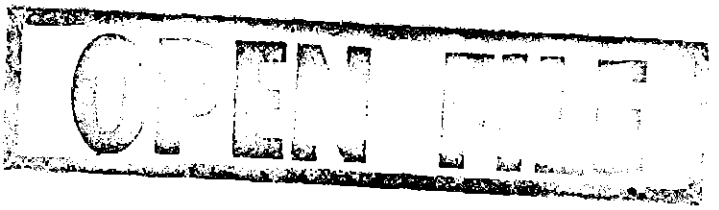
TMAT-2



NEWCREST MINING LIMITED

Annual Report for Exploration Licences 22/92 Tower Hill, 23/92 Alberton & 34/92 Mt Saddleback Tasmania

9 October 1992 to 9 September 1993

D.F. PEARSON
Brisbane

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SUMMARY

Exploration Licences (EL) 22/92, 23/92 and 34/92 have been collectively explored over the period October 1992 to September 1993 for large scale stockwork style gold mineralisation. The exploration programme has included geological mapping at 1:25,000 (and in greater detail at selected localities), image processing and interpretation of aeromagnetic data available for part of the project area, drainage sampling and detailed geochemical surveys including soil and outcrop sampling. In the course of this work many of the sites of old mine workings and prospects identified by previous workers have been visited and assessed.

Within the project area extensive zones of quartz vein stockworking occur within altered psammitic units of the Mathinna beds. These stockworks have been shown to be weakly mineralised and locally encompass narrow veins of moderate (1-10 ppm Au) gold grade. To date however, no evidence of economically bulk mineable grades (ie. ≥1.5 ppm Au) have been identified in significant volumes of this material.

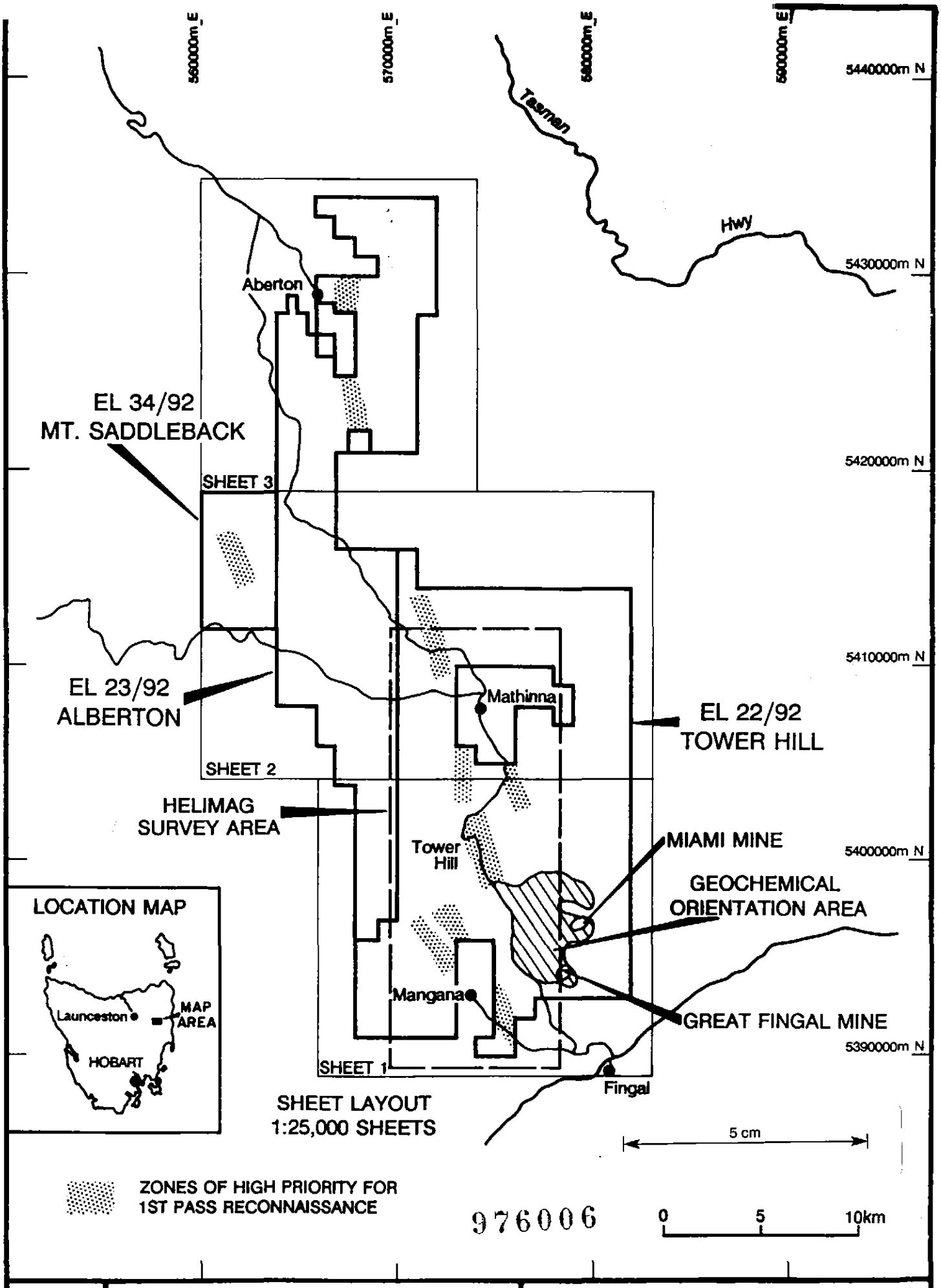
1. INTRODUCTION

The Mathinna project is comprised of three exploration licences for which joint reporting has been approved:

EL 22/92	First anniversary	9 October 1993
EL 23/92	First anniversary	9 October 1993
EL 34/92	First anniversary	8 January 1994

The licences cover parts of the old gold fields at Alberton, Dans Rivulet, Mathinna, Tower Hill and Mangana (Figure 1). Landforms in the area include the mountain peaks of Mt Victoria, Mt Saddleback and Tower Hill as well as intermediate plateau lands dissected by steep gorges which lead to broad river valleys. Land use includes forestry, both natural forests and extensive pine forests, in the plateau and mountain country and cattle and sheep grazing in the cleared river valleys.

The area around Mt Victoria and adjacent northern parts of EL 23/92 is restricted to exploration due to a Forest Reserve and Recommended Areas for Protection (R.A.P.s). Elsewhere access is generally good along an extensive system of reasonably well maintained forestry tracks with a pleasing level of co-operation and friendly advice available from the local Forestry Commission office in Fingal.



NORTH	NEWCREST MINING LIMITED		MATHINNA PROJECT TASMANIA
	COMPILED DFP	SCALE 1:250,000	LOCATION OF
	DRAWN CC	DRAWING No. TMAT - 7	FIELD ACTIVITIES
	DATE July 1993	FIGURE No. 1	

2. EXPLORATION OBJECTIVES AND RATIONALE

The objective of Newcrest's exploration on the Mathinna project is to locate substantial resources of gold mineralisation suitable for development at a scale commensurate with the company's existing operations. That is, in the order of 100,000 oz gold production per annum or greater.

The distribution of known gold mineralisation in the project area suggests that there has been a regionally extensive mineralising event concentrated on a narrow NNW trending structural corridor probably related to deep crustal fracturing. This setting is considered prospective for large scale vein stockwork style mineralisation similar to that at the Enterprise Mine at Pine Creek Northern Territory, or the Carson Hill/Jamestown style of the Mother Lode district of California.

Mineralisation of this style can be expected to have a surface expression (barring masking by surficial deposits) of greater than 1 km strike length over widths of 50 m to several hundred metres. Exploration including applied geological mapping/reconnaissance, outcrop sampling, drainage sampling and soil sampling should be effective in detailing such mineralisation if it is present in sufficient magnitude to be of interest.

3. PREVIOUS EXPLORATION

A detailed compilation of previous exploration, research and mining has been prepared for Newcrest by consultant Lindsay Newnham. Relevant parts of this compilation are included as Appendix I.

Recorded gold exploration in the project area commenced with the first discovery of gold in Tasmania at Mangana in 1852. Total production since that time has been reported as 334,000 oz 85% of which came from the New Golden Gate Mine area at Mathinna.

Modern exploration by major mining groups has been directed to shallow stockwork or multiple vein targets amenable to open-cut mining. Junior exploration groups have attempted to evaluate some of the previously worked narrow high grade veins. Exploration of the major river valleys for bulk alluvial gold resources has met with little success, however, Mr Alex White and Alcaston Mining NL have recovered approximately 1800 oz of gold from alluvial mining operations at Major's Gully near Mangana.

For a detailed resume' of previous exploration the reader is referred to Appendix I. Those previous workers that have produced data considered to be of direct relevance to the current programme include:

- Gold Fields Exploration Pty Ltd 1986-87 detailed geological evaluation of the Alberton field
  Licence: EL 17/86
  Report: 87-2735

- KA White/Alcaston Mining NL Outcrop sampling and percussion drilling in the Argyle Mine area - Mangana.
  Licence: EL 55/83
  Report: 88-2883

- Pegasus Gold Aust Ltd Outcrop and soil sampling at Tower Hill followed by RC percussion drilling. Helimag - aeromagnetic and radiometric survey over the area from Mangana to Mathinna.
  Licence: EL 55/83
  Reports: 89-3052, 90-3197

- Placer Exploration Ltd Drainage sampling (BLEG) and follow up reconnaissance and sampling - Tombstone Creek Anomaly.
  Licences: EL 3/90, EL 10/89 and EL 8/89
  Reports: 90-3145, 90-3150, 91-3254, 91-3255

- Billiton Australia Drainage sampling (BLEG)
  Licences: EL 58/88, EL 6/90
  Reports: 92-3337, 92-3342

In addition geological mapping at 1:25,000 and 1:50,000 scale by the geologists of the Tasmanian Department of Mines as well as geophysical and geochemical compilations and metallurgical surveys conducted as part of the NETGOLD programme provide encouragement and useful background data for exploration of the district.

4. GEOLOGY

The regional geology of the project area has been recorded in considerable detail by the geologists of the Department of Mines on the Ben Lomond [8414N (48)] and Alberton [8415 S(40)] 1:50,000 geological maps. Host rocks to the primary gold mineralisation are the Mathinna Beds which are also the oldest sequence in the project area.

The Mathinna beds are comprised of a relatively monotonous sequence of shales, siltstones and sandstones which are variably deformed and frequently metamorphosed to phyllites and quartzites.

No precise age has been established for the gold mineralised rocks, however, probable deposition in the late Ordovician to Silurian and folding and cleavage development prior to intrusion of the adjacent Devonian granites is evident in outcrop.

The Mathinna beds are folded on NW trending axes with wavelengths of 0.5-2 km and gentle axial plunge reversals with wavelengths in the order of 2-5 km. Folding is moderate to tight and asymmetric with local steep overturning to the west in some cases. Second order folds including 'M' folds are common with wavelengths of 5-50 m.

Mineralised quartz veining tends to be associated with anticlinal fold limbs commonly sub-parallel to cleavage and in some places following bedding plane partings and forming half saddle reefs on the eastern limbs. Narrow cross veins trending 010°-050° are also mineralised and may dominate locally.

Veins are rarely greater than 1 m in width and vary from massive clean buck quartz to quartz filled fault breccia with chloritic phyllite fragments. Quartz is also commonly brecciated and gold mineralisation is associated with pyrite and arsenopyrite in all of the above vein types and particularly their narrow altered selvages. Mineralised zones appear to have a broad pervasive halo of silicification in sandier units and chlorite alteration in the phyllites. Spotting by cordierite or carbonate is also common in these halos.

Sandstone units tend to be preferentially silicified and commonly host quartz vein stockworks particularly in fold hinge zones, zones of shearing and cross faulting and within the halo zones surrounding mineralisation

Evidence of cleavage parallel shearing is evident in places eg. Mangana Reefs, but significant shearing at 050° is evident in Major's Gully and a shear zone trending 110° cuts between the New Golden Gate Mine and the Golden Hinges adit and no doubt contributed to the anomalous dilation evident there.

Faulting and kink zones are generally dextral, normal, and NE trending, however, a few north trending faults were also observed.

The Mathinna beds are overlain by flat dipping Permian sandstones and argillites with a basal conglomerate carrying subrounded pebbles and cobbles of silicified quartz veined Mathinna beds and quartz. this sequence is host to coal measures at Fingal, Cornwall and Tower Hill and is overlain by Triassic sediments and Jurassic dolerite. Relatively recent erosion of the flat Permian unconformity has contributed to the eroded plateau like landform of most of the Mathinna beds exposure.

Unconsolidated cover includes deep alluvial fill in the major creeks and river valleys. Several perched alluvial terraces are evident in the valley of the South Esk river.

Extensive areas of Pleistocene age glacial tallus have been recorded by the Mines Department mapping. These deposits are particularly evident where they are dominated by large erratic boulders of Jurassic dolerite. Deposits dominated by Mathinna beds fragments are less easy to discriminate. High energy outwash deposits are also evident on perched positions such as the eastern slopes of Fords Gully 4 km west of Fingal.

Many of the flat topped hills in the Mangana to Mt Saddleback area and the Mathinna and Una Plains further north have abundant Permian detritus in the soil profile as a relatively thin veneer to basement Mathinna beds. These deposits are of minor volume but have great potential to contribute to spurious and misleading geochemistry.

In some areas previously mapped as Mathinna beds the combination of thin Permian wash on the flat ridge tops, thick scree on the steep gorge slopes and alluvial valley fill is such that the only exposure that can safely be regarded as residual is on the ridge shoulders.

5. EXPLORATION PROGRAMME

5.1 Overview

Newcrest has conducted an exploration programme on the Mathinna Project aimed at the discovery of previously overlooked large tonnage bulk mineable gold resources.

An inspection of many of the old mines in the Mangana, Tower Hill, Mathinna, Dans Rivulet and Alberton gold fields has shown that these deposits are narrow (often less than 1 m in width) irregular veins with erratic grade distribution and generally weak wall rock alteration. However, extensive quartz stockwork zones have been identified in the area and some of these are gold anomalous. Such zones have the tonnage potential to satisfy Newcrest's objectives provided that economic grades can be demonstrated.

The Year 1 programme included the following surveys:

1. A review of relevant literature and past exploration results (referred to above and in Appendix I).

2. Soil sample and drainage sample orientation Miami and Great Fingal Mine areas.

3. Image processing and interpretation of the Pegasus helimag data.

4. Reconnaissance geological mapping at 1:25,000 scale and outcrop sampling.

5. Old mine inspections and detailed geological mapping and sampling.

6. Drainage sampling.

7. Follow-up drainage sampling and soil sampling

These surveys are described in more detail in the following paragraphs.

After the initial orientation surveys and aeromagnetic interpretation, geological reconnaissance was concentrated on a number of areas considered to be of greatest prospectivity on the basis of known geology, previous mining and exploration results, geophysical signature and target size (see Figure 1). Drainage sampling was conducted throughout the licence areas except where comparable data from previous surveys was available or the geomorphology was unsuitable for sampling.

5.2 Geochemical Orientation Survey

A total of 14 stream sediment samples, 20 soil samples and four rock chip samples were collected during a one week orientation programme completed early in October 1992. All samples were freighted to Amdel Adelaide. Stream sediment samples were sieved to -3 mm for BLEG analysis and -80# for ICP-MS multi element analysis. Soil samples were sieved to -80# and analysed by ICP-MS whilst rock samples were analysed by fire assay and ICP (data in Appendix II).

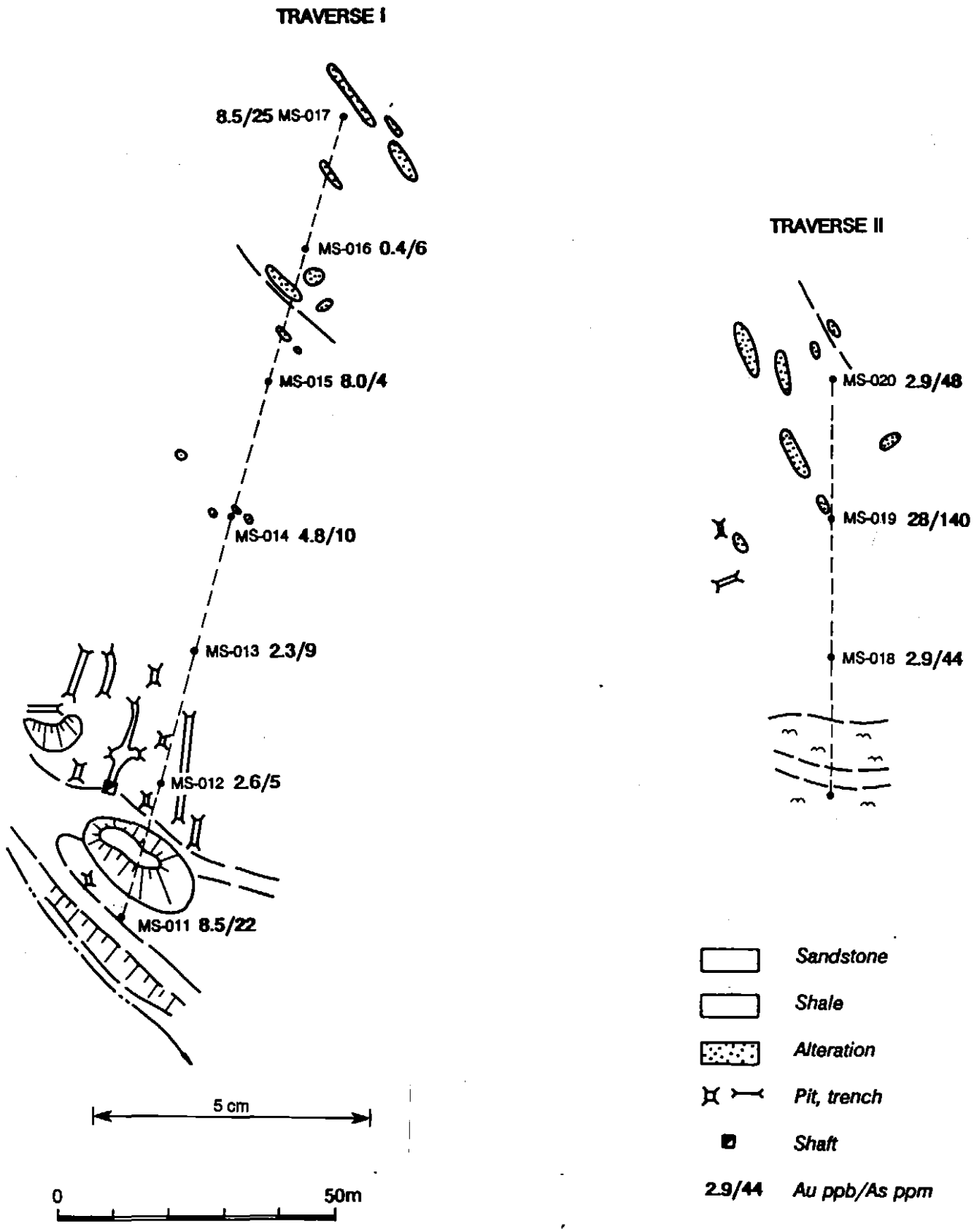
The area chosen for the orientation sampling programme covered old workings of the Miami and Great Fingal Mines located near the south eastern border of EL 22/92 Tower Hill (Figure 1), well away from the known areas of major historical production (Mathinna, Mangana).

Stream sediment samples were collected from creeks draining the Miami and Fingal workings, as well as creeks draining barren areas (no known gold mineralisation) surrounding the mine areas (Figure 1). Geomorphic problems were encountered at several sample sites, where the occurrence of significant volumes of alluvium/colluvium necessitated samples being collected well up the relevant drainages. Visible gold was panned at three sample sites, one of which was thought not to drain any known workings.

Soil samples spaced at 25 m intervals were collected from along three lines, one over the Miami workings and two over the Great Fingal workings (Figures 2 and 3). Samples tended to be very damp due to recent heavy rainfall and hence were not sieved on site.

Drainage sample results (Plans 1 and 2 and Appendix II - Samples MB001-MB014) were uniformly low at <0.5 ppb Au with the exception of sample MB-13 taken down stream of the Great Fingal Workings which returned 26 ppb Au. These results suggest a low regional background with little evidence of broad pervasive mineralisation away from the known veins. Interestingly one sample which returned <0.1 ppb Au was taken from a site at which traces of alluvial gold were detected in panning suggesting an erratic distribution of gold metal in the drainage with insignificant dispersion into clay or oxide mineral phases.

Results for the orientation soil sampling for Au and As are shown on Figures 2 and 3. Gold results are <50 ppb in every case and As in <140 ppm. The distribution suggests a weak geochemical halo to the narrow veins previously mined and provide no evidence of disseminated mineralisation of likely economic interest. ICP-MS data for Au supports the BLEG data although at a higher background reflecting incomplete leaching in the BLEG process and smaller sample size for the ICP. Arsenic is weak but generally sympathetic to Au distribution whilst analysis of Ag, Cu, Pb, Zn, Bi, Mo, Sb and Te show no response that could be considered useful in a regional survey. Results are listed in Appendix II.



NORTH	NEWCREST MINING LIMITED		TOWER HILL EL 22/92
	COMPILED GFJ	SCALE 1:1000	Orientation Soil Sampling
	DRAWN BS	DRAWING No. T004/2	Fingal Workings
	DATE Oct. 1992	FIGURE No. 2	

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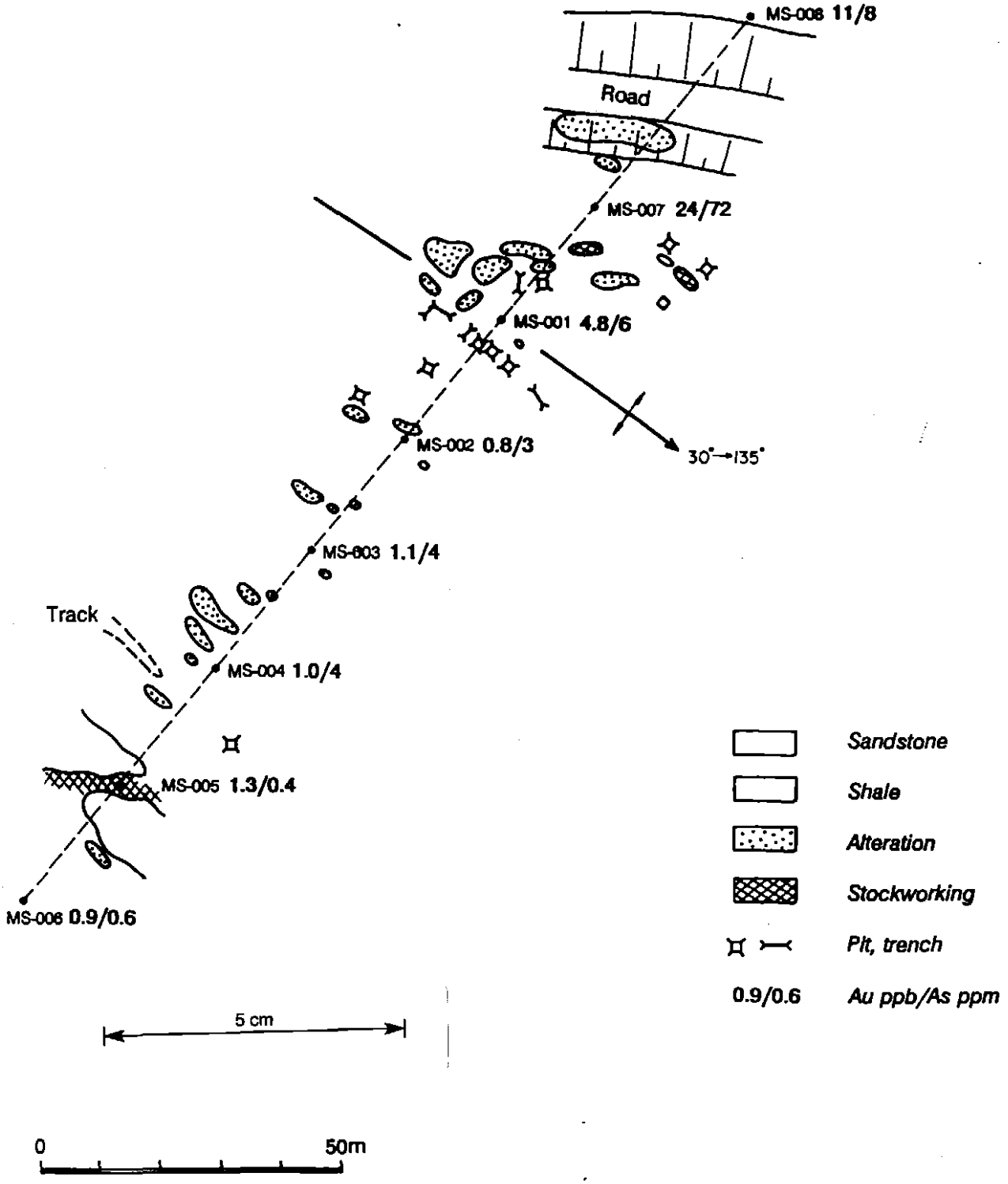

NEWCRETEST MINING LIMITED			TOWER HILL EL 22/92
COMPILED	GFJ	SCALE	1:1000
DRAWN	BS	DRAWING No.	T004/3
NORTH	DATE Oct. 1992	FIGURE No.	3
			Orientation Soil Sampling
			Miami Workings

5.3 Interpretation of Pegasus' Helimag Survey

Pegasus Gold Australia Ltd flew a helicopter-borne aeromagnetic and radiometric survey over the Mangana, Tower Hill and Mathinna gold fields in 1990. They had concluded that the previously available aeromagnetic data showed a possible relationship between magnetic lows and zones of gold mineralisation but that the survey data was too sparse to be resolved in sufficient detail to be of direct value to exploration. Further support for the link between mineralised zones and magnetic lows was apparent in ground magnetic traverses conducted at Tower Hill.

Specifications for the helimag survey include nominal terrain clearance at 80 m, N-S traverse lines spaced 150 m, E-W tie lines at 400 m, magnetics recorded at 0.48 sec, radiometrics at 0.95 sec with a 16.8 lt detector.

Newcrest acquired the digital data from the helimag survey and image processed the data as a basis for interpretation (Figure 1, Plan 3). The survey shows zones of more intense magnetic response trending NW separated by zones of relatively quite magnetics in the Mathinna and Mangana areas. In broad terms, the magnetic high zones are interpreted to represent granite intrusives at relatively shallow depth beneath the Mathinna beds with the magnetic low zones representing Mathinna beds extending to greater depths between the interpreted plutons.

Major cross cutting structures are evident in the data as are discrete magnetic high anomalies related to dolorite intrusions and highs which plot within the Mathinna beds on subtle NW trends. The subtle magnetic high NW trends are of particular interest as in many cases the old mine workings appear to lie right on these subtle trends.

Ground checking of these magnetic trends has failed to provide a direct unequivocal exploration of their origin, however, in some places they appear to correspond to the axial traces of anticlines in the Mathinna beds. Inspection of many of the old mine sites has shown that mineralisation is commonly associated with anticlinal hinge zones.

A dextral disruption of three NW trending magnetic ridges is evident in the area immediately east of the Tower Hill - Sunbeam mine workings. Also, two NE trending faults are interpreted to bracket this area. These features were interpreted to represent unusual structural complexity (perhaps greater ground preparation for mineralisation) and so this area was selected for specific ground checking.

Several discrete magnetic high features were found to be related to large blocks of dolerite talus or cultural causes when checked on the ground.

5.4 Geological Mapping

Geological mapping completed as part of the reconnaissance phase of the Mathinna project is presented at 1:25,000 scale on Plans 4, 5 and 6 (sheet layout is shown on Figure 1). Previous mapping by the Department of Mines provides a detailed geological base for much of the area and has been incorporated on these maps.

The Department of Mines mapping has been rigorous in approach and is designed for general use whilst the Newcrest mapping has been somewhat more applied to the needs of gold exploration and as a result some differences are evident. On Plans 4, 5 and 6 post Mathinna beds sediments are all considered to be cover and hence a potential mask to the gold mineralisation, thus divisions in this stratigraphy have been simplified. The Permian unconformity, Tertiary sediments and perched Quarternary sediments are all considered to have potential to release previously eroded gold into the present drainage system and could produce misleading geochemical anomalies. Newcrest mapping has paid particular attention to the distribution of these units and evidence of their soil remnants eg. the trace of the Permian unconformity is far more extensive on the flat hill tops than the actual outcrop of intact Permian sediments.

Within the Mathinna beds close inspection of many of the areas of previous gold mining shows that there is a direct relationship with anticlines. Consequently particular attention has been paid during the Newcrest mapping to identifying fold closures and axial plane traces.

Because these observations have led to some differences with the Department of Mines mapping where these changes have occurred, a heavy continuous line has been used to indicate a Newcrest mapped geological boundary as distinct from boundaries traced from the Department of Mines' maps without modifications, which are presented as finer partly broken lines on the maps. Furthermore, bedding and structural fabric observations by Newcrest are recorded in heavier pen than previous Mines Department mapping and old mine sites inspected by Newcrest are named in heavier script than those which have not been visited.

Plans 4, 5 and 6 also record the locations of outcrop rock chip samples taken during the reconnaissance and areas of more detailed geological mapping and sampling. These programmes have been extended across the EL boundaries into adjacent tenements in the Mangana, Mathinna and Tower Hill Freehold mine areas with the tenement holders' permission.

More detailed maps at 1:10,000 scale are included as Plan 7, for the Mangana area (including Golden Gully-Majors Creek and Argyle-Long Gully) and Plan 8 for the Mt Saddleback East area respectively. Maps at 1:1000 scale of the Tower Hill Freehold Mine area, and the Bucklands Ridge area are presented as Plans 11 and 12.

5.5 Drainage Sampling

Despite the obvious potential for contamination of drainage by gold released from Permian and later sediments and the likely problems of interpretation caused by random clean free gold in the drainage, as demonstrated in the orientation survey, it was decided to proceed with a comprehensive drainage sampling survey. The reasoning for this was that the orientation survey and previous sampling by Placer and Billiton had shown relatively strong gold anomalies associated with known, or in Placer's case at Sweets Creek, subsequently discovered gold mineralisation. More importantly however, it was considered that Newcrest's target - a large disseminated gold deposit would be more likely to produce a strong and repeatable drainage gold anomaly through contributions of fine grained gold to oxide and clay mineral phases as well as free native metal. The survey was also designed to demonstrate the regional gold geochemical pattern in the hope that interpretation with respect to known gold mineralisation may identify new targets.

In the current survey 109 drainage samples were taken with catchment sizes ranging from <0.5 km^2 for follow-up samples to 5 km^2 for drainages marginal to the main area of interest. Sampling procedure was to select active-transported sediment from channels and banks and sieve on site to -2 mm with nominal sample weights of 2 kg with a 500 g split for separate multi-element analysis. Sediment material was generally damp and in some cases up to ten times the sample volume was rejected as over size.

Analysis was conducted by active cyanide (bottle roll) leach with an activated carbon sachet subsequently ashed and analysed for gold at ALS Laboratory in Brisbane. Splits were assayed for Cu, Pb, Zn, Ag, As and Bi by AAS at Analabs Laboratory in Burnie. Selected splits including all follow-up samples were also assayed for Au by fire assay.

Sample locations and gold data are shown on Plans 1 and 2 and detailed data is reported in Appendix II.

Sample sites were selected to cover exposures of the Mathinna beds upstream of areas of obvious thick alluvials. The Permian unconformity was overlapped but sampling of wholly post Permian unconformity drainages was not undertaken. Areas previously covered by BLEG sampling by Placer and Billiton were mostly not resampled, however, data from these previous surveys is plotted on Plan 2 for reference.

As expected, the BLEG data shows poor repeatability and many of the samples have been reassayed (where sufficient material was available) as a check. In one case, (follow-up sample T003/015/D) although 581 ppb Au was recorded by fire assay in the split, no gold was detected in the bulk sample by BLEG. This result was reminiscent of the orientation sampling experience and further underlines the problem of erratically distributed clean free gold in the drainage systems.

In general, the BLEG data recorded in the survey show a higher background than that previously recorded in the orientation survey and the Placer and Billiton surveys. This is attributed to more efficient gold recovery by the active leach/carbon sachet method.

Interpretation of the results with respect to geology, geophysics and outcrop sampling data highlighted five catchments that were considered worthy of further follow-up vis.:

(i)	Saddleback East	Sample No. T003/010/D	57 ppb Au
(ii)	Bowl Creek	Sample No. T004/026/D	104 ppb Au
(iii)	Tower Hill East (magnetic anomaly)	Sample No. T004/025/D	142 ppb Au
(iv)	Golden Gully	Sample No. T004/012/D	143 ppb Au
(v)	West Tower	Sample No. T003/018/D	98 ppb Au

These drainages demonstrated repeatable anomalies in areas considered to have potential for large scale mineralised stockwork systems. Results of the follow-up sampling will be discussed separately below.

5.6 Outcrop Sampling

Outcrop sampling was conducted as part of the reconnaissance mapping survey and as an adjunct to more detailed surveys of previous mining areas and follow-up of drainage anomalies. In general, outcrop sampling had two purposes:

(i) evaluation of extensive quartz stockwork zones where chip and grab samples ranging from 5-50 m traverse lengths were employed, and
(ii) characterisation sampling of known or suspected discrete zones of mineralisation eg. paired samples of veins and adjacent wall rocks, and samples of the basal Permian conglomerate.

Samples were analysed by Analabs Burnie with fire assay for gold and AAS for Cu, Pb, Zn, Ag, As and Bi following crushing of the entire sample to -75 microns. Sample locations are shown on the geological maps and results and sample data are recorded in Appendix II. Initial sampling programmes included 108 outcrop samples with an additional 51 taken in June 1993 and follow-up and a further 30 samples taken in August.

Outcrop sampling has shown that many of the zones of extensive quartz stockwork veining located in the project area and on adjacent tenements carry weak gold mineralisation in the range 0.01 g/t Au to 0.10 g/t Au which is consistent with the results of Pegasus Gold Australia Ltd's extensive sampling of the well known stockwork zone at Tower Hill. Gold mineralisation of this tenor may be capable of providing a source for further concentration to economic grades in alluvial deposits but is too low grade to be considered as a hard rock resource.

Inspection of Placer Exploration Ltd's Sweets Creek anomaly on the west side of Mt Saddleback confirmed that the anomaly is sourced from a narrow zone of sporadically mineralised quartz breccia which terminates against the Scottsdale granite. This zone is developed in andalusite schist - hornfels, marginal to the granite but in all other respects appears typical of the Mathinna-Mangana style deposits. No other mineralisation was detected in this area.

On Bucklands ridge Plan 12, a series of open unreported trenches across quartz stockworked sandstone units in the Cardinal mine area were sampled on 5 m intervals. Results ranged from <0.005 g/t Au to 0.026 g/t with the exception of sample T004/016/R which returned 2.76 g/t Au and included a 40 cm quartz vein (with a shallow shaft adjacent to the trench) and sample T004/031/R which returned 0.49 g/t Au and 700 ppm As.

Sampling of stockwork quartz veining within the floor and adjacent to the Major's Creek alluvial gold mine (Plan 7, 8 and 9) returned results ranging from <0.005 g/t Au to 0.077 g/t Au with As in the range 15-530 ppm. A series of samples across the anticline hinge SE of the Jubilee Mine near Mathinna (Plan 5, samples T004/070R to 072/R) returned 0.01-0.036 g/t Au with As in the range 21-57 ppm.

In general terms, weak As anomalies were detected in association with weak gold mineralisation, Bi was not detected and the other elements showed no clear relationship to Au distribution.

Minor arsenopyrite was located in quartz veins in the Saddleback East and Golden Gully areas. These zones were extensively sampled during follow-up surveys which are discussed below.

5.7 Follow-up Sampling Programmes

On the basis of the geological reconnaissance, outcrop and drainage sampling results and the aeromagnetic interpretation, five areas were selected for more detailed evaluation. Follow-up programmes included close geological inspection, outcrop sampling, closed up drainage sample spacings, grid soil sampling (where applicable) and ridge and spur sampling. These programmes were designed to demonstrate potential for large bulk tonnage gold mineralisation in these areas and have been effective tests for this target. The programmes are not, however, considered comprehensive tests for small scale high grade veins of the type that have previously been mined in the district.

5.7.1 Mt Saddleback East Anomaly

In this area, follow-up of a 57 ppb BLEG anomaly concentrated on extensive traversing of the surrounding steep ridges and flat up-land area adjacent to the Mt Saddleback Permian unconformity. Basement rocks included typical phyllites and metasandstones of the Mathinna beds with quartz vein stockworking in the sandstone units.

More intense veining accompanied by chloritic slate and quartz arsenopyrite veins was located at the Wedge and Axe Prospects and at the Wedge Prospect a 50 m long 3 m wide quartz vein with minor arsenopyrite was recorded. These discoveries were considered significant as no previous gold mining had been recorded in the area.

The follow-up programme included 12 additional drainage samples, two local soil sampling grids (70 soil samples), 100 m spaced ridge and spur soil samples covering two major ridges and two spurs (65 samples) and 30 outcrop samples. Sample locations are shown on Plan 8 and sample and assay data is recorded in Appendix II and Plan 10.

Results of the follow-up drainage sampling were disappointing, with only weak gold responses recorded by BLEG in sample T003/013/D at 1.3 ppb Au in the upper part of the original anomalous catchment and 3.9 ppb Au from sample T003/014/D taken on a minor tributary of very limited catchment 200 m upstream from the original anomalous sample. As noted previously, however, evidence of erratic free gold in the sediment is provided by sample T003/015/D which returned a fire assay result of 0.58 g/t Au from the 500 g split whilst no gold was detected by BLEG on the main bulk of the sample. Sample T003/015/D also recorded anomalous As at 110 ppm as did T003/012/D (also 110 ppm As) taken adjacent to the Wedge prospect.

Grid soil sampling on 50 x 100 m centres was conducted over both the Wedge and Axe prospect areas where extensive quartz veining carrying minor arsenopyrite had been observed. Soil samples were of "C" to "B" horizon with hand sorting to remove rock fragments greater than 1 cm and organic material in the field followed by drying and crushing of the entire 2 kg sample to -75 microns at Analabs Burnie. Soil samples were assayed for Au by fire assay, Ag, As, Cu, Pb, Zn and Bi by AAS. Sample treatment was identical for ridge and spur soil samples and broad grid soil samples taken at the Tower Hill East and Golden Gully survey areas.

Soil sampling at the Wedge prospect showed a weak NW trending As and Au anomaly with peak responses of 360 ppm and 0.021 ppm respectively. These results are consistent with outcrop samples of the NW trending subcropping quartz veins which returned peak results of 0.037 ppm Au, 6330 ppm As, 3 ppm Ag and 744 ppm Pb. Chip samples of 2 and 3 m across the outcropping massive buck quartz vein (samples T003/021/R and 022/R) returned 550 and 620 ppm As, however, Au and Ag were not detected. These results demonstrate the presence of weak Au/As mineralisation but preclude the presence of a significant resource.

Outcrop sampling of the Axe prospect returned peak values of 0.637 ppm Au and 1720 ppm As. Soil sample results show peaks of 250 ppb Au and 510 ppb As in separate samples. Repeat sampling however, returned only 40 ppb Au from the 250 ppb Au site and despite the presence of arsenopyrite bearing veins it can also be concluded that no major Au resource is present at the Axe prospect.

To further test the Saddleback East anomaly the catchment was bracketed with 100 m spaced ridge and spur soil samples (Plan 8). Peak results of 120 ppb Au and 420 ppm As were returned from the same sample; the overall distribution of results however, suggests that these and other weakly anomalous results represent isolated mineralised veinlets rather than a coherently mineralised zone of significant volume.

Outcrop samples of quartz stockworks on the SE part of the ridge separating the Wedge and Axe prospects returned weak anomalies of 0.034 ppm Au and 1120 ppm As (sample T003/006/R) which are consistent with the conclusions drawn from the ridge and spur soil sampling.

5.7.2 Bowl Creek Anomaly

Bowl Creek is located 2.5 km SW of Mathinna and was one of the areas selected for particular attention during the geological reconnaissance (Figure 1). First pass sampling returned a BLEG result of 104 ppb Au (Plate 2) and although no significant anomalies were detected in outcrop sampling of the adjacent ridge, extensive zones of quartz stockwork were observed.

Follow-up sampling included further inspection and sampling of the surrounding ridges, inspection of the Scott and Pickett mine site (1.2 km upstream of the anomaly, see Plate 5) and an additional six drainage samples. This work demonstrated that whilst the mineralisation at the Scott and Pickett mine had no potential as a major gold resource it was probably responsible for the drainage anomaly. No other mineralisation was detected in the catchment.

5.7.3 Tower Hill East Anomaly

This area first attracted attention as a magnetic anomaly suggestive of structural complexity and potential ground preparation to the east of the previously explored Tower Hill stockwork zone. First round reconnaissance showed that the area was partially covered by Permian sandstone but that the exposed Mathinna beds were anomalously chloritic and carried several zones of quartz stockworking. Proximal BLEG sampling had returned 14.2 ppb Au and Cox's Creek which drained the area to the east had an anomalous drainage train extending 5 km (Plans 2 & 5).

Outcrop sampling failed to identify significant gold mineralisation and so the area was soil sampled on road traverses producing a grid of approximately 200 m x 400 m (samples T004/001/S to T004/035/S). These samples returned peak results of 0.044 ppm Au and 110 ppm As and thus preclude the possibility of a significant bulk tonnage resource in this area.

5.7.4 Golden Gully Anomaly

The Golden Gully-Black boy ridge area was also one of the areas selected for close attention during the geological reconnaissance (Figure 1) First round drainage sampling returned 143 ppb Au from Golden Gully which is one of the tributaries to the Majors Creek alluvial gold field. The Tower Hill Freehold gold mine lies in the catchment of the anomalous sample, however, it was considered unlikely that this potential source of gold could alone explain the anomaly.

Ridge and gully traverses in the area showed that quartz stockworked sandstone occurred extensively through the catchment and outcrop samples of this material were taken along with four infill drainage samples. Relatively tight folding was observed in the area with local disruption caused by NNE trending faults (Plan 7).

Follow-up drainage sample results were at a much lower level than the original anomaly with BLEG returning 1.3 ppb Au from Maudwidt Gully and 7.2 ppb from 1 km upstream in Golden Gully. BLEG did not detect any gold in two samples from Little Golden Gully, however, 13 ppb was detected in a fire assay of the split of sample T004/039/D in the upper part of this creek.

Outcrop samples in general returned results typical of the weak Au and As anomalies previously returned from stockworks ie. <100 ppb Au and <150 ppm As (Plate 9). Exceptions were sample T004/102/R which returned 1.1 ppm Au and 4070 ppm As from a subcropping quartz matrix breccia vein and T004/106/R which returned 0.59 ppm Au and 12 ppm As from quartz stockwork sampled over 5 m in flat dipping sandstone in the hinge of an anticline which is central to the Golden Gully area.

Follow-up sampling of these anomalous outcrops demonstrated that the 1.1 g/t Au result was sourced from a narrow (<½ m) vein of very limited extent whilst the 0.59 g/t results could not be repeated and is assumed to have been derived from sporadic mineralisation within some of the stockwork veins (Plans 7 and 9).

In order to further investigate the Golden Gully anomalous drainage the catchment was bracketed with 100 m spaced ridge and spur soil samples (Plans 7 and 9). Results show peaks of 34 ppb Au (by fire assay) and 200 ppm As with considerable variation suggesting minor mineralisation related to small sporadically mineralised veins throughout the catchment rather than the broad zones of coherently mineralised rock that are sought.

A relatively consistent though low order As anomaly (120-200 ppm As) was detected over a 400 m x 200 m area on the western flank of the catchment. This anomaly was coincident with relatively extensive stockwork veining developed in sandstone and phyllitic siltstone in the hinge of a south plunging anticline along strike from sample T004/106/R which had returned 0.59 g/t Au in earlier sampling.

A field inspection was conducted and a further six 5 m chip samples (T004/127/R to T004/132/R) were taken from outcrops of moderately sericitised and stockwork veined sandstones to siltstones with minor fine grained disseminated pyrite. Peak results were disappointing at 95 ppb Au and 95 ppm As, far less than potential ore grades.

5.7.5 West Tower Drainage Anomaly

The West Tower anomaly was detected in a BLEG drainage sample, taken on a west flowing creek located 5 km NW of Tower Hill, which returned 21.6 ppb Au and 98.2 ppb in a repeat sample (Plates 2 and 5). No previous gold workings are recorded in this catchment, however, the reconnaissance mapping had located quartz veining associated with a tight SE plunging anticline which appears to control an unusual sharp bend in the course of the gully.

This anomaly was followed up with a further five drainage samples (T003/027/D to T003/031/D)and four outcrop samples. All nine samples failed to return significant gold results demonstrating that no significant mineralisation occurs within that part of the catchment which lies within EL 23/92. Reconnaissance of the ridge immediately north of the anomalous drainage revealed a few areas of scattered quartz float within monotonous phyllitic siltstone outcrop (samples T003/009/R and T003/010/R). None of this looked particularly prospective and it is concluded that the drainage anomaly is unlikely to represent a major undiscovered gold resource.

5.7.6 Corbetts Hill

The Corbetts Hill area is located just west of the township of Mangana and appears to have been the centre of extensive shallow loaming and eluvial gold prospecting. Numerous shallow pits and areas of disturbed ground were observed on the hill along with extensive quartz float. It was impossible to determine whether this quartz was of local origin or some form of lag deposit from an eroded tertiary sedimentary deposit.

Five soil samples were taken on 50 m intervals in a single traverse E-W across the ridge to test for evidence of broad disseminated gold mineralisation associated with the quartz (Plans 7 and 9). Results were disappointing with gold in the range <5 ppb to 14 ppb by fire assay and As in the range 5-22 ppm clearly demonstrating that no significantly mineralised quartz system is present in this area.

6. CONCLUSIONS

(i) Extensive zones of stockwork quartz veining occur in the Mangana-Mathinna gold fields and surrounding Mathinna beds. Some of these zones are weakly mineralised with gold and arsenic, and in places surround narrow quartz matrix breccia veins which carry moderate grades ie. 1-10 ppm Au and 0.1-1 % As.

(ii) Although extensive quartz vein stockwork zones have been demonstrated it is obvious that much of this quartz veining is not gold mineralised. For exploration for this target to be successful more information on regional structural controls and the timing of the gold mineralising event needs to be considered so that sites of maximum structural dilation coincident with the mineralising event can be predicted.

(iii) Geochemical Au/As anomalies detected at Mt Saddleback East, West Tower drainage and the Placer anomaly at Sweets Creek may represent a weakly Au/As mineralised zone extending under the Tower Hill and Mt Saddleback Permian unconformities from the Mangana field. This zone may represent a parallel regional control to that evident in the linear zone of the Alberton/Dans Rivulet/Mathinna goldfields.

8. EXPENDITURE

Expenditure on the ELs for the period was as follows:

Item	EL 23/92 $	EL 22/92 $	EL 34/92 $
Salaries and Wages	29,432	38,474	5,017
Oncosts	3,438	4,980	464
Assays	3,914	7,605	154
Geological Consultant	3,994	3,994	
Geophysics	846	846	
Supplies	532	1,548	168
Tenement Costs	4,703	3,255	1,188
Travel & Accommodation	4,964	7,371	686
Vehicles	1,624	824	
Freight	1,166	1,233	
Office & Administration	15,588	21,438	104
TOTAL	**$70,201**	**$91,568**	**$7,781**

APPENDIX I

Review of Previous Exploration

To be
indexed as
appendix 1 of
TCR 93-3498

91

NEWNHAM EXPLORATION AND MINING SERVICES

EXPLORATION LICENCES 22/92 AND 23/92

NORTH-EAST TASMANIA

REVIEW OF PREVIOUS

EXPLORATION INFORMATION

TEXT AND FIGURES

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1 SUMMARY:

In north east Tasmania, a sequence of folded and faulted Ordovician sediments has been intruded by several granodioritic and granitic plutons. Siliceous gold bearing fluids emanating from the granodiorites permeated into tension gashes and other favourable repositories developed within a major NNW shear zone. This structural preparation may have been enhanced by tight folding and north east shearing.

The NNW shear zone between Waterhouse and Mangana is 90 kilometres long and 10 kilometres wide.

Newcrest Mining Limited has applied for two Exploration Licences covering much of the southern half of this zone between Alberton and Mangana. Those sections of this part of the zone not covered by the Newcrest tenements encompass the key goldfields of Alberton, Dans Rivulet, Mathinna and Mangana, all of which are held by junior explorers.

Land management in the area is dominated by forestry and agricultural industries. In general, exploration access is straightforward provided certain establishment protocols are observed.

Historical reported production from the region since 1852 is 334,000 ounces or 11 tonnes gold, 85% of which came from the New Golden Gate Mine area at Mathinna.

Mineralisation consists of quartz plus several percent sulfides, generally arsenopyrite, pyrite and minor galena, sphalerite and chalcopyrite. Gold occurs closely associated with the sulfides and as free grains, in veins in structurally prepared sites. These veins are typically narrow with short strike and dip lengths, although opportunities for more substantial veins to develop do exist.

An important feature of these steeply dipping veins is that many of them do not outcrop.

Historical exploration has been directed at both primary and secondary gold deposits. Scope for substantial secondary deposits is limited.

Major explorers have concentrated on searching for shallow stockwork or multiple vein deposits amenable to open-cut mining whilst junior explorers have made some attempts to evaluate and re-open shallow, narrow, high grade veins.

Exploration in the last 30 years has been dominated by surficial mapping and sampling around old workings, stream sediment and magnetic surveys. Detailed follow up work has been cursory.

The effectiveness of bulk cyanide leach stream sediment surveys and magnetic surveys in this region is questioned.

A conspicuous feature of the field is the lack of effective drilling, particularly deep drilling.

Exploration to date has failed to result in the discovery of any significant resource.

However, several areas of immediate continuing interest have been indicated:

a) Alberton - underground sampling in the Mount Victoria Mine located a quartz vein stringer zone which may develop into a major vein system at depth similar to that at New Golden Gate Mine.

b) Mathinna - past work suggests a major quartz vein stringer zone which developed above the two main reef formations at New Golden Gate may extend north. A detailed study of this mine is justified.

c) Mangana - the Golden Entrance-Argyle Mine occurs within a long persistent untested structure, and scope exists for adjacent parallel structures.

d) Vein intersections - auriferous vein intersections have been obtained in drilling programs at Long Struggle (Alberton), O'Briens (Dans Rivulet) and Sunbeam (Tower Hill) Mines. If this style of deposit conforms to the Newcrest objectives, they should be pursued.

e) Saddleback - a sizeable As-Au anomaly occurs in soils and rocks on the west side of Mt. Saddleback, outside the Newcrest tenements. No mines exist in the area, and the anomaly is recommended for further consideration.

Regional exploration for undiscovered gold mineralisation (not outcropping) should be directed towards foci of structural deformation. These could be located by state of the art airborne EM and satellite image processing studies, followed up on the ground by detailed soil and rock sampling surveys aimed at defining gold pathfinder halos as opposed to direct gold anomalies.

Ground geophysics, especially EM, could be an efficient structural mapping tool but is unlikely to be effective in locating mineralisation.

Core drill testing of appropriate targets is recommended.

3 DATA BASE

One hundred and thirty years of gold mining and exploration in north-east Tasmania have resulted in a substantial information data base on the Alberton-Mangana zone.

The Department of Mines Office in Hobart is the repository for most of this information.

There are three principal sources of information:

- Government reports
- Company reports
- Academic research and reports.

3.1 Government Reports

These may exist as Typescript, Technical, Unpublished and Published Reports, and Bulletins. They can be systematically referenced on a map quadrangle basis.

The Newcrest tenements are covered by

- Quadrangle 48: Ben Lomond
- Quadrangle 40: Alberton

Many of these reports are old and are only available on microfiche. Unpublished reports cannot be purchased but may be copied.

A full list of reports appears as Appendix 2.

The Department of Mines also maintains a State register of drill holes, which can be accessed on a co-ordinate block basis. This register includes all holes drilled either by the Department or private investors where information pertaining to that drilling is in the public domain.

A listing of these holes in the Alberton - Mangana area is attached as Appendix 3. The list is not complete where drilling is undertaken on Mining Leases which are still current. Also logs for some holes are difficult to obtain, particularly in the Mathinna area.

3.2 Company Exploration Reports:

When a company or individual relinquishes an exploration tenement, all reports relating to that tenement are placed on open file and are available for inspection and copying at the Department of Mines.

Drawings contained in more recent open file reports are usually available in transparency form for copying.

Open file reports can be listed on a computerised co-ordinate block basis, and such a listing with respect to the Newcrest tenements is appended in

chronological order as Appendix 1. This search technique annotates reports outside the area of immediate interest and these reports are highlighted with a cross (x) in this appendix.

If reports are more than five years old but refer to a current Exploration Licence, they are also placed on open file. however, this situation does not pertain to any of the Newcrest ground.

3.3 Academic Reports and Research:

A variety of papers exist on north east Tasmania geology. These are normally available in standard references or in the Department of Mines and the University of Tasmania libraries.

The more significant of these are included in Appendix 2.

3.4 Other Data Sources:

The Department of Mines is proposing to undertake a long term research program on the north east goldfields, aimed at stimulating and assisting explorers in the region.

Known as NETGOLD, this program is currently on hold because of government budgetary problems. The initial phase of NETGOLD was to establish a mine and prospect data base as a prerequisite to developing metallogenic maps. This work continues slowly, and preprints of work completed in the Mangana and Tower Hill Mathinna areas were acquired and are attached as Appendix 6, 7. Similar information may shortly be available on a non-official basis on the Alberton area, however in the interim, a mine data base for Alberton has been developed from open file Company Reports (Appendix 5).

Report listings on specific mines or prospects in the region can be obtained from another computerised Department of Mines data base known as MIRLOCH. If, for example, a detailed listing of all available information on the New Golden Gate Mine was required, this could be acquired by accessing MIRLOCH. This data base was not accessed for the purposes of this report.

3.5 Information Gaps:

There are gaps in information on previous work completed in the area for several reasons:

a) Closed file reports
b) Mining Lease reports
c) Unreported work
d) Regional studies

a) Closed file reports:

Reports on current Exploration Licences, where those Licences are less than five years old, are not available. This is not a problem on the Newcrest ground because the only area in this category is E.L. 4/88 at Alberton. This Licence is currently explored for alluvial gold and only one

square kilometre lies within E.L. 23/92.

b) **Mining Lease reports**

Until recently, Companies owning M.L.'s in Tasmania were not required to report on exploration activities.

Further, reports on current M.L.'s remain on closed file.

Information on old leases is best obtained by talking with persons involved with the Leases.

Information on current Leases in best obtained by direct negotiation with the owners.

Three important current Lease areas on the Newcrest ground where this should be done are:

- Mangana (1479P/M - Alex White)
- Mathinna (43M/89 - Alex White)
- Alberton (44M/88, 45M/88, 46M/88 - Oceania Tasmania Pty Ltd - Malcolm Bendall)

c) **Unreported work:**

Minor exploration programs are occasionally undertaken with or without tenement protection and results are not reported. This commonly occurs on Prospecting Licences.

It is considered unlikely that significant work of this type has been undertaken on the Newcrest ground.

d) **Regional Studies:**

Major Companies sometimes undertake regional studies without reference to specific tenements. This work may or may not be reported to the Department of Mines.

For example, a Tasmania wide landsat study by RGC in the 1970s was not reported to the Department, but some of the regional studies by Billiton in the north-east were.

Access to unreported studies (if known) may be possible by direct approach to Companies.

5 REVIEW OF PREVIOUS WORK: ALBERTON-MANGANA ZONE

5.1 Historical Exploration and Development:

Gold was discovered at Mangana in 1852, and as exploration logically extended to the North, further discoveries were made, eventuating in the definition of four significant and distinct zones of mineralisation:

- Lyndhurst to Mangana
- Lisle
- Lefroy
- Beaconsfield

By the 1880's, significant gold mines were operating on all four fields. In the Lyndhurst-Mangana zone, activity was concentrated on the southern section between Mangana and Alberton within a 70 x 5 km belt of deformed turbiditic sediments.

Exploration was intense in this corridor. The classical target was narrow, high grade sulfidic quartz veins. It was recognised at an early stage that these veins were structurally controlled and occurred in a range of orientations and forms within zones of shearing and tectonic deformation.

In these early days, economic grades were 20-30 g/t gold, and cut-off grades 15 g/t.

Recorded production in the Alberton-Mangana area was dominated by the New Golden Gate Mine. The top 10 producers were:

New Golden Gate	254,000 oz	Mathinna
City of Hobart	22,000	
Tasmania Consolidated	11,000	
Volunteer	3,000	
Volunteer Consolidated	2,000	
Ringarooma Gold Mining	9,000	Alberton
Mt. Victoria	5,000	
New River	5,000	
Mercury	2,000	
Golden Entrance	3,000	Mangana

Several of these individual operations were probably working the same orebody, or extensions of nearby deposits, for example, the Tasmania Consolidated reefs were the northern extensions of the New Golden Gate reefs, and the Argyle Mine the southern extension of the Golden Entrance Mine.

A full listing of mine production and mine dimensions appears as Appendix 4. Principal mines are clustered into four districts or "goldfields":

- Alberton
- Dans Rivulet
- Mathinna
- Mangana

Dans Rivulet may simply be a southern extension of the Alberton field, with a belt of younger (post mineralisation) rocks on Mount Victoria artificially dividing the field.

The division of the belt into three or four sub-goldfields, combined with the apparent westerly offset of the Mangana field may be due to important regional structural factors which will be discussed further below.

Significant mine production continued till about 1920. The generally rugged nature of the country allowed easy mine access by either shafts or adits. Typical vein features throughout the belt were:

width	0.1-1.0	up to 5 m
length	10-100m	up to 350m
depth	<100m	up to 580m
grade	15-30g/t	cut off 15g/t
strike variable,	NW to NE dominant	
dip typically steep	70 to 80^0	
mineralisation	quartz, pyrite, arsenopyrite, minor galena, chalcopyrite, sphalerite.	

Individual veins often existed in "lode formations", which tended to be wider structural features carrying several narrower but parallel quartz veins. The fragmented sediments and clays in these formations typically carried low gold grades and the quartz veins were selectively mined.

Outside these formations the host shales and sandstones carry virtually no gold (<0.01g/t)

Several early mills were constructed, principally at Mathinna, Mangana and Alberton. Generally these were simple stamp and gravity mills which recovered most of the coarse free gold, but gold closely associated with sulfides was lost. The New Golden Gate mill experimented with cyanide extraction treatment of their sulfides with limited success.

Initial early exploration was by stream sediment panning, closely followed by widespread pitting, trenching, shallow shaft sinking and adit development. Grades and prospectivity of quartz veins was determined with the dolly pot and test crushings of small parcels of quartz vein material in the numerous small stamp batteries in the district.

Interestingly some prospecting is still undertaken on the field today using these traditional methods.

An important but not unexpected feature of this area is that many of the quartz veins never outcropped, and were only discovered during underground development aimed at other veins. This was conspicuously the case at the New Golden Gate Mine.

By 1920, all significant production and exploration had ceased. Apart from small scale prospecting, the field essentially lay dormant until about 1960.

During this 40 year interval, the Department of Mines attempted to

stimulate activity by completing drilling programs at the Long Struggle, Krushka, Prendergast, O'Briens and New Golden Gate Mines. Drilling results at the Long Struggle (Alberton) and O'Briens (Dans Rivulet) mines were encouraging by contemporary standards, but were not sufficiently so at the time of drilling.

5.2 Contemporary Exploration and Mine Development:

Commencing in the late 1950s the field has been subjected to a mosaic of exploration and mine development programs which have generated much knowledge and information, but little gold. This work is reviewed chronologically below and on a district basis in the succeeding section 6.

5.2.1 E.Z. Company - 1959:

(Ref. Appendix 1/4,5)

In 1959, E.Z. completed an aeromagnetic - EM survey over a large section of North East Tasmania.

Instrumentation and altitude control problems were experienced during the survey, which was undertaken with a fluxgate magnetometer and dual frequency EM equipment. Magnetic results were generally flat, and EM responses were attributed to water filled shear zones.

A number of anomalies were defined in the Fingal-Alberton area and several were ground checked. No detailed follow-up work eventuated.

5.2.2 Geophoto Resource Consultants - 1969-74:

(Ref. Appendix 1/6-13 and 15-22)

Geophoto held EL 6/68 for six years to facilitate major exploration programs for a range of commodities and targets in North East Tasmania.

The south west corner of the 1050 sq. kilometre licence covered the Mathinna-Mangana area.

Regional Studies

Initial work was of a regional nature over the whole licence area and included airborne scintillometer surveys, stream sediment sampling programs and broad geological reviews (1/6,7,8).

They concluded that folding and deformation was more intense in the major mineralised areas and decided to continue exploration for gold in the Mathinna-Mangana area, initially using a regional fracture analysis to highlight areas and to follow these up with gold-arsenic geochemical surveys and geophysical programs in major shear zones.

They also decided to test for alluvial gold in the Mathinna area.

For various reasons, Geophoto had technical difficulties with their fracture analysis study, but eventually produced some useful data (1/8,11). In addition to quantifying major structural features they also attempted to define placer channels beneath Cainozoic cover.

They concluded (on the basis of fracture analysis) that the gold zone was dominated by a primary NW trend overprinted by a later NE trending direction, and proposed that mineralisation was located where NE tension zones cross the NW trend (Fig. 3)

This general structural concept has received independent support from later workers studying local and regional structure in NE Tasmania.

Outside the main Mangana-Mathinna area, Geophoto also highlighted the potential of the Golden Ridge area NNE of Mathinna, which currently lies just outside the Newcrest tenements within E.L. 58/88 (1/10,21). They mapped the area and took 57 soil samples which were assayed for Cu, Pb, Zn, Ag. No further work was undertaken. This area was again highlighted by Billiton in 1991 (see below)

In 1972, Geophoto reduced their Licence to 56 sq. kilometres around Mathinna and directed further work at both detailed ground surveys over several former mines and an evaluation of alluvials in the region.

Detailed Primary Gold Programs (Mathinna Area)

Ground surveys were concentrated on grids established over the Jubilee-Mountaineer area and the City of Hobart- Chester and Murray-Old Boys-Volunteer area to the South and West of the New Golden Gate Mine respectively (see Figure 11 for general location).

These two areas were selected because of their structural setting. The Jubilee-Mountaineer area lay within the "zone of close folding" which ran immediately west of the New Golden Gate and was regarded as an important genetic factor in the development of that deposit(s).

The City of Hobart-Volunteer area lay immediately west of this zone, arguably in a deformed region associated with the "zone of close folding" which would correspond to the New Golden Gate position on the east side of the zone.

The Jubilee Mine also attracted attention because it is one of the few mines in the district interpreted as having been developed on saddle reef stratabound type veins.

Geophoto mapped their whole E.L. at 1:6,300 scale and the specific grid areas at 1:750.

On the **Jubilee Grid**, they experimented with various geophysical techniques including I.P. (dipole-dipole) and VLF. Whilst these methods defined fault zones, Geophoto doubted (quite correctly) their ability to locate concealed mineralised veins.

The grid was soil sampled and assayed for Cu, Ni, Co, Pb, Zn, Ag, As, Mn, Sb, Hg. The As:Cu ratio was considered a useful pathfinder for Au. The logic of this was not explained and must be questioned.

Two trenches dug over the strongest geophysical anomalies were mapped and sampled in detail. Few quartz veins were exposed and assays were disappointing.

Apart from mapping, the City of Hobart-Volunteer Grid was soil sampled, with discouraging results.

Following this grid work, Geophoto concluded:

- structure is important in the genesis and formation of the lodes.
- geophysical methods were of limited value.
- geochemical soil sampling was useful but limited.
- drilling was the best exploration method.

However, they undertook no drilling in their exploration for primary gold deposits.

Alluvial Exploration: (Ref. 1/15, 17, 19-22)

Geophoto had an alluvial search objective of a minimum $0.8Mm^3$ of 3g/t Au (seems high?)

They tested alluvial deposits in Black Horse Gully and Long Gully Creek which drain north from Mathinna into the South Esk River, and in the Dans Rivulet north of Mathinna.

They also undertook limited auger sampling of the New Golden Gate tailings.

In **Black Horse Gully**, west of Mathinna, sampling in 1906 by Twelvetrees had indicated $600,000m^3$ of $750 mg/m^3$.

Geophoto initially took 104 samples from five lines of backhoe pits. Two of these lines indicated a possible $100,000m^3$ of $500mg/m^3$.

Following a further 94 holes on five lines, they concluded the results were highly erratic with most gold in the bottom 0.5m.

In **Long Gully Creek**, two lines of pits were completed but results were poor.

Following several lines of seismic profiling in the lower **Dans Rivulet** valley, seven backhoe pits and 18 cable drill holes on three lines

were completed along Claytons and Mathinna Falls Road and north of Mathinna Falls road. Difficulty was experienced with water inflows. The alluvium was up to five metres thick and the best grade was 500mg/m^3.

Because their minimum target resource was not apparent in any of the above three areas, no further alluvial exploration was conducted.

5.2.3 **Una-Hinemoa Syndicate 1973-75:** (Alberton and Dans Rivulet)

References 1/14, 23

Special Prospecting Licence 107 was held by a local syndicate over the Strickland, Una, Hinemoa Mines in the North end of the Dans Rivulet goldfield from 1973-75. (These mines straddle the boundary of E.L. 23/92).

They were inspected by representatives of Geopeko (1973) and Mt. Lyell (1975) as potential joint venture partners.

On both occasions, narrow cleavage parallel quartz veins exposed in shallow adits and pits were sampled. Values range from 2-45g/t Au but no further work was undertaken and the tenement was relinquished.

This style of cursory examination and sampling generally adds little to the understanding of geology or potential of these vein systems.

5.2.4 **Stannon Engineering Co. Pty. Limited 1975-76 (Alberton):** References 1/24,25.

This Company (of which little is known) held E.L.'s 6/76, 7/76, 8/76 over the Alberton gold field from 1975-76.

Their interests centred on the main Ringarooma Mine and the adjacent Mercury Mine.

Apart from lengthy dissertations, based on historical data, on the virtues and benefits to be had from drilling, re-opening and developing these two mines, their reports contribute little to knowledge or exploration of the area.

5.2.5 **Amdex Mining Limited 1980 (Alberton):**

Reference 1/31

Amdex Mining Limited and Kibuka Mines Pty. Limited briefly explored E.L. 7/80 of seven sq. kilometres over the main Alberton mines

under an agreement with a local syndicate.

They regarded the Alberton lodes as emplaced by selective replacement of sheared country rock in a linear shear zone of either strike slip or wrench faulting.

Some samples were taken from the Hannah Tunnel on the Ringarooma Mine and the Long Struggle adit.

Results were low grade and no further work was undertaken.

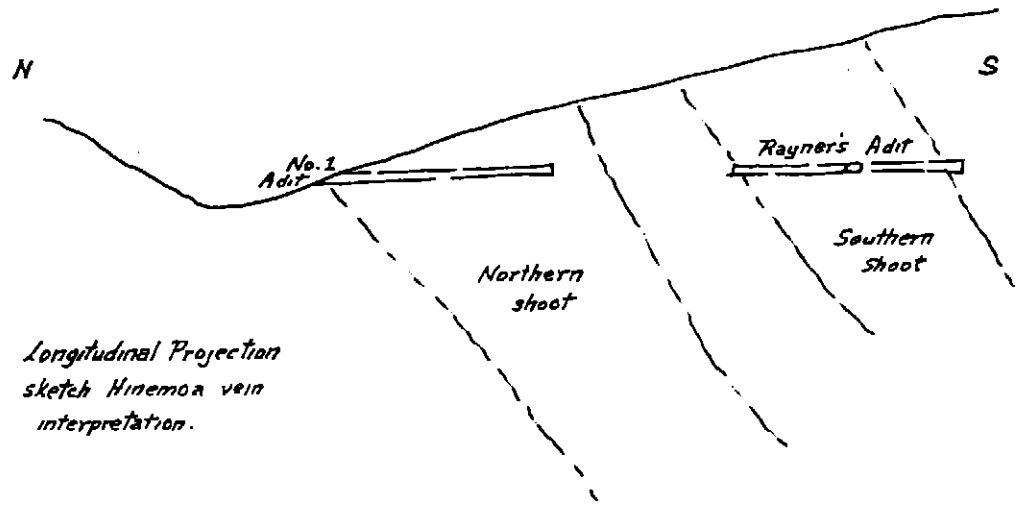
5.2.6 **Sturts Meadows Prospecting Syndicate 1980 (Dans Rivulet area):**

Reference 1/29

This syndicate held E.L. 31/76 over the whole Dans Rivulet gold field, and field work was undertaken by A.C. Howe Australia Pty. Limited.

Most of the area lies outside the Newcrest tenements with the exception of the Hinemoa and Una Mines.

Sturts Meadows thought the **Hinemoa Mine** was developed along a single vein system for 250m by way of three adits and a series of trenches. Two 'ore-shoots' were developed along this north-south vein, each shoot with a strike length of 50-60m, width 0.25m, dip 75^0N, plunge South. The northern shoot was developed in No. 1 adit and the Southern shoot in Rayner's adit.



Longitudinal Projection sketch Hinemoa vein interpretation.

At the **Una Mine**, five adits were interpreted as having been driven into a major shear zone consisting of a number of parallel (?) lodes. The syndicate considered this to be a strong structural NNW trending zone 550m long and 75m wide, which warranted further investigation.

At Tin first mineral survey but may be worth a look.

In the event, no further work was undertaken in this area.

5.2.7 Mineral Holdings Australia Pty. Limited 1980-81 (Dans Rivulet):

(Reference 1/41)

E.L. 3/80 covered all the Dans Rivulet area and was taken up when Sturts Meadows relinquished E.L. 31/76 (above).

Selective samples were taken from known workings, including the Una and Hinemoa, but the results and consequences of this work are of limited value.

5.2.8 Tasminex N.L., 1978-82 (Mathinna-Mangana Area):

Reference 1/26,27,28,30,39,40,44,46.

Tasminex held E.L. 17/78 over the Mathinna-Mangana area for a four year period from 1978-82.

Their principal objectives were:

- Explore for alluvial gold deposits
- Explore for primary gold deposits
- Retreatment of tailings

Alluvial gold exploration:

Tasminex's minimum alluvial target was 0.5Mm^3 at 500mg/m^3 Au.

They concentrated sampling on Black Horse Gully, Long Gully Creek at Mathinna, Dans Rivulet north of Mathinna, and Richardsons Creek and tributaries north of Mangana.

Initially samples were taken with a backhoe and concentrated on site with a pan to give 50-300g pan concentrate samples.

The method used to reduce a backhoe sized sample to a pan concentrate is not made clear in their reports.

Pan concentrates were grain counted and assayed.

In total 1026 samples were collected from 15 lines on Black Horse Gully and Long Gully Creek, four lines at Mangana, and 16 pits in Dans Rivulet. Sample lines were generally 300m apart, with sample points every 25m.

Of the 317 samples assayed, 169 contained detectable gold. Considerable problems were encountered in reconciling assays with pan

concentrate grain counts.

At Mathinna the alluvials were generally 2-3m thick, at Mangana in excess of 6m, and at Dans Rivulet in excess of 4m.

In contrast with earlier Geophoto sampling, Tasminex found most of their gold at Black Horse Gully near the tops of holes, not the bottoms. * This is consistent with Alec White observations at Majors Gully

Because of perceived discrepancies with assays, further sampling was undertaken by passing bulk samples (10-160m^3) through a small pilot plant equipped with screens and jigs. Nine samples from Mathinna and four from Mangana were processed in this manner.

Mathinna grades were in the 20-460mg/m^3 range and Mangana (Majors Gully) 70-270mg/m^3.

Volumes were estimated as less than the minimum target and no further alluvial testing was undertaken.

Primary Gold Exploration;

Tasminex explored the Mathinna-Mangana area for primary gold deposits.

Initially they undertook both orientation stream sediment surveys to establish effective district parameters, and compiled available data on known deposits.

Minus 80 mesh active sediments were collected and assayed for Cu, Pb, Zn, As. As a result of this work, Pb and As were considered good pathfinders for mineralised quartz veins.

Forty seven mines were located within the E.L., and sampled. Of the 691 samples taken, 219 were in-situ vein samples and 472 quartz veined dump samples. Samples were crushed and only those with visible gold were assayed. (This whole exercise seems rather pointless).

They evaluated a range of geophysical methods as a way of prioritising these mine targets, but concluded that all available methods were likely to be ineffective in locating the anticipated reef targets sought.

A detailed study of the **New Golden Gate-Tasmania Consolidated Mines** was undertaken, including a thorough analysis of the structural controls on mineralisation.

They concluded:

i) reefs were developed in a folded zone east of a major shear zone, equivalent to the 'slide' or 'zone of close folding' of earlier workers.

ii) gold grades were influenced by changes in strike and dip of the reef.

iii) scope existed for the reefs to extend North at depth.

and

Based on these conclusions, they proposed a program of four cored holes to test the northern extension of the East Reef and the depth extension of the West Reef beneath the Caledonian Mine.

It was also proposed that the East and West Reefs could be further tested by extending the previous drilled Department of Mines No. 3 hole.

Tasminex identified several other mines within their E.L. which warranted drilling.

At the **Jubilee Mine**, the Flat, Derby and Lyons Reefs were interpreted as part of the same reef transposed by folding along a SSE plunging axis (ie) a disrupted saddle reef. Last production was from the 79m level where 18 tonnes ore averaged 45g/t Au. Tasminex proposed one hole to test the southern extension of this lode.

At the **City of Hobart Mine**, the reef varied in dip around the vertical and was thought to have been displaced by a fault at the 174m level.

The **Miners Dream Mine** was close spaced sampled but results were disappointing.

Tasminex proposed one hole under each of the above two mines.

They regarded the reefs at Mangana to be more strike persistent than at Mathinna. They identified the **Argyle Mine**, which is a SE extension of the Golden Entrance Mine, as warranting investigation.

The main Argyle reef was developed by three adits - the No. 1S, No. 2S, and No. 2N. Production between 1900-1905 was 2400oz. from 604 tonnes ore at an average 124g/t.

Tasminex sampled the No. 1S adit (Figure 12). The vein averaged 0.5m wide and samples averaged 31g/t. They re-opened the lower No. 2S adit for 38m and all eight samples taken from across a 0-2.0m wide sulfidic quartz reef zone were <0.3g/t Au. This is not surprising because the south plunging reef in the No. 1S Adit would be present in the 80m of No. 2S Adit which was not re-opened. They recommended one drill hole to test this reef.

Despite all the recommendations for drilling by Tasminex in the Mathinna-Mangana area, no drilling was undertaken (or at least reported). They appear to have rapidly lost interest in the primary gold potential of the region and turned their remaining attention to tailings retreatment opportunities.

Tailings Retreatment:

Tasminex completed various resource definition and metallurgical studies on a number of tailings dumps in the Mathinna-Mangana area, concentrating on the New Golden Gate tailings.

They decided at an early stage to pursue a heap-leach treatment route. Their resource estimate of the New Golden Gate at 265,000 tonnes 1.5g/t compares with 323,000 tonnes by the Department of Mines in 1948.

Other dams in the district were estimated at:

City of Hobart	6000t	0.43g/t
Mangana Reefs	9000t	0.82
Volunteer	4000t	0.65
Twilight	2000t	2.38
City of Melbourne	1000t	2.07

The total district was therefore about 300,000 tonnes of 1-2g/t material.

Tasminex concluded that the primary, alluvial, and tailings retreatment potential of the area was unattractive and withdrew from the region.

5.2.9 **Australian Anglo American Corporation 1981-82** (South Esk River):

References 1/32-35,37,38,42,43,45.

Anglo identified the South Esk river flats between Fingal and Mathinna as representing a large volume alluvial target containing gold shed from the extensively eroded Mathinna and Dans Rivulet goldfields. (Fig 3)

Initially they attempted to define paleochannels using ground magnetics. This was unsuccessful so drilling commenced in 1981 using a Gemco 210B rotary rig. They acknowledged that this rig was unsatisfactory for anything other than quantifying alluvial volumes (ie) depth to bedrock. However, samples were collected, screened to -20 mesh and panned to a 10-30g concentrate.

In this first program, 47 holes were completed on nine lines on 400 metre centres.

Potentially large volumes of alluvials were indicated in two sedimentary regimes north of Beauty Flat Road:

- lacustrine environment
- fluvial channels on west side of valley.

A second program of 233 holes totalling 2526m was completed on 80m centres along lines 800m apart north of Beauty Flat Road using an RC rig. Samples were deslimed, cradled and panned. This program indicated the alluvials were generally <8m thick and low grade.

A third program of detailed drilling was completed in the Marshalls Flat area where alluvials were up to 14m thick but averaged six metres. Spot values up to 1305mg/m^3 were obtained, with some holes in the 200-500mg/m^3 range. However block grades were generally <100mg/m^3.

Some cable tool drilling was then undertaken north and south of Beauty Flats Road to check the validity of RC sampling.

Cable results were generally 50% of RC results.

Anglo concluded that the most promising area was on Marshalls Flat where alluvials were 6-8m thick and 1-2Mm^3 at 50mg/m^3 were indicated.

This resource did not meet minimum target sizes, so the project was abandoned.

Prior to relinquishing the E.L., Anglo undertook some stream sediment sampling over outcrop areas in the N.E. and W of the licence

area. Orientation studies indicated the -20+40 mesh fraction was best. They then collected 201 samples which were assayed for Cu, Pb, Zn, As, Au.

Au and As anomalies were outlined in the Miami-Mullers-Little Hospital Creek area, which may all be attributed to the scattered small scale mining operations at the Daylight-Great Fingal Mines.

Follow up work was cursory and the E.L. was relinquished.

5.2.10 **Oceania Tasmania Pty Limited 1984-88** (Alberton):

References 1/47,48,54,57,58,63

Oceania held the principal mines of the Alberton district under E.L. 23/82 from 1984-88. Their search objectives were extensions to the lode deposits of the Long Struggle, Mercury and Ringarooma Mines, and to a lesser extent, the alluvials in the Dorset and New Rivers.

They regarded the main primary deposits as occurring in the west limb of a regional N-S anticline which had been deformed and broken by a period of later NE trending cross-folding. Mineralisation was considered strongest where the cross-folding deformation was greatest.

Oceania re-opened the main adits of the above three mines. In the Ringarooma and Mercury Mines they described main vein formations as being 1-1.5m wide, with lode formations 10-20m apart. The ground between the formations is unmineralised.

Apart from clearing out adits, Oceania appears to have done little other work during the currency of the Licence. They experimented in a relatively crude fashion with EM as a means of locating concealed quartz veins. However the results and usefulness of this work is questionable.

In 1987, Renison Goldfields Consolidated Limited was exploring for gold over the north half of the Lyndhurst-Mangana zone. As part of this work, they received permission from Oceania to map and sample the principal workings on the Alberton Field. The results of this work are reviewed in 5.2.11 below.

When Oceania relinquished E.L. 23/82, they acquired three 100 hectare Mining Leases over the main workings to enable them to continue working in the area. These leases are current, and some minor underground exploratory work is in progress.

5.2.11 Renison Goldfields Consolidated 1986-87 (Alberton Area)

Reference 1/59,60,73.

In 1982, RGC commenced a detailed review of all known gold deposits in NE Tasmania (Appendix 12). They produced a comprehensive deposit data base (1/73) for the whole Alberton-Mangana zone. The data base was essentially reproduced and upgraded in the Alberton area for this report (Appendix 5) and used extensively by the Department of Mines for their Mathinna and Mangana reports (Appendices 5,7).

This regional review led RGC to acquire E.L. 17/86 over the northern half of the Lyndhurst-Mangana zone from Branxholm to Dans Rivulet.

Most of the former mines in this zone were located and where accessible, mapped and sampled.

RGC's target was bulk mineable quartz vein stockwork mineralisation. It was rapidly concluded that stockworks adjacent to major veins, or high concentrations of major veins did not exist in their E.L. area.

The Alberton field (held by Oceania) was identified as being the most prospective area for the target model and Oceania gave permission for RGC to map and sample their E.L. 23/82. Fig 10 of the Alberton Field is largely based on the RGC work.

RGC concluded the Alberton mines occurred in a narrow NNW zone of tight folding. Stockwork vein systems were unlikely, but areas of close spaced major veins were possible.

All accessible workings were mapped and sampled in detail. At the Mt. Victoria Mine, an 18m quartz vein stringer zone from 166-184m assayed 2.52 g/t. This zone was apparently evident in the lower two adits but not in the upper adit. It appears to cross-cut bedding and cleavage and may represent fault or fissure in-filling.

They reviewed at length the results of the 1933 Department of Mines underground drilling on the Long Struggle Mine, and concluded:

- Hole 1 intersected 2.5m (horizontal) 15g/t Au representing the northern extension of the Long Struggle Reef which had split into three bedding parallel quartz reefs within an overall reef formation 2.5m wide.
- 33m E of this reef, Hole 1 intersected an extension of the Caxton No 1 Reef which assayed 3.6g/t over 0.6m.
- Hole No 2 was drilled parallel to anticipated reefs.
- Hole No 3 was prematurely abandoned.

RGC withdrew from all exploration activities in N.E. Tasmania in 1987 because of other priorities.

5.2.12 Epoch 1985 (Mathinna)

Reference 1/52

When Tasminex withdrew from the Mathinna area, Epoch Minerals Exploration N.L. acquired E.L. 35/81 with a view to retreating the New Golden Gate tailings.

They thoroughly reviewed all past testwork on the tailings and concluded that whilst the insitu grade was approximately 1.5g/t, various cyanidation extraction routes would recover considerably less than that:

- heap leaching: 0.55g/t recovered
- agitated leaching: 0.75
- grinding followed by agitated leaching 0.85

Epoch was discouraged by these results and decided not to proceed with further studies. They entered into an agreement with Alex White to take over the tenements.

5.2.13 K.A. White 1983-90: (Mathinna-Mangana Area)

(Reference 1/49,51,56,61,65,66,69,77)

E.L. 55/83 has essentially been explored by Alex White for eight years under various names and joint venture: as K.A. White, then Tasmanian Alluvials, then Alcaston Mining N.L., then Pegasus Gold Australia Limited.

Work has been directed at:

- alluvials at Mangana and Mathinna
- tailings and dump retreatment
- primary gold

Alluvials:

White concentrated on testing alluvials in three areas:

- Majors Gully north of Mangana
- Black Horse Gully west of Mathinna
- South Esk River flats north of Mathinna

In 1984, 17 backhoe holes were completed in **Majors Gully.** Results were encouraging but were not followed up until 1985 when a number of trenches and pits were dug and the 800m^3 bulk samples obtained were processed through an on-site pilot plant. The alluvials

averaged 2.7m thick over widths of 55m.

A resource of 300,000m^3 of 307mg/m^3 was estimated, and most of the gold was present in the lower gravel layer.

In 1987, E.L. 55/83 was transferred to Alcaston Mining N.L., who estimated the Tower Rivulet and tributaries (including Majors Gully) contained a possible 7.4Mm^3 of alluvials.

A production processing plant was constructed but subsequent results were disappointing. The plant has not operated now for several years.

The remaining resource in Majors Gully is estimated at 250,000m^3 300mg/m^3.

At **Black Horse Gully** in 1986, three costeans were dug for bulk samples, and 16 excavator holes were dug to establish wash: overburden ratios.

The bulk samples were each approximately 750m^3 and were processed through Alex White's pilot plant at Lisle.

Results were:

Costean 1 (Dunn St) 240mg/m^3
Costean 2 (Upper Esk Road) 160mg/m^3
Costean 3 (Black Horse Gully) 270mg/m^3

A resource estimate was 750,000m^3, including 500,000m^3 of greater than 240mg/m^3.

Average wash depth was 2-3m, and the overburden: wash ratio was in the range 1:1-1:5.

Some limited testing of alluvials on the **South Esk River flats** was apparently undertaken in 1987 in the Midson's Flats area, which is upstream of the areas tested by Anglo in 1981. The target was a large volume of dredgeable material close to where Black Horse Gully and Long Gully Creek join the South Esk River

The work appears to have been limited (possibly by landowners) and no results are reported.

Tailings and Dump Retreatment:

White acquired rights to the New Golden Gate tailings from Epoch. He has recently received government permission to cyanide heap leach the tailings and has established some plant on site. Problems were experienced in 1991 with local sheep graziers down stream, however the problems were not attributed to White and the issue has been resolved.

It is believed no actual retreatment has yet taken place.

In 1985, tailings dams were sampled at several former mines in the district:

Mangana Reef	1.6g/t
Fingal Reef	1.4
Union Reef	2.59

No estimates of tonnages were made.

The Mangana Reef tailings grade is double that obtained by Tasminex.

Primary Gold:

Primary gold exploration on E.L. 55/83 has been concentrated in the New Golden Gate, Tower Hill and Argyle Mine areas, eventuating in drilling programs on the latter two areas.

In 1985, a detailed review of the geology of the whole E.L. was undertaken (Ref. 1/49) and the main conclusions were:

- the NE and NNE quartz reefs were fissure fillings resulting from dextral rotation on a NW-SE shear couple.
- EW (or NE) reefs tend to have longer strike lengths than NW (bedding and cleavage conformable) ones.
- dextral movement on the NW goldfield lineament is conjugate to sinistral movement on the parallel Tamar Fracture System.
- quartz veins were either fault bound (New Golden Gate) or stratabound (Horseshoe, Jubilee, Eldorado, Oldboys, Tower Hill).
- there were two phases of gold mineralisation; an earlier one accompanying sulfides and a later one as discrete gold.
- scope for strataform or saddle reef deposits is limited.

A rather unique and interesting interpretation was placed on the reefs at the New Golden Gate which were interpreted as forming within two main lode channels:

- a 30m wide eastern channel carrying Loanes and Main Reefs.
- a 33m wide western channel carrying central and Western Reefs.
- near surface, these formations consisted of stringer mineralisation and it was only in No. 1 and No. 2 Levels did discrete reef structures develop (it is interesting to rethink the importance of the stringer zone in the lower levels of the Victoria Mine at Alberton in this context).

It was suggested that these two wide lode channels or formations continued northward towards the North Golden Gate Mine.

Tower Hill was interpreted (as by all previous workers) as a 30m wide quartzite unit, approximately 250m long, carrying numerous narrow quartz veins with a random orientation.

The exploration target at this stage was low grade open cut gold mineralisation and the geological studies highlighted three possibilities:

- northern extensions of the two main New Golden Gate shear zones.
- Tower Hill north of Mangana
- Golden Entrance/Argyle Mine at Mangana.

Further work on these areas was apparently not undertaken until 1988 when Alcaston took control of exploration. Under their direction, the following programs were undertaken:

- structural analysis of the Mangana-Mathinna area using satellite imagery.
- sampling and drilling the Golden Entrance/Argyle Mine.

The **structural analysis** work indicated fold structures developed adjacent to both sides of a major structural zone encompassed most of the Mathinna and Mangana deposits.

Cleavage trends around Mangana show a deviation from the regional NNW-NW trend.

This structural analysis was largely repetitive of a number of previous studies and predictably the conclusions were similar.

At the **Argyle Mine** (Fig. 12) Alcaston took 38 chip samples from accessible workings and completed eight percussion holes.

Results of the chip samples were disappointing when compared with the results of the 1981 Tasminex sampling whose samples from No. 1 South adit averaged 31g/t from a reef structure averaging 0.44m wide. Of the 38 Alcaston samples, 21 were <0.1gt and 13 were in the 0.1-0.76g/t range. In the No. 1 South adit, two samples assayed 10g/t and 9g/t whilst in the No. 2 South adit, two samples assayed 4.9g/t and 3.1g/t.

Eight percussion holes totalling 245m were drilled. Logs and sections appear as Appendix 8. It was not clear from reports whether this drilling was open hole percussion or reverse circulation. Samples were collected through a cyclone and sub sampled with a spear. Whilst quartz veins were common, Au and As results were disappointing, with the best result in hole AA7 which intersected 8m 0.18g/t Au just below No. 2 South adit, with the highest assay being 1m 0.33g/t.

APPENDIX II
Parts A, B, C & D

GEOCHEMICAL SAMPLING DATA

The effectiveness of this drilling program must be questioned (Fig. 12). Two of the holes were well west of the reef formation; one hole appears to have tested an adjacent reef to the west at a shallow depth; a further two holes penetrated the Argyle Reef 40m above the upper most workings and two further holes tested the Reef immediately beneath the No. 1 South adit. Only AA7 tested below No. 2 South.

In general, this program could not be regarded as a good test of the depth potential of this long, high grade reef formation.

In 1989, Alcaston entered into a joint venture with Pegasus to continue exploring E.L. 55/83. Pegasus concentrated their initial work on two projects:

- reassessment of previously flown Government aeromagnetics
- evaluation of the quartz veined sandstone units at Tower Hill.

Aeromagnetic data acquired by government as part of their NETGOLD project was reprocessed. It was concluded firstly that there may be some correlation between magnetic lows and gold mineralisation and secondly that carefully controlled magnetic surveys may be able to define quartz vein concentrations and thereby distinguish between mineralised and unmineralised ground.

It was therefore decided in 1990 to refly the area with a high resolution helicopter borne aeromagnetic survey. An interpretation of this data suggested structural trends within the Mathinna Beds may be expressed by subtle, systematic magnetic variations.

At **Tower Hill**, the quartz veined sandstone unit was gridded, mapped, chip sampled, soil sampled and covered with ground magnetic survey (Fig. 12).

Mapping defined two vertical, sub-parallel sandstone beds trending NW and separated and enclosed by slates. Quartz veins in the sandstones generally trend NE.

68 composite rock chip samples were taken from the high density quartz veined areas and assayed for Au, As, Pb; 17 of these samples, including 16 from dumps, assayed > 0.1g/t Au.

Soil samples were taken along grid lines with a hand auger; Pb values were low and Au, As values were patchy and generally low.

Ground magnetic data was spikey but the Mathinna Beds demonstrated relatively uniform magnetic properties. Some gross NW and NE trends were indicated. Magnetic lows existed over the Sunbeam and Tower Hill mines.

To follow up perceived anomalous zones, 13 RC holes were completed at Tower Hill in 1990 (Fig. 12). Logs and sections are attached

(appendix 9). Numerous quartz veins were intersected, some carrying pyrite, arsenopyrite and minor chalcopyrite.

Gold results in the four holes around the Tower Hill Mine were very low.

The best results were obtained in holes TH10 and TH11. These two holes were 50m apart and drilled NW beneath the Sunbeam Mine. Considerable variation was encountered between the original fire/AAS assays and the screen fire assay repeats. This is not unexpected in the Alberton-Mangana region where coarse gold presents assay problems.

TH10	Au (g/t)	Au (screen-fire)	As (p.p.m.)
11-12	0.2	0.20	70
12-13	0.35	0.43	70
13-14	0.81	2.08	85
14-15	0.28	2.26	9
TH11			
33-34	1.79	4.28	1300
34-35	0.63	0.74	3000
35-36	4.54	4.03	4700

It is possible these two intersections were on the same NE trending vein. Adjacent holes TH12 and TH13 were drilled at right angles to TH10 and TH11 (ie) parallel to this possible vein, and their low values suggest they missed the vein.

It is instructive to note the significant width of the As geochemical halo around the intersections in TH10 and TH11 (see logs). This is a useful exploration tool in this region and is commented upon further, later in this report.

At the conclusion of this work, Pegasus and Alcaston appear to have withdrawn from the area and the E.L. relinquished.

Alex White has subsequently applied for E.L. 17/91 and E.L. 18/91 over the Mathinna and Mangana areas respectively.

5.2.14 Mineral Holdings 1989: (Dans Rivulet Area)

Reference 1/67

In 1989, Mineral Holdings tested the alluvials on Rosedale Flat for cassiterite which was indicated by two previously drilled Department of Mines holes.

The Department's holes were drilled primarily to test the theory that the Dans Rivulet represented the northern continuation of the main Mathinna shear zone.

The existence of cassiterite in sludge from one of these holes is regarded as highly suspicious.

However, Mineral Holdings completed 12 churn drill holes and one excavator pit. No cassiterite was found and only very minor gold recorded in several of the churn drill holes.

The area was relinquished.

5.2.15 **Cominex 1989-90: (West Tower Hill area)**

Reference 1/71,76

Cominex is a family company operated by Hugh Nolan. In 1989, it held E.L. 55/88 on the west flank of Tower Hill.

Interest in this area, which lies to the west and outside the main Alberton-Mangana gold zone, was generated by the recent discovery of several narrow quartz veins by local prospectors Wallis and Roddam.

Nolan decided to take advantage of the presence of the aircraft completing the 1989 government aeromagnetic survey of the Alberton-Mangana area, and had them extend the survey west over E.L. 55/88.

Results again confirmed the magnetic blandness of the Mathinna Beds.

Following discouraging assay results from a limited number of chip samples, the Licence was relinquished.

5.2.16 **Placer Exploration Limited 1989-90 (North of Mathinna):**

References 1/74,75,80,81.

From 1989-90, Placer held E.L. 3/90, 10/89 and 8/89 to the NE and NW of Mathinna. Their target was Carlin or Ketza River style gold mineralisation.

Exploration methodology required taking both regional drainage sediment samples for bulk cyanide leaching, and stream sediment samples which were assayed for Cu, Pb, Zn, Ag, Au, As. Sample sizes were 5kg of -6mm material for the BCL tests and 1kg of -20 mesh silt for the stream sediments.

E.L. 8/89 covered the **Evercreech area** north of E.L. 17/91 (White) and in the far NE of Newcrest E.L. 22/92. BCL anomalies were obtained in Claytons and Evercreech Rivulets. Follow up stream sediment sampling on creeks and tributaries defined some low order spotty anomalies which could be traced to localised zones of minor quartz veining. Some anomalies were attributed to the King Mine.

Results were generally considered discouraging and the licence

was relinquished.

E.L. 3/90, **north of Mt. Saddleback** lay largely west of E.L. 23/92 (Newcrest). Similar surveys to those on E.L. 8/89 defined one unexplained anomaly near Olivers Hill. No source was identified by Placer but it may have been related to the Golden Possum workings.

E.L. 10/89, **west of Mt. Saddleback** again lay west of the Newcrest tenements. Similar surveys defined anomalies in three areas:

- Memory Creek
- Tombstone Creek headwaters
- Sweets Creek

The first two anomalous areas appear to fall within the Scottsdale Batholith. Follow up sampling failed to confirm the anomalies.

However, follow up sampling did confirm the Sweets Creek anomaly which was traced to a silicified quartz vein stockworked zone of Mathinna Beds in the headwaters of Sweets Creek. The outcrop area was 5-10m wide and 120m long (ref. 1/81).

The zone was mapped, chip sampled and partially soil sampled. It is strongly cleaved (320-330Mag-80^{0}NE) and brecciated with interstitial hematite, chlorite and mica, but no sulfides at surface. Strong anomalous As and patchy anomalous Au values were recorded in rock chips over a strike length of 200m.

Au and As grades increased to the north where sampling was halted by thick bush.

Placer tested the anomaly no further.

This area at 561600E, 5415600N lies outside Newcrest's E.L. 23/92 (Fig. 3) but is recorded here as an area of significant interest. The anomalous arsenic may represent a geochemical halo surrounding concealed gold mineralisation in a sizeable stockwork zone adjacent to the Scottsdale Batholith.

5.2.17 Billiton Australia 1989-92: (North East Tasmania Regional)

References 1/82,83.

Billiton identified NE Tasmania as a potential target area for the discovery of large tonnage open cut gold deposits, containing a minimum 15t. Au.

To better assess this potential, they undertook a variety of office studies, reconnaissance field mapping, and regional stream sediment surveys. Their initial target area was virtually the whole of NE Tasmania and encompassed the two Newcrest tenements.

They used landsat imagery to complete a fracture analysis of

NE Tasmania (no map sighted) designed to identify dominant structural trends and then integrate the results of this work with existing regional gravity, geology and metallogenic data.

On the basis of this regional review they concluded:

i) gold mineralisation is spatially separate from Sn, W, Cu, Pb, Zn mineralisation in the region.

ii) gold mineralisation is related to NNW structural linears in Mathinna Beds.

iii) gold is genetically associated with granodiorite and some occurs within the contact metamorphic aureole.

iv) many NNW structures exist but only some have associated gold mineralisation.

v) all gold deposits occur in a WNW gold corridor 90km x 25kms from Beaconsfield-Lefroy in the NW to Mangana-Golden Ridge in the SE.

The first four of these conclusions were previously well known features of the area. The fifth conclusion is curious. To place all the gold deposits of NE Tasmania in one WNW "corridor" as opposed to a number of parallel NNW corridors is difficult to support.

Billiton had three deposit models in mind (Fig. 9):

- Sheeted or stockworked quartz vein systems in hornfelsed Mathinna Bed aureoles in strong structural zones near granodiorite intrusions.

- Epithermal Au-Ag mineralisation associated with the St Mary's porphyry.

- Structurally controlled gold in late stage differentiates of Scottsdale and Blue Tier Batholiths.

The latter two models are not applicable to the Newcrest areas.

Billiton selected 40 areas which met most of their exploration and model criteria and further investigated these with reconnaissance mapping, and regional BCL and -80 mesh stream sediment sampling programs.

They regarded the development of prominent contact aureole zones in Mathinna Beds as important to their target search. To this end, they completed a review of contact metamorphism in NE Tasmania (appendix 11), which did not rate the region highly for thermal aureole gold mineralisation. The report appears to genetically link all the gold to granites and places emphasis on gold migration within the thermal aureole.

These genetic and migration models are possibly not applicable or important in NE Tasmania, hence this report possibly adds little to exploration philosophy in the region.

However, the thermal aureole studies combined with regional geochemistry led Billiton to concentrate on two areas:

- Golden Ridges near the Blue Tier Pluton
- Mathinna-Mangana which they identified as gold anomalous (!) and the most extensive hornfelsed roof zone in the region.

Most of their subsequent work was concentrated on the Golden Ridges area, which lies off the NE corner of E.L. 22/92.

In 1991, they entered into an agreement with Aureole N.L., American Horizon Resources Inc., and Federation Resources N.L., who jointly held E.L. 58/88 over the Golden Ridge area.

In this area, Mathinna Beds have been intruded by the Poimena Pluton and the Pyengana Granodiorite. Scattered gold mineralisation occurs in a one kilometre wide zone of hornfelsed sediments which have historically been prospected by a variety of shafts, trenches and adits.

They completed a one sample/sq. kilometre BCL stream sediment survey and decided to relinquish the western half of the Licence in early 1992 and concentrate further work on the Brilliant Creek area.

It is not known if Billiton are still involved with E.L. 58/88

5.2.18 **Department of Mines:**

The Department of Mines has been an active explorer in the Alberton-Mangana region since the 1850s.

Their work can be broadly grouped under three headings:

- Mine and district inspections
- Core drilling programs
- Regional studies.

Mine and district inspection reports are numerous (appendix 2). Collectively they provide a useful insight into the geology and prospectivity of individual mining operations and mining districts.

The more comprehensive district reports include:

- Alberton: Blake 1933 (Ref. appendix 2/4).
  Hughes 1952 (2/23).
  Twelvetrees 1900 (2/56/59).

- Dans Rivulet: Hughes 1947 (2/20).
  Twelvetrees 1904 (2/58).

- Mathinna: Finucane 1935 (2/13).
  Henderson 1941 (2/16).
  Twelvetrees 1906,1907 (60, 61, 63).

- Mangana: Finucane 1935 (2/13).
  Twelvetrees 1907 (2/62).

References to descriptions of individual mines are contained in the deposit data sheets presented in Appendix 5 (Alberton), 6 (Mathinna) and 7 (Mangana).

Core drilling has been undertaken by the Department for two basic reasons:

- test extensions of known deposits
- evaluate geological concepts.

A list of Departmental drilling appears as Appendix 3. Holes which refer to the Newcrest tenements are marked with a full dot while those in adjacent areas are marked with an open dot. This list is neither up to date nor complete because, until recently, private drilling undertaken on Mining Leases did not have to be reported to the Department. Hence much of the drilling completed by both private companies and the Department on the New Golden Gate (underground and surface) is not reported or recorded and logs are difficult to locate.

Departmental **lode extension drilling** programs were completed in the 1930's on the Krushka, Prendergast and Long Struggle mines (Alberton) and on the New Golden Gate (Mathinna); in the 1950s on O'Briens Mine (Dans Rivulet); in the 1960s on the Starlight-Carnegie (Dans Rivulet).

The drilling at **Krushka** and **Prendergast** failed to intersect significant mineralisation or reef structures (Fig. 3).

Of the three underground holes at **Long Struggle**, one was abandoned, another may have drilled parallel to the target and the third intersected north extensions of both the Long Struggle and Caxton reefs. The Long Struggle reef assayed 15g/t over 2.5m (horizontal) and the Caxton 3.6g/t over 0.6m (horizontal).

Records of drilling at the New Golden Gate are difficult to locate, but it is known that several holes were completed north and south of the

mine looking for reef extensions. This data will probably emerge with persistent effort.

Five holes were completed at the O'Briens Mine in 1954-55. One hole intersected 4.5m 10g/t Au.

Two holes were completed east of O'Briens on the Starlight-Carnegie workings. Results were disappointing.

Following completion of a major study of the Waterhouse-Mangana field by Threader, the Department drilled two holes at Mathinna, two at Dans Rivulet and four at Alberton to **test theories** developed in that study (see below).

The results of this conceptual drilling are unclear because most of the holes have not yet been reported upon. However, it is known that no significant mineralisation was intersected.

The Department has undertaken a number of **regional geological and geophysical studies** in order to highlight the region's potential and assist explorers.

In 1967, Threader completed his MSc thesis on the geology of the Mangana-Waterhouse district. One of his main conclusions was that the gold mineralisation was concentrated adjacent to a major NNW structurally deformed zone, offset at regular intervals by later NE trending cross structures.

This structural control on gold mineralisation has been further refined by later Departmental workers. In Unpublished Report 1989/42, the effects of later NE trending mega kink bands on the earlier NNW cleavage are illustrated (Fig. 6(a) and (b)), and the impact of these intersecting structural trends on the location of mineralisation is discussed in Report 1992/10 (appendix 6).

Recently, the Department commenced a major long term project called NETGOLD (North East Tasmania Gold) designed to more fully understand and promote the gold potential of the area. Data reviews of the Dans Rivulet, Mathinna, Mangana areas (appendix 6, 7) were the first step in this project. Future work has been slowed by Government cutbacks.

The Tasmanian Government has co-operated with the BMR to produce a 1:500,000 aeromagnetic map of NE Tasmania, and in 1989 the Department completed a detailed aeromagnetic survey over the Alberton-Mangana area (Fig. 4 - transparency accompanying this report). A brief Departmental report 1989/19 refers to this survey and concluded:

- The area is underlain by granodiorite at 1-2 kilometre depth.
- Gold zone occurs in a narrow depression in the roof of this granodiorite basement.

- Mathinna Beds have little magnetic character.

Extensive gravity data collected by the Department has been interpreted and recently presented in Unpublished Report 1992/11 (Ref. 2/29). This interpretation illustrates the "Mantle 91" interpreted relationship between the granites and granodiorites of NE Tasmania (Fig. 7) and lends support to the theory that they gold zone is a mega roof pendant or deep structural trough in the granodiorite which has been intruded at relatively shallow depth by later granites.

Appendix II-A

Orientation Sampling Results

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ANALYTICAL SERVICES

Amdel Laboratories Limited
Brown Street, Thebarton, 5031
Telephone: (08) 416 5300 Facsimile: (08) 234 0321

Mr Grant McEwen
Newcrest Mining Limited
PO Box 1367
MILTON
QLD 4064

F I N A L A N A L Y S I S R E P O R T

Your Order No: B 5074 Our Job Number : 2AD3000

Samples received : 20-OCT-1992 Results reported : 11-NOV-1992
No. of samples : 41
Report comprises a cover sheet and pages 1 to 12

This report relates specifically to the samples tested in so far as that the samples as supplied are truly representative of the sample source.

Note:
If you have any enquiries please contact Miss Anne Reed quoting the above job number.

Approved Signatory:

for John Waters
Laboratory Manager - Adelaide

MM Mr Grant McEwen QLD

Report Codes:
N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficent Sample.

Distribution Codes:
CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

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976063

ANALYTICAL REPORT

Job: 2AD3000
O/N: B 5074

Sample	Au	Ag	As	Cu	Pb	Zn	Bi
MB-001	4.2	<0.2	7.4	8.6	17	15	260
MB-002	2.7	<0.2	14	7.6	15	30	260
MB-003	0.7	<0.2	1.8	2.2	3.0	10	70
MB-004	1.9	<0.2	7.8	7.4	10	17	170
MB-005	2.1	<0.2	5.2	4.0	11	11	160
MB-006	2.1	<0.2	5.2	22	28	56	420
MB-007	1.4	<0.2	8.2	17	20	46	350
MB-008	1.4	<0.2	11	9.8	17	38	280
MB-009	1.1	<0.2	11	8.8	15	42	220
MB-010	2.4	<0.2	11	11	17	38	230
MB-011	0.8	<0.2	4.2	4.0	9.6	20	160
MB-012	1.2	<0.2	5.0	6.0	9.4	11	130
MB-013	26	<0.2	28	11	18	26	240
MB-014	0.8	<0.2	5.4	5.6	12	9	200
Units	ppb	ppm	ppm	ppm	ppm	ppm	ppb
DL	0.1	0.2	0.2	0.2	0.2	1	1
Scheme	IC7M	IC7M	IC7M	IC7M	IC7M	IC7M	IC7M

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ANALYTICAL REPORT

Job: 2AD3000
O/N: B 5074

Sample	Mo	Sb	Te	Au	Ag
MB-001	0.4	0.6	<0.2	0.45	0.02
MB-002	0.4	0.4	<0.2	0.15	<0.02
MB-003	<0.2	<0.2	<0.2	0.20	<0.02
MB-004	0.4	0.2	<0.2	0.20	<0.02
MB-005	0.4	0.4	<0.2	0.30	<0.02
MB-006	0.6	0.2	<0.2	0.25	<0.02
MB-007	0.4	0.2	<0.2	0.15	<0.02
MB-008	0.6	0.4	<0.2	0.15	<0.02
MB-009	0.6	0.4	<0.2	0.25	<0.02
MB-010	0.8	0.2	<0.2	0.30	<0.02
MB-011	0.4	0.2	<0.2	0.05	<0.02
MB-012	0.2	0.4	<0.2	0.10	<0.02
MB-013	0.8	0.8	<0.2	26	<0.02
MB-014	0.4	0.4	<0.2	<0.05	<0.02
Units	ppm	ppm	ppm	ppb	ppm
DL	0.2	0.2	0.2	0.05	0.02
Scheme	IC7M	IC7M	IC7M	BLEG2	BLEG1C

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ANALYTICAL REPORT

Job: 2AD3000
O/N: B 5074

Sample	Ag	As	Cu	Pb	Zn	Bi	Mo
MB-001	0.10	5.0	10	19	18	0.3	0.6
MB-002	0.10	9.0	8	15	32	0.2	0.4
MB-003	0.10	6.0	9	15	55	0.3	0.4
MB-004	0.10	10.0	16	20	38	0.3	0.6
MB-005	<0.05	7.0	9	17	18	0.2	0.4
MB-006	0.10	4.0	28	30	70	0.4	0.6
MB-007	0.10	7.0	22	22	54	0.3	0.6
MB-008	0.10	9.0	14	20	48	0.3	0.6
MB-009	0.10	9.0	11	17	48	0.2	0.8
MB-010	0.10	9.0	13	19	40	0.2	0.8
MB-011	<0.05	2.0	7	13	24	0.2	0.4
MB-012	<0.05	4.0	4	11	13	0.1	0.4
MB-013	0.10	28	12	19	32	0.2	0.6
MB-014	<0.05	6.0	6	15	10	0.2	0.6
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	0.05	0.2	1	0.2	1	0.1	0.2
Scheme	IC2M	IC2M	IC2M	IC2M	IC2M	IC2M	IC2M

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Job: 2AD3000
O/N: B 5074

ANALYTICAL REPORT

Sample	Sb	Te
MB-001	0.4	<0.2
MB-002	0.3	<0.2
MB-003	0.2	<0.2
MB-004	0.3	<0.2
MB-005	0.4	<0.2
MB-006	0.2	<0.2
MB-007	0.2	<0.2
MB-008	0.4	<0.2
MB-009	0.4	<0.2
MB-010	0.3	<0.2
MB-011	0.2	<0.2
MB-012	0.2	<0.2
MB-013	0.4	<0.2
MB-014	0.2	<0.2
Units	ppm	ppm
DL	0.1	0.2
Scheme	IC2M	IC2M

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ANALYTICAL REPORT

Job: 2AD3000
O/N: B 5074

Sample	Au	Ag	As	Cu	Pb	Zn	Bi
MS-001	4.8	<0.2	5.8	1.6	3.6	3	80
MS-002	0.8	<0.2	2.8	2.4	<0.2	4	60
MS-003	1.1	<0.2	3.8	3.4	4.0	4	110
MS-004	1.0	<0.2	3.8	2.4	4.4	4	100
MS-005	1.3	<0.2	0.4	1.2	1.4	6	30
MS-006	0.9	<0.2	0.6	0.8	1.8	1	20
MS-007	24	<0.2	72	7.2	9.4	14	170
MS-008	11	<0.2	8.4	5.6	11	7	150
MS-009	1.5	<0.2	13	1.4	6.0	2	140
MS-010	5.0	<0.2	15	3.6	14	3	190
MS-011	8.5	<0.2	22	11	18	18	350
MS-012	2.6	<0.2	5.2	3.4	6.8	5	210
MS-013	2.3	<0.2	9.2	7.2	9.6	8	210
MS-014	4.8	<0.2	10	5.4	16	8	220
MS-015	8.0	<0.2	3.8	1.6	5.2	3	120
MS-016	0.4	<0.2	5.8	1.8	4.6	5	80
MS-017	8.5	<0.2	25	14	11	14	270
MS-018	2.9	<0.2	44	17	16	26	350
MS-019	28	<0.2	140	11	46	17	350
MS-020	2.9	<0.2	48	5.8	9.6	6	190
MS-021	1975	0.2	160	54	32	66	70
MS-022	1130	0.8	110	32	65	58	250
MS-023	44	0.4	11	22	38	40	40
Units	ppb	ppm	ppm	ppm	ppm	ppm	ppb
DL	0.1	0.2	0.2	0.2	0.2	1	1
Scheme	IC7M	IC7M	IC7M	IC7M	IC7M	IC7M	IC7M

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ANALYTICAL REPORT

Job: 2AD3000
O/N: B 5074

Sample	Mo	Sb	Te	Au Avg	Au	Au Rpl	Au SS1
MS-001	0.2	0.6	<0.2	6	6	--	--
MS-002	0.2	0.4	<0.2	<2	<2	--	--
MS-003	0.2	0.6	<0.2	<2	<2	--	--
MS-004	0.2	0.4	<0.2	<2	<2	--	--
MS-005	<0.2	<0.2	<0.2	<2	<2	--	--
MS-006	<0.2	<0.2	<0.2	<2	<2	--	--
MS-007	0.6	1.2	<0.2	44	44	--	--
MS-008	0.4	0.4	<0.2	18	18	--	--
MS-009	0.4	0.4	<0.2	2	2	--	--
MS-010	0.4	0.6	<0.2	4	4	--	--
MS-011	0.8	0.6	<0.2	4	4	--	--
MS-012	0.4	0.4	<0.2	2	2	--	--
MS-013	0.4	0.4	<0.2	<2	<2	--	--
MS-014	0.4	0.2	<0.2	4	4	--	--
MS-015	0.2	0.2	<0.2	<2	<2	--	--
MS-016	0.4	0.4	<0.2	<2	<2	--	--
MS-017	0.4	0.6	<0.2	2	2	--	--
MS-018	0.8	0.8	<0.2	2	2	--	--
MS-019	1.4	1.2	<0.2	32	32	--	--
MS-020	0.8	1.0	<0.2	4	4	--	--
MS-021	2.6	6.2	0.4	2115	2115	--	--
MS-022	8.4	3.4	2.0	1220	1220	--	--
MS-023	1.8	0.4	<0.2	10	10	--	--
Units	ppm	ppm	ppm	ppb	ppb	ppb	ppb
DL	0.2	0.2	0.2	2	2	2	2
Scheme	IC7M	IC7M	IC7M	AA9	AA9	AA9	AA9

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ANALYTICAL REPORT

Job: 2AD3000
O/N: B 5074

Sample	Ag	As	Cu	Pb	Zn	Bi	Mo
MS-001	<0.05	5.0	1	4.0	3	0.1	0.4
MS-002	<0.05	2.0	<1	<0.2	3	0.1	0.4
MS-003	0.10	2.0	2	4.0	3	0.1	0.4
MS-004	0.10	3.0	2	5.0	3	0.1	0.4
MS-005	0.10	<0.2	<1	<0.2	6	<0.1	0.2
MS-006	0.10	<0.2	<1	<0.2	<1	<0.1	0.4
MS-007	0.10	60	8	10	26	0.2	0.8
MS-008	<0.05	10.0	6	12	7	0.1	0.4
MS-009	<0.05	12	<1	6.0	2	0.1	0.4
MS-010	0.10	13	3	16	2	0.4	0.4
MS-011	0.10	19	14	22	22	0.3	0.8
MS-012	0.10	5.0	3	7.0	5	0.2	0.6
MS-013	0.10	9.0	8	11	8	0.2	0.6
MS-014	0.10	10.0	6	19	8	0.2	0.6
MS-015	0.10	4.0	1	6.0	3	0.1	0.6
MS-016	<0.05	4.0	<1	4.0	3	0.1	0.6
MS-017	0.10	22	16	11	15	0.3	0.6
MS-018	0.10	38	22	16	28	0.3	0.8
MS-019	0.10	160	19	54	24	0.3	1.4
MS-020	0.10	50	6	11	6	0.2	0.8
MS-021	0.30	210	96	36	105	0.1	2.8
MS-022	0.90	115	60	76	85	0.3	7.0
MS-023	1.40	32	70	140	155	0.1	6.2
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	0.05	0.2	1	0.2	1	0.1	0.2
Scheme	IC2M	IC2M	IC2M	IC2M	IC2M	IC2M	IC2M

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Job: 2AD3000
O/N: B 5074

ANALYTICAL REPORT

Sample	Sb	Te
MS-001	0.4	<0.2
MS-002	0.3	<0.2
MS-003	0.5	<0.2
MS-004	0.4	<0.2
MS-005	0.1	<0.2
MS-006	0.1	<0.2
MS-007	1.2	<0.2
MS-008	0.6	<0.2
MS-009	0.3	<0.2
MS-010	0.4	<0.2
MS-011	0.4	<0.2
MS-012	0.3	<0.2
MS-013	0.4	<0.2
MS-014	0.4	<0.2
MS-015	0.2	<0.2
MS-016	0.3	<0.2
MS-017	0.5	<0.2
MS-018	0.6	<0.2
MS-019	1.1	<0.2
MS-020	0.6	<0.2
MS-021	6.0	0.4
MS-022	2.3	2.0
MS-023	1.0	<0.2
Units	ppm	ppm
DL	0.1	0.2
Scheme	IC2M	IC2M

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Job: 2AD3000
O/N: B 5074

ANALYTICAL REPORT

Sample	Au	Ag
MS-001	3.0	<0.02
MS-002	<0.5	<0.02
MS-003	<0.5	<0.02
MS-004	<0.5	<0.02
MS-005	<0.5	<0.02
MS-006	<0.5	<0.02
MS-007	22	<0.02
MS-008	8.0	<0.02
MS-009	0.5	<0.02
MS-010	2.0	<0.02
MS-011	2.5	<0.02
MS-012	0.5	<0.02
MS-013	0.5	<0.02
MS-014	1.0	<0.02
MS-015	<0.5	<0.02
MS-016	<0.5	<0.02
MS-017	1.0	<0.02
MS-018	1.0	0.02
MS-019	10	0.02
MS-020	1.0	<0.02
Units	ppb	ppm
DL	0.5	0.02
Scheme	BLEG1A	BLEG1C

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ANALYTICAL REPORT

Job: 2AD3000
O/N: B 5074

Sample	Ag	As	Bi	Cd	Co	Cr	Cu
MR-001	<0.5	6	<5	<1	<2	115	8
MR-002	<0.5	40	<5	<1	2	36	13
MR-003	<0.5	22	<5	<1	8	50	19
MR-004	<0.5	5	<5	<1	<2	62	7
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	0.5	1	5	1	2	2	1
Scheme	IC2E	IC2E	IC2E	IC2E	IC2E	IC2E	IC2E

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ANALYTICAL REPORT

Job: 2AD3000
O/N: B 5074

Sample	Fe	Mn	Mo	Ni	Pb	P	Sb
MR-001	1.31	30	2	5	7	20	<5
MR-002	2.26	35	<1	7	14	50	<5
MR-003	3.24	50	<1	20	25	210	<5
MR-004	0.82	65	1	5	13	340	<5
Units	%	ppm	ppm	ppm	ppm	ppm	ppm
DL	0.01	5	1	1	3	5	5
Scheme	IC2E	IC2E	IC2E	IC2E	IC2E	IC2E	IC2E

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Job: 2AD3000
O/N: B 5074

ANALYTICAL REPORT

Sample	V	Zn	Au Avg	Au	Au Rp1	Au SS1
MR-001	8	2	0.02	0.02	--	--
MR-002	3	26	0.01	0.01	--	--
MR-003	7	44	0.02	0.02	--	--
MR-004	5	19	0.02	0.02	--	--
Units	ppm	ppm	ppm	ppm	ppm	ppm
DL	1	1	0.01	0.01	0.01	0.01
Scheme	IC2E	IC2E	FA1	FA1	FA1	FA1

Appendix II-B

Drainage Sampling Results

SAMPLE	EAST	NORTH	Au(BLEG)	Au(BLEG2)	Au(ppm)	Au(ppm2)	Cu	Pb	Zn	Bi	As
T003001D	564550	5412800	1.31	0.62	X	-	9	17	17	<10	3
T003002D	567400	5411600	0.86	0.48	0.016	-	20	18	22	<10	6
T003003D	567300	5411700	0.86	0.82	X	-	11	19	28	<10	3
T003004D	566600	5413200	1.16	-	X	-	17	15	17	<10	24
T003005D	567450	5406350	1.06	-	X	-	16	28	25	<10	11
T003006D	566900	5404700	6.93	1.60	0.006	-	21	50	27	<10	330
T003007D	567950	5409350	0.86	0.66	0.021	-	11	17	24	<10	49
T003008D	567250	5413100	0.60	-	0.006	-	6	3	20	<10	40
T003009D	566900	5413750	1.01	-	0.016	-	21	46	25	<10	360
T003010D	566850	5413700	57.30	5.00	X	-	8	8	26	<10	5
T003011D	568700	5410450	0.60	1.31	X	X	24	17	46	<10	3
T003012D	565300	5415750	0.10	-	X	0.008	19	21	104	<10	110
T003013D	565600	5415000	1.30	-	X	-	46	32	147	<10	36
T003014D	565700	5413800	3.90	-	0.015	-	19	9	94	<10	43
T003015D	566650	5413850	<0.1	0.40	0.581	-	25	16	89	<10	110
T003016D	566700	5413950	<0.1	-	X	-	17	16	124	<10	50
T003017D	566000	5414700	<0.1	-	X	-	22	18	183	<10	37
T003018D	566150	5403300	21.60	98.20	X	-	25	21	159	<10	11
T003019D	570000	5407800	0.40	-	X	-	10	11	33	<10	4
T003020D	569300	5407000	0.50	-	X	-	34	56	72	<10	18
T003021D	565000	5415750	0.40	-	X	-	11	10	33	<10	5
T003022D	565000	5415700	0.40	-	X	X	17	21	37	<10	11
T003023D	565800	5416900	<0.1	-	X	-	8	5	57	<10	4
T003024D	565900	5415550	<0.1	-	0.005	-	24	25	75	<10	7
T003025D	565900	5415500	<0.1	-	X	-	16	14	85	<10	24
T003026D	566650	5415000	<0.1	0.20	0.058	-	15	22	84	<10	12
T003027D	568350	5402650	<0.1	-	-	-	-	-	-	-	-
T003028D	568300	5402600	0.10	-	-	-	-	-	-	-	-
T003029D	568050	5403050	<0.1	-	-	-	-	-	-	-	-
T003030D	567600	5402900	0.30	-	-	-	-	-	-	-	-
T003031D	567600	5402850	<0.1	-	-	-	-	-	-	-	-
T004001D	569000	5391900	1.07	-	0.007	-	4	10	9	<10	5
T004002D	569000	5391800	0.92	0.91	X	-	13	10	28	<10	5
T004003D	572400	5392700	0.66	-	X	-	15	12	32	<10	110
T004004D	570500	5393650	0.52	0.31	X	-	13	32	29	<10	7
T004005D	570550	5395900	0.26	-	0.013	-	9	13	16	<10	27
T004006D	570600	5395950	0.66	16.10	0.008	0.012	5	26	25	<10	11
T004007D	571800	5394750	4.54	7.25	X	-	6	12	27	<10	3
T004008D	571600	5394400	0.83	0.43	X	-	15	24	55	<10	6
T004009D	572400	5394800	2.16	-	0.024	-	8	10	35	<10	X
T004010D	573050	5395750	3.53	-	0.044	-	21	24	36	<10	X
T004011D	572850	5395850	3.48	99.30	0.030	-	9	11	27	<10	2
T004012D	572900	5395900	143.00	156.00	X	-	9	19	18	<10	1
T004013D	571950	5396450	4.51	-	X	-	7	4	19	<10	9
T004014D	576300	5400050	1.67	-	X	-	12	14	44	<10	4
T004015D	576250	5400100	2.19	-	X	-	14	14	40	<10	1
T004016D	576300	5400200	4.82	5.81	X	-	19	25	38	<10	8
T004017D	577500	9401050	0.92	0.69	X	-	5	5	7	<10	1
T004018D	578900	5400750	2.65	0.23	X	-	4	4	10	<10	7
T004019D	578900	5400750	0.58	0.28	X	-	6	3	7	<10	1
T004020D	575550	5403100	7.94	8.73	X	-	9	13	23	<10	1
T004021D	578800	5404700	0.92	-	X	X	22	19	71	<10	5
T004022D	579000	5403850	3.82	-	X	-	10	19	42	<10	1
T004023D	574350	5402200	2.24	-	X	-	16	13	32	<10	3
T004024D	574300	5402200	1.75	-	X	-	17	15	45	<10	8
T004025D	574450	5401700	14.20	8.02	X	-	6	3	16	<10	5
T004026D	572650	5405700	104.00	52.80	X	-	10	8	19	<10	3
T004027D	572400	5405250	1.15	-	0.008	-	13	27	29	<10	26
T004028D	573250	5410750	1.78	2.43	0.005	-	33	20	52	<10	44
T004029D	572600	5411500	2.24	2.77	X	-	10	8	30	<10	4
T004030D	571050	5413400	2.19	-	X	-	14	15	54	<10	X
T004031D	570100	5414000	1.15	-	X	X	10	19	19	<10	3
T004032D	568700	5406950	0.75	-	X	-	11	13	49	<10	2
T004033D	568800	5417200	0.72	-	X	-	10	9	11	<10	1
T004034D	570800	5413500	0.58	-	X	-	7	7	11	<10	5
T004035D	574950	5402700	43.50	182.00	0.126	-	17	37	127	<10	43
T004036D	573150	5396500	1.30	-	0.006	-	24	23	142	<10	47
T004037D	572950	5396800	<0.1	-	X	-	18	21	137	<10	39
T004038D	572900	5396800	7.20	9.10	0.027	-	22	26	98	<10	180
T004039D	572900	5397500	<0.1	-	0.013	-	25	18	122	<10	46
T004040D	572700	5403500	<0.1	-	X	X	36	29	279	<10	59
T004041D	573000	5404300	<0.1	-	0.011	-	22	18	124	<10	7
T004042D	573050	5404350	<0.1	-	X	-	22	24	67	<10	7
T004043D	573100	5404750	<0.1	-	0.051	-	19	23	40	<10	36

SAMPLE	EAST	NORTH	Au(BLEG)	Au(BLEG2)	Au(ppm)	Au(ppm2)	Cu	Pb	Zn	Bi	As
T0040440	572900	5405250	<0.1	-	X	-	16	17	59	<10	18
T0040450	572900	5405200	36.90	121.00	0.127	0.130	16	19	89	<10	71
T0040460	576700	5407600	<0.1	-	X	-	16	13	50	<10	11
T0040470	578050	5406800	<0.1	-	X	-	14	16	46	<10	5
T0040480	575150	5405550	4.50	4.20	0.019	-	13	18	56	<10	55
T0040490	574700	5404350	<0.1	-	X	-	16	14	99	<10	23
T0040500	573700	5405400	0.10	-	0.005	-	17	19	41	<10	13
T0040510	570300	5406100	<0.1	-	X	-	22	20	69	<10	6
T0040520	569900	5406150	2.40	2.00	X	-	21	20	115	<10	13
T0040530	571300	5405100	0.40	-	X	-	17	13	85	<10	10
T0040540	574600	5395800	1.40	-	X	-	23	19	84		

Appendix II-C

Outcrop Sampling Results

SAMPLE	EAST	NORTH	WIDTH(M)	GEOLOGY	Cu	Pb	Zn	Ag	Au(ppm)	Au(R)	Bi	As
T003001R	569050	5409400	5	Qtz Mn O2 veined sandstone	47	19	64	<2	<0.005	-	<1	5
T003002R	567350	5428400	10	Crown Prince mine dump	11	20	19	<2	0.020	-	<1	580
T003003R	565300	5416200	5	Qtz stockworked sandstone	5	13	17	<2	<0.005	-	<1	4
T003004R	565250	5415800	10	Qtz veins in phyllite	6	11	22	<2	<0.005	-	<1	21
T003005R	565350	5415700	20	Qtz veins in chl. phyllite	5	26	18	<2	<0.005	-	<1	320
T003006R	566050	5414950	2	Qtz veins in phyllite	3	18	5	<2	0.034	-	<1	1120
T003007R	566550	5414300	30	Qtz, Qtz breccia in sandstone	4	33	14	<2	0.020	-	<1	1190
T003008R	565100	5415850	50	Qtz stockwork float	4	10	10	<2	<0.005	-	<1	66
T003009R	567500	5403200	5	Qtz vein in phyllite	5	7	12	<2	<0.005	-	<1	17
T003010R	566800	5403250	10	Brecciated chlorite phyllite	21	41	73	<2	<0.005	-	<1	15
T003011R	568700	5403700	20	Qtz stockworked phyllite	10	12	29	<2	<0.005	-	<1	11
T003012R	568100	5406400	10	Qtz veins adjacent to ROMEO Mine	4	X	10	<2	<0.005	-	<1	47
T003013R	565050	5415700	30	Qtz stockworked sandstone	3	6	7	<2	<0.005	-	<1	17
T003014R	565025	5415925	50	Qtz stockworked phyllite	3	3	8	<2	<0.005	X	<1	12
T003015R	565050	5415950	5	Qtz chlorite Asp vein float	5	744	8	<2	0.037	-	<1	6330
T003016R	565100	5416000	1	Qtz Asp Vs in quartzite	5	24	8	<2	0.025	0.026	<1	2960
T003017R	565100	5416000	1	Qtz Asp Vs in quartzite	5	17	9	<2	0.012	-	<1	720
T003018R	565025	5415900	50	Qtz stockworked chlorite slate	5	X	16	<2	<0.005	-	<1	60
T003019R	565750	5417100	5	Biotote qtzite with deformed QV's	4	7	13	<2	<0.005	-	<1	6
T003020R	565090	5415860	20	Large qtz float with Asp	5	503	6	3	0.024	-	<1	2240
T003021R	565080	5415860	2	Qtz vein (3m) minor Asp	3	8	4	<2	<0.005	-	<1	550
T003022R	565070	5415880	3	Qtz vein (3m) minor Asp	3	29	5	<2	<0.005	-	<1	620
T003023R	565560	5414670	20	Qtz Asp vein float	5	9	10	<2	0.015	-	<1	1190
T003024R	565550	5414650	20	Qtz chl. Py,Asp veins in phyllite	5	9	17	<2	0.041	0.038	<1	1720
T003025R	565600	5414550	5	Qtz Py veins in quartzite	4	3	7	<2	0.011	-	<1	840
T003026R	565650	5414350	20	Qtz veins with gossan patches	4	7	11	<2	<0.005	-	<1	28
T003027R	565700	5416600	20	Qtz veins to 30cm minor Asp	4	11	8	<2	0.056	0.045	<1	1400
T003028R	565620	5414690	50	Qtz vein float minor Py Asp	5	X	8	<2	0.637	-	<1	720
T003029R	565700	5414700	50	Qtz and Qtz breccia V,s in phyllit	3	6	8	<2	<0.005	-	<1	32
T003030R	567300	5414050	10	QtzPy vein float	4	5	19	<2	<0.005	-	<1	50
T003031R	567050	5415300	10	Qtz meshworked quartzite	7	6	29	<2	<0.005	-	<1	20
T003032R	566950	5415400	10	Qtz & Qtz breccia V's in phyllite	4	9	15	<2	<0.005	-	<1	17
T003033R	566400	5415950	10	Qtz stockworked quartzite	4	21	9	<2	<0.005	-	<1	8
T003034R	565560	5414670	5	Repeat T003/023/R	4	5	5	X	0.012	-		530
T003035R	565590	5414680	5	Qtz veined sandstone, Qtz float	3	3	X	X	0.011	0.016		530
T003036R	565620	5414690	5	Repeat T003/028o/R	5	X	3	X	0.011	-		550
T003037R	568100	5402950	5	Phyllitic shale West Tower	33	65	144	X	X	-		4
T003038R	568125	5402925	5	Phyllitic shale	15	22	77	X	X	-		3
T003039R	568150	5402900	5	Phyllite minor sandstone	24	8	77	X	X	-		4
T003040R	566200	5414050	1	Qtz chlorite Py vein float	13	35	40	X	0.011	0.011		25
T003041R	565730	5414640	1	Qtz phyllite breccia vein flt	6	19	11	X	X	-		56
T003042R	565660	5414650	1	Qtz phyllite breccia vein flt	11	19	13	X	X	-		74
T003043R	568100	5402800	10	Qtz vein float from sandstone	9	11	32	X	X	-		14
T004001R	575300	5392900	25	Qtz veined phyllite	13	14	14	<2	<0.005	-	<1	3
T004002R	575300	5392700	5	Qtz stockworked quartzite	20	12	56	<2	<0.005	-	<1	5
T004003R	575300	5392700	0	Qtz vein	16	9	58	<2	<0.005	-	<1	3
T004004R	575300	5392600	10	Qtz veined sandstone	17	6	23	<2	0.022	-	<1	14
T004005R	575300	5392550	5	Qtz veined sandstone	10	11	51	<2	<0.005	-	<1	7
T004006R	575150	5392700	5	Chloritised phyllite & qtz - dump	28	23	45	<2	0.073	0.084	<1	26
T004007R	571600	5394400	3	Qtz veined sandstone	6	21	10	<2	<0.005	-	<1	6
T004008R	573050	5395000	10	Qtz stockworked siltstone	10	9	18	<2	<0.005	-	<1	5
T004009R	572250	5396300	20	Qtz float - phyllite	8	8	24	<2	<0.005	-	<1	2
T004010R	571500	5396250	20	Qtz stockworked sandstone	6	X	7	<2	<0.005	-	<1	2
T004011R	571550	5396000	5	Qtz Bucklands Mine	9	31	6	<2	0.300	-	<1	25
T004012R	571700	5395450	3	Footwallstockworked sandstone	5	21	9	<2	0.118	0.117	<1	34
T004013R	571700	5395450	6	Qtz stockworked sandstone	30	21	46	<2	<0.005	-	<1	25
T004014R	571695	5395450	5	Qtz veined sandstone	16	25	32	<2	<0.005	-	<1	18
T004015R	571685	5395445	5	Qtz veined sandstone	15	25	14	<2	0.008	-	<1	22
T004016R	571685	5395445	5	Qtz veined sandstone	10	21	23	<2	2.760	2.500	<1	22
T004017R	571680	5395445	5	Qtz veined sandstone	7	20	12	<2	<0.005	-	<1	15
T004018R	571600	5395440	11	Qtz veined phyllite	16	25	30	<2	0.007	-	<1	24
T004019R	571650	5395430	5	Qtz veined phyllite	29	66	26	<2	0.009	-	<1	37
T004020R	571705	5395455	5	Qtz stockworked sandstone	15	33	13	<2	0.009	0.007	<1	24
T004021R	571710	5395455	5	Qtz stockworked sandstone	11	21	11	<2	0.011	-	<1	17
T004022R	571720	5395550	6	Qtz veined sandstone	16	34	16	<2	0.010	0.010	<1	34
T004023R	571670	5395550	5	Weathered stockworked qtzite	12	44	13	<2	0.022	0.019	<1	14
T004024R	571665	5395545	5	Qtz veined sandstone	19	70	58	<2	0.028	0.026	<1	53
T004025R	571660	5395545	5	Qtz veined sandstone	19	48	33	<2	0.019	-	<1	35
T004026R	571655	5395540	5	Qtz veined sandstone	6	40	11	<2	0.006	-	<1	19
T004027R	571650	5395540	5	Qtz veined sandstone	21	29	62	<2	0.005	X	<1	28
T004028R	571640	5395540	8	Qtz veined sandstone	20	74	38	<2	0.026	-	<1	140
T004029R	571650	5395520	5	Qtz, sandstone - dump	40	107	23	<2	0.024	-	<1	50
T004030R	571650	5395610	5	Stockworked sandstone - dump	5	18	7	<2	<0.005	-	<1	11
T004031R	571630	5395600	5	Qtz - dump	23	34	21	<2	0.493	-	<1	700
T004032R	571640	5395640	5	Qtz stockworked quartzite	25	42	13	<2	0.019	-	<1	30
T004033R	571645	5395640	5	Qtz stockworked quartzite	26	20	26	<2	<0.005	-	<1	13
T004034R	571650	5395640	5	Qtz veined sandstone	36	23	66	<2	<0.005	-	<1	12
T004035R	571660	5395640	10	Qtz veined sandstone	35	80	30	<2	0.008	-	<1	17

SAMPLE	EAST	NORTH	WIDTH(M)	GEOLOGY	Cu	Pb	Zn	Ag	Au(ppm)	Au(R)	Bi	As
T004036R	571600	5395730	20	Qtz veined quartzite	6	13	11	<2	0.074	-	<1	5
T004037R	571620	5395750	20	Qtz veined quartzite	X	7	6	<2	0.166	0.160	<1	2
T004038R	571550	5395920	20	Qtz stockwork float	4	9	8	<2	<0.005	-	<1	1
T004039R	571550	5395950	20	Qtz stockworked phyllite	X	7	9	<2	<0.005	-	<1	2
T004040R	571580	5395960	20	Qtz stockworked quartzite	X	7	9	<2	<0.005	-	<1	3
T004041R	576750	5394000	10	Permian pyritic sandstone	8	18	17	<2	<0.005	-	<1	5
T004042R	573400	5395650	20	Qtz veined phyllite	X	9	27	<2	0.009	-	<1	1
T004043R	573500	5395500	20	Qtz veined phyllite	7	10	32	<2	<0.005	-	<1	X
T004044R	572950	5395950	20	Qtz veined phyllite	7	10	21	<2	<0.005	-	<1	X
T004045R	572350	5395950	30	Qtz veined phyllite	4	12	13	<2	0.014	-	<1	41
T004046R	572130	5397600	6	Spotted phyllite & qtz	26	67	25	<2	0.151	-	<1	25
T004047R	572130	5397620	5	Qtz veined phyllite	11	11	9	<2	0.206	-	<1	29
T004048R	572140	5397620	5	Sheared sandstone	20	35	14	<2	0.048	-	<1	15
T004049R	572115	5397510	5	Spotted phyllite, qtz-dump	9	12	12	<2	0.226	-	<1	2
T004050R	572120	5397480	20	Qtz stockworked phyllite	7	7	8	<2	0.017	-	<1	1
T004051R	572150	5397380	10	Qtz sandstone quartzite	10	16	20	<2	0.008	-	<1	61
T004052R	572200	5397570	10	Qtz stockworked quartzite	7	19	10	<2	0.010	0.008	<1	67
T004053R	572190	5397600	10	Phyllite wall rocks	34	27	27	<2	0.188	-	<1	43
T004054R	572120	5397670	20	Qtz stockworked quartzite	5	9	7	<2	0.008	-	<1	3
T004055R	577950	5401700	20	Qtz stockworked quartzite	8	10	11	<2	<0.005	-	<1	1
T004056R	574000	5400500	20	Qtz stockworked quartzite	6	15	7	<2	0.023	-	<1	110
T004057R	574300	5402200	5	Qtz stockworked phyllite	8	28	60	<2	<0.005	-	<1	6
T004058R	574500	5402000	20	Qtz stockworked quartzite	7	10	8	<2	<0.005	-	<1	31
T004059R	574800	5401570	50	Qtz veined sandstone	4	7	8	<2	<0.005	-	<1	22
T004060R	579350	5402850	50	Qtz stockworked phyllite	6	43	14	<2	<0.005	-	<1	20
T004061R	577300	5400950	4	Qtz veined phyllite	21	32	44	<2	<0.005	-	<1	10
T004062R	574600	5404650	5	Permian conglomerate	13	11	40	<2	<0.005	-	<1	10
T004063R	573700	5405250	20	Qtz meshwork phyllite	6	16	6	<2	<0.005	-	<1	5
T004064R	573600	5405300	20	Qtz meshwork quartzite	8	17	5	<2	<0.005	-	<1	11
T004065R	573400	5405350	20	Qtz veined quartzite	6	20	9	<2	<0.005	-	<1	2
T004066R	573350	5405500	20	Qtz stockworked phyllite	8	22	6	<2	0.022	-	<1	17
T004067R	573250	5405450	0	Qtz arsenopyrite vein	114	2183	20	<2	13.500	-	<1	4100
T004068R	573200	5406100	20	Qtz veined phyllite	18	22	78	<2	0.029	-	<1	3400
T004069R	573250	5406300	10	Qtz veined phyllite	22	16	16	<2	0.007	-	<1	27
T004070R	575200	5404300	5	Qtz veined phyllite	33	23	49	<2	0.010	0.008	<1	21
T004071R	575205	5404300	5	Phyllite minor qtz	63	42	59	<2	0.020	-	<1	44
T004072R	575210	5404300	6	Qtz veined phyllite	38	22	15	<2	0.036	-	<1	57
T004073R	579200	5407600	2	Qtz veined fold hinge	20	15	65	<2	<0.005	-	<1	10
T004074R	574100	5406700	10	Chlorite schist-dump	39	26	105	<2	0.007	-	<1	19
T004075R	574100	5406700	10	Chlorite shist qtz-dump	42	30	112	<2	0.011	-	<1	20
T004076R	574100	5406700	10	Selected qtz-dump	12	19	25	<2	<0.005	-	<1	8
T004077R	574200	5406800	10	Qtz veined phyllite	34	28	98	<2	0.006	-	<1	17
T004078R	574250	5404700	10	Phyllite minor qtz	37	33	124	<2	0.006	-	<1	21
T004079R	575400	5405100	5	Qtz stockworked phyllite	10	16	28	<2	<0.005	-	<1	8
T004080R	575450	5405100	5	Qtz stockworked phyllite	16	22	30	<2	0.010	0.007	<1	6
T004081R	572100	5397750	1	Massive qtz vein	30	56	11	<2	0.039	-	<1	750
T004082R	571900	5397450	5	Permian conglomerate	10	5	4	<2	0.006	-	<1	15
T004083R	573750	5394200	5	Qtz stockworked sandstone	12	21	25	<2	<0.005	-	<1	15
T004084R	573800	5394100	5	Qtz veined phyllite	15	14	43	<2	0.007	-	<1	28
T004085R	573200	5394950	6	Qtz stockworked phyllite	10	13	24	<2	0.005	-	<1	15
T004086R	573100	5394950	5	Chloritic phyllite minor Py	15	20	32	<2	<0.005	-	<1	17
T004087R	573200	5395000	6	Qtz stockworked sandstone	11	16	10	<2	0.056	-	<1	380
T004088R	573150	5395000	5	Qtz veined sandstone	14	14	32	<2	0.069	0.076	<1	530
T004089R	573100	5395100	5	Qtz stockworked sandstone	8	12	9	<2	0.077	-	<1	240
T004090R	573000	5395250	1	Bedding parallel qtz breccia	9	30	14	<2	0.061	-	<1	290
T004091R	573000	5395250	2	Pyritic chlorite schist	16	21	37	<2	0.057	-	<1	270
T004092R	570650	5411750	50	Qtz veined sandstone	12	12	9	<2	<0.005	-	<1	2
T004093R	571800	5412350	5	Qtz stockworked phyllite	9	11	5	<2	<0.005	-	<1	15
T004094R	571700	5412500	2	Qtz veined shear-dump	28	61	33	<2	3.760	-	<1	790
T004095R	574600	5405050	30	Qtz float near pits	28	24	93	<2	0.049	0.045	<1	22
T004096R	574300	5404400	20	Qtz stockworked phyllite	12	18	7	<2	<0.005	-	<1	21
T004097R	575400	5403100	5	Phyllite Qtz meshwork Tr Py	8	16	22	<2	<0.005	-	<1	29
T004098R	573200	5397000	10	Qtz vein float 30cm	5	4	26	<2	<0.005	-	<1	38
T004099R	573150	5396700	10	Qtz stockworked phyllite	8	14	22	<2	<0.005	-	<1	17
T004100R	573150	5396600	30	Qtz stockworked phyllite	8	13	12	2	0.068	-	<1	140
T004101R	573150	5396550	10	Qtz stockworked phyllite	5	34	10	2	0.029	-	<1	72
T004102R	572900	5396840	5	Qtz breccia vein float 20cm	11	21	11	20	1.090	1.120	<1	4070
T004103R	572900	5396910	50	Sheated Qtz V's in sandstone	3	6	8	<2	<0.005	-	<1	17
T004104R	572900	5396940	10	Qtz stockworked sandstone	5	6	14	<2	<0.005	-	<1	37
T004105R	573650	5396650	50	Qtz stockworked phyllite	4	9	14	<2	<0.005	-	<1	9
T004106R	572650	5396500	5	Flat Qtz stockworked sandstone	5	9	16	<2	0.586	-	<1	12
T004107R	572600	5396800	50	Qtz veined sandstone	5	16	9	<2	0.008	-	<1	46
T004108R	572450	5396950	10	Qtz stockworked sandstone	3	9	6	<2	0.007	0.010	<1	17
T004109R	572400	5404500	30	Qtz stockworked sandstone	6	9	18	<2	<0.005	-	<1	38
T004110R	572600	5402600	5	Phritic sandstone in quarry	7	17	14	<2	<0.005	-	<1	10
T004111R	572600	5402600	5	Qtz veined sandstone in quarry	4	5	10	<2	0.009	-	<1	8
T004112R	573150	5404700	3	Qtz stockworked sandstone	5	3	12	<2	<0.005	X	<1	21
T004113R	577750	5405800	5	Qtz stockworked phyllite	15	24	65	<2	<0.005	-	<1	18

SAMPLE	EAST	NORTH	WIDTH(M)	GEOLOGY	Cu	Pb	Zn	Ag	Au(ppm)	Au(R)	Bi	As
T004114R	577300	5405700	50	Qtz stockworked S/'S in anticline	6	7	26	<2	<0.005	-	<1	3
T004115R	575850	5406900	5	Qtz stockworked narrow S/'S bed	5	10	13	<2	<0.005	-	<1	11
T004116R	570400	5405900	1	Major Qtz vein with St/'S frags.	4	X	15	<2	<0.005	-	<1	3
T004117R	572650	5396500	5	Repeat T004/106/R	12	94	42	1	0.026	-		18
T004118R	572675	5396500	25	Qtz stockworked sandstone	6	30	49	X	0.014	-		14
T004119R	572625	5396500	25	Qtz stockworked sandstone	4	8	4	X	0.007	-		7
T004120R	572650	5396525	25	Qtz stockworked sandstone	6	13	10	X	0.011	-		10
T004121R	572650	5399475	25	Qtz stockworked sandstone	5	7	12	X	X	-		9
T004122R	572900	5396840	5	Repeat T004/102/R	7	8	15	X	0.081	-		500
T004123R	572900	5396815	25	Qtz veined sandstone	7	12	17	X	X	-		17
T004124R	572925	5396840	25	Qtz veined sandstone	6	12	11	3	0.414	-		1370
T004125R	572875	5396840	25	Qtz veined sandstone	5	10	13	X	0.012	-		37
T004126R	572900	5396865	25	Qtz veined sandstone	4	5	3	X	0.008	-		15
T004127R	572720	5396000	3	Stockworked phyllite diss. Py	8	X	10	X	0.025	-		15
T004128R	572700	5396100	5	Qtz stkwkd sandstone diss. Py	6	X	11	X	0.005	-		32
T004129R	572695	5396100	5	Chloritic phyllite thin Qtz stkwk	10	13	34	X	0.012	-		75
T004130R	572660	5396300	5	Qtz stkwk and breccia in S/S	10	15	20	X	0.095	-		95
T004131R	572655	5396300	5	Stkwkd S/S diss. sericite Py	8	8	14	X	0.024	-		60
T004132R	572660	5396360	5	stkwkd S/S	16	18	10	X	0.028	-		76
T004133R	572910	5396840	20	Stkwk & breccia Vs jarosite	12	X	28	X	0.077	0.035		120
T004134R	572900	5396830	20	Slkwk & breccia Vs in S/S	13	X	34	X	0.006			42
T004135R	572890	5396835	1	Qtz S/S breccia V minor Asp	15	51	18	22	1.230	1.400		4400
T004136R	573050	5396300	2	Im back Qtz V breccia margins	26	113	69	X	4.230	4.290		380
T005001R	561850	5415700	20	Qtz veined ser andalusite schist	18	12	45	<2	0.068	0.056	<1	640
T005002R	561850	5415700	1	Schist breccia qtz matrix	11	9	8	<2	0.170	-	<1	1500
T005003R	561850	5415700	0	Qtz arsenopyrite vein	18	16	26	<2	0.080	-	<1	3210
T005004R	561850	5415700	1	Qtz stockworked schist	15	21	31	<2	0.270	-	<1	3760
T005005R	561850	5415600	7	Qtz meshworked schist	17	13	27	<2	<0.005	-	<1	310
T005006R	561900	5416600	2	Qtz pyrite veined schist	25	21	33	<2	<0.005	-	<1	11
T005007R	561650	5416550	5	Qtz stockworked quartzite	15	10	17	<2	<0.005	-	<1	29
T005008R	561600	5416500	10	Quartzite breccia qtz float	31	13	30	<2	0.005	-	<1	220
T005009R	561500	5416850	10	Qtz meshworked schist float	11	12	13	<2	0.005	0.005	<1	29
T005010R	554300	5420200	2	Qtz feldspar veins	9	8	11	<2	0.008	-	<1	2
T005011R	554300	5420200	5	Pink granite smokey qtz	19	18	26	<2	<0.005	-	<1	1
T005012R	561250	5416800	5	Pink granite smokey qtz	8	10	37	<2	<0.005	-	<1	2

Appendix II-D

Soil Sampling Results

SAMPLE	EAST	NORTH	Cu	Pb	Zn	Au (ppm)	Au (R)	Bi	As
T004001S	573800	5401500	4	10	9	0.007	-	<10	5
T004002S	574000	5401650	13	10	28	X	-	<10	5
T004003S	574200	5401750	15	12	32	X	-	<10	110
T004004S	574350	5401900	13	32	29	X	-	<10	7
T004005S	574500	5402000	9	13	16	0.013	-	<10	27
T004006S	574650	5402200	5	26	25	0.008	0.012	<10	11
T004007S	574200	5401000	6	12	27	X	-	<10	3
T004008S	574400	5401050	15	24	55	X	-	<10	6
T004009S	574550	5401150	8	10	35	0.024	-	<10	X
T004010S	574700	5401350	21	24	36	0.044	-	<10	X
T004011S	574750	5401550	9	11	27	0.030	-	<10	2
T004012S	574850	5401750	9	19	18	X	-	<10	1
T004013S	573950	5401850	7	4	19	X	-	<10	9
T004014S	574100	5402000	12	14	44	X	-	<10	4
T004015S	574100	5402250	14	14	40	X	-	<10	1
T004016S	574250	5402400	19	25	38	X	-	<10	8
T004017S	574450	5402400	5	5	7	X	-	<10	1
T004018S	574500	5402550	4	4	10	X	-	<10	7
T004019S	574550	5402800	6	3	7	X	-	<10	1
T004020S	574650	5401850	9	13	23	X	-	<10	1
T004021S	574000	5401250	22	19	71	X	X	<10	5
T004022S	574150	5401500	10	19	42	X	-	<10	1
T004023S	574300	5401500	16	13	32	X	-	<10	3
T004024S	574500	5401600	17	15	45	X	-	<10	8
T004025S	574500	5401800	6	3	16	X	-	<10	5
T004026S	574100	5400150	10	8	19	X	-	<10	3
T004027S	574300	5400100	13	27	29	0.008	-	<10	26
T004028S	574500	5400150	33	20	52	0.005	-	<10	44
T004029S	574600	5400350	10	8	30	X	-	<10	4
T004030S	574750	5400500	14	15	54	X	-	<10	X
T004031S	574900	5400600	10	19	19	X	X	<10	3
T004032S	575100	5400600	11	13	49	X	-	<10	2
T004033S	575300	5400500	10	9	11	X	-	<10	1
T004034S	575500	5400450	7	7	11	X	-	<10	5
T004035S	575700	5400350	9	20	15	X	-	<10	2
T004036S	572660	5396400	7	7	26	0.061	-		11
T004037S	572680	5396330	10	18	19	0.033	-		120
T004038S	572690	5396240	20	48	48	0.017	0.013		200
T004039S	572700	5396150	8	18	18	0.007	-		160
T004040S	572720	5396060	10	17	17	0.010	-		150
T004041S	572740	5395970	10	13	37	X	-		33
T004042S	572960	5396100	16	22	43	0.013	-		160
T004043S	573000	5396290	5	X	15	0.007	-		11
T004044S	572940	5396300	7	8	25	0.023	0.018		62
T004045S	572860	5396300	13	15	31	0.009	-		170
T004046S	572770	5396310	6	13	32	0.006	-		150
T004047S	572610	5396600	4	5	9	0.006	-		14
T004048S	572590	5396700	7	21	15	0.013	-		180
T004049S	572550	5396780	8	6	31	0.005	-		25
T004050S	572500	5396870	4	6	11	X	-		7
T004051S	572450	5396850	4	X	9	X	-		6
T004052S	572410	5396820	8	7	38	X	0.005		19

SAMPLE	EAST	NORTH	Cu	Pb	Zn	Au (ppm)	Au (R)	Bi	As
T004053S	572360	5396790	11	15	27	0.005	-		31
T004054S	572440	5396960	7	8	15	X	-		6
T004055S	572380	5397030	14	18	35	0.005	-		13
T004056S	572330	5397120	4	6	8	0.008	-		4
T004057S	572270	5397210	9	9	41	0.009	-		43
T004058S	572220	5397290	11	15	36	0.015	-		37
T004059S	572180	5397350	7	4	21	0.018	0.018		9
T004060S	572650	5396770	8	11	24	0.009	-		36
T004061S	572740	5396750	11	13	45	0.009	-		24
T004062S	572830	5396750	11	16	61	0.005	-		25
T004063S	572950	5396750	12	14	46	X	-		16
T004064S	572930	5396870	27	27	87	0.006	-		200
T004065S	572920	5396980	14	18	60	0.034	-		150
T004066S	572900	5397060	6	7	30	0.006	-		16
T004067S	572860	5397150	5	7	23	X	-		6
T004068S	572790	5397220	6	12	40	0.014	-		4
T004069S	572710	5397170	14	23	71	0.010	0.006		60
T004070S	572720	5397300	8	5	26	X	-		13
T004071S	572650	5397370	3	X	12	0.013	-		52
T004072S	572590	5397450	8	5	20	0.005	-		35
T004073S	572530	5397530	11	15	38	0.008	-		64
T004074S	572450	5397600	5	3	9	0.006	0.006		170
T004075S	572700	5397440	5	21	22	0.013	0.013		310
T004076S	572800	5397430	7	15	34	0.015	-		4
T004077S	572890	5397420	17	17	56	X	-		6
T004078S	572480	5397460	8	25	47	0.005	-		45
T004079S	572370	5397460	8	3	27	0.005	X		25
T004080S	572310	5397430	6	8	34	0.006	0.006		38
T004081S	572260	5397400	7	14	52	0.005	-		33
T004082S	572580	5396950	8	8	28	0.006	-		55
T004083S	572650	5397000	34	36	46	0.028	-		240
T004084S	572620	5397100	36	13	114	X	-		30
T004085S	572490	5397070	15	23	73	0.006	-		62
T004086S	572590	5396340	7	X	23	X	-		-
T004087S	572500	5396370	7	X	25	0.011	0.015		70
T004088S	573020	5396500	17	21	59	X	-		17
T004089S	573000	5393100	15	16	61	0.005	-		5
T004090S	572950	5393100	16	16	45	0.005	0.006		19
T004091S	572900	5393100	15	19	51	X	-		8
T004092S	572850	5393100	25	31	77	0.006	-		22
T004093S	572800	5393100	13	20	47	X	-		11
T004094S	572750	5393100	13	15	57	0.014	-		7

SAMPLE	EAST	NORTH	Cu	Pb	Zn	Au (ppm)	Au (R)	Bi	As
T003001S	565320	5416040	9	17	17	X	-	<10	3
T003002S	565270	5416020	20	18	22	0.016	-	<10	6
T003003S	565220	5416000	11	19	28	X	-	<10	3
T003004S	565180	5415980	17	15	17	X	-	<10	24
T003005S	565140	5415960	16	28	25	X	-	<10	11
T003006S	565110	5415940	21	50	27	0.006	-	<10	330
T003007S	565090	5415930	11	17	24	0.021	-	<10	49
T003008S	565070	5415920	6	3	20	0.006	-	<10	40
T003009S	565040	5415910	21	46	25	0.016	-	<10	360
T003010S	565000	5415890	8	8	26	X	-	<10	5
T003011S	564950	5415870	24	17	46	X	-	<10	3
T003012S	565310	5416150	11	9	18	X	-	<10	3
T003013S	565270	5416130	12	18	22	X	-	<10	4
T003014S	565220	5416100	17	24	26	X	-	<10	6
T003015S	565180	5416080	12	27	26	X	-	<10	6
T003016S	565130	5416060	8	8	24	X	-	<10	3
T003017S	565090	5416040	7	5	31	X	-	<10	1
T003018S	565050	5416020	17	8	74	X	-	<10	13
T003019S	565000	5416000	10	9	25	X	-	<10	11
T003020S	564950	5415980	17	12	38	X	-	<10	15
T003021S	564950	5416090	43	37	84	X	-	<10	30
T003022S	565220	5416220	11	18	21	X	X	<10	5
T003023S	565180	5416200	9	13	26	X	-	<10	2
T003024S	565130	5416180	12	19	26	X	-	<10	X
T003025S	565090	5416150	34	23	45	X	-	<10	9
T003026S	565050	5416130	8	6	23	X	-	<10	1
T003027S	565000	5416110	9	13	26	X	-	<10	2
T003028S	565000	5416220	18	39	46	X	-	<10	65
T003029S	564950	5416190	26	23	39	X	-	<10	3
T003030S	564900	5416170	15	13	35	X	-	<10	4
T003031S	564840	5416150	26	14	50	X	-	<10	7
T003032S	565000	5415770	11	13	33	X	-	<10	6
T003033S	565050	5415790	12	16	34	0.006	-	<10	12
T003034S	565090	5415820	8	11	37	0.012	-	<10	4
T003035S	565140	5415840	39	29	40	0.008	-	<10	27
T003036S	565180	5415860	9	8	20	0.006	X	<10	14
T003037S	565220	5415890	71	68	28	0.006	-	<10	24
T003038S	565270	5415910	8	11	23	X	-	<10	3
T003039S	565310	5415930	8	9	19	X	-	<10	1
T003040S	565360	5415950	11	10	25	X	-	<10	4
T003041S	565490	5414860	13	27	26	0.008	-		61
T003042S	565450	5414950	14	11	60	0.008	-		380
T003043S	565400	5415030	23	23	59	0.005	0.006		230
T003044S	565320	5415110	12	13	27	X	-		13
T003045S	565250	5415180	6	4	21	X	-		5
T003046S	565180	5415260	22	20	48	0.009	-		35
T003047S	565110	5415340	16	17	50	0.007	-		32
T003048S	565430	5414740	6	5	16	X	-		17
T003049S	565480	5414760	5	6	18	X	-		10
T003050S	565530	5414780	6	16	17	X	0.008		59
T003051S	565580	5414790	7	13	34	X	-		10
T003052S	565620	5414800	8	11	26	0.006	-		16

SAMPLE	EAST	NORTH	Cu	Pb	Zn	Au(ppm)	Au(R)	Bi	As
T003053S	565670	5414810	14	23	56	X	X		16
T003054S	565700	5414720	24	20	56	0.007	-		170
T003055S	565650	5414710	6	4	17	X	-		3
T003056S	565620	5414700	12	14	36	X	-		34
T003057S	565600	5414700	7	12	20	X	X		22
T003058S	565580	5414690	8	13	26	0.006	X		61
T003059S	565550	5414680	13	27	29	0.007	-		510
T003060S	565530	5414670	6	15	21	0.005	-		53
T003061S	565500	5414660	5	14	44	X	-		160
T003062S	565450	5414650	38	27	84	0.008	-		33
T003063S	565490	5414550	8	12	27	X	-		15
T003064S	565540	5414570	4	6	14	0.005	-		4
T003065S	565580	5414590	19	23	56	0.006	-		16
T003066S	565630	5414600	7	17	27	0.018	-		31
T003067S	565680	5414610	7	10	26	0.007	-		20
T003068S	565730	5414630	8	11	30	0.242	0.260		35
T003069S	565800	5414540	12	9	42	X	-		16
T003070S	565750	5414520	16	15	41	X	-		200
T003071S	565700	5414510	20	35	44	0.007	-		46
T003072S	565650	5414500	8	15	24	X	-		11
T003073S	565610	5414490	6	5	19	0.005	-		3
T003074S	565550	5414470	7	6	24	0.090	-		11
T003075S	565680	5414400	8	5	24	0.008	-		7
T003076S	565790	5414360	10	6	29	X	-		6
T003077S	565860	5414300	13	10	42	0.007	-		6
T003078S	565900	5414200	12	14	41	0.020	0.016		9
T003079S	565940	5414120	7	X	10	X	-		2
T003080S	565990	5414050	5	7	24	X	-		4
T003081S	566040	5413980	7	12	28	X	-		3
T003082S	566100	5413900	19	18	64	X	-		120
T003083S	566150	5413800	14	17	43	0.013	-		3
T003084S	566200	5413730	21	15	54	0.016	-		62
T003085S	566270	5413670	19	24	68	0.008	-		31
T003086S	566330	5413600	18	12	66	0.006	-		3
T003087S	566400	5413530	25	14	75	X	-		10
T003088S	566480	5413450	23	19	81	X	-		19
T003089S	566540	5413400	26	16	55	0.008	0.006		170
T003090S	566600	5413330	13	8	94	X	-		38
T003091S	565020	5415430	10	15	35	X	-		50
T003092S	565090	5415470	4	3	13	X	-		7
T003093S	565180	5415450	3	X	10	0.011	-		4
T003094S	565270	5415400	3	6	14	X	-		10
T003095S	565360	5415370	6	14	29	X	X		8
T003096S	565450	5415330	4	4	18	X	-		3
T003097S	565530	5415260	5	5	15	X	-		3
T003098S	565610	5415200	5	8	16	X	X		4
T003099S	565680	5415130	7	12	20	X	-		10
T003100S	565750	5415070	17	17	50	X	-		7
T003101S	565840	5415010	5	12	20	X	-		4
T003102S	565920	5414970	6	13	17	0.022	-		22
T003103S	566020	5414940	8	10	28	X	-		160
T003104S	566090	5414860	5	X	31	X	-		26

SAMPLE	EAST	NORTH	Cu	Pb	Zn	Au (ppm)	Au (R)	Bi	As
T003105S	566140	5414800	20	10	59	X	X		59
T003106S	566210	5414730	10	14	31	X	-		42
T003107S	566270	5414650	9	13	38	X	-		50
T003108S	566320	5414570	20	16	52	X	-		53
T003109S	566380	5414490	16	17	45	X	-		48
T003110S	566420	5414410	5	7	23	X	-		10
T003111S	566470	5414340	22	20	54	0.007	0.005		370
T003112S	566530	5414280	7	12	25	0.005	-		79
T003113S	566600	5414200	32	21	62	0.123	0.133		420
T003114S	566660	5414100	16	17	46	0.010	-		100
T003115S	566700	5414020	13	19	38	0.007	-		35
T003116S	566750	5413940	10	15	36	X	-		17
T003117S	566800	5413860	20	14	39	0.008	-		29
T003118S	566840	5413770	12	13	35	X	-		14
T003119S	566620	5413970	21	13	77	0.012	0.012		20
T003120S	566530	5414010	19	7	64	X	-		14
T003121S	566450	5414030	23	23	49	X	-		15
T003122S	566360	5414060	33	23	79	0.008	0.008		24
T003123S	566270	5414070	25	15	68	X	-		35
T003124S	566180	5414060	21	18	52	X	-		23
T003125S	566090	5414040	14	14	58	X	-		11
T003126S	566110	5413890	25	20	104	X	-		52
T003127S	566290	5413730	18	10	69	0.010	0.010		16
T003128S	566380	5413720	25	19	74	X	-		9
T003129S	566460	5413690	25	18	67	X	-		29
T003130S	566550	5413670	33	20	60	X	-		40
T003131S	566640	5413670	16	6	29	X	-		18
T003132S	566730	5413660	15	5	37	X	-		24
T003133S	565730	5414630	19	26	87	0.040	-		45
T003134S	565780	5414640	9	6	30	X	-		12
T003135S	565830	5414650	10	X	34	0.005	-		12

T004016D ● Stream sediment routine sample

MB12 ■ Stream sediment orientation survey sample

GN MN 14.4°	DATE	SCALE
	30/10/92	1:50,000
	REF No.	PLAN No.
	TMAT-8	1

0 2500m

5 cm

MATHINNA PROJECT

TASMANIA

DRAINAGE SAMPLE

LOCATIONS

976088

NEWCREST MINING LIMITED

93-3498.

560000mE 565000mE 570000mE 575000mE 580000mE 585000mE

5435000mN 5430000mN 5425000mN 5420000mN 5415000mN 5410000mN 5405000mN 5400000mN 5395000mN 5390000mN

EL29/92 ALBERTON

EL34/92 MT. SADDLEBACK

EL22/92 TOWER HILL

MOUNT VICTORIA

MOUNT SADDLEBACK

TOWER HILL

SADDLEBACK PINE PLANTATION

TOWER HILL PINE PLANTATION

Mathinna

Mangana

o 0.35 Placer Exploration Ltd. samples
(20) 1st pass spurious ? results

• 0.20 Newcrest Mining Ltd. samples
Au ppb 1st assay/Au ppb repeat assay

GN MN 14.4°	DATE 30/10/92	SCALE 1:50,000
	REF No. TMAT	PLAN No. 2

0 2500m

5 cm

MATHINNA PROJECT

TASMANIA

DRAINAGE SAMPLE RESULTS Au ppb

NEWCREST MINING LIMITED

93-3498.

976089

560000mE 565000mE 570000mE 575000mE 580000mE 585000mE

5435000mN
5430000mN
5425000mN
5420000mN
5415000mN
5410000mN
5405000mN
5400000mN
5395000mN
5390000mN

Ringarooma
Prendergust
Ringarooma
Long Struggle
Una
Chinamans Corner
MOUNT VICTORIA
MOUNT SADDLEBACK
SADDLEBACK PINE PLANTATION
TOWER HILL
TOWER HILL PINE PLANTATION
Owners Right
New Golden Gate
Great Fingal
Daylight
Miami
Fingal Township
St. Marys

EL29/92 ALBERTON

EL34/92 MT. SADDLEBACK

EL22/92 TOWER HILL

Strong total count anom. assoc. with this granite trend

mag quiet zone

granite shallow

Bdy, helicopter mag

- + *Magnetic buried granite*
- × *Non Magnetic buried granite*
- *Extent of alteration*
- *Dolerite sills*
- *Mag 'high' trends*
- *Mag 'high' anomalies*
- *Mag 'low' trends*
- *Structural trends*
- (R) *Total count anomaly*

GN MN	DATE	SCALE
14.4°	30/10/92	1:50,000
	REF No. TMAT - 6	PLAN No. 3

0 2500m

5 cm

MATHINNA PROJECT

TASMANIA

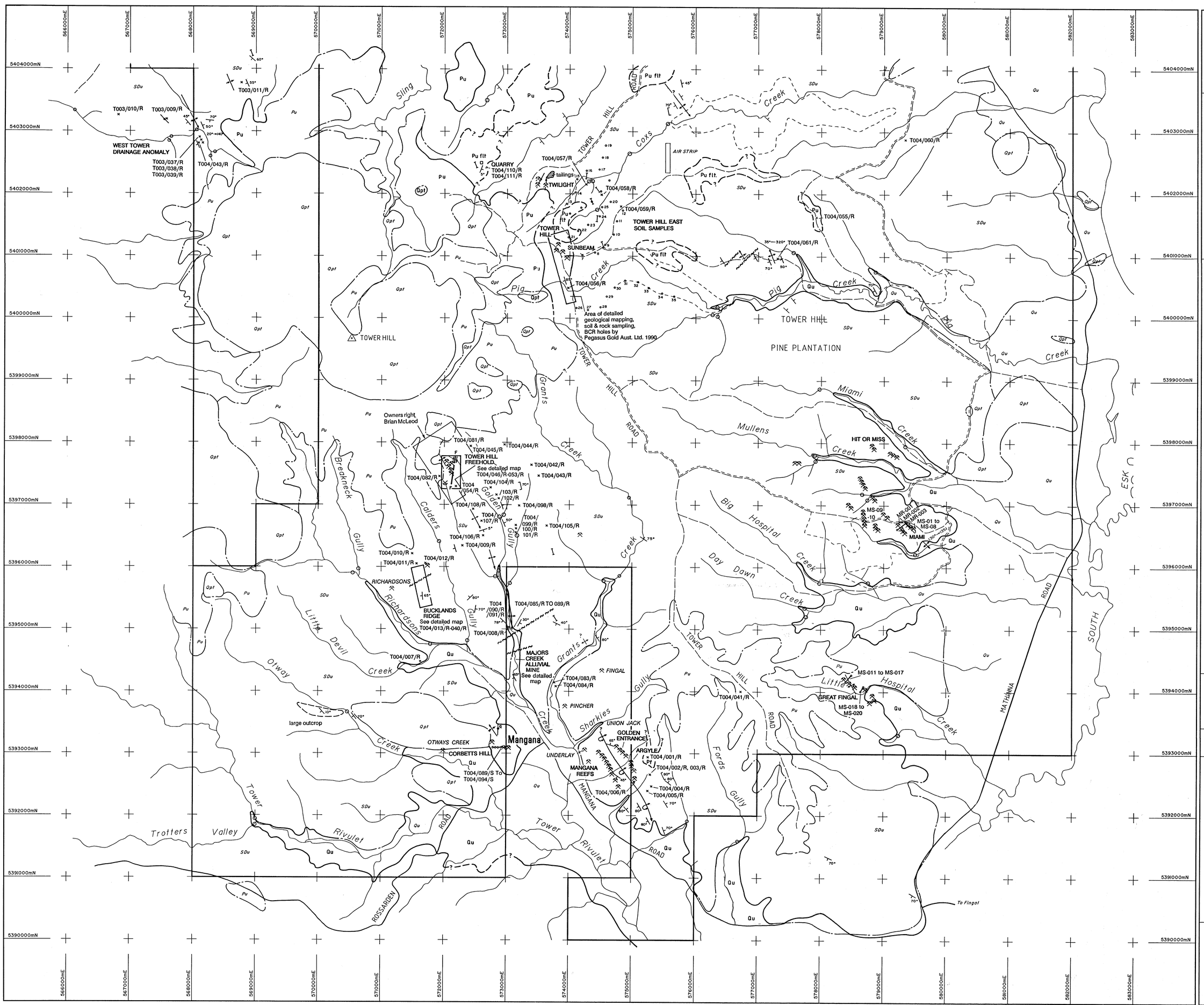
Interpretation of

Pegasus's Helimag Data

976090

NEWCREST MINING LIMITED

93-3498.



LEGEND

Qu	Quaternary cover - alluvial, scree, talus
Qpt	Talus with large exotic boulders commonly jurassic dolerite
Tb	Tertiary
Tu	Tertiary undifferentiated sediments
Jd	Jurassic dolerite
Pu	Permian sediments undifferentiated
Pt	Permian sediment float
Dba	Granite of the Blue Tier Batholith
Dsg	Granite of the Scottsdale Batholith
SDh	Hornfelsed Mathinna beds
SDu	Mathinna beds

- Bedding (Newcrest)
- Bedding (Dept. of Mines Geological survey)
- Cleavage
- Kinking
- Shearing
- Hard rock mine working
- Alluvial diggings
- Drainage sample site
- Rock sample site
- Single soil sample, soil sample traverse
- Fold axis
- Geological boundary (Dept. of Mines Geological survey)
- Geological boundary (Newcrest)

SCALE	DATE	SHEET
1:25,000	May 1993	1 of 3
	REF No. TMAT 2	PLAN No. 4

0 1250 2500m

5 cm

MATHINNA PROJECT

GEOLOGY AND SAMPLE LOCATIONS

SHEET 1

976091

NEWCREST MINING LIMITED

93-3498.

MT. SADDLEBACK EL34/92

EL22/92 TOWER HILL

MOUNT SADDLEBACK

CHINAMAN CORNER

CHINAMAN CORNER QUARRY MR-004

WEDGE PROSPECT AREA
Soil samples T003/001/S to T003/040/S
Rock samples T003/003,4,8/R T003/020/R to 022/R

SWEETS CK STOCKWORK ZONE

Old sawmill site

MILLERS

REVENUE

BAILEYS

MABEL

OCTOBER

SADDLEBACK PINE PLANTATION

BRIGHT STAR

KING SOLOMON

HEATON

LADY MARY

GOLDEN HORSESHOE

TRUE BLUE

CITY OF MELBOURNE

VOLUNTEER

ROMEO

Mathinna

ST PATRICK

CITY OF HOBART

TASMAN CONSOLS

NEW GOLDEN GATE

tailings

PRIDE OF THE HILLS

MINERS DREAM

GLADSTONE

HORSESHOE

TELEGRAPH

JUBILEE

COMMERCIAL

SCOTT & PICKETT

MOUNTAINEER

PROSPECTORS CLAIM

NEW GOLDEN KING

Complex meso scale folds and shearing

Scree cover

Extensive scree cover in the area

Air Strip

Walkers Creek

Polleys Creek

Sweets Creek

Merry Creek

Wines Creek

Williams Creek

Oxford Creek

Jimmys Creek

Lucky Creek

Brooks Creek

Devlin Creek

Lady Mary Gully

Watts Creek

Robinsons Creek

Clay Hats Creek

Rivulet

Evercreech

Barrows Creek

Rabbitys Creek

Golden Gully

Poimena Creek

MATHINNA PLAINS ROAD

SOUTH ESK ROAD

UPPER ESK ROAD

TYNE ROAD

MATHINNA ROAD

RIVER SOUTH ESK

RIVER TYNE

RIVER BROOKS

LEGEND

- Qu — Quaternary cover - alluvial, scree, talus
- Qpt — Talus with large exotic boulders commonly jurassic dolerite
- Tb — Tertiary
- Tu — Tertiary undifferentiated sediments
- Jd — Jurassic dolerite
- Pu — Permian sediments undifferentiated
- Pt — Permian sediment float
- Dba — Granite of the Blue Tier Batholith
- Dsg — Granite of the Scottsdale Batholith
- SDh — Hornfelsed Mathinna beds
- SDu — Mathinna beds

- Bedding (Newcrest)
- Bedding (Dept. of Mines Geological survey)
- Cleavage
- Kinking
- Shearing
- Hard rock mine working
- Alluvial diggings
- Drainage sample site
- Rock sample site
- Single soil sample, soil sample traverse
- Fold axis
- Geological boundary (Dept. of Mines Geological survey)
- Geological boundary (Newcrest)

SCALE	DATE	SHEET
1:25,000	May 1993	2 of 3
	REF No. TMAT 3	PLAN No. 5

0 1250 2500m

5cm

MATHINNA PROJECT

GEOLOGY AND

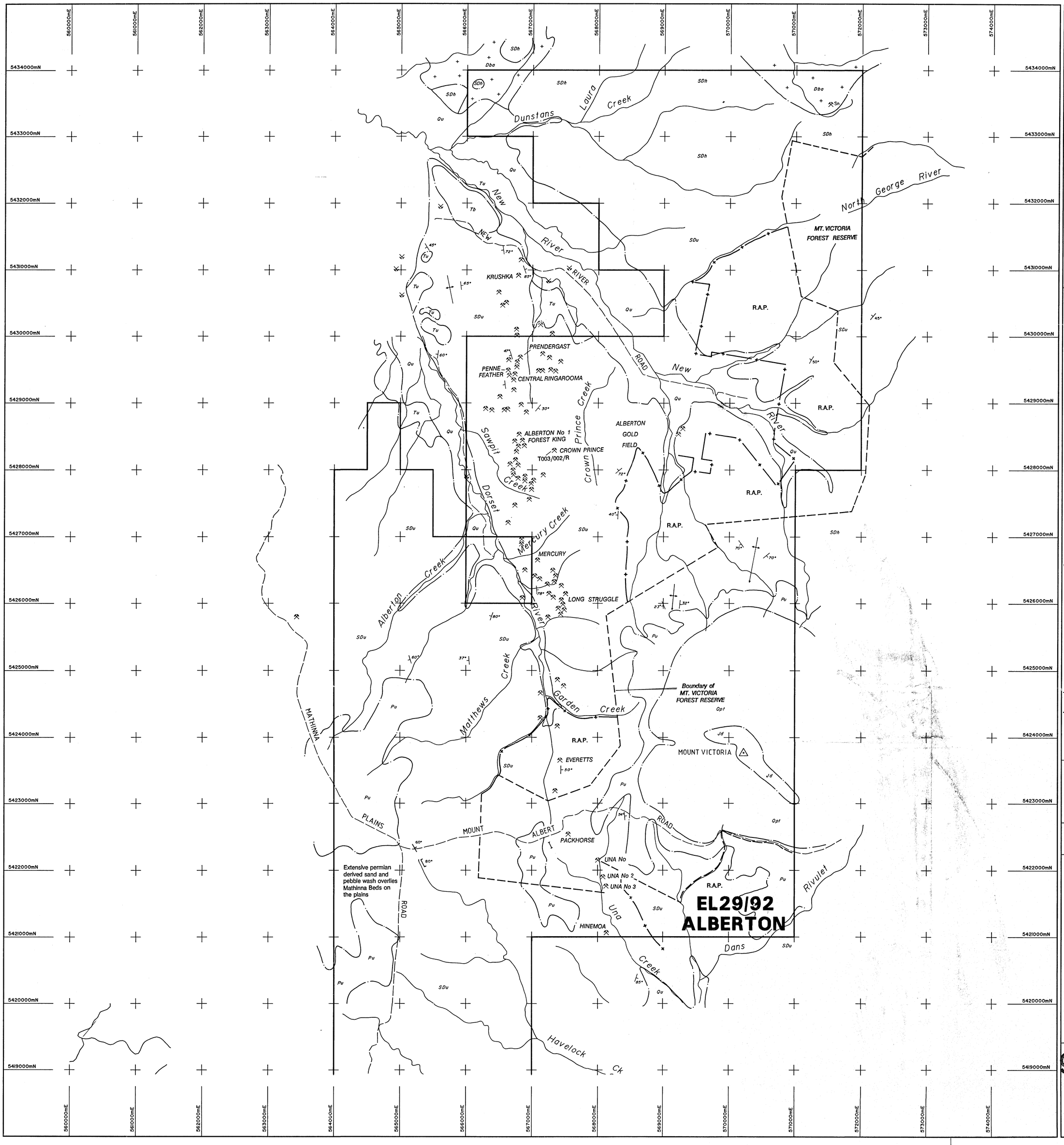
SAMPLE LOCATIONS

SHEET 2

976092

NEWCREST MINING LIMITED

93-3498.



LEGEND

Qu	Quaternary cover - alluvial, scree, talus
Qpt	Talus with large exotic boulders commonly jurassic dolerite
Tb	Tertiary
Tu	Tertiary undifferentiated sediments
Jd	Jurassic dolerite
Pu	Permian sediments undifferentiated
Pt	Permian sediment float
Dba	Granite of the Blue Tier Batholith
Dsg	Granite of the Scottsdale Batholith
SDh	Hornfelsed Mathinna beds
SDu	Mathinna beds

- Bedding (Newcrest)
- Bedding (Dept. of Mines Geological survey)
- Cleavage
- Kinking
- Shearing
- Hard rock mine working
- Alluvial diggings
- Drainage sample site
- Rock sample site
- Single soil sample, soil sample traverse
- Fold axis
- Geological boundary (Dept. of Mines Geological survey)
- Geological boundary (Newcrest)
- R.A.P. — Recommended areas for protection (Forestry)

SCALE	DATE	SHEET
1:25,000	May 1993	3 of 3
	REF No. TMAT 4	PLAN No. 6

0 1250 m

5 cm

MATHINNA PROJECT

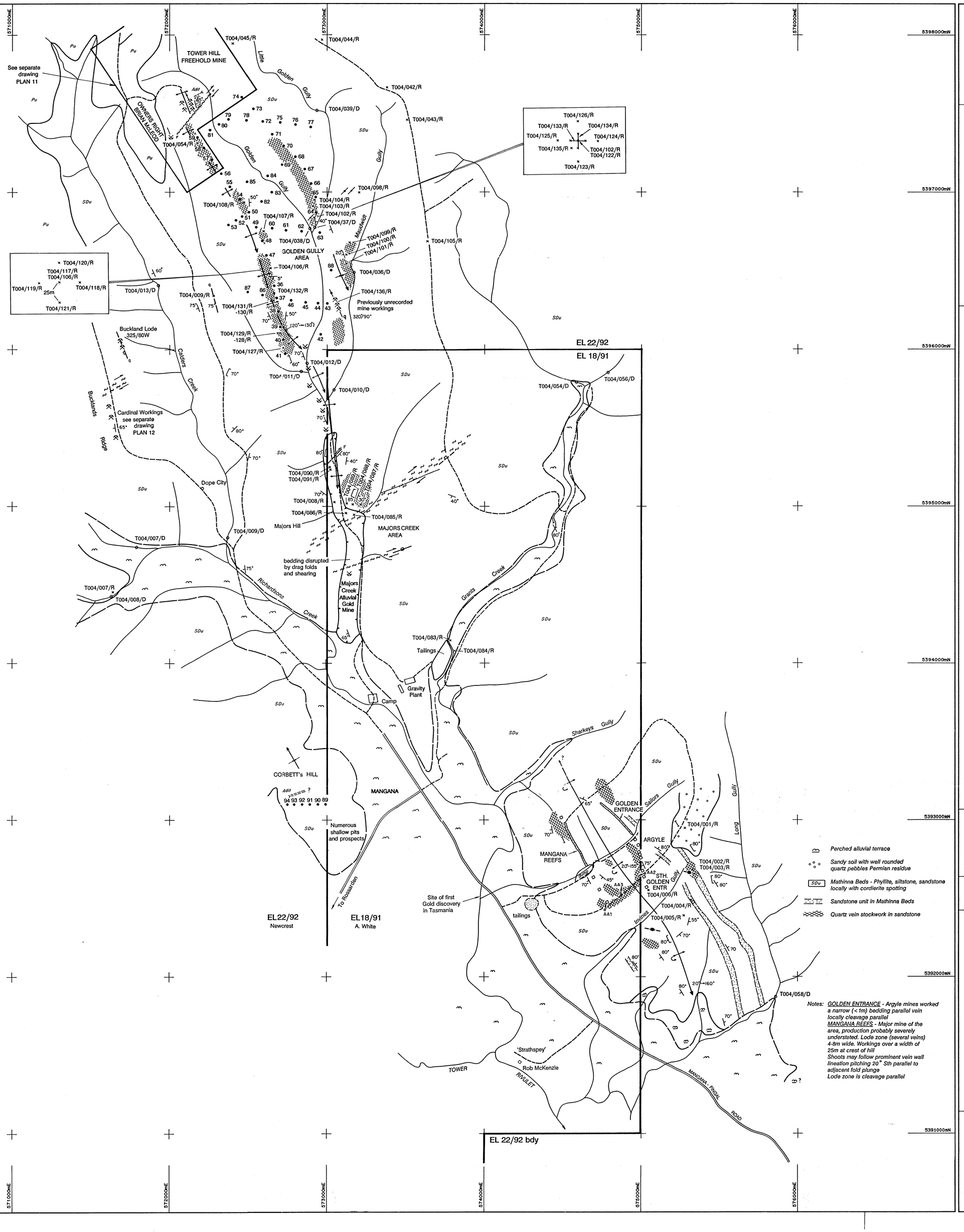
GEOLOGY AND SAMPLE LOCATIONS

SHEET 3

976093

93-3498.

NEWCREST MINING LIMITED


571000mE
572000mE
573000mE
574000mE
575000mE
576000mE
5398000mN
5397000mN
5396000mN
5395000mN
5394000mN
5393000mN
5392000mN
5391000mN
TOWER HILL FREEHOLD MINE
See separate drawing PLAN 11
OWNERS RIGHT BRIAN McLEOD
Little Golden Gully
Golden Gully
Gully
T004/045/R
T004/044/R
T004/042/R
T004/039/D
T004/043/R
T004/054/R
T004/126/R
T004/133/R
T004/134/R
T004/125/R
T004/124/R
T004/135/R
T004/102/R
T004/122/R
T004/123/R
T004/098/R
T004/104/R
T004/103/R
T004/102/R
T004/37/D
T004/108/R
T004/107/R
T004/038/D
Mason Adit
T004/099/R
T004/100/R
T004/101/R
T004/105/R
GOLDEN GULLY AREA
T004/106/R
T004/036/D
T004/120/R
T004/117/R
T004/106/R
T004/119/R
T004/118/R
25m
T004/121/R
T004/013/D
T004/009/R
T004/132/R
T004/131/R -130/R
T004/136/R
Previously unrecorded mine workings
320/90°
Buckland Lode 325/80W
Calders Creek
T004/129/R -128/R
T004/127/R
T004/012/D
T004/011/D
EL 22/92
EL 18/91
T004/054/D
T004/056/D
T004/010/D
Bucklands Ridge
Cardinal Workings see separate drawing PLAN 12
Dope City
T004/090/R
T004/091/R
T004/088/R
T004/087/R
T004/008/R
T004/086/R
T004/085/R
Majors Hill
MAJORS CREEK AREA
T004/007/D
T004/009/D
bedding disrupted by drag folds and shearing
T004/007/R
T004/008/D
Richardsons Creek
Majors Creek Alluvial Gold Mine
Grants Creek
T004/083/R
Tailings
T004/084/R
Gravity Plant
Camp
CORBETT's HILL
Adit
94 93 92 91 90 89
MANGANA
Numerous shallow pits and prospects
To Rossarden
EL22/92
Newcrest
EL18/91
A. White
Site of first Gold discovery in Tasmania
tailings
Sharkeys Gully
GOLDEN ENTRANCE
Sailors Gully
ARGYLE
MANGANA REEFS
Jump
STH. GOLDEN ENTR
T004/006/R
T004/004/R
T004/005/R
Irwins Gully
Long Gully
T004/001/R
T004/002/R
T004/003/R
T004/058/D
'Strathspey'
Rob McKenzie
TOWER RIVULET
MANGANA - FINGAL ROAD
EL 22/92 bdy
Perched alluvial terrace
Sandy soil with well rounded quartz pebbles Permian residue
Mathinna Beds - Phyllite, siltstone, sandstone locally with cordierite spotting
Sandstone unit in Mathinna Beds
Quartz vein stockwork in sandstone
Notes: GOLDEN ENTRANCE - Argyle mines worked a narrow (<1m) bedding parallel vein locally cleavage parallel
MANGANA REEFS - Major mine of the area, production probably severely understated. Lode zone (several veins) 4-9m wide. Workings over a width of 25m at crest of hill
Shoots may follow prominent vein wall lineation pitching 20° Sth parallel to adjacent fold plunge
Lode zone is cleavage parallel
LEGEND
Alluvials
Shear zone
Pu Permian sediments
SDu Mathinna beds Phyllite-sandstone with local zones of silica cericite alteration and quartz stockworking. Locally chloritic with minor pyrite. Locally spotted cordierite
Alluvial diggings - pits
Majors Creek Mine outline
bedding
Cleavage
Faults, shearing, kinking
quartz vein
Fold axis
Alcaston PDH's
Pit or adit
Open mine workings
SAMPLES
72 Soil sample T004/072/S
T004/085/R Outcrop sample
T004/056/D Drainage sample
SCALE 1:10,000
DATE Aug. 1993
COMPILED DFP
REF No. T004/5
PLAN No. 7
0 500m
TOWER HILL EL22/92
MANGANA AREA
5 cm
GEOLOGY &
SAMPLE LOCATION
976094
93-3498.
NEWCREST MINING LIMITED

564000mE 565000mE 566000mE 567000mE 568000mE

5417000mN 5416000mN 5415000mN 5414000mN 5413000mN

MT. SADDLEBACK

Qpt

Extensive scree of stockwork veined quartzite

MATHINNA PLAINS ROAD

SDu

Stockwork veined quartzite

WEDGE PROSPECT SOIL GRID

Fold closure interpreted

Fold closure observed

AXE PROSPECT SOIL GRID

WEDGE PROSPECT 1:5,000

AXE PROSPECT 1:5,000

Major quartz vein

Qpt Quaternary scree and Permian sediments

SDu Mathinna Beds

Cleavage

Bedding

•20 Soil sample (T003/20/S)

× 8/R Outcrop sample (T003/008/R)

○ 25/D Drainage sample (T003/025/D)

SCALE	DATE	COMPILED
1:10,000	Sept. 1993	DFP
	REF No. T003-3	PLAN No. 8

0 500m

MATHINNA PROJECT TASMANIA

SADDLEBACK EAST

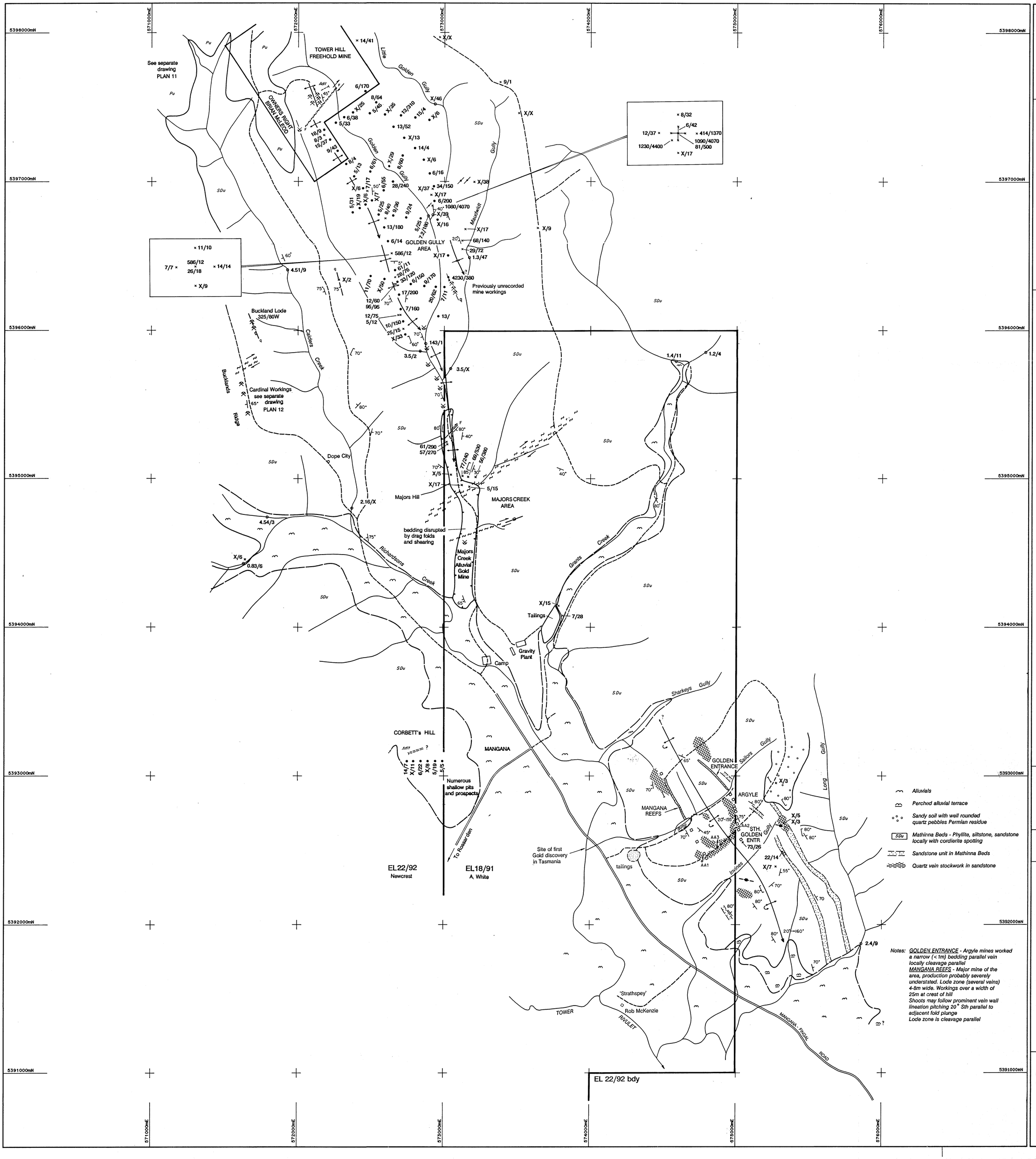
GEOLOGY AND SAMPLE LOCATIONS

5 cm

NEWCREST MINING LIMITED

976095

93-3498.



Notes: GOLDEN ENTRANCE - Argyle mines worked a narrow (< 1m) bedding parallel vein locally cleavage parallel
MANGANA REEFS - Major mine of the area, production probably severely understated. Lode zone (several veins) 4-8m wide. Workings over a width of 25m at crest of hill
Shoots may follow prominent vein wall lineation pitching 20° Sth parallel to adjacent fold plunge
Lode zone is cleavage parallel

SCALE	DATE	COMPILED
1:10,000	Aug. 1993	DFP
	REF No.	PLAN No.
	T004/6	9

0 500m

5 cm

TOWER HILL EL22/92

MANGANA AREA

ASSAY RESULTS

Au ppb, As ppm

976097

93-3498.

NEWCREST MINING LIMITED

564000mE 565000mE 566000mE 567000mE 568000mE

5417000mN 5416000mN 5415000mN 5414000mN 5413000mN

MT. SADDLEBACK

MATHINNA PLAINS ROAD

WEDGE PROSPECT SOIL GRID

AXE PROSPECT SOIL GRID

WEDGE PROSPECT 1:5,000

AXE PROSPECT 1:5,000

- Soil sample (T003/20/S) Au by fire assay (Analabs)
- Outcrop sample (T003/008/R) Au by fire assay (Analabs)
- Drainage sample (T003/025/D) Au by 2kg BLEG (ALS)
- 11/48 Au ppb/As ppm

SCALE	DATE	COMPILED
1:10,000	Sept. 1993	DFP
	REF No. T003-3	PLAN No. 10

0 500m

5 cm

MATHINNA PROJECT
TASMANIA

SADDLEBACK EAST

ASSAY RESULTS
Au ppb / As ppm

926096

93-3498.

NEWCREST MINING LIMITED

572000mE 572100mE 572200mE 572300mE

5397700mN 5397600mN 5397500mN 5397400mN

T004/053/R
T004/081/R
phyllite
scale uncertain
T004/048/R
inclined shaft
T004/47/R
phyllite
T004/052/R
T004/046/R
slope
T004/051/R
quartzite
T004/049/R
(50m E T004/082/R
Permian conglomerate)
Small alluvial diggings
T004/050/R
phyllite-siltstone
T004/054/R

Bedding
Cleavage
Quartz vein
Fault
Stockwork quartz veining
Quartz veining outcrop
Steep ridge shoulder
Mine dump
Open mine workings
Shaft or pit
Fold axis

SCALE	DATE	PLAN No.
1: 1000	7/5/93	11
	REF No. T004/7	Mapped DFP

0 50m

5 cm

TOWER HILL
FREEHOLD MINE AREA
GEOLOGY AND
SAMPLE LOCATIONS

976099

NEWCREST MINING LIMITED

93-3498.

571500mE
571600mE
571700mE
571800mE

5396000mN
5395900mN
5395800mN
5395700mN
5395600mN
5395500mN
5395400mN

T004/040/R
T004/039/R
65°
T004/038/R
70°
T004/37/R
T004/036/R
T004/035/R
T004/034/R
T004/033/R
T004/032/R
T004/030/R
T004/031/R
T004/028/R
T004/025/R
T004/026/R
T004/027/R
T004/024/R
q
85°
T004/029/R
80°
65°
T004/019/R
T004/018/R
T004/017/R
T004/016/R
T004/015/R
T004/014/R
T004/013/R
T004/022/R
T004/021/R
T004/020/R

- Degree of quartz stockworking in costean wall
- Prominant sandstone unit
- Quartz vein outcrop
- 65° Bedding
- 70° Cleavage
- q Quartz vein
- Shearing
- Surface chip sample traverse
- Ridge shoulders
- Track
- Hand dug trench
- Excavator costean
- Shaft or pit
- Dump

SCALE	DATE	PLAN No.
	May 1993	12
1: 1000	REF No.	Mapped
	T004/4	DFP

0 50m

5 cm

STH. BUCKLANDS RIDGE

CARDINAL MINE AREA

GEOLOGY AND SAMPLE LOCATIONS

976098

NEWCREST MINING LIMITED

93-3498.