



**EXPLORATION PERMIT FOR MINERALS 14121**

**PROSPECT CREEK**

**ANNUAL REPORT**

**FOR THE PERIOD**

**3 AUGUST 2009 TO 2 AUGUST 2010**

**BY**

**J.J. HUGENHOLTZ**

**DATE: 1 SEPTEMBER 2010**

**PRIVATE AND CONFIDENTIAL**  
**NOT TO BE COPIED OR DISTRIBUTED**

**DISTRIBUTION:**  
Department of Mines and Energy, Brisbane  
ActivEX Limited, Brisbane

**Registered Office**  
117 Quay Street  
Brisbane, QLD, 4000  
Telephone: 07 3236 4188  
Facsimile: 07 3236 4288



## TENEMENT REPORT INDEX

|                            |   |
|----------------------------|---|
| <b>OPERATOR:</b>           | ActivEX Limited   |
| <b>PROJECT:</b>            | Prospect Creek  |
| <b>TENEMENTS:</b>          | Exploration Permit for Minerals: 14121                                |
| <b>TITLE:</b>              | Prospect Creek  |
| <b>HOLDER:</b>             | ActivEX Limited   |
| <b>REPORT PREPARED BY:</b> | ActivEX Limited   |
| <b>AUTHOR:</b>             | J.J. Hugenholtz   |
| <b>STATE:</b>              | Queensland  |
| <b>LATITUDE:</b>           | -24° 32'  |
| <b>LONGITUDE:</b>          | 150° 22'  |
| <b>MGA94</b>               | <b>mN:</b> 7 283 500  |
|                            | <b>mE:</b> 234 000  |
| <b>1 : 250,000 SHEET:</b>  | Monto SG56-1  |
| <b>1 : 100,000 SHEET:</b>  | Banana 8949<br>Theodore 8948  |
| <b>LOCALITY:</b>           | Biloela   |
| <b>TECTONIC:</b>           | Auburn Arch, Bowen Basin, Gogango Overfolded Zone,<br>Yarrol Province |
| <b>STRATIGRAPHY:</b>       | Camboon Andesite, Torsdale Beds, Glandore Granodiorite                |
| <b>AGE:</b>                | Permian   |
| <b>COMMODITY:</b>          | Gold  |
| <b>KEYWORDS:</b>           | Soil sampling, assaying, Niton analysis, PIMA analysis                |

## TABLE OF CONTENTS

|   |  |   |
|---|--|---|
| 1 | EXECUTIVE SUMMARY                        | 1 |
| 2 | TENEMENT STATUS                          | 2 |
| 3 | LOCATION AND ACCESS                      | 2 |
| 4 | NATIVE TITLE                             | 2 |
| 5 | EXPLORATION RATIONALE                    | 3 |
| 6 | GEOLOGY AND MINERALISATION               | 3 |
|   | 6.1 MINERALISATION                       | 3 |
| 7 | EXPLORATION                              | 4 |
|   | 7.1 SURFACE SAMPLING                     | 4 |
|   | 7.1.1 Gossans West – Cockatoo Ridge pipe | 5 |
|   | 7.1.2 Gossans West – regional sampling   | 5 |
| 8 | CONCLUSIONS AND RECOMMENDATIONS          | 6 |
| 9 | REFERENCES                               | 7 |

## LIST OF FIGURES

1. Exploration index plan  
1:100,000, A4, portrait
2. Tenement location map  
1:250,000, A4, portrait
3. Regional geology  
1:100,000, A4, portrait
4. Gossans West prospect, Niton sample locations  
1:25,000, A4, landscape

## LIST OF APPENDICES

- I INI Target Generation Research Project, Final Report
- II Niton soil sample locations
- III Niton analytical results
- IV Niton analytical results, averages

## 1 EXECUTIVE SUMMARY

### Figure 1

Exploration Permit 14121, Prospect Creek, was granted as 100 sub-blocks located approximately 20km south-west of Biloela in central Queensland. Twenty five sub-blocks were relinquished on 2 August 2007. Twenty sub-blocks were relinquished on 2 August 2008. A further five sub-blocks were relinquished on 2 August 2009.

The tenement was acquired with the aim of exploring for low sulphidation epithermal style gold mineralisation such as at Vera Nancy and Cracow.

The Prospect Creek area lies in the Yarrol Province of central Queensland. The project area is dominated by the Camboon Volcanics, which are the host lithologies at Cracow, 60km to the south of Prospect Creek.

The two key prospects, Gossans West and Prairie Creek, were the subject of a first pass RC drilling program during the third year of tenure. Two RC holes were drilled at Prairie Creek and six holes were drilled at Gossans West. Other work has included geochemical sampling, PIMA spectroscopy and the development of a conceptual geological model.

Three key alteration pipes were tested by the drilling at Gossans West. The pipes are dominated by silica, alunite and illite alteration and were thought to represent the barren “cap” above the bonanza/stockwork zones of an epithermal system.

Gossans West displays features of a high sulphidation epithermal gold mineralisation system probably overprinted by a late stage low sulphidation system. Drilling was aimed to test these systems but only very low gold values were intersected.

Anomalous molybdenum values from both the drilling and previous soil geochemistry at Cockatoo Ridge and Oasis Ridge suggest the potential for a deeper Cu-Mo porphyry system. Advanced argillic alteration zones can also be derived by the de-gassing of intrusions at depth and so may point towards buried porphyries.

Cockatoo Ridge is a hydrothermal breccia pipe, with quartz-feldspar porphyry clasts containing secondary Mo minerals formed by the weathering of molybdenite within these clasts. This breccia may overlie a Mo-bearing mineralised intrusion at depth.

Work during the current year has concentrated on geochemical testing of Cockatoo Ridge to better define the anomaly and zoning within the advanced argillic alteration. This work is being partially funded by an Industry Network Initiative grant from the Queensland Government. The Target Generating Research Project Final Report is included as Appendix 1.

## 2 TENEMENT STATUS

| Tenement | Holder                 | Date of Grant | Sub-blocks |
|----------|------------------------|---------------|------------|
| EPM14121 | ActivEX Limited (100%) | 3 Aug 2005    | 50         |

EPM 14121, Prospect Creek, was granted as a 100 sub-block EPM to Findex Pty Ltd on 3 August 2005 for a period of 5 years. The title was later transferred to ActivEX Limited (which at that time was a wholly owned subsidiary of Findex Pty Ltd). The grant was approximately 312 square kilometres. Twenty five sub-blocks were relinquished on 2 August 2007. Twenty sub-blocks were relinquished on 2 August 2008. A further five sub-blocks were relinquished on 2 August 2009.

The permit currently consists of 50 sub-blocks and an application to renew the permit for a further 5 years was submitted in April 2010.

There are no Mining Leases or ML applications within the permit area.

Block Identification Sheet – Brisbane

| Block | Sub-block                                     |
|-------|---|
| 436   | h,j,k,n,o,p,s,t,u,x,y,z                       |
| 437   | b,c,d,f,g,h,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z |
| 438   | l,q,v   |
| 508   | c,d,e,k,p,u                                   |
| 509   | a,f,l,q                                       |
| 510   | a,f   |

## 3 LOCATION AND ACCESS

Figure 2

The project area is located approximately 20km from the major rural centre of Biloela in central Queensland which lies 130km south of Rockhampton. The tenement lies in the western portion of the Monto 1:250,000 sheet area and is centred on longitude 150<sup>0</sup>22' E and latitude 24<sup>0</sup>32' S.

The project lies in the Banana Range district, at the northern end of the Auburn Arch. This is some 60 km north of Cracow which lies in the central part of the Auburn Arch.

The area is pastoral land and forest, utilised predominantly for cattle grazing and is accessed by secondary bitumen roads and station tracks. The western half of the EPM may be accessed from Banana but is predominantly steep hilly country that is difficult to traverse.

## 4 NATIVE TITLE

There are two Native Title Claim Applications present in the project area.

An Application by the Gangulu People (National Native Title Tribunal Application QC97/036) covers the entire permit area.

An Application by the Wulli Wulli People (National Native Title Tribunal Application QC00/007) covers the southern portion of the permit, south of the Banana Range.

## 5 EXPLORATION RATIONALE

Exploration Permit for Minerals 14121, Prospect Creek, was acquired to explore for epithermal gold mineralisation of the style exhibited at Cracow some 60km to the south.

The Cracow deposits are hosted by the Camboon Andesite of early Permian age which formed in an arc extension zone prior to and bounding the eastern margin of the Bowen Basin.

Exploration by ActivEX Limited has shown that the Gossans West prospect displays features of a high sulphidation epithermal gold mineralisation system probably overprinted by a late stage low sulphidation system. Drilling, conducted in 2008, was aimed to test these systems but only very low gold values were intersected.

Anomalous molybdenum values from both the drilling and previous soil geochemistry at Cockatoo Ridge and Oasis Ridge suggest the potential for a deeper Cu-Mo porphyry system. Advanced argillic alteration zones can also be derived by the de-gassing of intrusions at depth and so may point towards buried porphyries.

## 6 GEOLOGY AND MINERALISATION

[Figure 3](#)

The geological units within the EPM are part of the Auburn Arch surrounded by early Bowen Basin arc extension rift zone and later sag phase sedimentary sequences which have been termed the Gogango Overfold Zone.

The arch forms resistant hills of the Banana Range mainly due to the silicic nature of the dacitic and rhyolitic Torsdale Beds which forms a broad, faulted anticlinal structure. The Glandore Granodiorite intrudes the Torsdale Beds occupying the axial portion of the structure.

The arch is flanked by Camboon Andesite which forms subdued topography. The andesite progresses easterly from terrestrial to marine and is made up of a sequence of andesitic and basaltic lavas, agglomerates and tuffs, with minor trachyte, sandstone, mudstone, siltstone and volcanic conglomerate. On the western flank the Camboon Andesite unconformably overlies the Torsdale Beds. The eastern flank contact with the Camboon Andesite is not clearly defined in most areas but there is a significant topographic change suggesting faulting.

Major faults trend northwest to north-northwest through the project area, most notably the Mount Bertha, Barfield and Drumberle Faults. The Mount Bertha and Drumberle Faults are thought to be high angle reverse faults related to thrusting developed in the Gogango Overfold Zone immediately to the east. They are upthrown to the northwest. The Mount Bertha fault forms the contact between the Glandore Granodiorite and the Camboon Andesite in the southwest of the project area.

Northeast trending cross faults are also evident in the area, particularly at Prairie Creek prospect.

### 6.1 MINERALISATION

There is no known pitting or shafting in the area. Mineralisation occurring in the area has been identified by modern exploration methods, principally stream sediment sampling and geological mapping.

Regional stream sampling with follow-up rock chip sampling identified four anomalous zones. Four key prospects were identified by previous explorers at Gossans West (weak copper, gold

and arsenic), Tarramba Creek (copper and gold), Glenhalvern (copper) and Prairie Creek (gold). Alteration zones have also been identified in two locations on the Banana Range – pyritic rhyolite (north of Tarramba Creek) and altered granite (east of Tarramba Creek).

### **Gossans West**

The alteration “pipes” at Gossans West were recognised by CRAE and Kennecott during reconnaissance geological mapping in their search for stratiform copper mineralisation. CRAE mapped the zones as volcanic pipe breccias whereas Kennecott recognised the pipes as alteration features. Both Kennecott and CRAE carried out rock chip sampling over the alteration zones but walked away when only low copper results were returned.

Burmine and ACM Gold targeted gold mineralisation and carried out systematic rock chip sampling but failed to return anomalous gold values. ACM Gold persisted, drilling one drillhole into the prospect area to test anomalous arsenic values associated with two closely spaced alteration zones. Their hole was located at an easily accessible site and took no account of structure or veining in the zones. They intersected elevated but not anomalous gold values.

Later work by CRAE targeting gold mineralisation concentrated on the alteration features defining 22 alteration pipes of two types: (a) conical hills of altered volcanics which were fractured and iron-stained with a central siliceous plug rimmed by sulphide rich material, and (b) low rises of rubbly ironstones. XRD clay analyses (by CRAE and ACM) were done on rocks from the pipes which indicated they were from the upper portions of hydrothermal alteration systems. In particular the alteration zones at Gossans West were identified as acid sulphate alteration with alunite being the dominant clay mineral along with illite, dickite and sericite. Traces of adularia were also apparent.

The alteration pipes form low hills in the subdued Camboon Andesite landscape east of the Banana Range. The clay alteration zones form small topographic highs reflecting their silica content. While rock chip values were considered low by the previous explorers they did contain elevated gold values up to 0.89ppm Au. Most interestingly they also contained high arsenic and mercury values (up to 420ppm As and up to 11.8ppm Hg).

Six RC holes for 905m were drilled at three alteration pipes by ActivEX. Two holes were drilled at Oasis Ridge, one hole at Gold High and three holes at Echidna Hill. All three areas intersected strong clay and iron alteration, as well as abundant pyrite and minor amethyst.

Only very low gold values were intersected in all holes.

Anomalous Mo, Cu and Pb values from the drill holes at Oasis Ridge, and to a lesser degree from soil geochemistry, suggest the potential for a deeper Cu-Mo porphyry system. Advanced argillic alteration zones can also be derived by the de-gassing of intrusions at depth and so may point towards buried porphyries. Se and Tl were also anomalous in both the drilling and soil geochemistry.

Surface sampling highlighted the Cockatoo Ridge alteration pipe as being anomalous in As, Mo, Pb, Bi, Sb, Se and Te. Work during the current year of tenure concentrated on this pipe.

## **7 EXPLORATION**

### **7.1 SURFACE SAMPLING**

During the fifth year of tenure 669 soil samples were collected from the Gossans West prospect, mostly from the Cockatoo Ridge pipe.

Sample sites were recorded by hand-held GPS. All samples were analysed by a hand-held Niton XRF instrument.

### **7.1.1 Gossans West – Cockatoo Ridge pipe**

Figure 4

Regional soil sampling in 2007 had highlighted anomalous values in the southern portion of Cockatoo Ridge. This was followed up by detailed sampling.

In early 2009, 464 soil samples were collected from Cockatoo Ridge along nine E-W lines and two N-S lines. Lines were spaced 200m apart in the northern section of the alteration pipe, with spacing varied to 100m and 50m closer to the original 2007 soil line.

In late 2009, during this reporting year, a further 308 soil samples were collected to complete the detailed coverage of the Cockatoo Ridge pipe.

Samples were collected at 25m intervals along the lines, using the hand-held GPS with a typical accuracy of  $\pm 3$  to 5m to locate sample sites. To preserve sample consistency with previous years, bulk samples were collected and consisted of 2-3kg of material.

Samples were collected with the intention of taking Niton readings of all samples and then sending anomalous samples for laboratory analysis. 186 samples collected during the current reporting year were sent to ALS Chemex in Brisbane for analysis.

Soil samples were analysed by an average of ten 90-second Niton readings per sample. Each 90 second Niton reading consists of 3 filters with individual reading times of 30 seconds per filter.

A total of 66 soil sample sites were also analysed by hand-held XRF in the field. These readings were taken to provide a comparison of essentially surface samples with more conventionally collected bulk soil samples.

This work was completed as part of the INI study and the data is included in the INI Final Report, which is included as Appendix I.

### **7.1.2 Gossans West – regional sampling**

During the reporting year, 295 soil samples were collected from regional soil lines in the Gossans West prospect. These lines are designed to provide geochemical information from the plains between the alteration pipes and to evaluate the more marginal areas of the alteration zone.

Samples were collected at 50m intervals along lines, using the hand-held GPS with a typical accuracy of  $\pm 3$  to 5m to locate sample sites. Bulk samples were collected and consisted of 2-3kg of material.

Soil samples were analysed by an average of three 120-second Niton readings per sample. Each 120 second Niton reading consists of 3 filters with individual reading times of 60 seconds for the main filter (which analyses for Cu and Mo, amongst others) and 30 seconds for the remaining two filters.

Further regional soil sampling will be conducted in the next reporting year, to provide a full coverage of the Gossans West prospect.

A complete list of the individual Niton readings, as well as the average reading for each sample, is provided in Appendices III and IV.

## 8 CONCLUSIONS AND RECOMMENDATIONS

The study of the Gossans West prospect using hand-held XRF, PIMA and XRD techniques has proven to be both useful and effective. Several conclusions can be drawn from the study, which can aid in the application of these techniques in a greenfields environment with advanced argillic alteration:

- Hand-held XRF analysis is an appropriate exploration tool in this environment and can be used to broadly define anomalous areas. As, Pb, Fe, Cu, Mn, Ca, Zn, Se, and Mo data can be used with a reasonable degree of certainty.
- Sample types and reading duration times influence the effectiveness of the hand-held XRF analyses, however overall, bulk samples are a cost effective method of prospect evaluation and are appropriate for exploration in this terrain. A reading time of 30 seconds per filter is adequate, however longer reading times will in general improve the accuracy of the value and decrease detection limits.
- Sample collection and hand-held XRF analysis should be carried out in as short a timeframe as possible, to reduce the effect of external factors such as weather affecting sample moisture content. Ideally, hand-held XRF readings should be carried out on-site, to allow immediate in-fill sampling when anomalies are identified.
- Although hand-held XRF readings can be taken at surface, with no sample preparation, more accurate results are obtained if samples are collected from sites prepared as for normal bulk sample collection, i.e. from the B horizon. This increases the time taken to conduct a field survey, however results are likely to be more reliable. Samples for infrared spectral analysis can also be collected at this stage.
- The bulk soil samples are the preferred sample type for infrared spectral analysis. The time and cost involved in preparation is minimal, and this study suggests the absorption features in spectra are better developed than in the soil pulp samples.

Several conclusions specific to the Gossans West prospect can also be drawn from the study:

- The alteration assemblages identified at Cockatoo Ridge and Oasis Ridge are consistent with advanced argillic alteration associated with lithocaps developed above porphyry systems.
- The spatial association of As and Sb with the advanced argillic alteration could represent weak high sulphidation mineralisation, or could represent overprinting low sulphidation epithermal mineralisation.
- The spatial association of weakly elevated Cu in soils with assemblages dominated by illite and smectite suggests further exploration is warranted to assess the potential for deeper porphyry-related Cu +/- Au mineralisation on the peripheries of the advanced argillic lithocaps.
- The good correlation of elements such as As and Fe in the Gossans West system may be a reflection of their abundance in the exposed advanced argillic lithocaps. These elements may not show such a high correlation in less weathered environments.

The study has highlighted several areas where further work at the Gossans West prospect is warranted. A future exploration program could incorporate the following:

- Detailed geological traversing around the edges of the advanced argillic zones, to locate any additional outcrop or subcrop, and attempt to more closely define the lithologies and possible alteration occurring peripheral to the advanced argillic zones.
- IP surveys over the north & south of Cockatoo Ridge, and southwest of Oasis Ridge, to identify potential zones of sulphide mineralisation.
- A broadly spaced IP survey over the centre of Cockatoo Ridge to assist with determining the structural and/or lithological controls on sulphide mineralisation in the lithocaps.
- Trial lines of ground magnetics to check for further detail in the magnetic signatures over and around the lithocaps.
- Depending on the results of the geophysical surveys, drill testing of the elevated Mo and Cu at the north and south of Cockatoo Ridge, and southwest of Oasis Ridge.
- Additional regional soil lines to evaluate the more marginal areas of the alteration zone, and to test the other smaller lithocaps in the prospect area.
- Handheld XRF and spectral reflectance surveys of less altered rocks distal to the lithocaps, to better define the extended alteration system, and to identify and characterise the geochemical and mineralogical signatures of the unaltered volcanics.

The Gossans West prospect has been the subject of an Honours project conducted by University of Queensland student, Rhys Lennings. His thesis, entitled 'Geology, alteration and geochemistry of a hydrothermal system at Gossans West, Central Queensland', aimed to characterise the geology, geochemistry and alteration of Gossans West and will be included in the 2011 Annual Report.

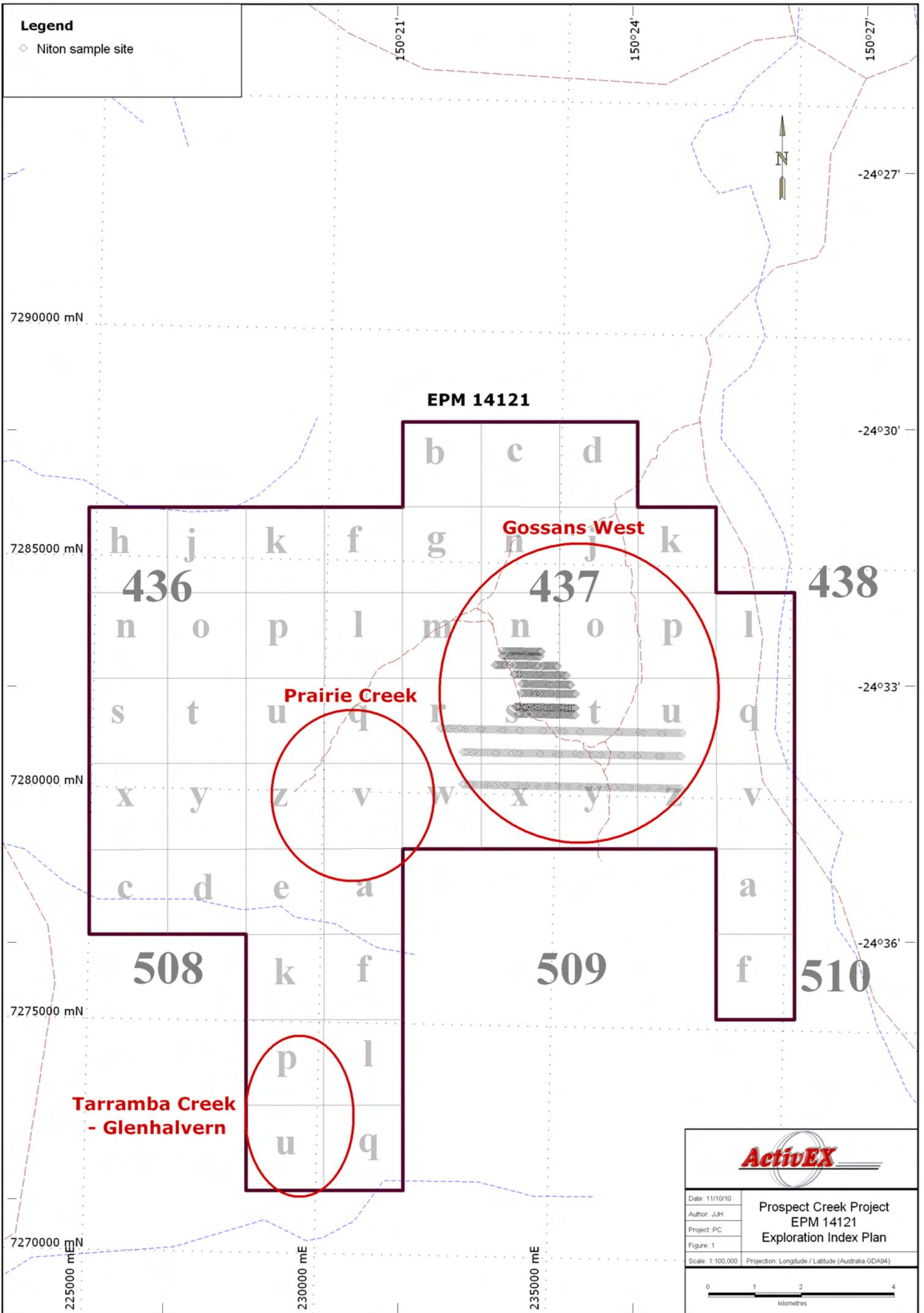
## 9 REFERENCES

- Camuti, K, 2007 PIMA Mineralogy Report, EPM 14121, Prospect Creek, Gossans West Area, for ActivEX Limited. *Unpublished Report*.
- Corbett, G, 2008 Comments on the Esk Trough and Gossans West Projects, Central Queensland, for ActivEX Limited. *Unpublished Report*.
- Hugenholtz J J, 2008 Exploration Permit for Minerals 14121, Prospect Creek, Annual Report for the Period 3 August 2007 to 2 August 2008. ActivEX Limited. *Company Report*.
- Hugenholtz J J, 2009 Exploration Permit for Minerals 14121, Prospect Creek, Annual Report for the Period 3 August 2008 to 2 August 2009. ActivEX Limited. *Company Report*.
- Hugenholtz J J, Camuti, K S, Harvey J E, & Lennings R D, 2010 Prospect Creek Project, Target Generating Research Project, EPM 14121, Industry Network Initiative, under the Smart Mining – Future Prosperity Program, Final Report, May 2010. *Unpublished Report*.

## **FIGURES**

**Legend**

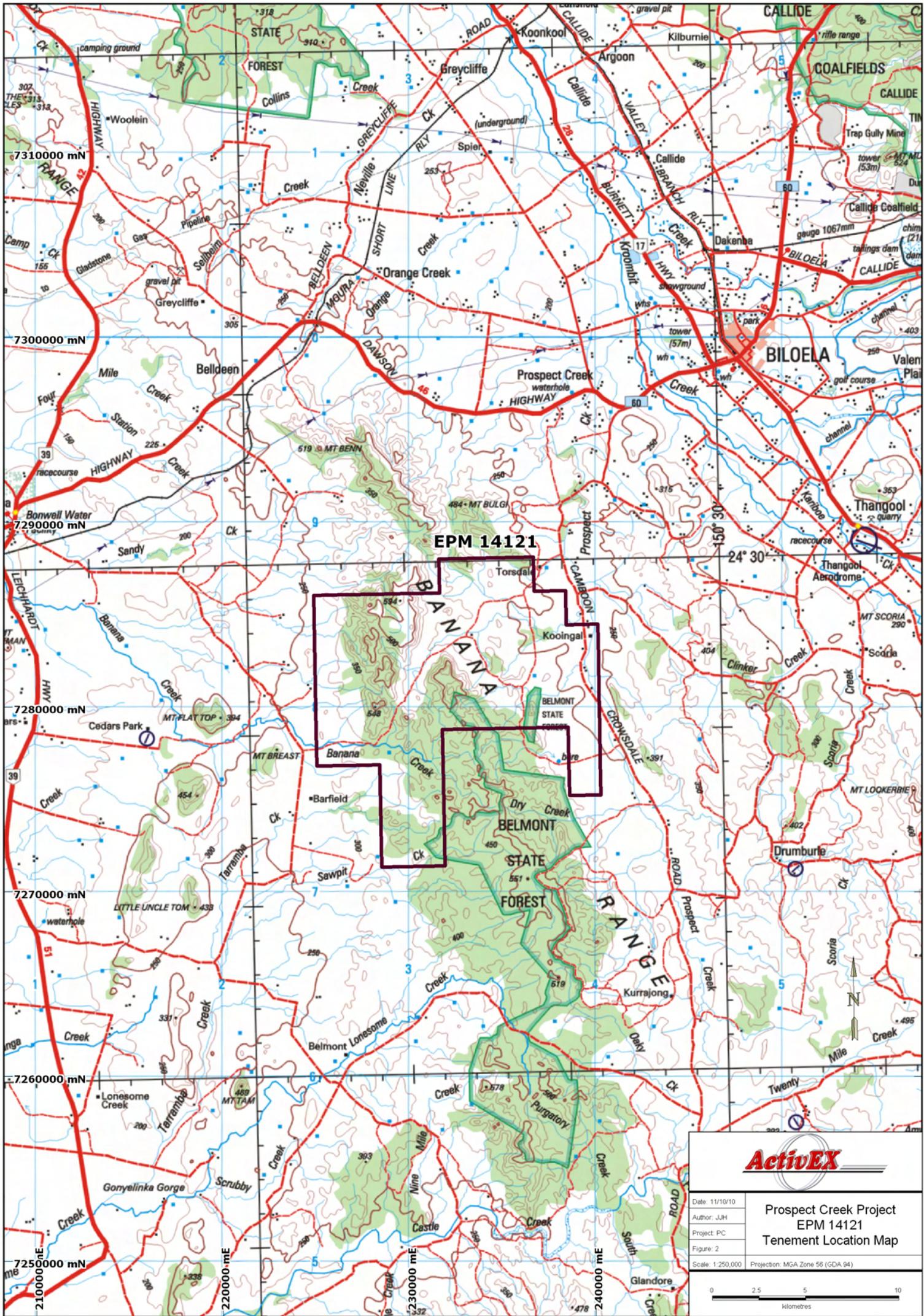
◇ Niton sample site



**ActivEX**

|                  |  |
|------------------|--|
| Date: 11/10/10   | <b>Prospect Creek Project</b><br>EPM 14121<br>Exploration Index Plan |
| Author: JJH      |  |
| Project: PC      |  |
| Figure: 1        |  |
| Scale: 1:100,000 | Projection: Longitude / Latitude (Australia GDA94)                   |



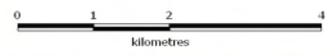


**EPM 14121**

**ActivEX**

|                  |   |
|------------------|---|
| Date: 11/10/10   | <b>Prospect Creek Project</b><br><b>EPM 14121</b><br><b>Tenement Location Map</b> |
| Author: J/H      |   |
| Project: PC      |   |
| Figure: 2        |   |
| Scale: 1:250,000 | Projection: MGA Zone 58 (GDA 94)  |

0 2.5 5 10  
kilometres



**Geology Legend**

**Tertiary**

- Sediment

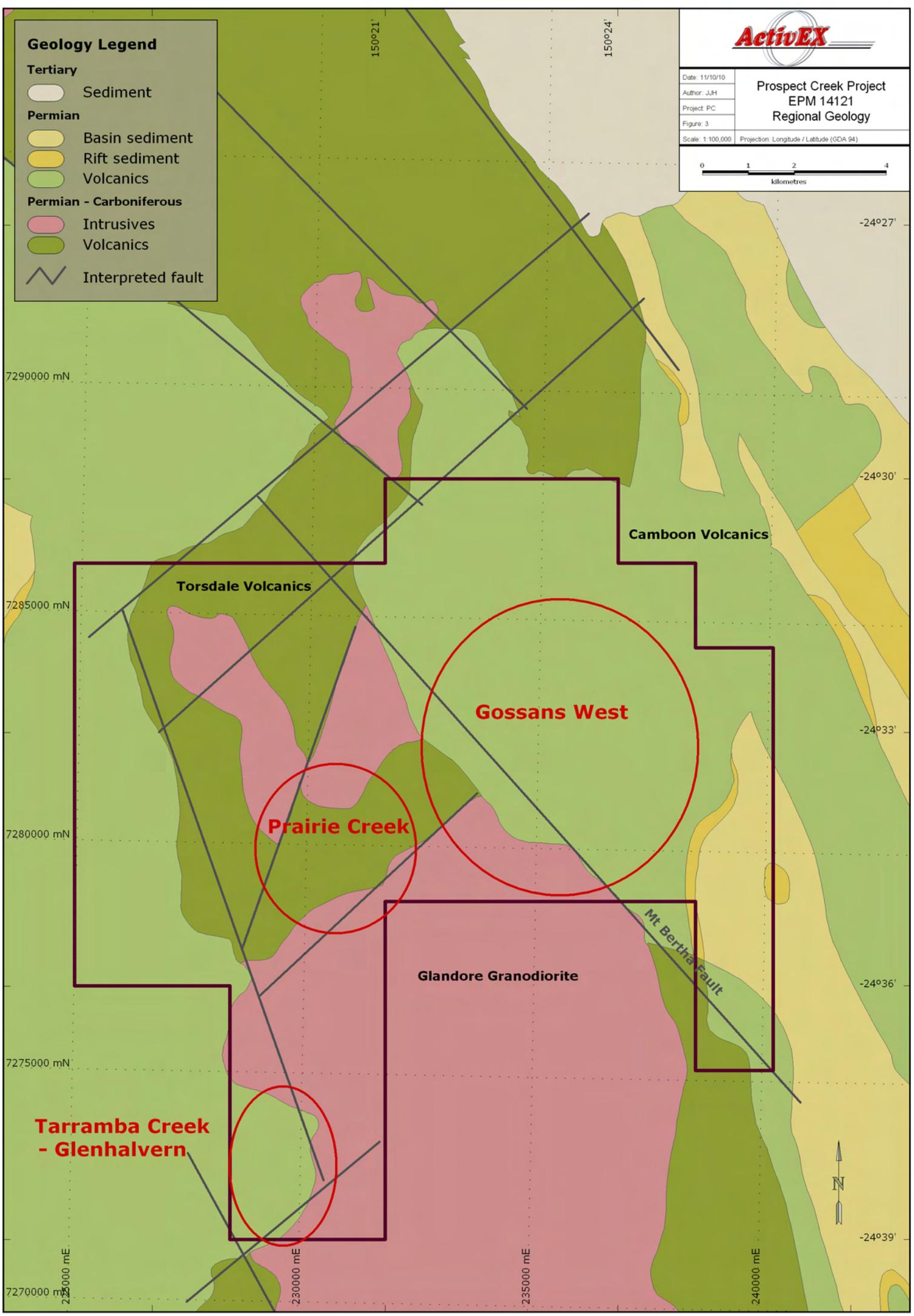
**Permian**

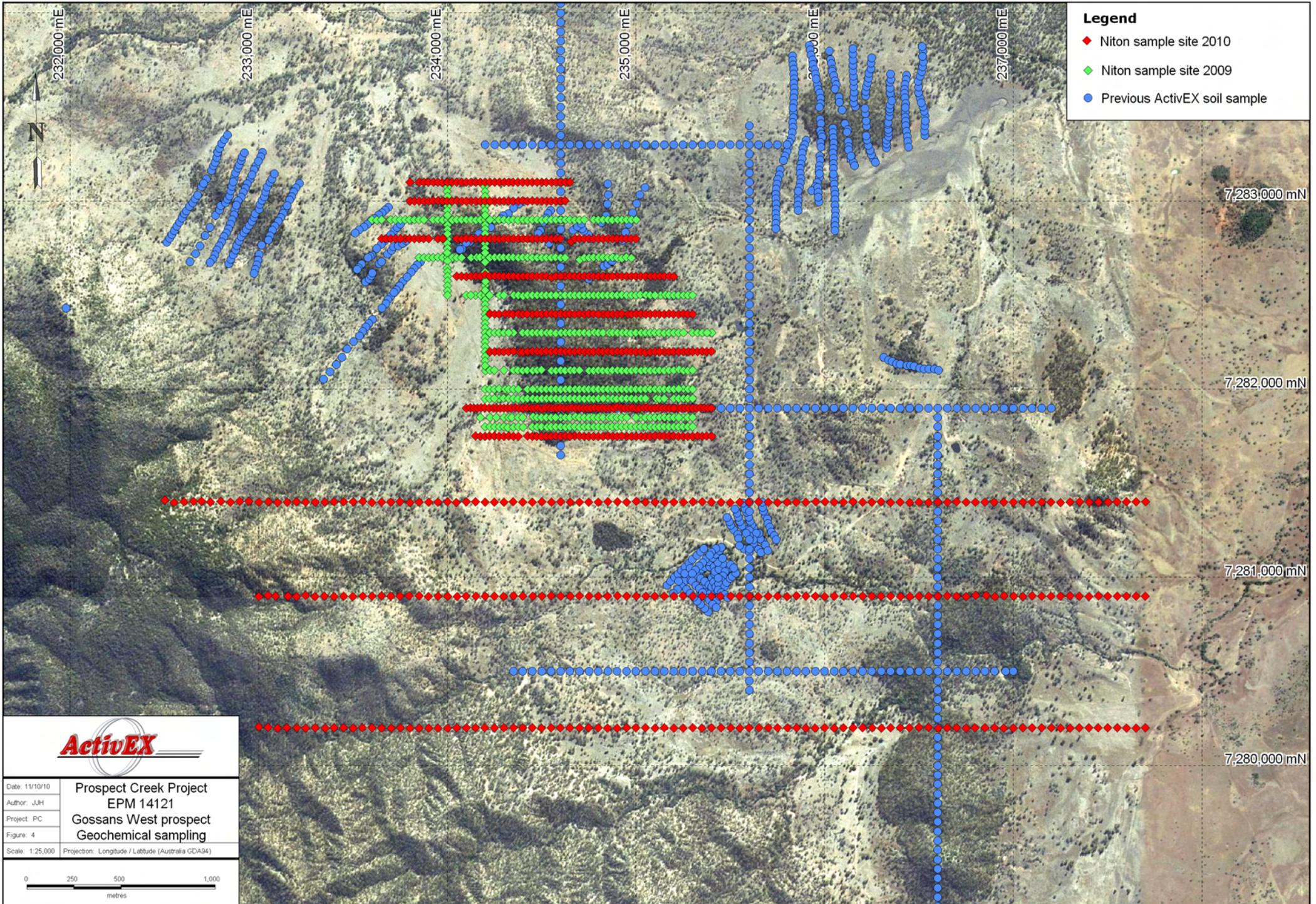
- Basin sediment
- Rift sediment
- Volcanics

**Permian - Carboniferous**

- Intrusives
- Volcanics

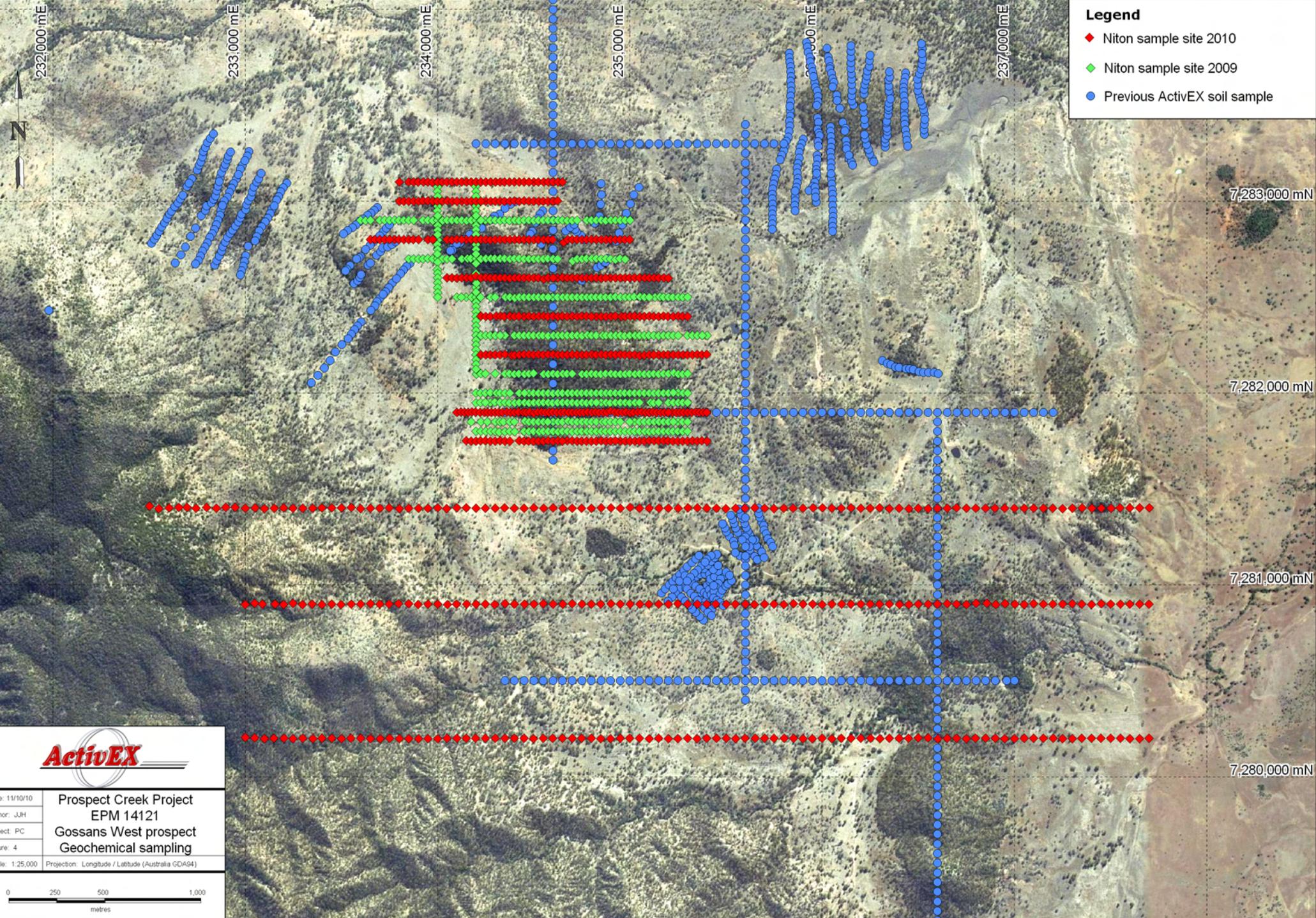
Interpreted fault





**Legend**

- ◆ Niton sample site 2010
- ◆ Niton sample site 2009
- Previous ActivEX soil sample



Date: 11/10/10  
 Author: JJH  
 Project: PC  
 Figure: 4  
 Scale: 1:25,000  
 Projection: Longitude / Latitude (Australia GDA94)

**Prospect Creek Project**  
**EPM 14121**  
**Gossans West prospect**  
**Geochemical sampling**

