SANDFIRE RESOURCES NL

Tawallah 2 Prospect SEL 26939

Drilling Completion Report

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1.0 EXECUTIVE SUMMARY

The Tawallah 2 (T2) prospect is in tenement SEL 26933 approximately 80km northwest of Borroloola and 5km west of Lorella Springs, Northern Territory (Figure 1). Access is along the Lorella Springs road and then 3km west along access tracks.

Sandfire completed one diamond (vertical) and two RC holes for 458.6m targeting a shallow EM feature and testing the basal contact of the Mallapunyah Formation (Pml) with the Masterton Sandstone (Pms). Previous work on the tenement includes geophysical surveys, geological mapping and percussion, RAB and RC drilling.

The drilling targeted an EM feature at 150-200m depth is accounted for by carbonaceous black shale horizons in the Amelia Dolomite and Mallapunyah Formation. A fine-grained sandstone unit with a clast-supported beccia marks the top of the Masterton Sandstone (Pms) and the base of the Mallapunyah Formation at 242.08m depth.

No significant mineralisation was observed and assays show the maximum copper in hole 11BLDD0007 is 260ppm. No further work is recommended.

2.0 INTRODUCTION

In 2011 Sandfire completed one diamond (vertical) and two RC holes for 458.6m at the Tawallah 2 prospect (Table 2-1). The hole was designed to determine the stratigraphy across a shallow EM feature (150-200m depth) by going through the basal contact of the Mallapunyah Formation with the Masterton Sandstone. The aim is to test for the potential to host red-beds style SEDEX mineralisation. Drilling intersected the Amelia Dolomite, Mallapunyah Formation and Masterton Sandstone units from the lower McArthur Group that dip shallowly to the south-west. Table 2-1 gives details of the drilling.

Hole ID	Final Depth (m)	Easting	Northing	Nat_RL
11BLDD0007	380.6	563516	8261093	95.63
11BLRC0100	60	563400	8261119	95.38
11BLRC0101	18	563296	8261072	96.81

Table 2-1. Location and Depth of drilling at Tawallah 2 (GDA94 53).

3.0 TENEMENT AND ACCESS

The Tawallah 2 (T2) prospect is in tenement SEL 26833 approximately 80km northwest of Borroloola and 5km west of Lorella Springs, Northern Territory (Figure 1). Access is along the Lorella Springs road and then 3km west along access tracks.

The tenement is substitution exploration licence 26833 which was granted in 2009 with details in Table 3-1.

Lease	Status	Current Area	Area Units	Current Commitment	Applied Date	Grant Date	Expiry Date	Group Report Number
SEL 26833	Granted	282	Blocks	$165,000	24/06/2008	9/06/2009	7/5/2012	C121/09 Borroloola

Table 3-1. Tenement Details.

4.0 GEOLOGY

The prospect is located on the Mount Young 1:250k and the Tawallah Range 1:100k NTGS geological sheet and details of the geology are in the Mount Young 250k explanatory notes (Figure 2) (Haines et al., 1993). The prospect is 35km west of the Emu Fault Zone in the Mesoproterozoic McArthur Basin. The Emu Fault Zone hosts the McArthur River Mine base metal deposit so Tawallah 1 is considered prospective for base metals.

T2 is at 95m elevation with low relief in the south east of Lorella Pocket, an embayment filled with Cretaceous submarine sediments that are largely unconsolidated and up to 60m thick at the prospect. The regional geology mapped by Haines et al. (1993) shows prospect is in the 4km west of outcropping Mesoproterozoic sandstones from the McArthur Group that dip upto 45º south-west (Figure 2).

5.0 PREVIOUS EXPLORATION

5.1 Introduction

Previous exploration on the tenement includes:

- Geological mapping;
- Geophysical surveys; and

5.2 Geological Mapping

Regional mapping at 250k and 100k scale was done by Haines et al (1993) for the Northern Territory Geological Survey (NTGS). Proterozoic rocks from the McArthur Group dip 25-45° west and form small ridges 4km east of the Tawallah 2 prospect. Cainozoic and Tertiary cover is up to 40m thick in the pocket but in the northeast some quartz sandstone from the McArthur Group outcrops (1:250k Haines et al., 1993). The general dip of the McArthur Group sediments is 5-10 ° southwest.

5.3 Geophysics

Western Mining Corporation (WMC) completed reconnaissance geophysical surveys in 1982 and 1983 targeting shale-hosted base metal deposits. In 1989 a radiometric survey was flown by Aerodata Holdings Ltd for the NTGS covering the Mount Young map area (Figure 2) (Haines et al., 1993). There have been multiple surveys completed in the area including aeromagnetic surveys, EM surveys and regional gravity (Figures 3 and 4).

6.0 SANDFIRE EXPLORATION

6.1 Introduction

Sandfire has completed the following work on the tenement:

- Airborne EM; and
- Diamond, RAB and AC drilling

Sandfire have explored in the tenement since 2008 for Cu, Pb, Zn and Mn deposits.

6.2 Geophysical Compilation

A wide-spaced airborne EM survey identified a shallow, deep conductive feature below the T2 prospect. Figure 5 shows the images across Lorella Pocket.

6.3 Prospect Mapping

The perimeter of Lorella Pocket was mapped by W. Herrmann in 2011 and generally agreed with the mapping done by Haines et al. (1993). The report and maps are in Appendix A.

6.4 Drilling

Figure 6, 7 and 8 show the locations of previous drilling on tenement SEL26833. In 2008 Sandfire explored for manganese on the tenement and drilled 6 RAB holes targeting the base of the Cretaceous. Manganese mineralisation was not encountered but the holes intersected fine grained sulphides in black shales and within fractures, hence the EM was attributed to a shallowly dipping black carbonaceous shale unit within the Amelia Dolomite.

A 2010 reverse circulation (RC) drilling programme drilled a total of 17 drill holes for a total of 3840 meters at the T2 prospect. These holes identified the stratigraphy of the lower McArthur Group dips shallowly to the southwest (Figure 9). Table 6-1 shows the assay results for holes BLRC001-016. Hole BLRC017 was terminated at 6m and not assayed.

Hole ID	Max depth (m)	Northing mN	Easting mN	Max Cu (ppm)	Max Pb (ppm)	Max Zn (ppm)
BLRC001	196	8261856	563774	1630	213	174
BLRC002	300	8261462	563442	592	166	88
BLRC003	208	8261092	563135	709	27	121
BLRC004	202	8261534	564162	452	22	168
BLRC005	240	8262167	563425	890	356	124
BLRC006	300	8262624	564416	330	19	48
BLRC007	228	8262248	564094	387	22	146
BLRC008	300	8260701	562806	426	22	64
BLRC009	242	8260336	562489	214	30	22
BLRC010	66	8260125	564295	188	174	31
BLRC011	250	8260453	563899	306	337	93
BLRC012	204	8261732	562374	421	52	52
BLRC013	240	8261424	562745	443	25	85
BLRC014	300	8259936	562184	309	47	56
BLRC015	300	8260273	561784	390	57	59
BLRC016	258	8260589	561395	247	54	53
BLRC017	6	8260777	563515	n/a	n/a	n/a

Table 6-1. 2010 Assay Results.

7.0 2011 DRILLING PROGRAM

7.1 Introduction

In 2011 Sandfire completed one diamond (vertical) and two RC holes for 458.6m at the Tawallah 2 prospect (Table 2-1). The hole was designed to determine the stratigraphy across a shallow EM feature (150-200m depth) by going through the basal contact of the Mallapunyah Formation with the Masterton Sandstone. The aim is to test for the potential to host red-beds style SEDEX mineralisation.

7.2 Results

7.2.1 Lithology

Drilling intersected the Amelia Dolomite, Mallapunyah Formation and Masterton Sandstone units from the lower McArthur Group. A summary is in Table 7-1. Underneath 17.5m of Cainozoic cover was the Amelia Dolomite (Pma). This unit is a stromatolitic dolomite with stylolites, a thin bed of black carbonaceous siltstone and bands of coarser arenite. The base of Pma (111.94m) has transitional and conformable contacts with the Mallapunyah Formation (Pml) red beds. Pml comprises interbedded banded dolomite and purple muddy dolomite alternating with interbedded massive red brown mudstone and dolomitic mudstone. At 172.7m a 7.36m wide zone of pyritic dolomitic siltstone, stromatolitic dolomite and carbonaceous shale is followed by more *red beds* down to 234.13m. Calcified cauliflower chert and chert nodules occur in the dolomitic siltstone and there are wavy, matted and domal stromatolites. A fine-grained sandstone unit with a clast-supported beccia marks the top of the Masterton Sandstone (Pms) at 242.08m depth. Pms is a pink weakly hematitic medium grained sandstone with intermittent coarse intervals with grains up to 5mm and quartz-lined vugs (Lauricella et al, 2011).

mFrom	mTo	Unit	Description
0	17.5	Cover	Cainozoic sediments
17.5	111.95	Amelia Dolomite (Pma)	Stromatolitic dolomite with stylolites, a thin bed of black carbonaceous siltstone and bands of coarser arenite.
111.95	242.08	Mallapunyah Fm (Pml)	Interbedded banded dolomite and purple muddy dolomite alternating with interbedded massive red brown mudstone and dolomitic mudstone. At 172.7m, a 7.36m wide zone of pyritic dolomitic siltstone, stromatolitic dolomite (wavy, matted and domal stromatolites) and carbonaceous shale is followed by more *red beds.* Cauliflower chert, chert nodules.
242.08	380.6	Masterton Sandstone (Pms)	Pink, weakly hematitic, medium grained sandstone with intermittent coarse intervals with grains up to 5mm and quartz-lined vugs

7-1. Summary log of hole 11BLDD0007.

7.2.2 Alteration

Masterton sandstone has hematitic overprinting from 357.56m and shows metasomatic alteration caused during diagenesis.

7.2.3 Mineralisation

The Amelia Dolomite contains 0.01-0.2% of interstitial and blebby pyrite. Black shale beds of the Mallapunyah Formation have disseminated and banded pyrite (0.05-1%) and it forms in fractures as a minor constituent of the Masterton Sandstone. The silty-dolomite beds of Pma contain 1-2% dendritic manganese. No significant copper mineralisation was observed.

7.2.4 Geochemistry

The assay results show there was no anomalous copper in holes 11BLDD0007 and 11BLRC0100 (Table 7-2). Samples from hole 11BLRC0101 were not sent for assay. Anomalous barium (up to 5105ppm) from 113.6 to 228m marks the upper units of the Pml unit and the barium disappears in the overlying Pma beds.

Hole ID	Max Cu (ppm)	Max Pb (ppm)	Max Zn (ppm)	Max Ba (ppm)
11BLDD0007	260	120	210	5105
11BLRC0100	95	22.5	305	795

Table 7-2. 2011 Assay Results.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The target at the Tawallah 2 prospect was a shallow EM feature and tested the red-beds model of SEDEX-style mineralisation. The EM feature can be accounted for by carbonaceous black shale horizons in the Amelia Dolomite and Mallapunyah Formation. Drilling intersected the basal contact of the Mallapunyah Formation with the Masterton Sandstone at 242.08m depth. No significant mineralisation was observed and assays show the maximum copper in hole 11BLDD0007 is 260ppm. No further work is recommended.

9.0 REFERENCES

Haines, P.W., Pietsch, B.A., Rawlings, D.J., and Madigan, T.L., 1993, 1:250,000 Geological Map Series, Explanatory Notes, Mount Young SE53-15.

Herrmann, W, 2011, Geology of Lorella Pocket, Borroloola Exploration

Lauricella, P., Hansen, A., Price, M. and Kiernan, P., 2011, Borroloola Project- August 2011 Exploration Monthly Report.

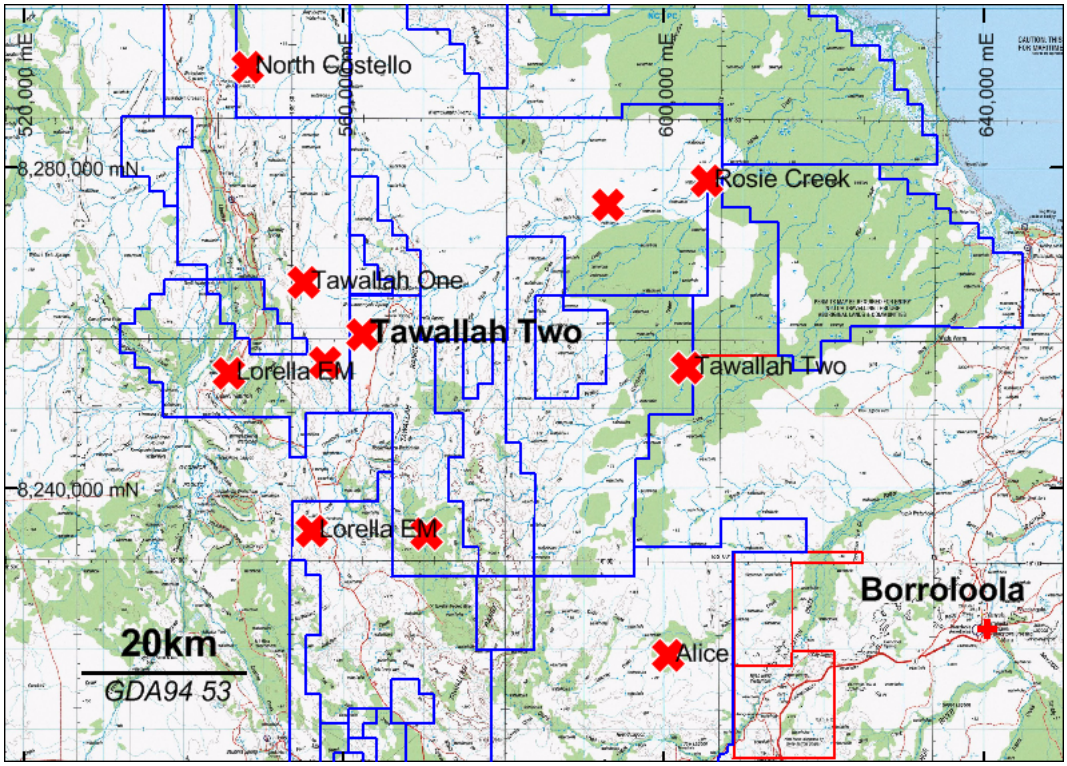

Figure 1. Location of Tawallah 2.

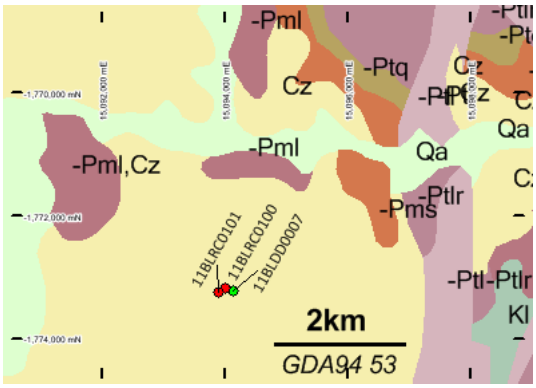

Figure 2. Geology and 2011 drilling.

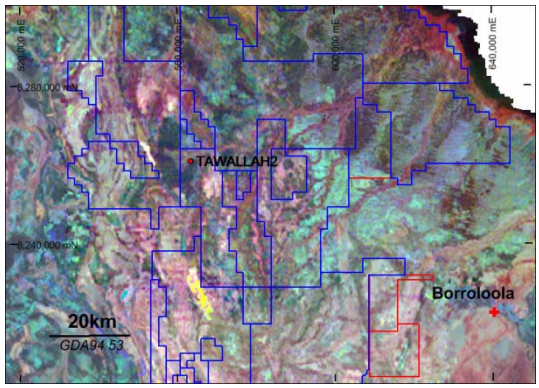

Figure 3. Radiometrics of the Mount Young region.

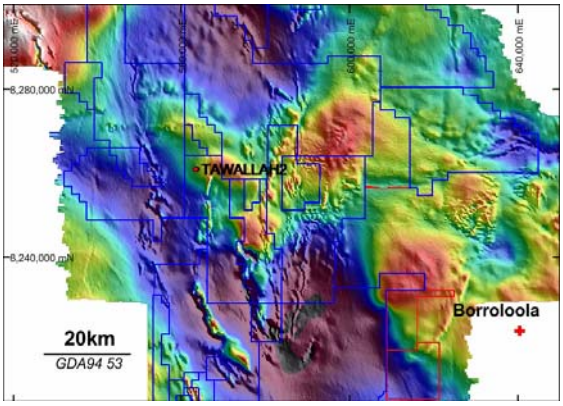

Figure 4. Magnetics of the Mount Young region.
Red cross marks Tawallah 1. TMI NE shade.

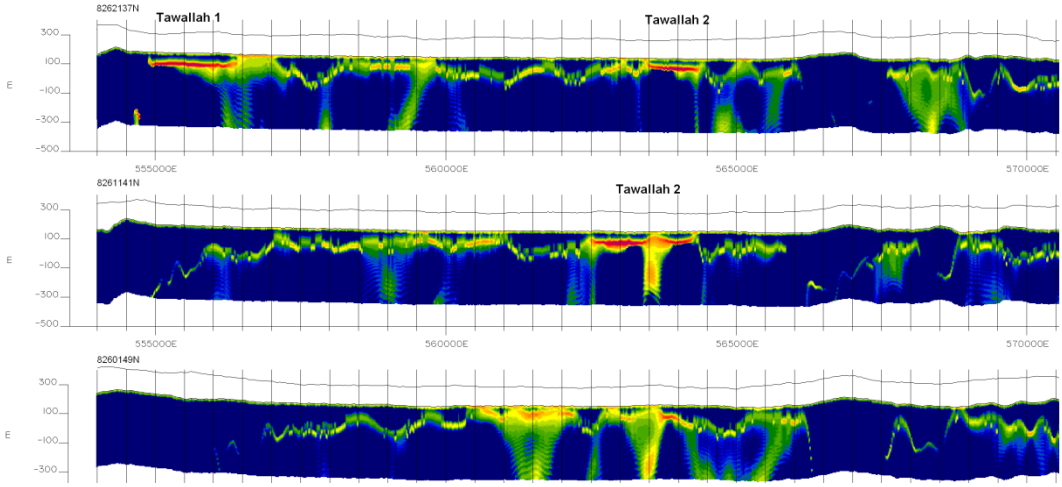

Figure 5. EM over Lorella Pocket. Shallow EM feature (Red) below Tawallah 2 .

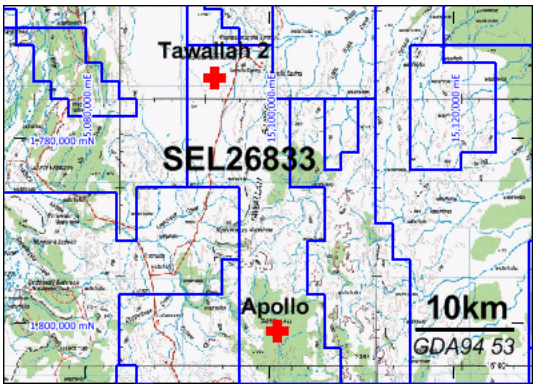

Figure 6. Map of SEL 26833. Red crosses mark prospects drilled by Sandfire prior to 2011.

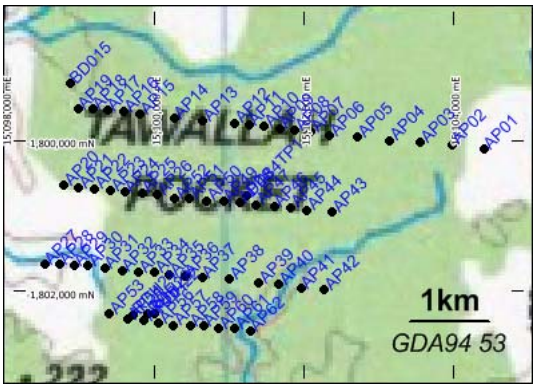

Figure 7. Apollo prospect. Percussion holes AP01-62 and diamond hole BD015.

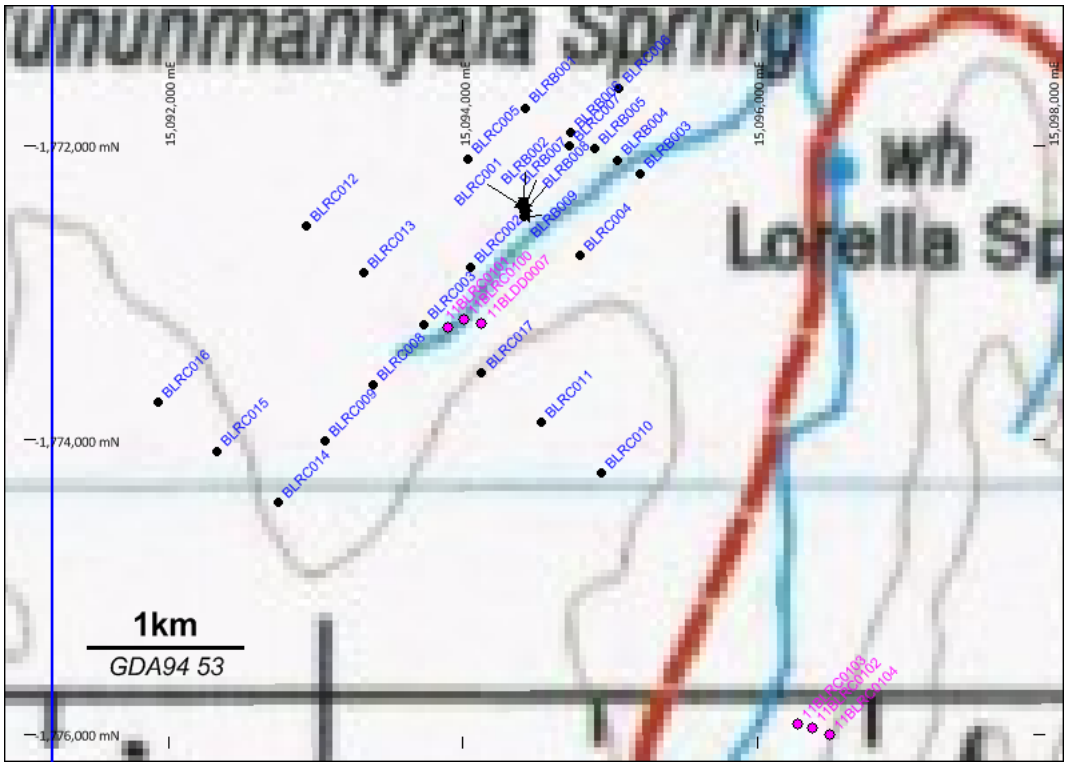

Figure 8. Drilling at Tawallah 2. Black dots = pre 2011 drilling. Pink dots = 2011 drilling.

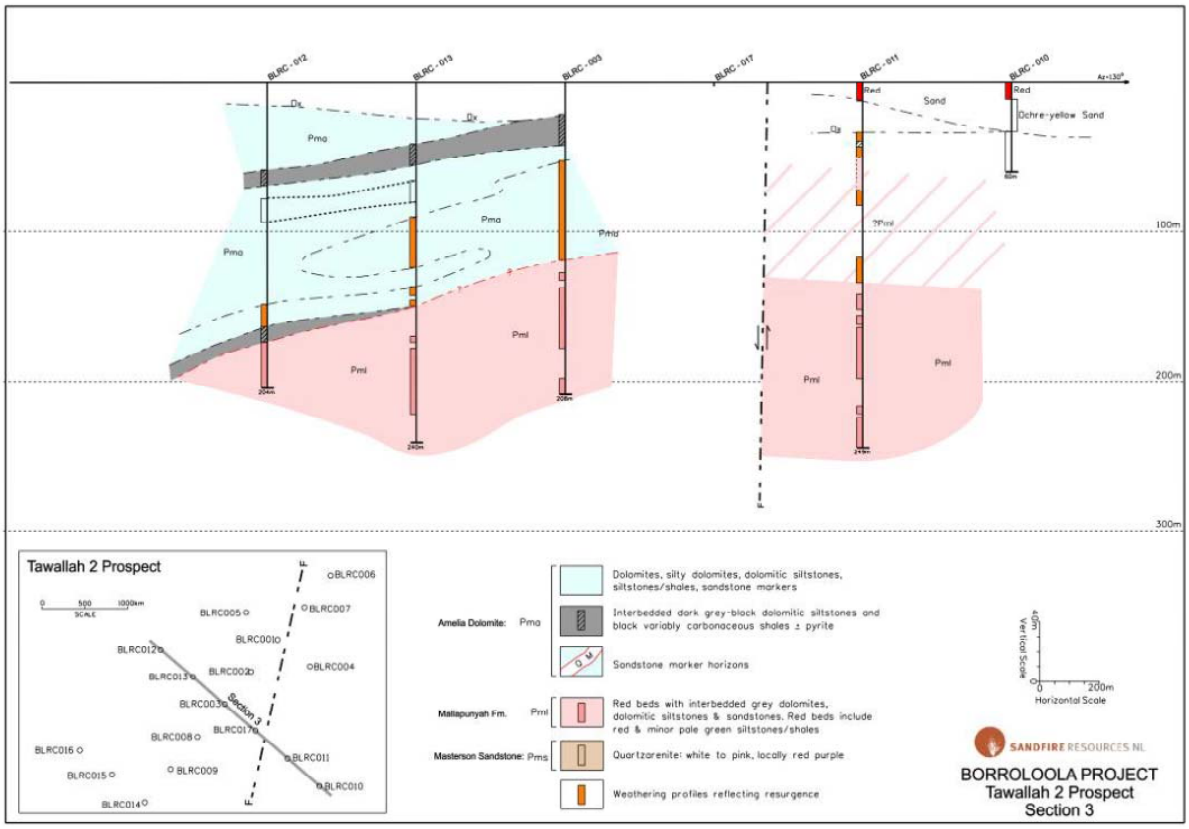

Figure 9. Cross section through Tawallah 2 using Sandfire 2010 RC drilling. The contact between Amelia Dolomite and Mallapunyah Fm dips <10° south-west.

APPENDIX A – WALLY HERRMANN MAPPING 2011, GEOLOGY OF LORELLA POCKET, BORROLOOLA EXPLORATION, W. HERRMANN. NTX30705.