Webb Mining Pty Ltd

EL 12/2011 – Sailors Gully

Year 2 Annual Report

John Carswell/Stuart Dawes
27th January 2014

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Abstract

EL 12/2011 is a 4 km^2 Category 1 license centered approximately 2 km SE of the Mangana township. The EL was awarded to Wesknight Mining Pty Ltd in December 2011, as the successful tenderer for a portion of Exploration Release Area 852. The license was transferred to Webb Mining Pty Ltd on 15th March 2013, and subsequently converted to Category 1 mining lease 4M/2013 on the 26th September 2013. This report covers exploration activities conducted by Webb Mining services Pty Ltd during the aforementioned period.

Current exploration is aimed at demonstrating the viability of developing an adit accessed, small scale, high grade narrow quartz vein gold mining operation on the Argyle-Golden Entrance reef and the Mangana reef. The Argyle-Golden Entrance reef is a 500 meter long NW-SE trending mineralised structure centered on Sailors Gully and extending from Sharkeys Gully to Irvines Gully in the central part of the EL. The Mangana reef occupies the ridge between Sailors Gully and Sharkeys Gully and is parallel to and about 500 meter's west of Argyle-Golden Entrance reef.

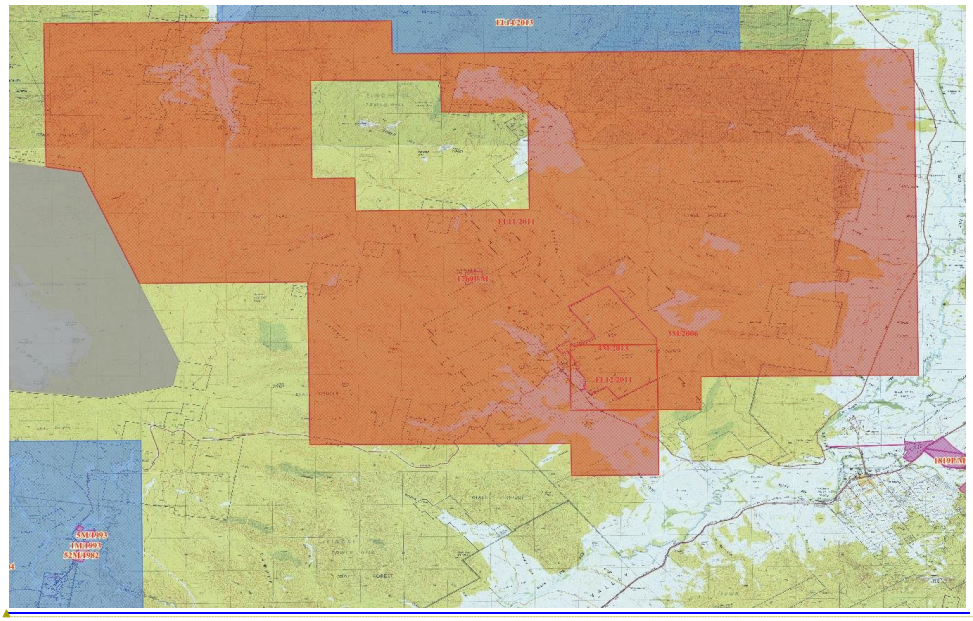
Exploration activity for the period included establishing and upgrading existing vehicle track access, drainage, signage, the installation of water tanks, limited underground sampling and 386.5 meters of diamond drilling in five holes at Argyle and Mangana. Results from this drilling were poor with only one economic grade intersection in hole MA2 which included 1.7 meters down hole grading 9.6g/t in the Mangana reef.

A survey of surface and underground infrastructure was completed and a set of maps and sections was produced. Cultural heritage, botany and fauna habitat surveys were also undertaken by consultants.

A Notice of Intent for a Mineral Processing Works was submitted to the Environmental Protection Authority in March 2013. An Environmental Effects Report was completed and advertised in August 2013 with a Planning Permit Application for an underground gold mine and processing plant. The Permit (DA 159-2013) was granted by the Break O'Day Council on 2nd October 2013.

INTRODUCTION & TENEMENT DETAILS

EL 12/2011 is a 4 km^2 Category 1 license centered approximately 2 km SE of the Mangana township. The EL was awarded to Wesknight Mining Pty Ltd in December 2011, as the successful tenderer for a portion of Exploration Release Area 852. The license was transferred to Webb Mining Pty Ltd on 15th March 2013, and a subsequently converted to Category 1 mining lease 4M/2013 on the 26th September 2013.



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The application was focused on acquiring tenure over the abandoned Mangana narrow vein quartz reef workings, in particular the partly mined Argyle-Golden Entrance structure and its adit infrastructure. Webb Mining has substantial experience and expertise in underground narrow vein mining of relatively high grade ore in narrow steeply dipping structures and the work program currently in progress is aimed specifically at proving up resources for a small scale underground gold mine

Land tenure across EL12/2011 comprises a combination of State Forest, Private Land, Private Reserve and Public Reserve, with the workings being located on State Forest. All weather access to most parts of the EL is available via 2WD roads to the southern part of the tenement and a combination of 4WD and walking tracks around the workings. All services and equipment needed for year round exploration are available in the Esk Valley-Launceston region.

This report covers all exploration and feasibility study activities conducted in license year 2, ending 26th September 2013. During the year, cultural heritage, botanical and fauna habitat surveys were conducted by specialist consultants and their reports are

included as appendices. All map grid references use GDA94.

GEOLOGY

The Mangana and Argyle-Golden Entrance deposits are one of several Devonian structurally controlled orogenic quartz vein style gold-silver-sulphide reefs which comprise the Mangana goldfield. The regional geology hosting all known mineralised structures in the Mangana area consists of folded and faulted greenschist metamorphosed turbiditic sandstones and black shales (mainly now slates), within the Siluro-Devonian Mathinna Supergroup (Tasmanian Geological Survey 1:25,000 Mangana Sheet).

The Argyle-Golden Entrance structure is a 500 metre long shear trending NW-SE from Sharkeys Gully to Irvines Gully, with most of the abandoned workings and known mineralization in the central part of the structure around Sailors Gully (Figure 1). The strike of the structure is normal to the strong NE-SW trending tectonic fabric controlling the ridge and gully topography of the area hosting the reef. This geometry is consistent with a late stage compressional shear structure and the banded and laminated nature of the quartz fill, together with the locally intense folding and brecciation at the reef-wall rock contacts, indicated several stages of dilation and fluid fill during the compression.

Exposures within the Argyle workings indicate a reef width ranging from 20 cm to 2 metres, and a steep dip to the NE. Remnant stopes show a lenticular shape to the mineralised shoots within the reef but there is no obvious structural control which could be used to predict the spacing of these wider, higher grade shoots.

The Mangana structure is approximately 500 metres to the west and sub-parallel to the Argyle-Golden Entrance structure, dipping steeply to the NE between Sailors and Sharkeys Gullies. Historical trenching and exposures in recent track making indicate the Mangana structure extends SE to Irvines Gully. Historical reports and exposures in the Mangana Reef workings indicate a reef ranging from a few centimeters to ~7m in width.

EXPLORATION AIMS & PHILOSOPHY

The potential for a viable modern mine appears to rely on narrow vein development of the adits, with continuous drilling and bulk sampling to delineate ore zones. Given the deformation style it is also likely that the reef may buckle and locally change dip direction with depth, so a consistent NE dip cannot be assumed. This should not be a problem in the early years of the mine life, as the sampling to date in both the Argyle and Golden Entrance adits, indicates better grades above the base of oxidation. The base of oxidation occurs at about the lower adit level in Sailors Gully and below this level there is a substantial increase in sulphide and ground water. Above this position the rocks are partially oxidised, mainly dry and possibly enriched in gold, albeit with an erratic and nuggety distribution, including some coarse visible gold.

From a mining and metallurgical perspective, the geology indicates a strong case to

initially concentrate the mine on the supergene enriched upper level workings either side of Sailors Gully.

The aims and philosophy of the current exploration program are to test the grade variability, metallurgy and ground conditions along strike within the old adits, and evaluate the economics of the project in terms of applying modern geological control and mining skills and equipment to more traditional manual mining methods.

SUMMARY OF PREVIOUS EXPLORATION

Tasmanian Geological Survey Bulletin No1 (Twelvetrees, 1907) and Unpublished Typed Reports (Reid, 1929, Blake, 1939 and Finucane, 1932) record the history of prospecting and mining on the Mangana goldfield. The main deposit, Mangana Reefs, was discovered in 1859 and was probably the first quartz vein gold reef to be mined in Tasmania, following sporadic alluvial mining in Richardsons Creek and Majors Gully by Chinese and European miners from 1852 onwards. The Golden Entrance reef was discovered in 1896 and worked intermittently until the mid 1920s and the Argyle, a southeasterly strike extension of the Golden Entrance, was discovered in 1927.

Despite substantial underground development, only one small shoot appears to have been mined on the Argyle reef. Sampling by government geologist Finucane in 1932, Tasminex NL in 1981 and Alcaston Mining NL in 1988, all produced grades in the range BLD-31 g/t gold from vein widths ranging from 20-100 cm, indicating that remnant ore grade mineralisation remains in the old stopes but the grade distribution in very nuggety. This interpretation is also supported by Finucane (1932) reporting systematic ore dump sampling returning an average gold grade of 1.2 g/t, much less than the average of hand picked channel samples from underground.

In 1988 Alcaston Mining NL drilled 8 inclined open hole percussion (RAB) drill holes under the Argyle workings. This program appears to be the only attempt to assess the overall grade of the vein system and the results were disappointing. All holes intersected intervals of geochemically anomalous but very much sub economic gold (Morrison, 1988). All intersections were <1 g/t Au.

The previous work has demonstrated that patchy high grade gold remains in the Golden Entrance-Argyle vein structure and that an opportunity exists for selective low tonnage mining utilising modern underground mining equipment.

EL 12/2011 YEAR 1 EXPLORATION RESULTS

Apart from a small sampling project on the old battery tailings sands, all work to date has been associated with refurbishing and sampling the Golden Entrance and Argyle adits and stopes.

The tailings sand sampling consisted of 12 evenly spaced channel samples, taken from top to bottom through the dune shaped body of sand located at the southern end of the EL (Table 1). The deposit is roughly estimated at approximately 7,000 tonnes, by tape measurement of the dimensions and assuming a bulk density of 1.6 t/bcm. The sampling returned a mean grade of 1 g/t gold and a fairly tight range of 0.46-1.68 g/t gold, by fire assay/AAS. These results are too low to contemplate trucking the sands to operating mills at Beaconsfield or Henty but indicate potential to reprocess the sand onsite, as part of the head feed to a crusher/gravity separation mill primarily treating oxide zone quartz vein ore from underground.

Table 1

Tailings Sand Channel Sampling-July 2012

(*GDA 94 by hand held GPS)

Sample ID	Easting*	Northing*	Au ppm
WR0001	574408	5392655	1.68
WR0002	574403	5392645	1.18
WR0003	574402	5392638	0.46
WR0004	574404	5392633	1.31
WR0005	574393	5392629	0.94
WR0006	574397	5392634	1.04
WR0007	574405	5392631	0.86
WR0008	574410	5392628	1.49
WR0009	574408	5392624	0.88
WR0010	574409	5392601	0.51
WR0011	574416	5392590	1.10
WR0012	574419	5392583	0.66

The main activity involved refurbishing drives and stopes with hand held drills and a small bobcat and taking samples from the reef using ladders and percussion hammers. Sample size ranged from 30-1000 kg and all samples were crushed onsite to sand size, manually split for analytical sub samples which were assayed at the ALS Burnie Laboratory. Table 2 shows the extreme range of gold concentration which resulted from samples of vein quartz plus minor wall rock, all showing no visible differences between samples and no reliable indicators for visually discriminating high and low grades during sampling. Grades range from 0.1 to 864 g/t gold, with a mean value of 32 g/t gold (n=17 samples). With such extreme variation the mean value is somewhat meaningless but if the 7 x 1000 kg samples are considered as potentially being more representative of the reef from a run of mine perspective, the range tightens to 0.5-25.1 g/t, with a mean of 9.2 g/t gold.

Table 2
Argyle-Golden Entrance Underground Bulk Sampling Results

Adit	Location	Au g/t	Ag g/t
Top Argyle	10-20 m of backs	0.09	2
Top Argyle	First winze 23m	14.05	2
Top Argyle	2nd winze 29m	18.4	3
Top Argyle	68m end of drive face	0.25	1
Top Argyle	Backs above winze 1	1.5	1
Top Argyle	Floor between 2&3 winze	2.07	1
Top Argyle	0-10m of floor	0.35	1
Golden Entrance		864	138
Golden Entrance		247	45
Top Argyle	10-20m of floor	1.8	1
Top Argyle	3rd winze 43m	25.1	4
Top Argyle	62 to 68m backs	0.47	1
Top Argyle	Above 3rd winze backs	69.2	14
Top Argyle	4th winze 58m	2.55	1
Top Argyle	0-10m of backs	0.7	1
Golden Entrance		221	35
Golden Entrance		116	5

Silver is generally low and correlates well with the gold grade, which is consistent with the near absence of visible base metal sulphides in the concentrates. Only 5 samples (A12, A13, B6, B13 and C13) returned silver grades of ≥5 ppm and they are the 5 samples with highest gold grades. More detailed metallurgical tests are needed but at the current stage of investigation the gravity concentrate mineralogy, at least from the oxide zone, appears to be a simple gold-silver electrum in a fine pyrite>>arsenopyrite black sand.

Overall the results demonstrate that substantial gold of probable ore grade remains exposed in the old workings and that bulk sampling is an effective technique for evaluating the reef, especially if the samples are of the order of 1000 kg rather than a few tens of kilograms.

EL 12/2011 YEAR 2 EXPLORATION RESULTS

Year two exploration included:

- Establishing vehicular access to drill sites in accordance with the approved works program.
- Limited underground sampling.
- Drilling 5 diamond drill holes to test reef structure and grade continuity in Mangana and Argyle, and to test for grade of a minor structure on the hanging wall of the Mangana structure in sailors Gully referred to as Jimmys Reef.

Table 3 summarises the location of the ten holes drilled during the year.

Table 3

Hole No	Northing	Easting	RL	Depth	Purpose
MA1	5392876	575169	446	125.8	Test the Argle reef structure and possibly the Argyle West structure
MA2	5392943	574834	303	79.5	Test Jimmys reef along strike and down dip of surface exposure. Also test Mangana reef at depth.
MA3	5392943	574834	303	35	Test Jimmys reef along strike and down dip of surface exposure.
MA4	5392943	574834	303	48	As above
MA5	5393080	574720	390	98	Test Mangana reef 30m north of end of 4 level between 3 & 4 Level (down plunge high grade stopes)

Drilling of Jimmy's Reef

Three short holes were drilled to test a quartz reef that was exposed about 20m east of the Mangana Shaft on the north side of Sailors Gully at about the elevation of the collar of the shaft. The results of the drilling are summarised in table 4.

Table 4

Hole Number	Reef intersection	Gold Grade g/t
MA2	9.4 – 10.7m 18.1 – 21.3m 31.7 – 32.2m	0.09 0.01 0.02
MA3	19.6 – 20.3m	0.07
MA4	23.6 – 24m	0.02

The three holes demonstrated the continuity of Jimmy's Reef but gold grades were poor. MA2 was continued through Jimmy's reef to test the Mangana Reef and abandoned in very hard buck quartz, the last 1.3 metres grading 9.1g/t.

Drilling of the Mangana Reef between 3 and 4 Level

One hole was drilled to test grade continuity below stopes that were mined in the Mangana Reef above 3 level between No 1 and No2 adit. The hole intersected the reef but with poor grades and narrow reef widths, as summarized in table 5. This drilling will continue in future programs.

Table 5

Hole Number	Reef intersection	Gold Grade g/t
MA5	71.45 – 77.85m	0.1

Argyle Structure Drilling

One hole was drilled into the Argle structure mostly to test down dip continuity of mined out high grade shoots. The results are summarised in table 6. Results were poor. This drilling is continuing.

Table 6

Hole Number	Reef intersection	Gold Grade g/t
MA1	50.4 – 52	0.1

Plans and sections of the drilling were unavailable at the time this report was written.

EXPENDITURE

Total expenditure on EL 12/2011 in the period that Webb Mining has held the tenement from 15th March 2013 to 26th September 2013 comprising the following categories.

Table 7 Expenditure

Geology	$7,350
Analytical/assays	$114,000
Drilling & Gridding Costs	
Gridding	$95,650
Drilling/plant hire	$136,800
Land Access and Surveying Costs	$64,234
Rehabilitation Costs	$3,000
Feasibility Study Costs	$5,180
Other Costs	$189,936
Administration Costs	$32,000
TOTAL	**$684,150**

ENVIRONMENTAL ACTIVITIES

Most direct exploration activity was conducted underground but upgrading of surface vehicle tracks and drainage and some safety fencing and signage was required prior to re-entering the old adits. Cultural heritage and botanical/fauna habitat surveys completed by consultants Parry Kostoglou and Philip Milner respectively formed part of the EER and permit application and their reports are enclosed in Appendices A and B. Three sites with heritage values related to the early mine settlement and a section of the original access track to one of the Argyle adits were identified (Appendix A), and the recommended actions to preserve these sites will be followed.

No plant or animal species or community listed as threatened or endangered under State or Federal Acts was encountered during the field survey in the area of the proposed works. No recommendations for specific actions were required (Appendix B).

FUTURE WORK

As the exploration lease has been transferred to mining lease, ongoing work will focus on underground mining activities, however it is expected that further surface drilling will be conducted in order to test extensions of known mineralisation of the Argyle-Golden Entrance Reefs and Mangana Reef.

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Appendix A

Historic Cultural Heritage Survey Report

Webb Mining

Mangana Gold Project

Environmental Effects Report

Appendix H Archaeological Assessment (Kostoglou)

June 2013

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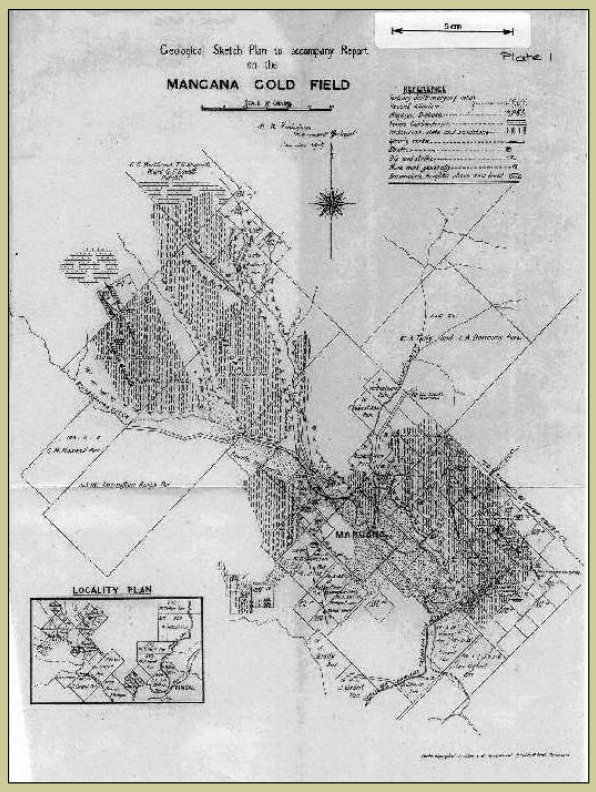
HISTORIC CULTURAL HERITAGE SURVEY

MANGANA GOLD MINE

FINAL REPORT



Prepared For Wesknight Mining Pty Ltd.
Parry Kostoglou
August, 2012

CONTENTS

1.1 INTRODUCTION

1.2 Background

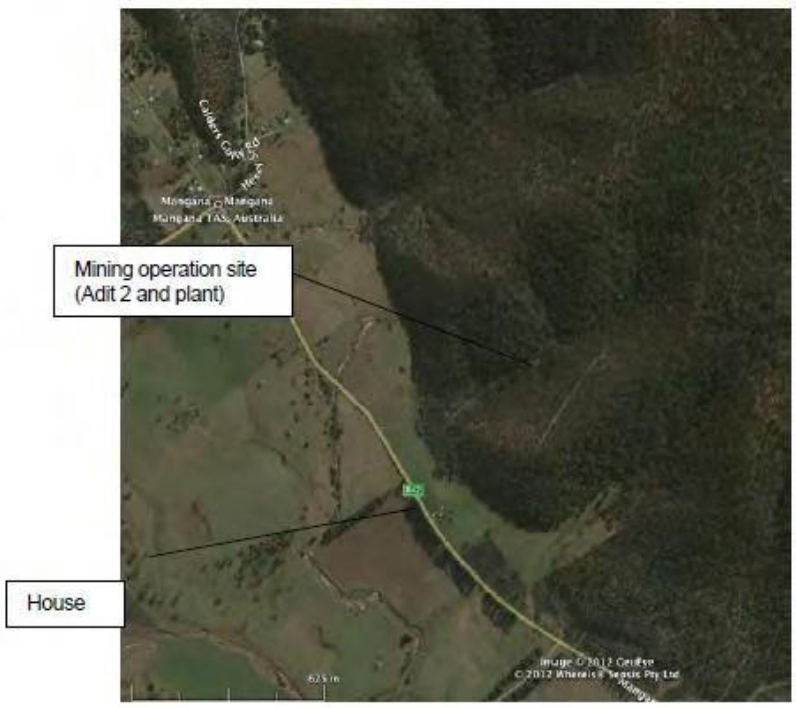
Wesknight Mining Pty Ltd is currently in possession of Mineral Exploration Licence 12/2011 which is situated on Sailors Gully some 400 metres south of Mangana Township. This vicinity hosts several historic mining adits which Wesknight have sampled and found to be sufficiently rich to encourage limited underground mining. As part of their statutory obligations this firm are required to sponsor a historic cultural heritage assessment of the former workings in order to identify any potential impacts on sites of significance. This document seeks to fulfil this obligation by assessing the attributes and significance of all known historic features within the licence area.

1.3 Previous work

No previous cultural heritage assessments have been undertaken in regard to this property.

1.4 Location of site

This licence area is situated in Sailors Creek Gully less than 500 metres south east of Mangana Township in north eastern Tasmania. More specifically the target mine adits occur on both sides of the creek within native forest flanking the parent gully. Cleared pasture adjoins the licence area to the west.



1.5 Objectives

The stated objectives of the survey were to collate the cultural contents of the site and make recommendations as to their management during future works.

1.6 Methodology

The consultant visited the site over a three hour period during early August, 2012.

2.0 SUMMARY OF RESULTS

This consultant recorded a total of eleven features at this site. These were:

Feature number	Feature name
01	Number 1 south adit
02	Old south adits track section
03	Number 2 south adit
04	Number 2 north adit
05	Number 2 adit 'Golden Entrance'
06	150' Level adit
07	Vertical timbered shaft
08	Partially collapsed drive
09	Long tunnel
10	Mangana mine settlement timber bridge
11	Mangana mine settlement

All sites are described individually in Section 5.0 of this report.

3.1 SIGNIFICANCE & RECOMMENDATIONS

Of the eleven features recorded and described overleaf, three are deemed to have sufficient significance to warrant further management related activities. These are:

- Old south adits track section
- The Mangana mine settlement
- Mangana mine settlement timber bridge

All three sites appear to be vestiges of the mine's occupancy between c1896 and 1940.

- Although all but destroyed by 20th century vehicular access, the remnant section of track remains well defined beside the current one. Given that the two tracks occur beside each other, it should be easy to protect this remnant vestige of the original track.

- The settlement complex will undoubtedly include sub surface remains related to dwellings, a blacksmith's shop and old rubbish deposits. As this complex seems undisturbed, the integrity of these sites is expected to be high. However, as both of these sites occur on the very boundary between the forested gully and the cleared pasture (and thus well away from the target historic adits), no conflict with the subject development is anticipated. It is therefore merely recommended that the development proponents be mindful of the two significant sites when proposing any deviation to the existing mine access track which passes 20 metres to the south of both entities.

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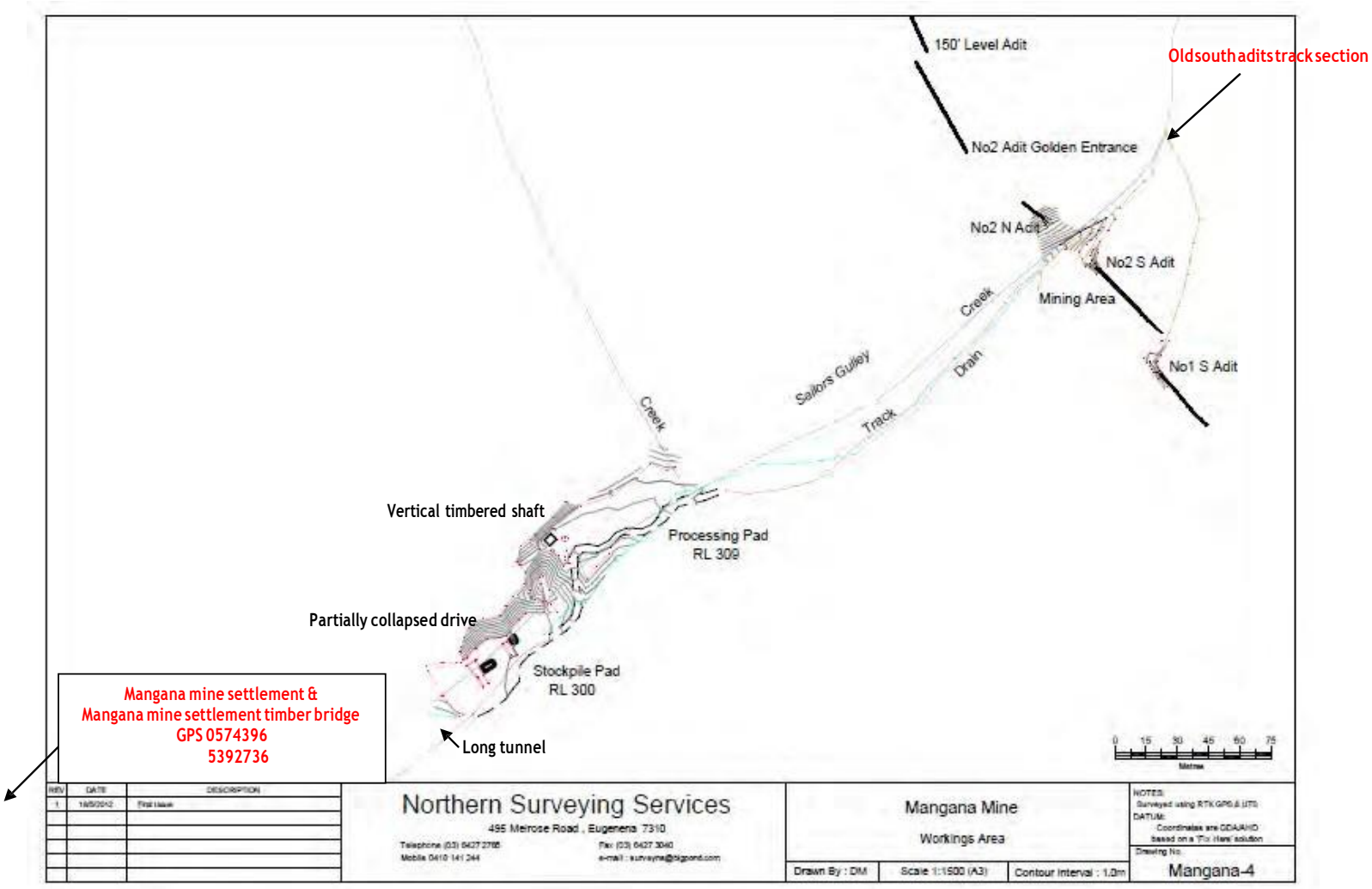
150' Level Adit
Old south adits track section
No2 Adit Golden Entrance
No2 N Adit
No2 S Adit
Mining Area
No1 S Adit
Creek
Sailors Gulley
Track
Drain
Creek
Vertical timbered shaft
Processing Pad
RL 309
Partially collapsed drive
Stockpile Pad
RL 300
Long tunnel
Mangana mine settlement &
Mangana mine settlement timber bridge
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5392736
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DESCRIPTION
Northern Surveying Services
495 Melrose Road , Eugenena 7310
Telephone (03) 6427 2765
Fax (03) 6427 3040
Mobile 0410 141 244
e-mail : surveyns@bigpond.com
Mangana Mine
Workings Area
NOTES:
Surveyed using RTK GPS & DTM
DATUM:
Coordinates are GDA/AHD
based on a 'Fix it here' solution
Drawing No:
Mangana-4
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Feature number	Feature name	Cultural Significance	Recommendations	Reason/s
01	Number 1 south adit	Low	None made	Unremarkable example of horizontal drive
02	Old south adits track section	Medium	Protect if possible	Sole surviving section of original 19th century track to this mine
03	Number 2 south adit	Low	None made	Unremarkable example of horizontal drive
04	Number 2 north adit	Low	None made	Unremarkable example of horizontal drive
05	Number 2 adit 'Golden Entrance'	Low	None made	Unremarkable example of horizontal drive
06	150' Level adit	Low	None made	Unremarkable example of horizontal drive
07	Vertical timbered shaft	Low	None made	Unremarkable example of vertical shaft
08	Partially collapsed drive	Low	None made	Unremarkable example of horizontal drive
09	Long tunnel	Low	None made	Unremarkable example of horizontal drive
10	Mangana mine settlement timber bridge	Medium	Protect from all impacts	The remains of this settlement appear to be undisturbed
11	Mangana mine settlement	High	Protect from all impacts	This feature forms part of the Mangana settlement

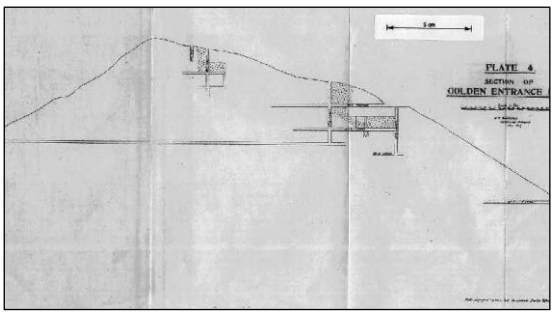
4.0 HISTORICAL SUMMARY

Originally known as "The Nook", Mangana was the site of the first payable gold discovery in February 1852 when a local servant Keeling Richardson found alluvially washed gold in Richardsons Creek. Two hundred miners quickly assembled to stake out and work the creek and its tributaries such as Majors Gully before they gradually dissipated as the gold proved elusive. However another nearby strike in 1859 proved longer lived when a gold bearing quartz reef was discovered half a mile south of Mangana. Over the ensuing forty years to 1900 other reefs were discovered including the 'Golden Entrance' reef (which is the subject of this report) in 1896 by J.S. Goodall.

During January and April 1900, the relevant sections were acquired by B & J. E. Smith and were transferred to the Golden Entrance Company. Between 1900-1902 a total of 224 tons of quartz yielded 1427 ounces of gold before it was worked on tribute producing 2415 ounces of gold from 565.5 tons of quartz

This company's leases were abandoned in 1909 as part of a larger mining down turn affecting the state until the late 1920's, although some prospecting was undertaken during the interim. In 1927, a prospector named C.E. Chesshire located a southern continuation of the Golden Entrance reef and formed a new company called the Argyle Gold Development Company to re-work it in 1929.

Between 1929 and c1935 twenty five miners were additionally lured back to the alluvial field before both the alluvial and deep lead gold mines at Mangana closed down again. Periodic but limited prospecting has occurred up to the present day.



Section drawing of Golden Entrance workings from Blake, 1939.

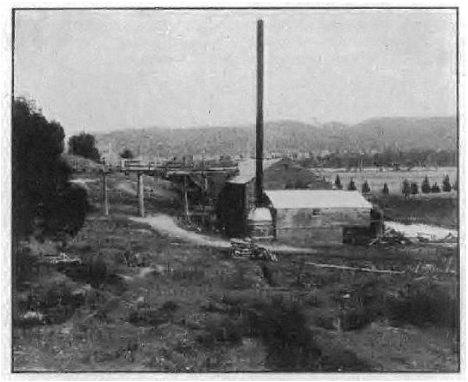
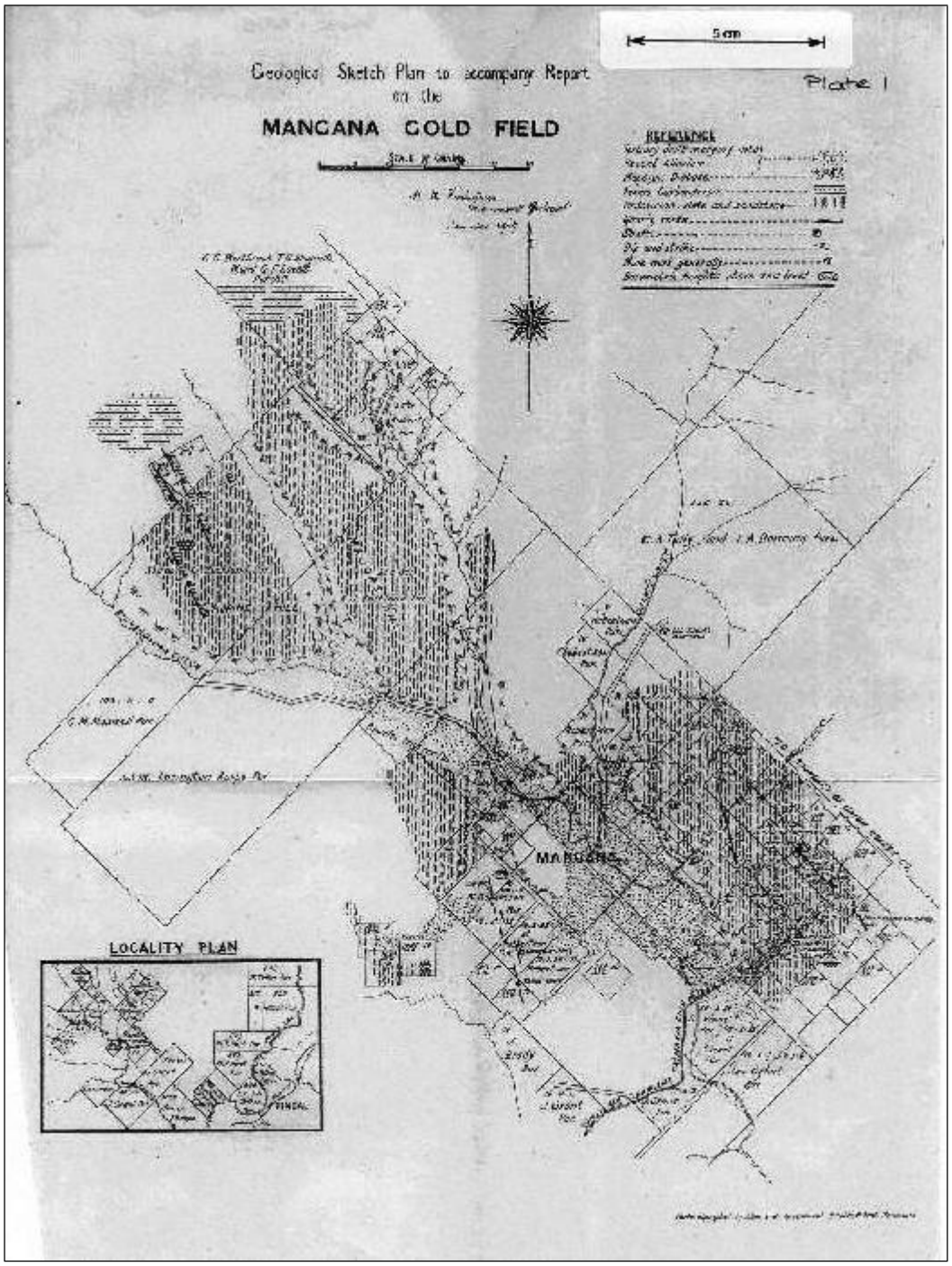


Photo showing nearby Mangana Reefs battery from Twelvetrees, 1907.



Map of the Mangana Leases from Twelvetrees, 1907.

5.0 FEATURE SUMMARIES TABLE

A tabular summary of all located features appears below. A scaled plan of the site showing the locations of these features likewise appears overleaf.

Feature number	Feature name	Description	Comment/s	Photograph
01	Number 1 south adit	Adit portal and horizontal drive	Unremarkable mine entrance	
02	Old south adits track section	Section of original track to the workings.	Relatively well preserved. Should be protected.	

03	Number 2 south adit	Adit portal and horizontal drive	Unremarkable mine entrance	
04	Number 2 north adit	Adit portal and horizontal drive	Unremarkable mine entrance	
05	Number 2 adit 'Golden Entrance'	Collapsed adit portal and horizontal drive	Unremarkable mine entrance	
06	150' Level adit	Collapsed adit portal and horizontal drive	Unremarkable mine entrance	

07	Vertical timbered shaft	Vertical shaft and remnant timbering	Unremarkable vertical mine shaft	
08	Partially collapsed drive	Adit portal and horizontal drive	Unremarkable mine entrance	
09	Long tunnel	Adit portal and horizontal drive	Unremarkable mine entrance	

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10	Mangana mine settlement timber bridge	Remnant timbers but no decking	Element of Settlement site described below. As such should be protected.	
11	Mangana mine settlement	Sequential low earthen mounds with associated brick scatters	Well preserved archaeological site which should be protected.	

1

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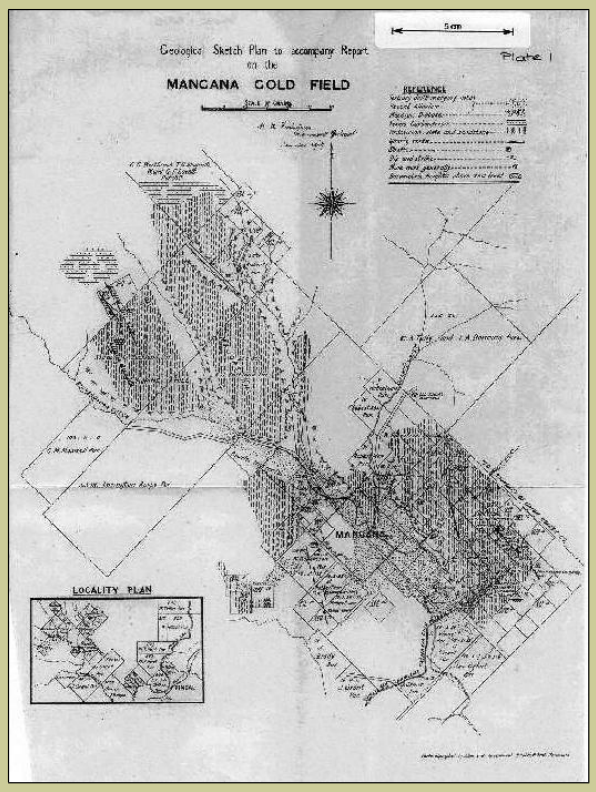
HISTORIC CULTURAL HERITAGE SURVEY

MANGANA GOLD MINE

SOVEREIGN WORKINGS

FINAL REPORT



Prepared For Miedecke & Partners
Parry Kostoglou
February 2013

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1.1 INTRODUCTION

1.2 Background

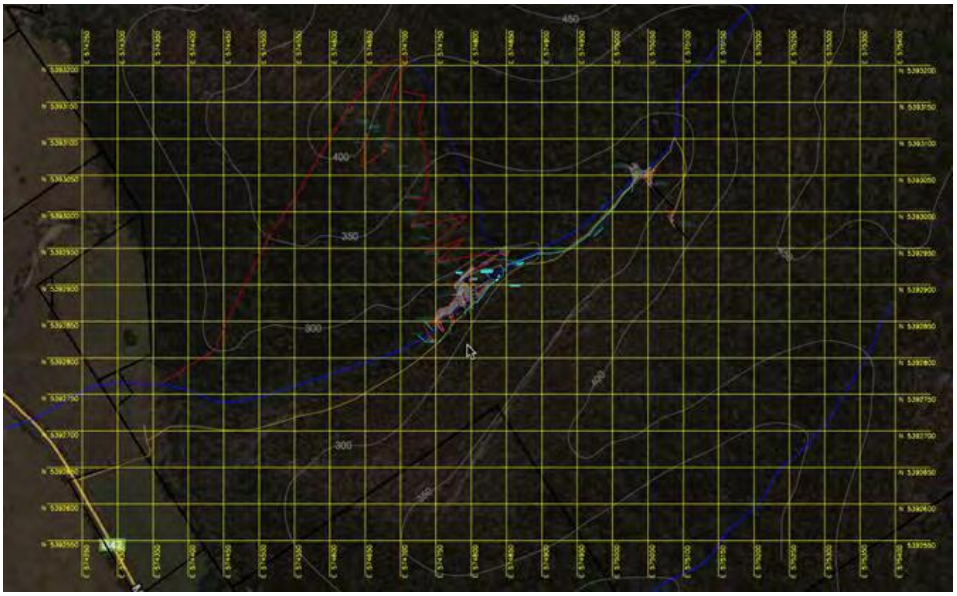
Situated slightly south of Mangana Township, these historic workings host a complex of shafts and connecting horizontal drives which have been recently sampled and found to be sufficiently rich to encourage limited underground mining. As part of its statutory obligations the relevant leaseholder is required to sponsor a historic cultural heritage assessment of the former workings in order to identify any potential impacts on sites of significance. This document seeks to fulfil this obligation by assessing the attributes and significance of all known historic features within the licence area.

1.3 Previous work

No previous cultural heritage assessments have been undertaken in regard to this property although an assessment of the adjacent workings at the Golden Entrance mine has been recently completed (Kostoglou August 2012)

1.4 Location of site

This licence area is situated less than 500 metres south east of Mangana Township in north eastern Tasmania. More specifically the target mine workings occur on the south eastern slope of Sovereign Hill situated between Sailors Creek Gully (to the south) and Sharkey's Gully (to the north).



Aerial overlay showing location of proposed mine infrastructure.

1.5 Objectives

The stated objectives of the survey were to collate the cultural contents of the site and make recommendations as to their management during future works.

1.6 Methodology

The consultant visited the site over a three hour period during mid February, 2013.

2.0 SUMMARY OF RESULTS

A total of twelve features have been noted at this site. These are:

Feature number	Feature name	Contents description
01	Sovereign shaft	Vertical shaft, stope and dry stone rock walling
02	Unknown adit (RL 422)	Adit, dry stone rock walling and mullock
03	Unknown shaft	Vertical shaft and stope
04	Unknown shaft	Vertical shaft, adit drive, finger dump and dry stone rock walling
05	Unknown adit	Collapsed drive and mullock
06	Unknown shaft	Vertical shaft
07	Unknown adit	Collapsed drive and mullock
08	Unknown adit	Collapsed drive and mullock
09	Unknown adit	Vertical shaft
10	Unknown shaft	Collapsed drive and mullock
11	Unknown adit	Collapsed drive and mullock
12	Unknown adit	Collapsed drive and mullock

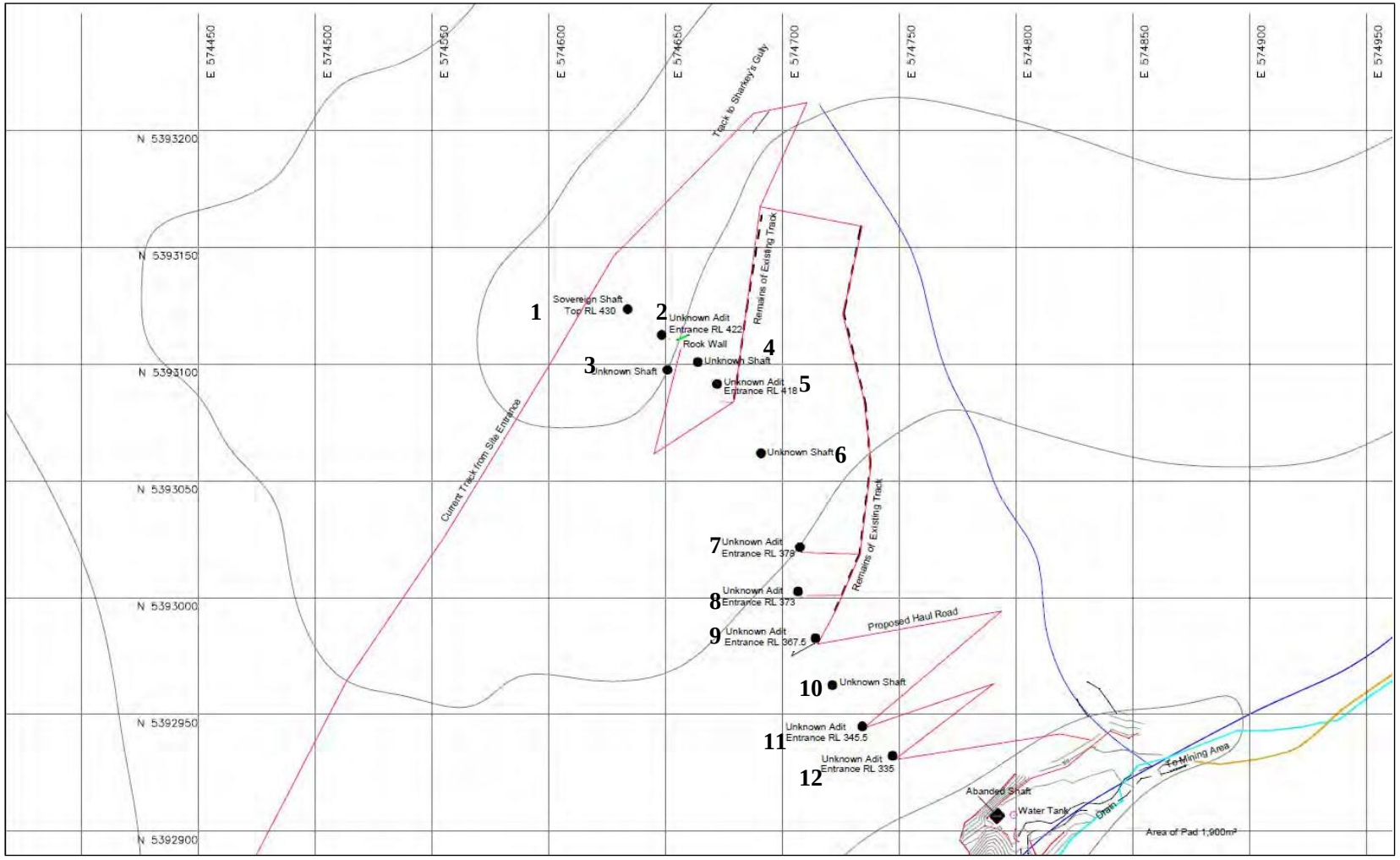
3.0 STATEMENT OF SIGNIFICANCE & RECOMMENDATIONS

The discovery of gold at Mangana in 1859 was the earliest gold strike in the state. Mangana is therefore a historically significant locality in regard to the earliest mining history of this state.

However the workings described in this report are vestiges of the re working of the Mangana area by more intensive hard rock mining during the late 19th and early 20th century rather than the older alluvial works.

As physical remnants of historic mining activities, these workings (above the ground anyway) are unremarkable examples of early 20th century hard rock mining. However the dry stone walling accompanying some of the shafts and adits is both well preserved and aesthetically pleasing. In association with their companion shafts and adits this stone work signposts historic mining activities in a location that will not impact on the proposed mining blueprint.

It is therefore recommended that the dry stone walling be protected from proposed mining activities.


E 574450
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E 574850
E 574900
E 574950
N 5393200
N 5393150
N 5393100
N 5393050
N 5393000
N 5392950
N 5392900
Track to Sharkey's Gully
Remains of Existing Track
Current Track from Site Entrance
Remains of Existing Track
Proposed Haul Road
1 Sovereign Shaft Top RL 430
2 Unknown Adit Entrance RL 422
Rock Wall
3 Unknown Shaft
4 Unknown Shaft
5 Unknown Adit Entrance RL 418
6 Unknown Shaft
7 Unknown Adit Entrance RL 378
8 Unknown Adit Entrance RL 373
9 Unknown Adit Entrance RL 367.5
10 Unknown Shaft
11 Unknown Adit Entrance RL 345.5
12 Unknown Adit Entrance RL 335
Abanded Shaft
Water Tank
Dam
to Mining Area
Area of Pad 1,900m²

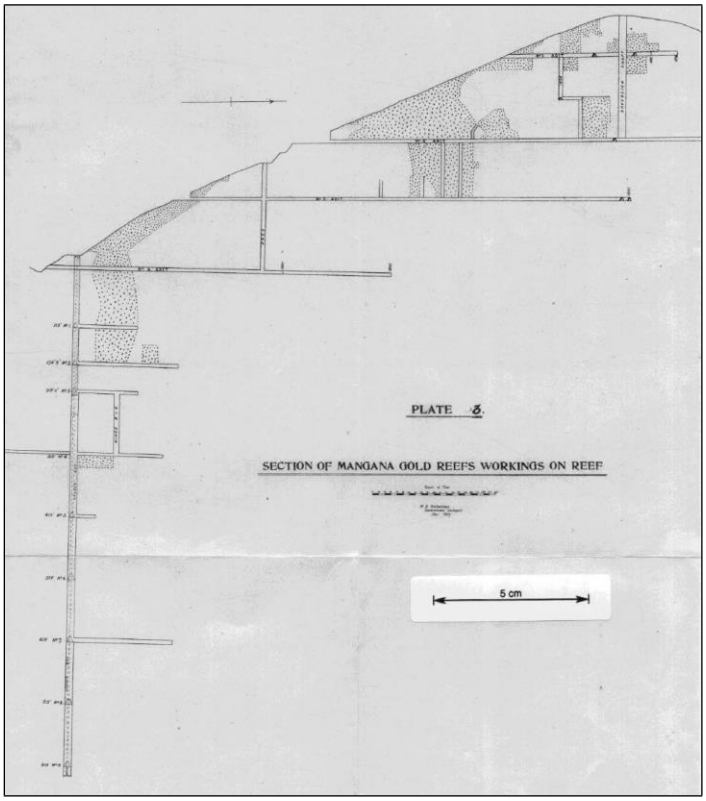
Two views of dry stone walling erected around Shaft (Site number 3).

4.0 HISTORICAL SUMMARY

Originally known as "The Nook", Mangana was the site of the first payable gold discovery in February 1852 when a local servant Keeling Richardson found alluvially washed gold in Richardsons Creek. Two hundred miners quickly assembled to stake out and work the creek and its tributaries such as Majors Gully before they gradually dissipated as the gold proved elusive. However another nearby strike in 1859 proved longer lived when a gold bearing quartz reef was discovered half a mile south of Mangana. This was in initially mined alluvially also although by the mid 1860's some hard rock mining was being undertaken by the Union Company NL, albeit with limited results. Mr C. Goodall subsequently acquired the forfeited Union Co. leases and discovered the Sovereign reef which was accessed by a number of adits. He worked the reef for a year before selling it off to the London Based Company Mangana Gold Reeefs Ltd. In 1884 Mines Department geologist Thureau made some general conclusions about the Mangana workings but pointedly noted that:

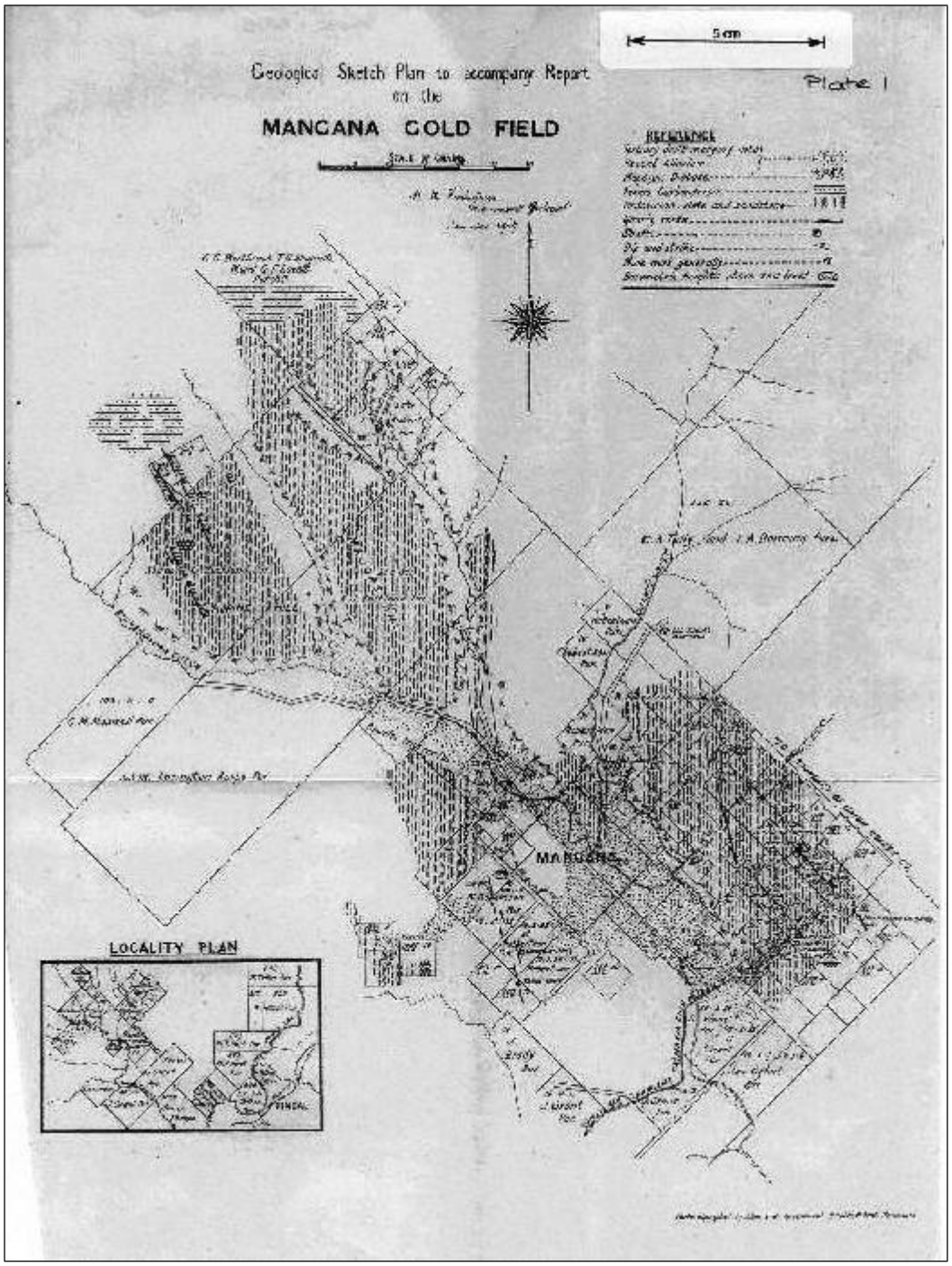
Originally the Mangana alluvial gold deposits have been very rich, but now they are very nearly exhausted, and the reefs in that neighbourhood have, in the past and present had considerable attention.

The prospects of the Mangana reef had however become brighter when Mines Department geologist Twelvetrees visited the workings in 1907. He noted that the workings on the slopes of Sovereign Hill had become more sophisticated with the sinking of a shaft on the gully floor and the extension of the four hillside adits. Work continued until the early 1920's where there was a lull on hard rock mining activities. Between 1929 and c1935 twenty five miners were additionally lured back to the alluvial field before both the alluvial and deep lead gold mines at Mangana closed down again. Periodic but limited prospecting has occurred up to the present day.



Section drawing of 'Sovereign' workings from Twelvetrees 1907

Photo showing nearby Mangana Reefs shaft from Twelvetrees, 1907.



Map of the Mangana leases from Twelvetrees, 1907.

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Appendix B

Botanical & Fauna Habitat Survey Report

MANGANA GOLD MINE

PROPOSED VEHICULAR TRACK FORMATION

SAILORS GULLY, MANGANA

BOTANICAL & FAUNA HABITAT SURVEY

10th March 2013

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A.B.N.No. 32 068 906 258

CONTENTS

1.0 Introduction:
Exploration licence EL12/2011 covers the old gold mining area located in Sailors Gully near Mangana. The company is planning to reopen the mine by accessing a number of the existing adits and is proposing the formation of a vehicular track in order to access each of these sites.
A botanical and fauna habitat survey is required as part of the licence conditions in order to determine any likely impacts on the natural values present in the area proposed for the track formation including threatened species, threatened vegetation communities and environmental weeds.
A previous survey was undertaken in July 2012 with a report dated 31st July. The details of the desktop survey of the location's natural values which was undertaken for that report are considered to be still current and are repeated here with some updating.

1.1 Objectives: The objectives of this survey were to;

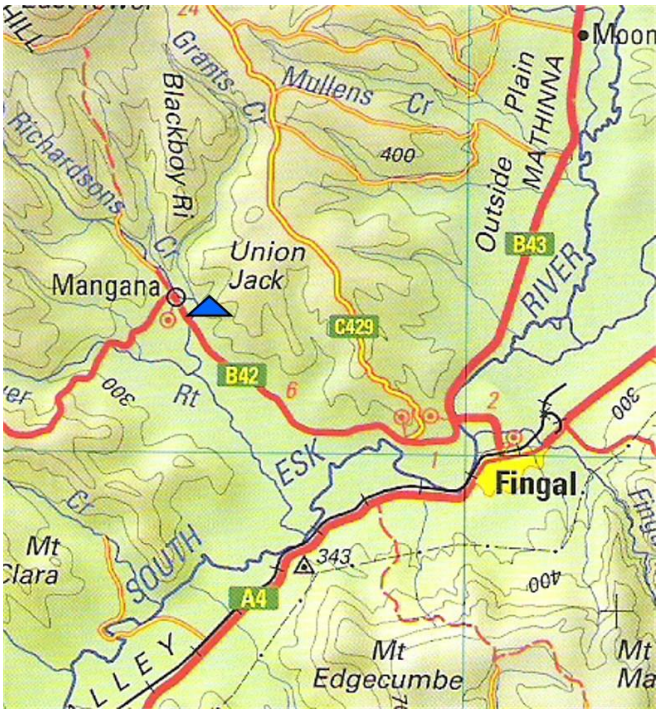
- Undertake a desktop survey to confirm the known biological records and the natural values present in the lease areas and in the vicinity.
- Undertake a field survey of the area proposed for the vehicular track formation to observe and record the natural values present including the vegetation types and plant communities, the flora and in particular any threatened species and potential habitat for species of threatened fauna, as well as the presence of environmental weeds.
- Determine the possible impacts of the proposed track formation on the natural values present and make recommendations on how those impacts can be minimised.

1.2 Location of Study Area:

MAP REF: Tasmap 1:25,000, Sheet No. 5639, Mangana

BIOREGION: Ben Lomond

GRID REF: 574800E – 5392900N
(All Grid References MGA Zone 55 GDA94)



MAP 1: Location of study area near Mangana

1.3 Site Description:

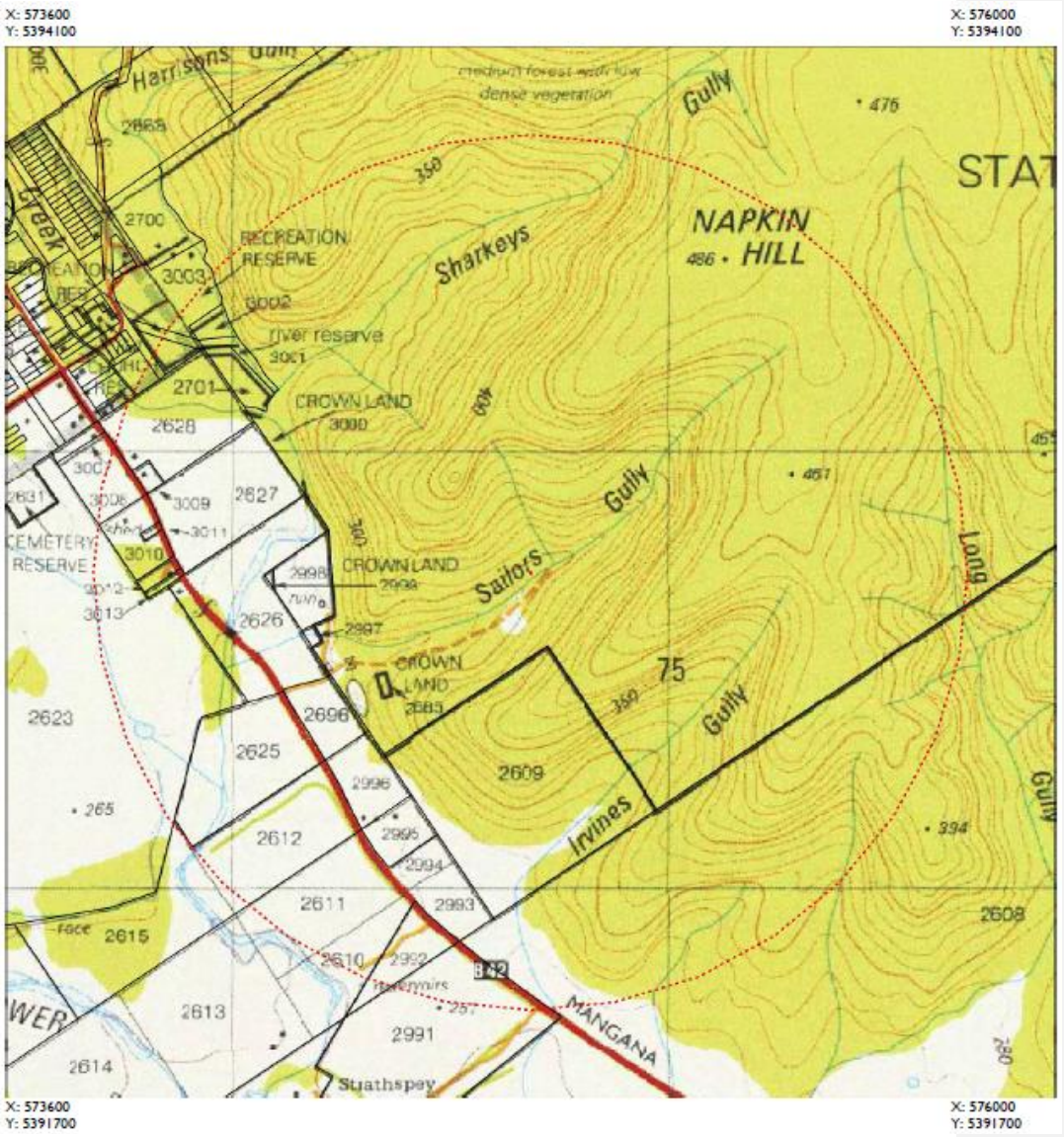
The location is within a steep sided valley called Sailors Gully located to the south-east of the Mangana township. Sailors Gully creek only flows intermittently into Richardsons Creek and then into Tower Rivulet before entering the South Esk River to the west of Fingal.

An existing vehicular track which extends off Mangana Road (B52) provides access to the site.

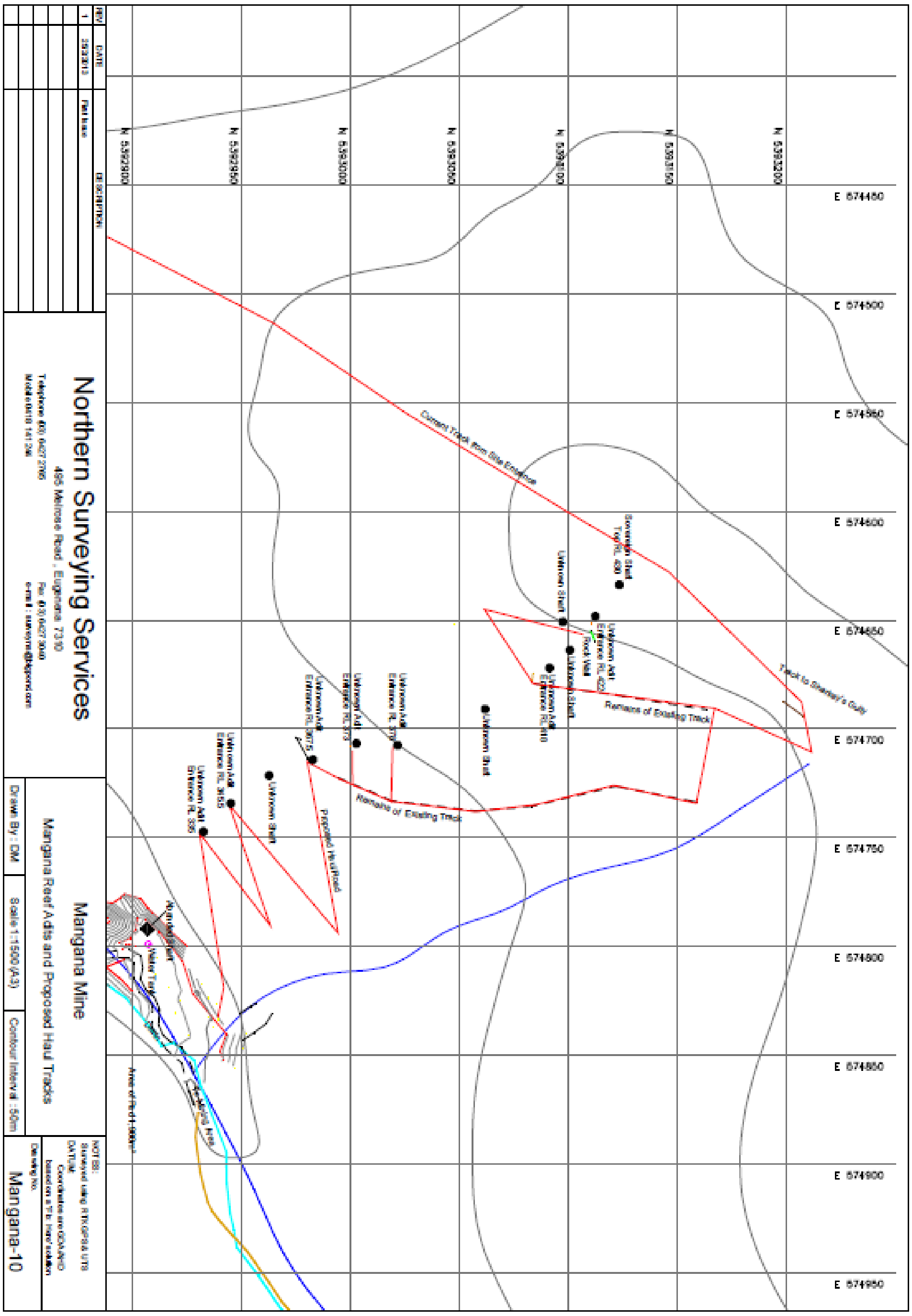
The land tenure is State Forest and both sides of the valley and adjacent slopes and ridgelines are well forested. Freehold land mainly consisting of established pasture extends along both sides of Mangana Road south-west of the site and the township of Mangana is within a few hundred metres of the entrance to the site.

The area has a history of previous mining with a number of existing adits and shafts on both sides and floor of the gully and mullock heaps on previously cleared areas. The valley floor and creek has also been subject to alluvial mining in the past.

The proposed vehicular track formation will extend from the existing access road along valley floor and up the slope on the north-western side of the Sailors Gully in order to access the existing adits. Old track formations will be utilized in part and the track work will also involve a number of switch-backs in order to reach the highest point near the Sovereign shaft.



MAP 2: Topographical map of Sailors Gully and adjacent landform with Mangana township in the north-west corner.



MAP 3:Proposed vehicular track formation to access adits and shafts on north-western side of Sailors Gully.

2.0 Desktop Survey of Natural Values:

The DPIPWE database "The Natural Values Atlas" was accessed for the known biological records of the locality and environs. Records of threatened species of flora and fauna known to occur within a 5,000 metre radius of the location were also accessed. Data sourced included the vegetation types and plant communities, the occurrence of any threatened vegetation communities, the recorded locations of any threatened species of plants and threatened fauna known or expected to occur in the vicinity.

REFERENCE POINT for the locality: 574800E – 5392900N

2.1 Desktop Survey Results:

VEGETATION COMMUNITIES:

The following vegetation communities are mapped under the TasVeg mapping program as occurring within 1,000 metres of the study area reference point.

VEGETATION COMMUNITY	TasVeg Code / Map colour	EXTENT IN STUDY AREA
Eucalyptus amygdalina Coastal Forest & Woodland	DAC / bright green	South-eastern facing slopes of Sailors Gully and Napkin Hill. Also similar slopes to the north-west and east.
Eucalyptus sieberi Forest & Woodland on Granite	DSG / Medium green with vertical lines	Most of the remaining forest within the study area.
Eucalyptus obliqua Dry Forest & Woodland	DOB / Dark green	One area on the south-eastern facing slope of the adjacent Irvines Gully, south of Sailors Gully.
Acacia dealbata Forest	NAd / Olive Green with horizontal white lines	One small patch along the creek of Sailors Gully. A larger patch along creek to the east and 3 small patches about 1km NNW of reference point.
Allocasuarina littoralis Forest	NAL / Olive green with diagonal white lines	One small patch near the south-west corner of the lease.
Broadleaf Scrub	SBR / Cerise with vertical lines	One small patch in the adjacent Irvines Gully and another small patch east of that.
Agricultural Land	FAG / cream	The south-western portion of the study area is cleared farming land across the valley floor.

TABLE 1: Vegetation Communities and extent within the study area as per TasVeg mapping program.

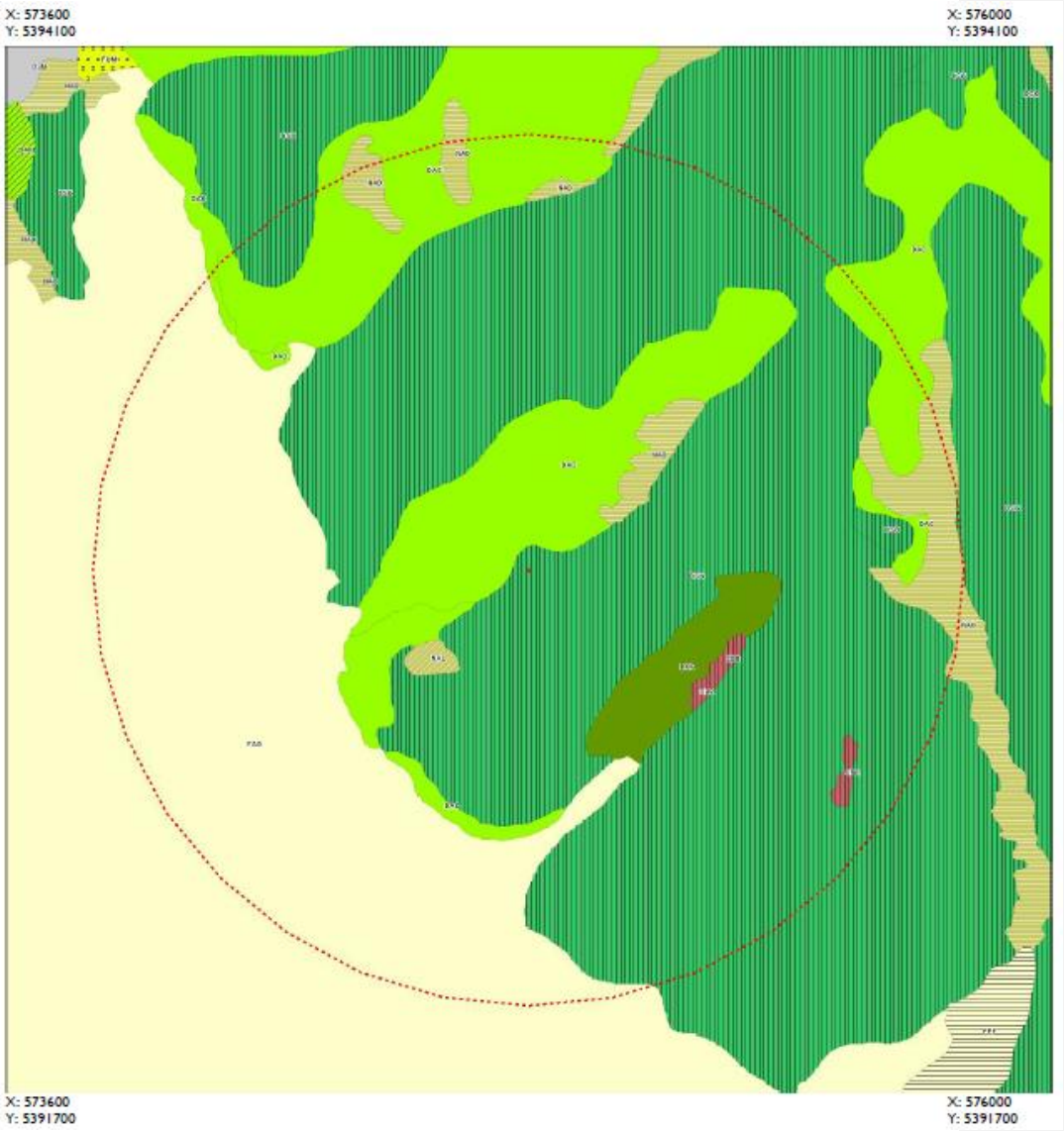


FIGURE 1: Vegetation communities as per TasVeg mapping program within 1,000 metres of reference point: GRID REF: 574800E – 5392900N.

CODE: **DAC ……...*Eucalyptus amygdalina* Coastal Forest & Woodland …… bright green**
DSG ……*Eucalyptus sieberi* Forest & Woodland on Granite…… mid-green with vertical lines
DOB ……*Eucalyptus obliqua* Dry Forest & Woodland …… dark green
NAD …….. *Acacia dealbata* Forest ……. olive green with horizontal white lines
NAL ……*Allocasuarina littoralis* Forest …… olive green with diagonal white lines
SBR …… Broadleaf Scrub …… cerise with vertical lines
FAG …….. Agricultural Land …… cream

VEGETATION COMMUNITIES:

DAC *Eucalyptus amygdalina* Coastal Forest and Woodland is a community usually dominated by the Black Peppermint *Eucalyptus amygdalina* less than 25 metres tall although other species such as *Eucalyptus viminalis* or *Eucalyptus obliqua* can also be

present as co-dominants. The community is characterized by its high floristic and structural diversity with an understorey typically heathy to shrubby. The low shrub layer is typically dense and diverse and bracken can be prevalent on sites with a high fire frequency. Grasses are usually not prevalent in the ground stratum.
This community is mainly found on siliceous soils in coastal or sub-coastal areas of northern and eastern Tasmania although it does extend inland in some locations up to about 450 metres altitude.
It is mapped under TasVeg as occurring on the north-western slopes of Sailors Gully and Napkin Hill as well as other similar slopes and aspects within 1,000 metres of the site.

DSG *Eucalyptus sieberi* Forest and Woodland on Granite is a dry sclerophyll community which usually has an understorey of tall shrubs. The low shrub layer and the ground stratum is usually sparse. *Eucalyptus sieberi* is often the only Eucalypt present within the community and trees are usually less than 30 metres in height.
The community is restricted to dry sites where the substrate is present usually on knolls and ridges in the north-east of the state between Friendly Beaches and Ansons Bay. This community can be easily confused with *Eucalyptus sieberi* Forest and Woodland not on Granite (DSO) where such forest occurs on substrates such as Mathinna Beds.
Most of the slopes and ridges in the location including the ridgeline of Napkin Hill are mapped by TasVeg as this vegetation type.

DOB *Eucalyptus obliqua* Dry Forest is easily distinguished from other forest communities by the dominant Eucalypt and the dry shrubby or heathy understorey. Trees typically have a well formed trunk and trees are generally up to 30 metres in height. Other Eucalypts are often present within the community. Typically the understorey is shrubby and diverse and the ground layer usually sparse although on frequently fired sites bracken may be predominate in the ground layer.
The community can be associated with dolerite, mudstones and siliceous substrates such as granites and sandstones. The community is widespread and extensive across the north, east and south-east of the state from sea level up to about 600 metres.
There is a single patch of this community mapped by TasVeg in the adjacent Irvines Gully to the south of the site.

NAD *Acacia dealbata* Forest is usually associated with sites which have been subject to past disturbance, both natural or man-induced but particularly along stream banks and riparian corridors. Often the Acacia is the only tree present as a dense canopy up to 20 metres high although the understorey can vary depending on the situation and the disturbance history of the location but could be bracken or wet forest or riparian species. The community is widespread across the state although less common in the west and south-west.
There is one small patch of this community within Sailors Gully as well as a larger area along a creek-line to the east of the study area and a few very small patches on slopes about one kilometre to the north.

NAL *Allocasuarina littoralis* Forest usually occurs as small patches within areas of Dry Eucalypt Forest throughout the drier parts of the state. It typically has a dense canopy dominated by the one species although emergent Eucalypts can also be present. The trees produce a deep litter layer which inhibits any understorey

vegetation so it is usually quite sparse, but may include widely spaced shrubs, bracken or graminoids such as *Lepidosperma spp.*
Because of its limited distribution this community is listed under the Tasmanian *Nature Conservation Act 2002* as a threatened native vegetation community.

SBR Broadleafed Scrub is a closed scrub community with a dense canopy which occurs on sites with a low fire frequency. The dominant species of small trees can include *Beyeria viscosa, Nematolepis squamea, Pomaderris apetala, Bedfordia salicina* or *Olearia argophylla.* This community is prevalent as scattered patches throughout much of Tasmania but often in gullies and other fire-protected situations from sea-level and up to at least 500 metres. The understorey is usually open and often rocky with a covering of mosses in the heavy shade cast by the dense canopy. Some shade tolerant shrubs can be present.

THREATENED VEGETATION COMMUNITIES:

- One natural vegetation community mapped within the study area is listed as threatened under the Tasmanian *Nature Conservation Act 2002*. *Allocasuarina littoralis* Forest (NAL) is listed as a rare community under the Act due to its limited and scattered occurrence. A small patch of this community is mapped as occurring to the south of the creek and to the immediate south of the access track into Sailors Gully, which is outside of the proposed mining area.

VEGETATION COMMUNITIES OF CONSERVATION SIGNIFICANCE
The following vegetation communities are considered to be under-reserved in the state particularly areas of forest types in an old-growth condition and have been targeted under the Tasmanian Community Forest Agreement for further reservation in some bio-regions.

- *Eucalyptus amygdalina* Coastal Forest and Woodland (DAC)
- *Eucalyptus obliqua* Dry Forest (DOB)
- *Eucalyptus sieberi* Forest and Woodland on Granite (DSG)
- Broad-leafed Scrub usually occurs as relatively small patches which are protected from fire by topography or landform and it is this susceptibility to fire which restricts the distribution of this community particularly in the eastern half of Tasmania. It is a closed (canopy) community and as such is considered to be a form of relict rainforest.

THREATENED FLORA:
One species of threatened flora listed under the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is recorded on the "Natural Values Atlas" database as occurring within 1,000 metres of the study area reference point.
No species of threatened flora is recorded on the database from within 500 metres of the study area reference point.

- *Bossiaea obcordata* the Spiny Bossia is listed as being rare under the Tasmanian Act. There are three records on the database from 1991 (x2) and 2007. *Bossiaea obcordata* is a prostrate, rigid, woody shrub with spreading branches that end in a spine. It is known to occur in the north-east and east coast on very dry sites within dry Eucalypt forest and is often recorded with *Eucalyptus sieberi.* It has been recorded on both dolerite and granite

substrates. The nearby Tower Hill is considered to be a key location for the species, and it is considered to be relatively well reserved within its range.

The following species of threatened flora are recorded on the database as occurring from between 1,000 and 3,000 metres of the study area reference point.

- *Bossiaea obcordata* There are a further 17 records of this species from within this radius of the reference point.
- *Hierochloe rariflora* Cane Holygrass is listed as being rare under the Tasmanian Act. There is a single 1990 record at Grid Ref: 575052E – 5394165N (100m +/-). This grass grows to about one metre tall and can be found in forested gorge and riparian habitats in the north-east and east of the state usually on granite or dolerite substrates. The notesheet on the species sourced from the DPIPWE website states that the species could be reassessed for delisting as recent observations have extended the species known frequency.

The following species of threatened flora are recorded on the database as occurring from within 3,000 to 5,000 metres.

- *Bossiaea obcordata* There are a further 49 records of this species from within this radius.
- *Caladenia congesta* the Black-tongue Finger-orchid is listed as being endangered under the Tasmanian Act.
  There are three records on the database, all dated from the 1980's. The 1986 record from Grid Ref: 579012E – 5390483N (100m +/-).
  This orchid is restricted to the central north and north-east of Tasmania, in habitat such as heathy woodland or open forest, on dry sites of sandy, loamy or gravelly soils.

THREATENED FAUNA:

Four species of threatened fauna listed under the above Acts are recorded on the database as occurring within 3,000 metres of the study area reference point.

- The Tasmanian subspecies of Wedge-tailed Eagle *Aquila audax* subsp *fleayi*. The bird is listed as being endangered under both State and Commonwealth Acts and requires large trees within tracts (>10ha) of old-growth forest for nesting. The birds are extremely sensitive to disturbance during the nesting season. Nests are traditional, with some having been used for at least 50 years. More than one nest can be present within a pair's territory but only one is used in any one year.
  There are three known nest tree sites recorded within 3,000 metres. Two within a closed valley about 2500 metres east south-east of the site and the third about 2,800 metres east north-east and to the east of Tower Hill Road. Nest Identification numbers 212, 1156 and 1629. Nest No 1156 was occupied during the 2010 breeding season. There is a further known nest tree within 5,000 metres, about 3,300 metres to the north-east, Nest Id. No. 1628. There are also three sighting records on the database from within 5,000 metres.
- The White-bellied Sea-eagle *Haliaeetus leucogaster.* There is a recorded nest tree about 3,000 metres south of this site on the flood plain of the Tower Rivulet, Nest Id. No.734 . The nest was last recorded in 2007.
  White-bellied Sea-eagle *Halieetus leucogaster* is listed as being vulnerable under the Tasmanian Act. It inhabits the coast and larger inland water bodies

and will also follow the larger rivers. It usually nests in heavily branched trees adjacent to river banks or lakesides, but will also nest on rock ledges on cliff-tops in coastal environments.

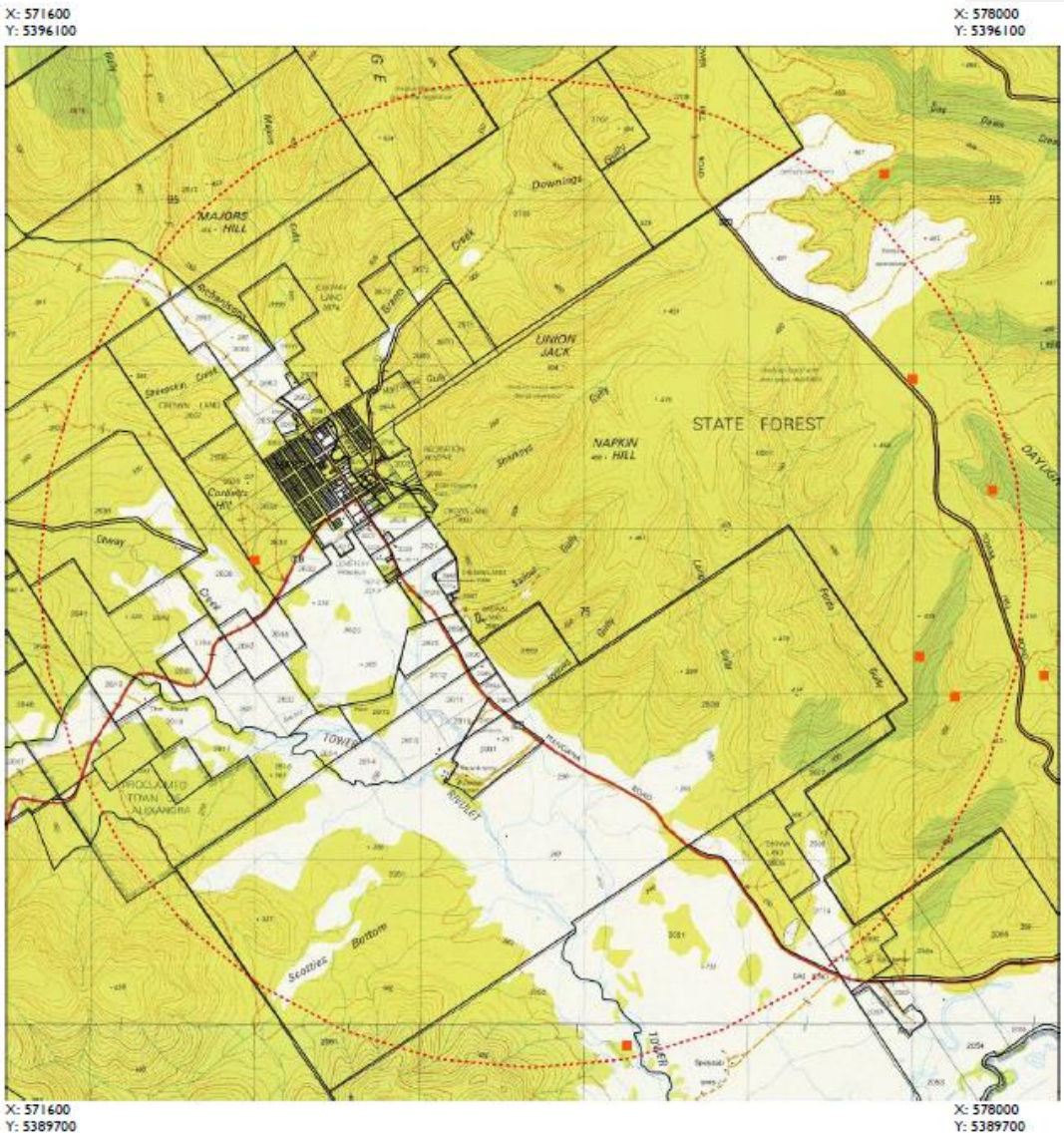


FIGURE 2: Plotted location of nest trees of Wedge-tailed Eagle, *Aquila audax* subsp *fleayi* and White-bellied Sea-eagle *Haliaeetus leucogaster* within 3,000 metres of the study area reference point.

- The Tasmanian Devil *Sarcophilus harrisii* is listed as being endangered under both State and Commonwealth Acts. There are 2 sight records on the database from within 3,000 metres, one dated from the late 1970's and the other from about 1996.
  There are three further records of the Devil from between 3,000 and 5,000 metres of the site.

- The Spotted-tailed Quoll, *Dasyurus maculatus* subsp *maculatus* is listed as a rare species under the Tasmanian Act and vulnerable under the Commonwealth Act. It inhabits a range of forest types although it prefers the wetter and denser forest types and will hunt and forage on adjacent farmland and pasture, travelling up to 20km at night. The animal will shelter in dens located in rocks, logs or thick vegetation. There is a single undated record of this species on the database.

No other species of threatened fauna are recorded on the database from within 5,000 metres of the site reference point.

The following eight species of threatened fauna could occur in the locality based on habitat mapping and on the known geographical range of each.

- The Tasmanian subspecies of the Masked Owl *Tyoto novaehollandiae* subsp *castinops* is listed as being endangered in Tasmania and considered to be vulnerable under the Commonwealth Act. This bird requires large tree hollows for nesting, usually in White Gums and prefers mature forest as habitat.
- The White (Grey) Goshawk *Accipiter novaehollandiae* is endangered in Tasmania. The species requires mature wet forest with Blackwoods as habitat and old-growth trees for nesting.
- Eastern-barred Bandicoot *Parameles gunnii* is relatively widespread in Tasmania but is rare on the mainland and is listed as being vulnerable under the Commonwealth Act.
- Glossy Grass Skink *Pseudomoia rawlinsii* is listed as being rare under the Tasmanian Act.
- The Tussock Skink *Pseudemoia pagenstecheri* is a grassland species which is considered to be vulnerable in Tasmania. It inhabits some types of native grasslands.
- The Swan Galaxia *Galaxias fontanus* is a small native fish considered to be endangered in Tasmania and nationally, and is found only within the catchments of the Esk Rivers. The species is endemic to Tasmania.
- Australian Grayling *Prototroctes mareana* is a fish which moves between fresh and salt water localities. The species is listed as being vulnerable both in Tasmania and nationally.
- The Green and Gold Frog *Litoria raniformis* is considered to be vulnerable in Tasmania
  and Nationally. It is found mainly in the north and north-east of the state.

3.0 Field Survey:

The field survey followed the proposed route of the new vehicular track and covered the area of the north-western slopes of Sailors Gully between the proposed starting point of the track near GRID REF: 574839E – 5392950N to near the ridge-line of Napkin Hill at the Sovereign Shaft at GRID REF: 574638E – 5393118N.
The field survey was undertaken on Friday the 22nd February 2013.

Methodology: The flora and fauna habitat survey of the proposed vehicular track covered the north-western slopes of Sailors Gully from the existing work area and access road on the valley floor up to the existing 4WD track which follows the ridgeline of Napkin Hill and to the Sovereign shaft at the highest point of the slope. The purpose of the new track is to provide access to the existing adits and shafts on

that side of the valley. The new track will utilize the remains of old existing tracks in a couple of sections and will involve a number of switch-backs in order to reach the top of the slope.
Vascular plant species were recorded, vegetation communities were observed and cross-referenced with the TasVeg map sourced from the Natural Values Atlas database.

Limitations: This survey was conducted in summer when most species have finished flowering, particularly ground layer flora within grasslands. No botanical survey can guarantee that all flora will be observed and recorded in a single survey in one year due to seasonal and annual variation in abundance and the possible absence of flowers and fertile material for identification. Ephemeral species which may have been present includes species of orchids, lilies, herbs, grasses and other graminoids. However all significant species known to occur in the study areas and their environs have been considered in this report.

VEGETATION COMMUNITIES:
The valley slopes on the north-western side of the creek-line and operations area rise steeply towards the ridgeline of Napkin Hill. The vegetation along the lower slopes to No.2 N Adit and up to No2 Adit Golden Entrance was *Acacia dealbata* Forest (NAD) which typically had a low to medium canopy of Silver Wattle. There was a low diversity of species in the understorey and ground layer being composed mainly of ferns and fallen debris. The Silver Wattle community would most likely have established following the disturbances resulting from the earlier mining activities in the location.
The middle and upper slopes however were covered in a mixed age and relatively open Eucalypt forest which had little understorey, except for an occasional Silver Wattle sapling and Prickly Box and had a ground layer dominated by the tussock grass *Poa rodwayi* with some associated herb species. A number of rocky outcrops were present across the slope and surface rock and small boulders were common. The vegetation and the geology gave the appearance of the community *Eucalyptus viminalis* Forest and Woodland on Dolerite however the mapped geology in the location is Mathinna Beds. *Eucalyptus viminalis* the White Gum was plentiful right across the hill slopes including a number of mature and old-growth trees. *Eucalyptus amygdalina* the Black Peppermint was also present in good numbers as a subdominant tree. The grassy ground layer and the preponderance of White Gum distinguishes this community from the typical *Eucalyptus amygdalina* Coastal Forest and Woodland as it is shown on the TasVeg map of the location. *E. amygdalina* Coastal Forest and Woodland usually presents with a heathy ground layer vegetation rather than being dominated by native tussock grasses.
For the purpose of this survey the vegetation community present across most of the survey area is described as *Eucalyptus viminalis* Grassy Forest and Woodland (DVG).
The area would have been extensively disturbed and cleared during the time of the original mining activities in the early 1900's and this vegetation has re-established since then.

The vegetation community *Eucalyptus sieberi* Forest and Woodland (DSG) on Granite occurred only along the ridgeline of Napkin Hill and extended downslope on the north-western side of the hill which corresponded with the change in geology.

Eucalyptus sieberi was the dominant tree and the understorey was shrubby, in contrast to the slopes above Sailors Creek where the track is proposed which had a grassy ground layer.

THREATENED VEGETATION COMMUNITIES:
No vegetation community listed as threatened under the Tasmanian *Nature Conservation Act 2002* was present in the areas surveyed.

THREATENED FLORA:
No species of flora listed under the Tasmanian *Threatened Species Protection Act 1995* or the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* were observed during the survey.

THREATENED FAUNA:
No species of threatened fauna were observed on the day of the survey. No evidence of the presence of other threatened species such as scats of Tasmanian Devils or Spotted-tailed Quolls, or soil scratching of Bandiccots was observed during the survey.

THREATENED FAUNA HABITAT:
No specific threatened fauna habitat was observed during the field survey.
A few mature Eucalypts with basal hollows which could be potential den sites for Tasmanian Devils *Sarcophilus harrisii* and Spotted-tailed Quolls *Dasyurus maculatus* subsp *maculatus* were observed on the middle and upper slopes of Napkin Hill although no dens were confirmed during the survey.
Mature and old-growth Eucalypts with upper trunk and branch hollows were also observed on the middle and upper slopes of Napkin Hill which would be potential habitat or nesting sites for species of fauna, including threatened species. No large hollows which may be suitable nest sites for Masked Owls were observed however there is potential for larger hollows to be present within the wider location.
The grassy understorey of the *Eucalyptus viminalis* Forest on the slopes of Napkin Hill may provide some marginal habitat for the Tussock Skink *Pseudemoia pagenstecheri*, and the Eastern-barred Bandicoot *Parameles gunnii* although no evidence of the presence of either species was observed.
The White (Grey) Goshawk *Accipiter novaehollandiae* generally prefers heavier forest as habitat than is present in Sailors Gully. If other gullies within the wider area contained denser forest with more Blackwoods as suitable nesting habitat then Sailors Gully could form part of a pair's hunting and foraging territory.
As the creek within Sailors Gully only flows intermittently and there is no other water body in the location there was no suitable habitat for the Green and Golden Frog *Litoria raniformis*, the Grayling *Prototroctes mareana* or the Swan Galaxis *Galaxia fontana.*

ENVIRONMENTAL WEEDS:
No weeds were observed in the survey area on the slopes of Napkin Hill however two species of weeds were present in the operations area along Sailors Creek.

- Spear Thistle, *Cirsium vulgare* was observed within the work, plant and storage areas. It is a common biennial weed of pasture and cultivation which responds to ground disturbance and will become more of an issue during mining and with the formation of the vehicular track if left unmanaged.

It initially develops as a leafy and prickly rosette flush with the ground and then forms a flower spike with the typical pink-purplish flower of the thistle. The weed will need to be addressed and managed as it appears, and ideally should be controlled while in the rosette stage before flowering or seeding.

- Great Mullein *Verbascum thapsus.* This is a perennial plant which has a grey downy leafed rosette in the first season and produces a tall spike of light yellow flowers in the second season. The plant is a prolific seeder and has the potential to further establish along the roadside and wherever there is ground disturbance. A number of plants of this weed were observed within and adjacent to the operations area.

PHYTOPTHORA:
There was no symptomatic field evidence observed of the root pathogen *Phytophthora cinnamomi* during this field survey.

4.0 Conclusions:
The proposed track formation will not impact on any threatened vegetation community or other significant vegetation although mature trees should be avoided as much as possible during the formation of the track. No threatened species of flora or fauna were observed during the survey and no potential habitat for species known or expected to occur in the wider area was observed.
No evidence of Tasmanian Devils or Quolls was observed in the survey area.
The proposed track formation will not impact on any potential habitat for threatened species of fauna.
The weeds Spear Thistle and Great Mullein will need to be managed.

5.0 Recommendations:
VEGETATION COMMUNITIES:

- Align the track formation to ensure the minimum of cut and fill is required.
- Avoid mature standing trees where ever possible.
- Limit the clearing of the grassy groundlayer vegetation to the minimum necessary to accommodate the track formation.

THREATENED VEGETATION COMMUNITIES:

- No threatened vegetation communities were present in the area surveyed and no specific action is required.

THREATENED FLORA:

- No threatened species of plants were observed during the survey and no potential habitat for the threatened species known to occur within 5,000 metres of the location was observed in areas likely to be impacted by the proposed track formation. No specific action is required.

THREATENED FAUNA:

- No species of threatened fauna or evidence of their presence was observed or recorded during the field survey. No specific action is required.

THREATENED FAUNA HABITAT:

- The track formation as proposed will not impact on any specific threatened fauna habitat, however the track alignment should avoid any mature trees and particularly any tree possessing basal or upper trunk and branch hollows.

ENVIRONMENTAL WEED MANAGEMENT:

- The areas being disturbed during the track formation works should be monitored for establishment of Spear Thistle, Great Mullein and other weeds and necessary action taken as needed.
  The most appropriate methods of weed control in this area near and adjacent to natural vegetation will be either manual removal or targeted herbicide applications. Control should be undertaken prior to the weeds flowering or seeding.
  Recommended herbicides and rates of application for each species of weed discussed in this report can be sourced from the Department of Primary Industry, Parks, Water and Environment website under "invasive species". www.dpipwe.tas.gov.au.
  Commonly used herbicides for the control of Spear Thistle and Great Mullein are Glyphosate, MCPA or Lontrel.
- All herbicides should be used in accordance with the product label and in accordance with its registration of use.
- As a precautionary measure and in order to prevent the introduction of weeds into weed free areas all equipment and machinery should be subject to a wash-down procedure to remove any soil or mud which could contain weed seeds before being transported into the work site.

PHYTOPHTHORA:

- Accepted protocols in regard to hygiene and wash-down procedures for all machinery and equipment entering the work site should be followed, to ensure that the pathogen is not inadvertently introduced into disease free locations by way of extraneous soil, mud and gravel adhered to tyres, work-boots and equipment.

Philip Milner

Vegetation Consultant

APPENDIX 1:
Vegetation Communities and Species Recorded

1. *Eucalyptus viminalis* Grassy Forest and Woodland (TasVeg Code DVG)

The mid and upper valley slopes on the north-western side of Sailors Gully and Napkin Hill was predominantly a grassy forest community dominated by White Gum *Eucalyptus viminalis* with Black Peppermint *Eucalyptus amygdalina* present as a subdominant tree. The community has all the appearance of the community *Eucalyptus viminalis* Grassy Forest on Dolerite however the author is unable to confirm the substrate as it is mapped as Mathinna Beds on the geological map of the area. The understorey vegetation was quite open with occasional understorey trees, few shrubby species and a low and often relatively thin groundlayer of grasses, predominately *Poa rodwayi.* The forest in this area was intact and relatively mature with a number of trees observed with both basal and branch/ upper trunk hollows which were potential habitat for fauna. These slopes do not appear to have been subject to fires as frequently as the opposite slopes.

DOMINANT TREES	COMMON NAME	FREQUENCY
Eucalyptus viminalis	White-gum	common
SUBDOMINANT TREE		
Eucalyptus amygdalina	Black Peppermint	common
UNDERSTOREY TREES AND TALL SHRUBS		
Acacia dealbata	Silver wattle	common
Acacia melanoxylon	Blackwood	uncommon
Bursaria spinosa	Prickly Box	occasional
Exocarpus cupressiformis	Native Cherry	occasional
Olearia argophylla	Musk	occasional
Pomaderris apetala	Dogwood	lower slopes
MEDIUM SHRUBS		
Lomatia tinctoria	Guitar Plant	occasional
SMALL SHRUBS		
Acrotriche serrulata	Ant's Delight	occasional
Astroloma humifusa	Cranberry Heath	occasional
Bossiae prostrata	Creeping Bossia	occasional
Chrysocephalum semipapposum	Clustered Everlasting	occasional
Indigofera australis	Native Indigo	occasional
CLIMBERS		
Clematis aristata	Southern Clematis	occasional
HERBS & HERB-LIKE PLANTS		
Acaena novaezelandiae	Buzzy	occasional
Dichondra repens	Kidneyweed	occasional

APPENDIX 1 (cont)
Eucalyptus viminalis Grassy Forest & Woodland (cont)

HERBS & HERB-LIKE PLANTS (cont)	COMMON NAME	FREQUENCY
Geranium potentillioides	Mountain Geranium	occasional
Lagenophora stipitata	Bluebottle Daisy	occasional
Oxalis perennans	Grassland Woodsorrel	common
Veronica calycina	Hairy Speedwell	occasional
Viola hederaceae	Ivy-leafed Violet	common
GRASSES & GRAMINOIDS		
Dianella tasmanica	Tasman Flax-lily	occasional
Poa labillardierei	Silver Tussockgrass	occasional
Poa rodwayi	Velvet Tussockgrass	common
Lomandra longifolia	Mat-rush	occasional
FERNS & ALLIED PLANTS		
Asplenium flabellifolium	Necklace Fern	occasional
Polystichum proliferum	Mother Shieldfern	occasional
Pteridium esculentum	Bracken	uncommon
ENVIRONMENTAL WEEDS		
Cirsium vulgare	Spear Thistle	uncommon

2. *Eucalyptus sieberi* Forest & Woodland not on Granite (TasVeg Code DSO)

The only occurrence of this community in the areas surveyed was along the ridgeline of Napkin Hill and along the existing ridgeline track and it won't be impacted by the new proposed track formation.

DOMINANT TREES	COMMON NAME	FREQUENCY
Eucalyptus sieberi	Tasmanian Ironbark	very common
SECONDARY TREES		
Eucalyptus viminalis	White Gum	uncommon
UNDERSTOREY TREES & LARGE SHRUBS		
Acacia melanoxylon	Blackwood	uncommon
Exocarpus cupressiformis	Native Cherry	occasional
MEDIUM SHRUBS		
Acacia terminalis	Sunshine Wattle	occasional
Cassinia aculeata	Dolly Bush	uncommon
Oxylobium ellipticum	Golden Shaggypea	common

APPENDIX 1 (cont)

Eucalyptus sieberi Forest & Woodland not on Granite (cont)

SMALL SHRUBS	COMMON NAME	FREQUENCY
Davesia ulicifolia	Spiky Bitterpea	uncommon
GRASSES & GRAMINOIDS		
Dianella revoluta	Spreading Flax-lily	occasional
Lomandra longifolia	Mat-rush	occasional
FERNS & ALLIED PLANTS		
Pteridium esculentum	Bracken	common

3. *Acacia dealbata* Forest (TasVeg Code NAD) including Broad-leafed Scrub and Work areas and along access road.

The main area of this community was located on the middle reaches and lower northern slopes of the valley floor in association with the Broad-leafed Scrub and only the lowest section of the proposed track will extend through this community.

DOMINANT TREES	COMMON NAME	FREQUENCY
Acacia dealbata	Silver Wattle	common
EMERGENT TREES		
Eucalyptus amygdalina	Black Peppermint	uncommon
Eucalyptus viminalis	White Gum	uncommon
SECONDARY TREES		
Acacia melanoxylon	Blackwood	uncommon
UNDERSTOREY TREES OR TALL SHRUBS		
Beyeria viscosa	Pinkwood	occasional
Bursaria spinosa	Prickly Box	uncommon
Nematolepis squamea	Satinwood	occasional
Olearia argophylla	Musk	common
Pittosporum bicolor	Cheesewood	occasional
Pomaderris apetala	Dogwood	common
Prostanthera lasianthos	Mintbush	occasional
MEDIUM SHRUBS		
Cassinia aculeata	Dollybush	occasional
Coprosma quadrifida	Native Currant	occasional
Olearia lirata	Forest Daisybush	occasional
Pultenaea juniperina	Prickly Beauty	occasional

APPENDIX 1 (cont)
Acacia dealbata Forest (cont)

HERBS & HERB-LIKE PLANTS	COMMON NAME	FREQUENCY
Oxalis perennans	Grassland Woodsorrel	occasional

Viola hederaceae	Ivy-leafed Violet	occasional
GRASSES & GRAMINOIDS		
Lomandra longifolia	Matrush	occasional
Poa labillardierei	Silver Tussockgrass	common
FERNS & ALLIED PLANTS		
Dicksonia antarctica	Soft Treefern	occasional
Polystichum proliferum	Mother Shieldfern	common
Pteridium esculentum	Bracken	common
ENVIRONMENTAL WEEDS		
Cirsium vulgare	Spear Thistle	occasional
Verbascum thapsus	Great Mullein	occasional

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5 Hyde-Wyatt B.H. & Morris D.(1989) *Tasmanian Weed Handbook,* Department of Agriculture (Tas)
6 Hyde-Wyatt B.H. & Morris D. (1980) *The Noxious and Secondary Weeds of Tasmania.*
7 Wapstra H, A & M, Gilfedder L. *The Little Book of Common Names for Tasmanian Plants*

PHOTO 1: Proposed starting point of new vehicular track adjacent to existing works area.

PHOTO 2: Existing 4WD track along the ridge-line of Napkin Hill with *Eucalyptus sieberi* Forest. Note the shrubby understorey with no grasses.

PHOTO 3: Sovereign Shaft near the ridge-line of Napkin Hill.

PHOTO 4: Interface between *Eucalyptus sieberi* Forest, *Acacia dealbata* Forest and *Eucalyptus viminalis* Grassy Forest on Napkin Hill.

PHOTO 5: Slopes of Napkin Hill and location of proposed vehicular track through *Eucalyptus viminalis* Grassy Forest.

PHOTO 6: Slopes of Napkin Hill and location of proposed vehicular track through *Eucalyptus viminalis* Grassy Forest.

PHOTO 7. *Acacia dealbata* Forest on lower slopes of Napkin Hill.

PHOTO 8: Broad-leafed Scrub on valley floor of Sailors Gully will not be impacted by the proposed new track formation.

Appendix C

Notice of Intent – Mineral Processing Works

Webb Mining Services Pty Ltd*. (ACN 12106029618)*

26 March 2013

The Chairperson
Board of Environmental Protection Authority
Department of Primary Industries, Parks, Water and Environment GPO Box 44
Hobart, Tas 7001.
Via email

Dear Sir,

Re : Mangana Gold Mine – Mangana Tasmania

Notice Of Intent - Level 2 Mineral Processing Works

1 Proponent

This submission is made by Webb Mining Services Pty Ltd. (*ACN 12106029618)*

Contact details are; Nigel Webb Managing Director Webb Mining Services, PO Box 82 Sorell Tasmania 7172. Phone 0407306867

Email nigelwebb4@gmail.com

Webb Mining Services Pty Ltd. (Webb Mining) is a private company established in 1996. It has 29 years of experience in underground mining and engineering construction and specialises in narrow vein underground mining, including airleg and jumbo development. A major recent project has been as contract miner at the Beaconsfield Gold Mine. Webb Mining is a major shareholder and Nigel Webb a Director of BCD Resources, the company which owns the existing operations.

2 Project name and location

The project name is the Mangana Gold Mine. The location of the project is shown in
Figures 1 and 2.

3 Background

Webb Mining has recently purchased Exploration Licence 12/2011 from Wesknight Mining near Mangana, North – East Tasmania.

The licence was granted in August 2011 as part of an Exploration Tender Area process and Wesknight has advanced exploration activities and conducted underground geological sampling and mapping. These results have been encouraging, although variable. This sampling is sufficient to justify Webb Mining planning to open a narrow vein underground gold mine based on the two reefs investigated by Wesknight.

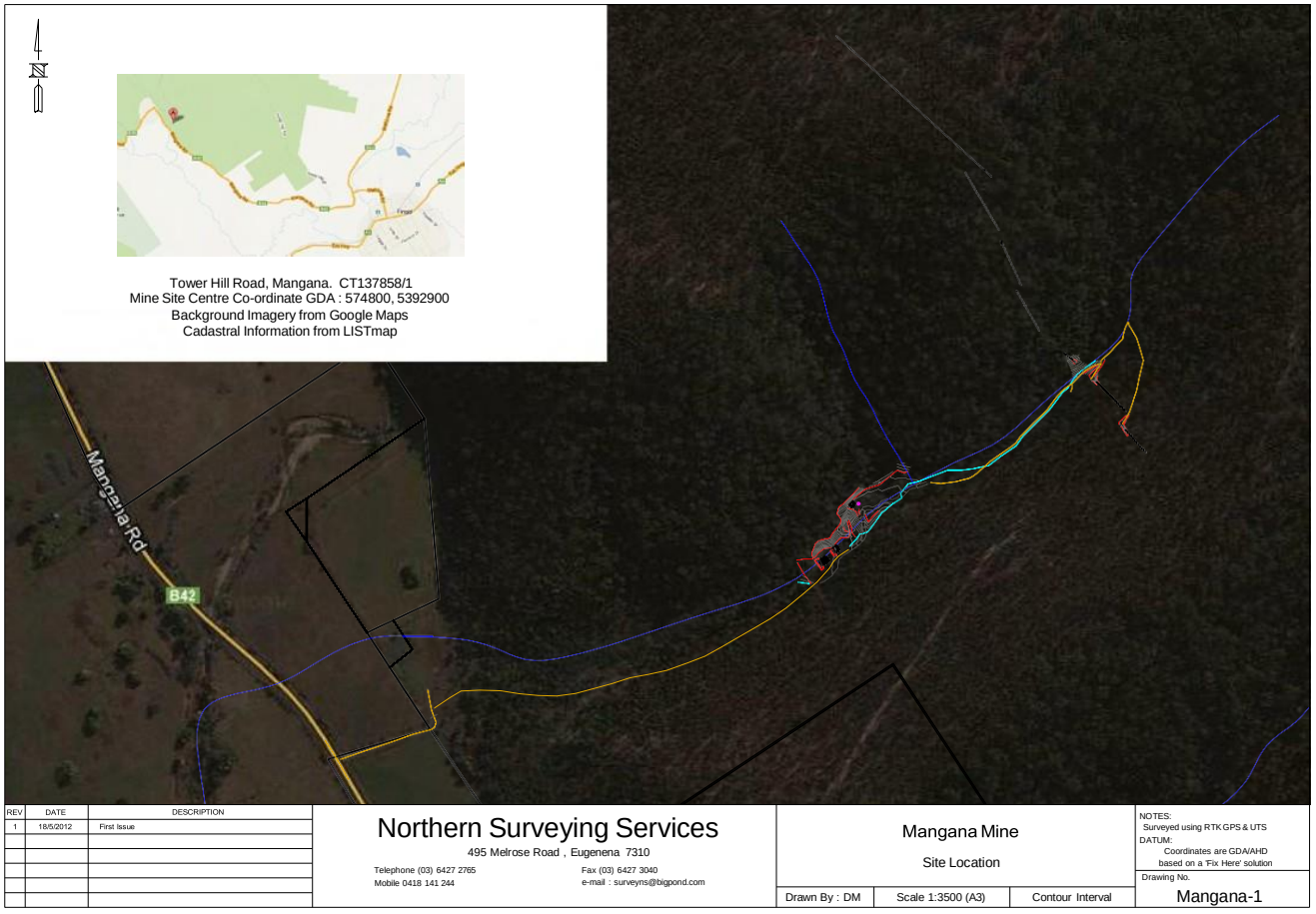
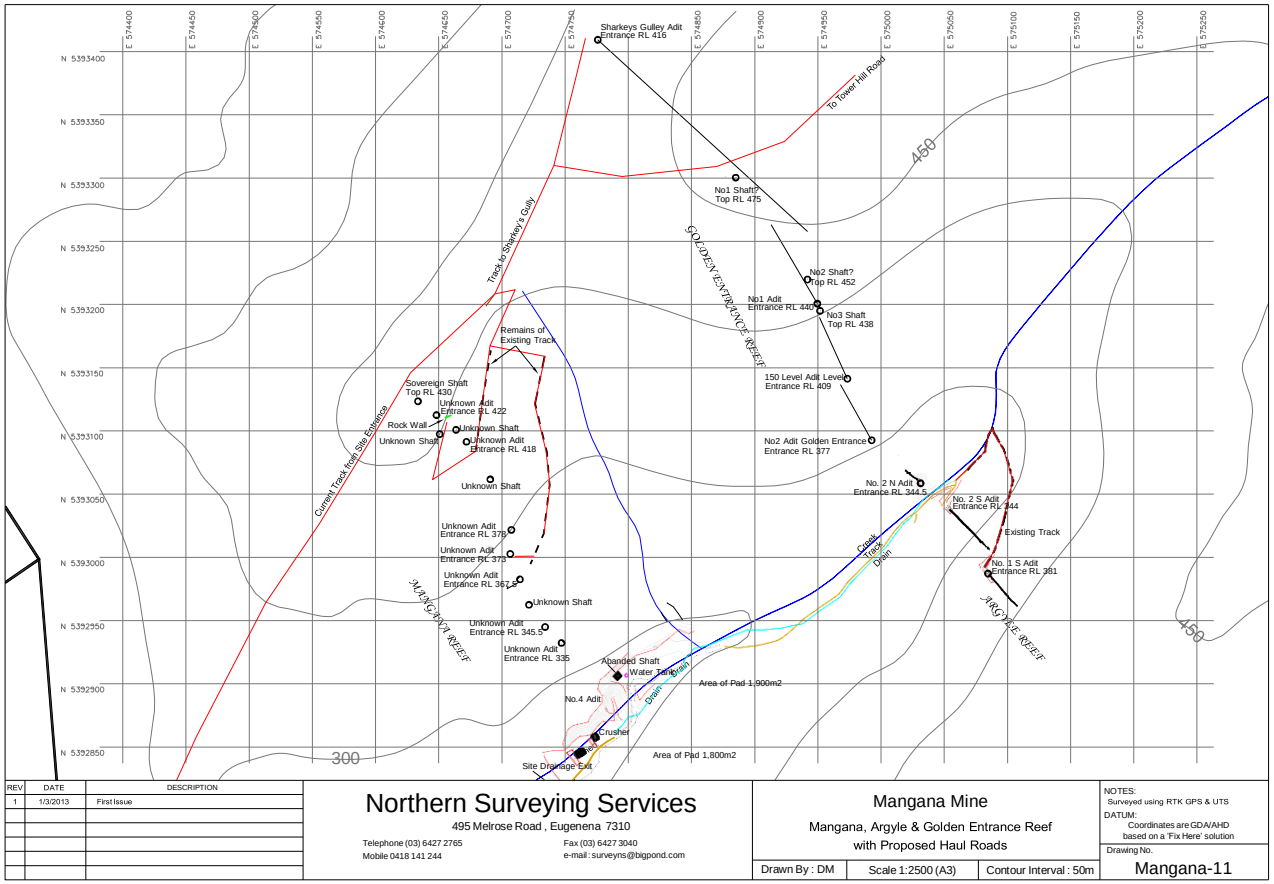


Figure 1 Mangana Gold Mine – Location Plan.



REV	DATE	DESCRIPTION
1	1/3/2013	First Issue

Northern Surveying Services
495 Melrose Road , Eugenena 7310
Telephone (03) 6427 2765
Mobile 0418 141 244
Fax (03) 6427 3040
e-mail : surveyns@bigpond.com

Mangana Mine
Mangana, Argyle & Golden Entrance Reef with Proposed Haul Roads

Drawn By : DM | Scale 1:2500 (A3) | Contour Interval : 50m

NOTES:
Surveyed using RTK GPS & UTS
DATUM:
Coordinates are GDA/AHD based on a 'Fix Here' solution

Drawing No.
Mangana-11

Figure 2 Mangana Gold Mine – Site Plan.

Wesknight Mining lodged a notice of intent with the EPA for a small scale gold mine and processing plant at the site on 24 May 2012. They received guidelines for an environmental effects report (EER) and were preparing this document until Wesknight decided that they would defer the application, largely because of sufficient funds. The EPA was advised of this on 27/11/2012.

Webb Mining have sufficient resources to commence small-scale underground mining and with a small gravity plant constructed on site (above ground) to recover gold as a concentrate for processing elsewhere.

This will also require compliance with mine safety laws. Webb Mining will comply with all applicable regulations and will consult with Workplace Safety Officers regarding the requirements. This will include the designation of the mine operator.

Webb Mining has applied for a mining lease over a 238 ha area covering the old workings within the EL. The mining lease area is shown in **Figure 3**.They will also carry out continued underground, surface and diamond drill exploration on other old working on the proposed lease.

As part of the mining application they are required to supply financial details including asset backing and financing. This is being provided to Mineral Resources Tasmania. The Managing Director of Webb Mining is a very experienced mine operator who has associates with mining engineering, geotechnical, geological and environmental engineering expertise.

4 Project Description

4.1 Resource

The variable nature of the quartz veining hosting the gold, and the "nuggety" nature of the gold makes any systematic estimation of the gold resource difficult, with traditional drilling and assaying. However, the sampling program conducted by Wesknight Mining has resulted in the sampling and representative assaying of some 9000 kilograms. The assays average over 32 gms/ tonne. Some small scale gravity recovery trials resulted in a high grade gravity concentrate (albeit in small quantities) grading some 2500g/t (806 ounces/tonne).

These results are sufficient to indicate that a small scale predominantly hand held mining method can be sustainable and economic at todays gold price.

4.2 Mining plans

The project will consist of small scale hand held airleg mining methods using cut and fill. Only small scale machinery is expected be used. The ore will initially be mined by accessing the Argyle No 2 Adit (see **Figure 2)** at the lower levels. Mining will be highly selective with minimal waste rock generated and that generated will be replaced as mine fill (with tailings). All waste rock (slates and sediments) and ore are expected to be non sulphidic (ie not reactive) and have little or no acid producing capacity. This is also demonstrated by previous mining mullock and tailings where there has been no evident oxidation or acid drainage generation. Water sampling from the lower adit also shows good quality.

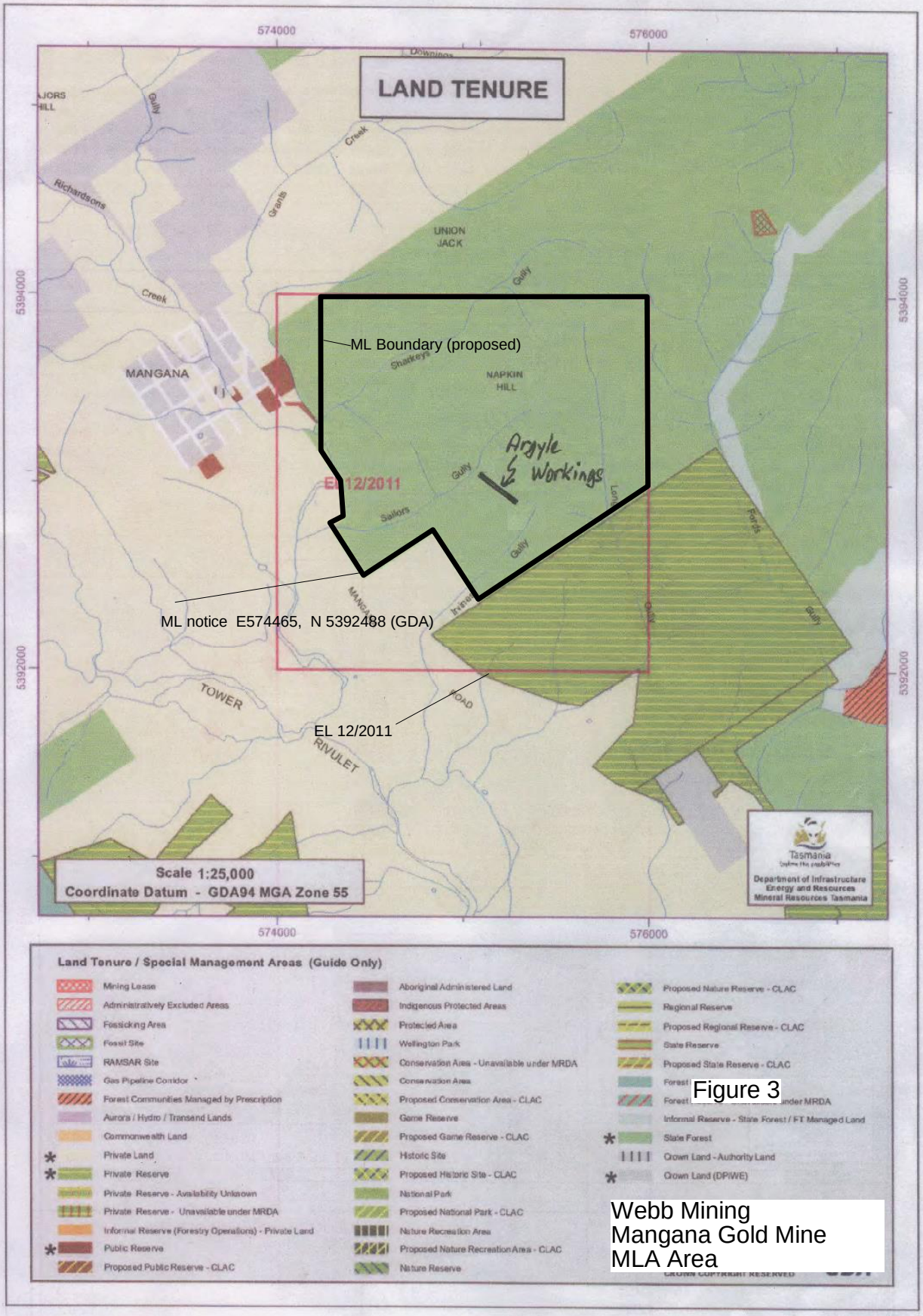


Figure 3

Webb Mining
Mangana Gold Mine
MLA Area

The mine will be accessed by an adit above the water table and no mine dewatering will be required. A mine plan is currently being developed which will include both a geotechnical and ventilation components.

Annual production is expected to be in the vicinity of 10-30,000 tonnes per year, depending on mining methods and ore recoveries. Ongoing exploration within the lease may also identify other areas for potential mining and these will also be pursued in the future (ie Mangana Reef etc).

Access for mining purposes will be via existing tracks where possible which will be widened as required, with a cleared area of approximately 5mx 10 m at each adit entrance for working platforms.

4.3 Processing

Processing will involve a simple gravity separation plant with no cyanide or chemicals involved. The plant will consist of a jaw crusher, cone crusher, ball mill, gravity tables, with final product a gold ore concentrate and tailings (**Figure 4** shows the process flow sheet). The tailings will be relatively coarse and permeable. The plant will be located on the surface near the Adit (**Figure 3**). It will be in an existing previously disturbed (cleared) area and have small footprint (approx 25m x25m). A likely layout is shown in **Figure 5.**

The concentrate will be processed elsewhere – possibly Beaconsfield.

4.4 Wastes

No mine dewatering will be required and all process waters will be recycled and a net water consumer. No discharges are anticipated.

Water required in the processing circuit is estimated at between 2-3 kL per hour when operating and is expected to be recycled and made up with external sources. These will be either surface waters and/or a ground water well into the underground workings.

A conceptual layout for water tanks is shown in **Figure 5**.

All tailings will be recovered after dry stacking and placed underground as fill.

All waste rock generated in mining will also be used as mine backfill.

4.5 Transport

Access is via Mangana Road from Fingal. The existing access road from Mangana Road to the site will require minor upgrading (culverts etc). There will be no significant transport impacts as production of gold concentrate will be low (less than 10 tonnes) and transported via light vehicles.

5 Project location

The location of the project is shown in **Figures 1 and 2.** A google image is also included.

6 Stakeholder consultation

It is proposed that consultation meetings will be held with the Mangana community to discuss the project. There has been sufficient public feedback to state that the new mine

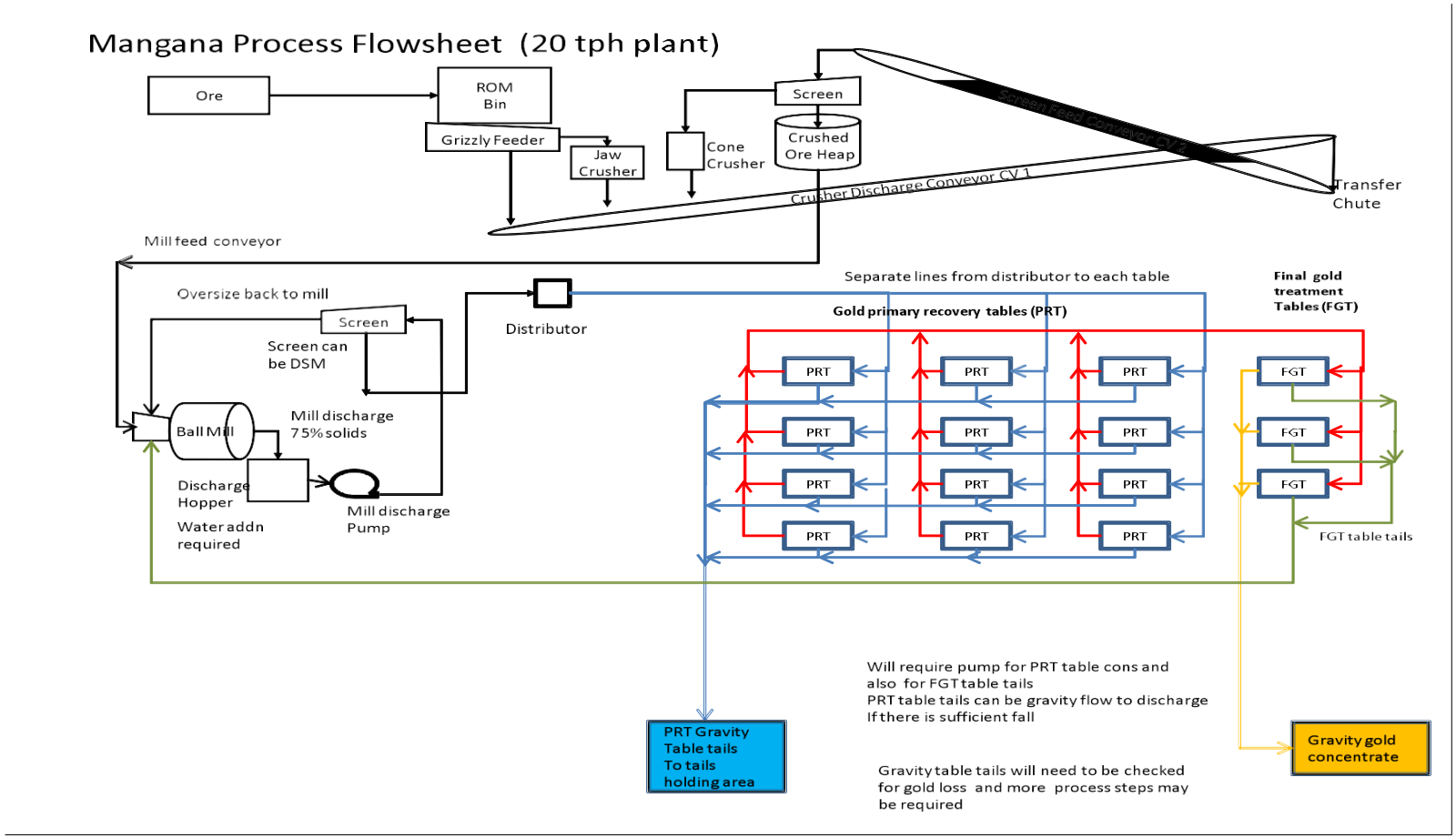


Figure 4 Mangana Gold Mine Process Flow Sheet

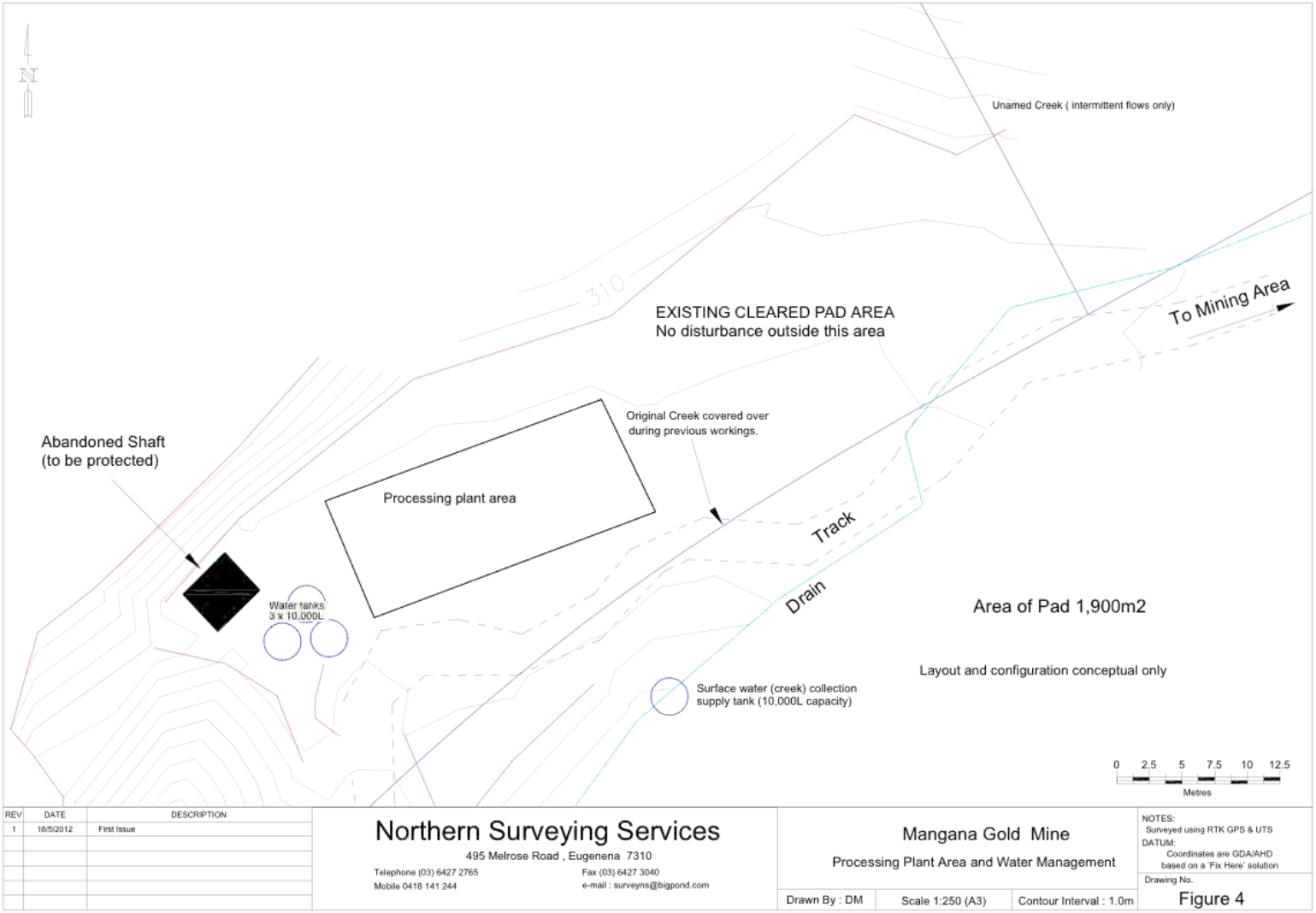


Figure 5 Plant Area possible layout

will be welcomed by the local community given the current state of the local economy and job opportunities.

The results will also be discussed with Break O'Day Council and Forestry Tasmania. EPA and MRT have been consulted.

Workplace Safety have previously been contacted prior to the exploration program commencing but no request for further information or for as site visit has been received, probably because of the nature of the works to date. Webb Mining are familiar with their requirements and will maintain contact with the mines inspectorate.

7 Environment Description

The Exploration Licence (and proposed mining lease) is situated in Sailors Gully, immediately south of Mangana, in an extensive area of native forest owned by the Crown (Forestry Tasmania). The topography is quite steep on each side of an incised valley floor. To the east is the South Esk Valley.

There is one residences approx 800m away from the mine and likely processing site and to the south of Sailors Gully (see **Figure 6 -** google image).

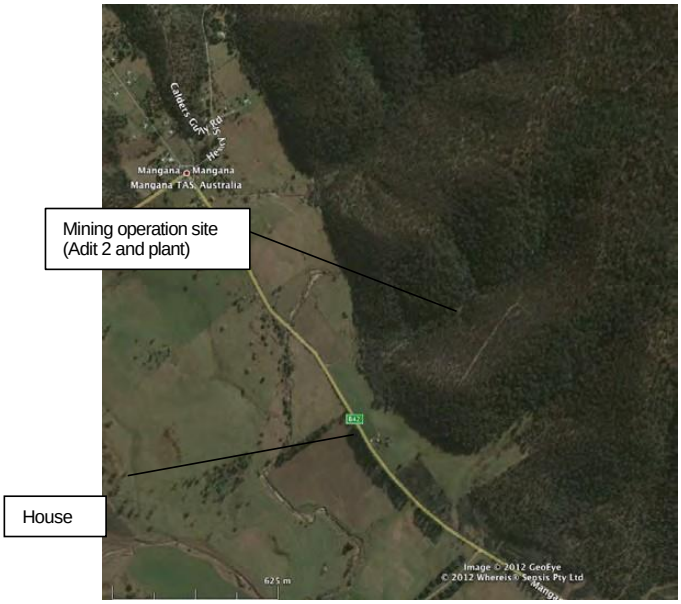


FIGURE 6 Land Use – Mangana TASMANIA – Source Google Maps

The house is shielded by the valley walls. There are no views into the site due to the native forest and the steep valley topography where the project is located.

Sailors Gully was the site of extensive underground gold mining in the late 1800's and early 1900's. This includes shaft mining (Mangana Gold Reefs Mine) and a number of adits (Golden Entrance Mine). There are little remaining remnants of this mining evident, except for adit entrances, shafts, and tailings. All the adits are above the valley ground level and no groundwater is expected.

Geology of the area is the Mathinna beds which consist of folded and faulted greenschist metamorphosed turbiditic sandstones and slates. None of these materials are acid generating and recent water sampling in one of the adits has confirmed this.

The site has been heavily disturbed with numerous adits, mullock dumps and the results of former alluvial mining in the valley floor. The floor of Sailors Gully has had numerous mining sites in the past but there are no remaining foundations, structures or items of historical interest, other than the mine shaft and adit entrances. The only other evidence is the mullock dumps and tailings which have been used by the Council as a source of fill.

Sailors Gully Creek drains to Richardsons Creek, then Tower Rivulet and the South Esk River, several kilometres to the west of Fingal. It only flows intermittently and there are no permanent waters in the proposed lease area. No flowing waters samples have been collected due to the prevailing dry conditions.

The vegetation in the gully has regenerated and is mapped as *Eucalyptus amygdalina* coastal forest and woodland (DAC). Minimal vegetation clearing will be required as the plant footprint is small and will be located in an existing cleared area and all mining is underground. Only limited clearing will be required for accesses and recent environmental studies have found no environmental values in the immediate area.

Zoning is Rural Agricultural under the Break O'Day Planning scheme (1996). Extractive industry is a discretionary use in the Zoning.

8 Issues

The principal environmental issues related to the mine and gravity processing are well understood, based on experience elsewhere.

Due to the isolation from residences, there are few issues relating to potential affects on the amenity and lifestyle of the area. Mining is welcomed as a source of employment and income.

The main issues are related to the waste rock and tailings characteristics (geochemistry), water quality, water supplies and reuse during mining and processing, flora and fauna, weeds and heritage.

9 Studies

It is proposed that the following studies will be conducted in the Mining Lease and area of the mine and processing works.

- Natural values/ flora and fauna Assessment (including weeds);
- Geochemical assessment of ore and tailings;
- Heritage;
- Water management (including water quality); and
- Waste management.

10 Timetable

It is intended that the EER will be completed within 2 months. Mining is proposed to start almost immediately on obtaining the Permit.

11 Environmental Approvals Process

It is our understanding that the following approvals process is required;

- A level 2 planning permit application to the Break O'Day Council,

The project will not require approval under the *Environment Protection and Biodiversity Conservation Act 1999*, as there is no potential to impact upon matters of national environmental significance or upon Commonwealth land.

If you have any questions relating to the proposal please contact the undersigned, or John Miedecke our consultant. (0418130672).

Yours sincerely

for

Nigel Webb , Director.