 24402, 24664, 24700 & 24778 to July 2006 by Vladimir David Golden Cross Operations Pty Ltd Report GCO 453 (David, 2006). During the second year of tenure, consultants were engaged by Finching Pty Ltd to reconnoitre and assess a manganese targets on these tenements, as reported in the Combined Annual Report EL 24401, 24402, 24664, 24700, 24778 for Exploration Licence Year ending 2 June 2007 (Algie and Muller, 2007).

Two hundred and six sub-blocks of EL24401 were surrendered at the fifth anniversary, and a further thirty sub-blocks at the sixth anniversary. The remainder of EL24401 remains a region of interest for exploration for copper, lead and zinc, and manganese, as part of the continuing integrated exploration on Sandfire Resources' Borroloola Project tenement holding.

Exploration work proposed for year 7 of the tenement licence includes:

- Further review of available airborne geophysical datasets and imagery for base metals targets in the Proterozoic McArthur Basin units.
- Further review of the manganese potential of Cretaceous and younger sediments.
- A detailed airborne magnetic/radiometric survey.
- Follow up diamond drilling.

8. BIBLIOGRAPHY OF ANNUAL REPORTS

Northern Territory Geological Survey Company Reports (unpublished)

Algie, C. (Sandfire Resources NL) and Muller, D. (Finching Pty Ltd), 2007 Combined Annual Report EL 24401, 24402, 24664, 24700, 24778 Exploration Licence Year ending 2 June 2007 Borroloola Project McArthur Basin, NT. Sandfire Resources NL Report 2007/NT/03 (Submitted June 2007).

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Jones, D., Roberts, R., Ahmat, A., Wynne, A., 2010 Group Annual Mineral Exploration Report Borroloola Project EL24401, EL25591, EL26555, EL26587, EL26908, EL26909, EL26953, SEL26831, SEL26833 SEL26835, SEL26836, SEL26837 SEL26938, and SEL26939 Combined Reporting Number: 121/09 Reporting Period: 11 April 2009 to 10 April 2010 Sandfire Resources NL Report 2010NT03 (Submitted 14 July 2010).

Lewis, T., Hansen, A., Wynne, A., 2009 Group Annual Mineral Exploration Report 068/09 Borroloola Project EL's 24401, 25591, 26555 and 26587 Combined Report Number C121/09 Reporting Period: 11 April 2008 to 10 April 2009 Sandfire Resources NL Report 2009NT03 (Submitted 23 June 2009).

Street, G., Lauricella, P., and Algie, C., 2008 Combined Annual Report EL 10121, 24349, 24373, 24374, 24401, 24402, 24714, 24664, 24700, 24946, 24778, 24943, 24996, 24997, 25070, 24942, 25328, 25312, 25590, 25591, 25592, 25462, 25647 Exploration Licence Year 11 April 2007 To 10 April 2008 Borroloola Project McArthur Basin, NT Sandfire Resources NL Report No. 2008NT02 (Submitted April 2008).

Wynne, A., 2010 Mineral Exploration Partial Surrender Report Borroloola Project EL24401 Year 5. Reporting Period: 3 June 2005 to 2 June 2011 Sandfire Resources NL Report 2010NT08.

9. DIGITAL DATA

Digital data for Appendix A is attached in .zip file format. Digital data for Appendices B and C was contained on the CD forwarded 8 March 2010 to the Department of Resources, Geosciences Division for the EL24401 Year 5 Partial Surrender Report.



APPENDIX A:

Details of Tenement Graticule Blocks Surrendered and Retained



APPENDIX B:

**Borroloola, Northern Territory TEMPEST Geophysical Survey
Acquisition and Processing Report for Sandfire Resources NL
Prepared by M. Lawrence and L. Stenning Survey flown May -June
2007 Fugro Airborne Surveys FAS Job # 1880
Fugro Airborne Surveys Area 5 Digital Data – Located Data and CDI
images.**



APPENDIX C:

Borroloola, Northern Territory TEMPEST Geophysical Survey CSIRO Interpretation Area 5 Digital Data –GeoTIFF and CDI images