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**Geotech International Pty Ltd and James Ian Stewart**

**Gray Project**

**Relinquishment Report**

**for EL31/2008**

**for the Period 20 January 2009 to 27 July 2009**

**Date: July 2009**

**Author:- Paul W. Askins, MSc., CP Geo., MAusIMM**



**PAUL W ASKINS  
GEOLOGY**

**SUMMARY OF ACTIVITIES FOR THE GRAY PROJECT**  
for the Period 20 January 2009 to 27 July 2009

- Compile previous work
- Assess prospectivity
- Field rock sampling and analyses

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- 1.0 Introduction and Philosophy
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## **KEYWORDS**

Geology/Mineralisation:

Berriedale Limestone, Parmeener Supergroup, impure limestone

Minerals/ Commodities:

Phosphate

Deposits/Occurrences:

Nil

Exploration:

Data review, prospectivity, rock sampling, analyses, P and multielement

## **COORDINATES**

All GDA co-ordinates in this report refer to the GDA94 Datum - Zone55

## 1.0 Introduction and Philosophy

This report details the exploration activities conducted by Geotech International Pty Ltd and James Ian Stewart within EL31/2008 at Gray (The 'Tenement'), for the period 20 January 2009 to 27 July 2009.

The Philosophy as quoted in the public release document is:-

Our vision is to find and develop an orebody by using the best available techniques. Our philosophy is to favour mineral deposits amenable to rapid evaluation and accordingly a pragmatic focused exploration program would be used. However an intelligent balance of lateral thinking, so as to identify and test new exploration models/targets in the area, would also be adopted. The primary exploration aim for the area is to locate near surface phosphate deposits in the Permian limestone sequences.

During the period all available previous work was evaluated and the desk based prospectivity was appraised. Government geologists have previously reported high phosphorus contents in limestones from the area.

A field visit established the best site for rock sampling, which was done as a set of continuous rock chips over the target stratigraphy. Samples were analysed for a suite of elements.

Analyses were uniformly low, so it was concluded that the prospectivity of the area for phosphate deposits of commercial tenor was poor. The applicants have applied for Tenement surrender.

## 2.0 Tenement Details

Tenement details are shown in Table 1.

Table 1 – Gray Project Tenement Details

Tenement	Holder	Date Applied	Date Granted	Area	Two Year Expenditure Commitment
EL31/2008	Geotech International Pty Ltd	March 2008	20 January 2009	12km <sup>2</sup>	\$20 000

## 3.0 Location and Access

The Tenement is located south of the township of St Marys, in NE Tasmania. It lies on the on the St Marys and Ironhouse 25000 sheet areas.

The location is shown on Figs 1 and 2.

#### **4.0 Geology**

The tenement covers Lower Permian sequences including the Berriedale Limestone, formed in a marine and glacial environment. It consists of a well bedded sequence of rather friable impure limestone and calcareous shale with a few metabentonite layers, and is highly fossiliferous in the project area, with abundant bryozoans (Fig 7), brachiopods, and pelecypods.

The unit is flat lying and well exposed in a number of places, especially around Mt Elephant, east of the tenement.

## 5.0 Previous Exploration

A summary of previous investigations and exploration activities, where concerned principally with phosphate, is presented in Table 2.

Table 2 – Gray Project Previous Investigations Summary

Year/Company	REPORT No	Activities
1917 Tas Geol Survey	Twelvetrees, "Phosphate Deposits in Tasmania" GSMR03	reported on limestone in this area, carrying 5% P <sub>2</sub> O <sub>5</sub> .
1925 Tas Geol Survey	Nye UR1925_130	Commentary on above
1951 Tas Geol Survey	Everard UR1951_60-63	Sampling with phosphate analyses
1957 Tas Geol Survey	Hughes "Limestones in Tasmania" GSMR10	Quotes above sampling but includes map
1967 Utah Devel Co	67-0468	Sampling by Banks

- Tasmanian Government geologist W. Twelvetrees in 1917 first reported that limestone in this area carries 5% P<sub>2</sub>O<sub>5</sub>.
- Nye, 1925, reports on this occurrence, and his report is copied in the Appendix. The location of the sample is vague.
- As Nye states: "If this sample is representative of the whole or even portion of the limestone zone, the deposit must be considered to be potentially an important one as the possible reserves are enormous".
- Some very limited sampling of the known horizon has been done just east of the Tenement, by G Everard in 1951, as quoted more thoroughly with a map showing sample locations by Hughes in 1957, an extract of which is included in the Appendix. Up to 0.4% P<sub>2</sub>O<sub>5</sub> was recorded; these analyses although low confirm the phosphatic nature of the limestones of the region. Location of samples close to the Tenement is also shown on Fig 3.
- A regional assessment of Tasmania for phosphate in 1967 by M. Banks of the University of Tasmania, for Utah Development Company, included a visit to the area south of Mt Elephant but no samples were reported to contain detectable phosphate.
- Although the quoted 5% analysis of the known sample in the Tenement is not a commercial grade, it is a significant level and it indicated at desk review status that that the geological environment was highly prospective for the development of major phosphate deposits.

## 6.0 Work Carried Out During the Period

Work during the period has consisted of

- Compile and review all past company exploration data, government reports, research data.
- Field visit to find and sample prospective stratigraphy.

We first thought that the likely location of the sample reported to carry 5%  $P_2O_5$  was west of Gray in lower terrain, as plotted on Fig 3. However our field visit to this area, in farmlands, did not locate any likely limestone outcrop, and it seemed more likely the sample was taken along the old road which is now close to, and partially coincident with, the main Elephant Pass Road (A4).

A suite of samples were collected along the good exposures of the road cut at approximately 5,391,100N, 601,800E, Fig 6. The samples were continuous rock chips across bedding, taken in the style illustrated on Fig 8. The samples were designed to cover the full exposed section of the impure limestone. Fig 5 is a sketch of sampling.

Samples were sent to Genalysis Laboratory in Perth (WA) for crushing, pulverising and XRF analyses for phosphate and a suite of other elements.

Phosphate analyses were uniformly very low, with a maximum of 0.2%  $P_2O_5$ .

No other elements occur in anomalous or interesting tenor.

Sample analyses are presented in the attached text file:  
GRAYS\_SSASSAY\_MARCH\_2009.txt

## **7.0 Prospectivity**

Although the quoted 5% grade of the sample collected by Twelvetrees is relatively low, it is a significant level and it was thought that a promising geological environment for the development of major phosphate deposits exists.

Our sampling gave very low results in a well exposed section. The results are in accord with prior sampling by Banks and Everard, so it is now thought that the area's prospectivity is low. It is possible that the original Twelvetrees sample was a very localised phosphate-replaced specimen or an incorrect analysis.

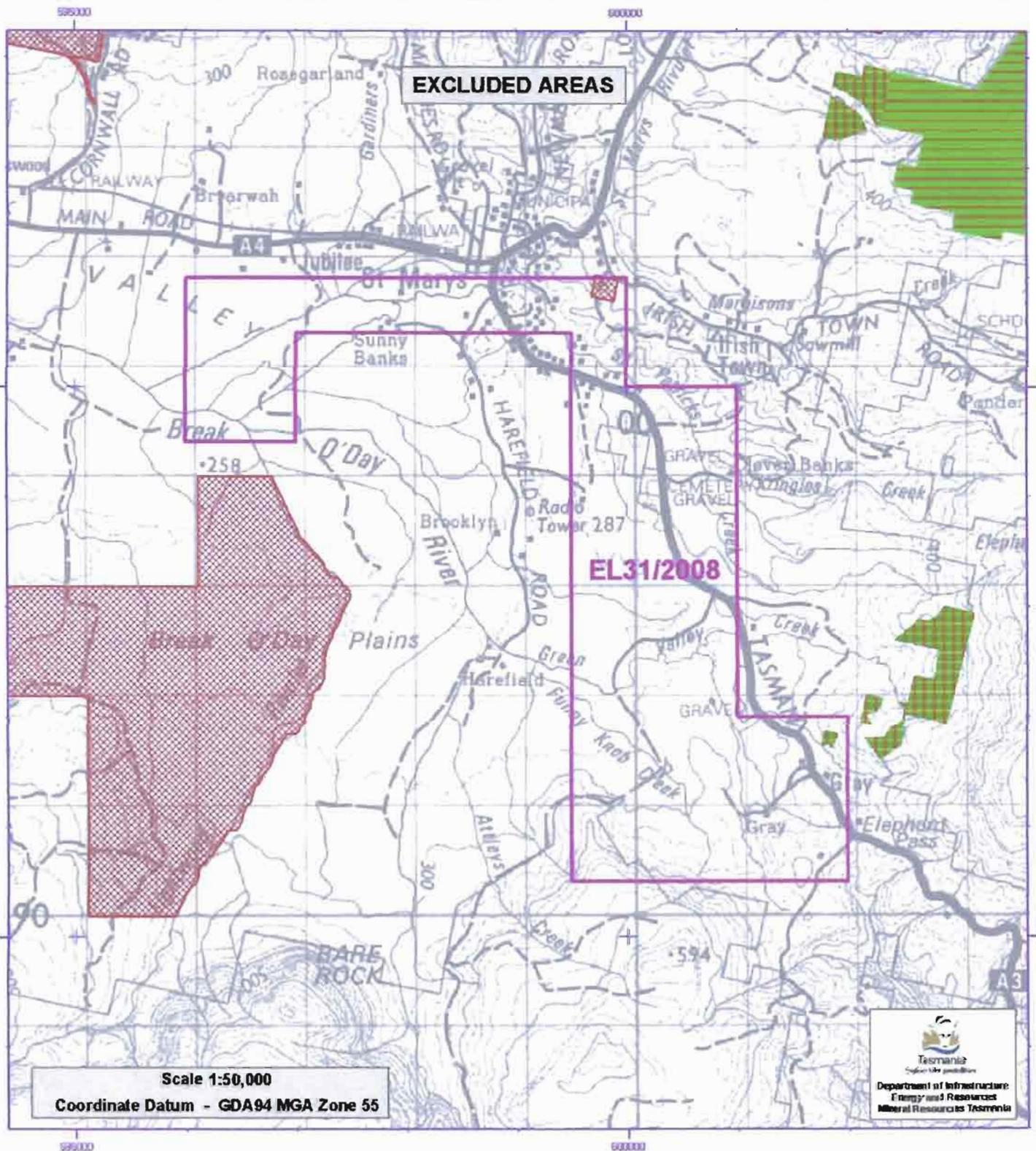
It was decided to surrender the Tenement.

For more detail on Launceston Region see pages 68 - 69



**GRAY  
PHOSPHATE  
PROJECT**

**FIG 1**



Scale 1:50,000  
 Coordinate Datum - GDA94 MGA Zone 55

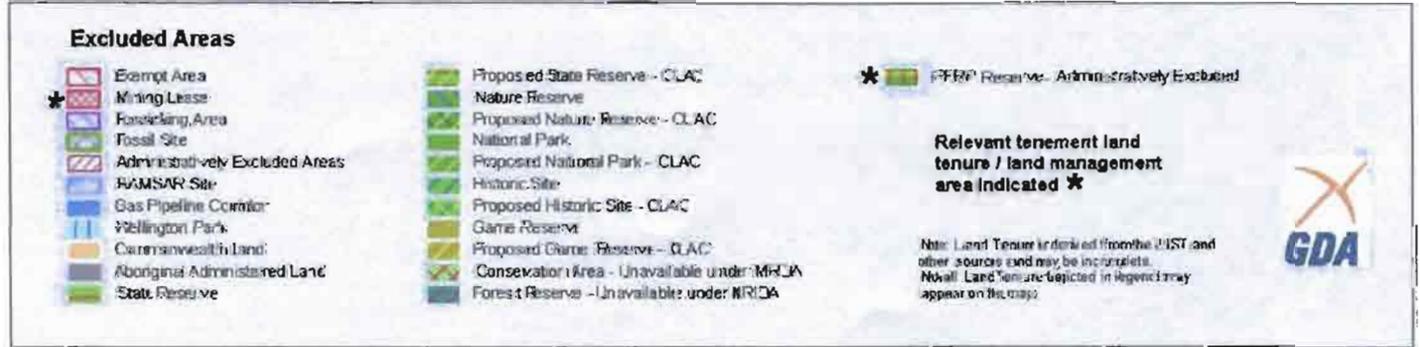
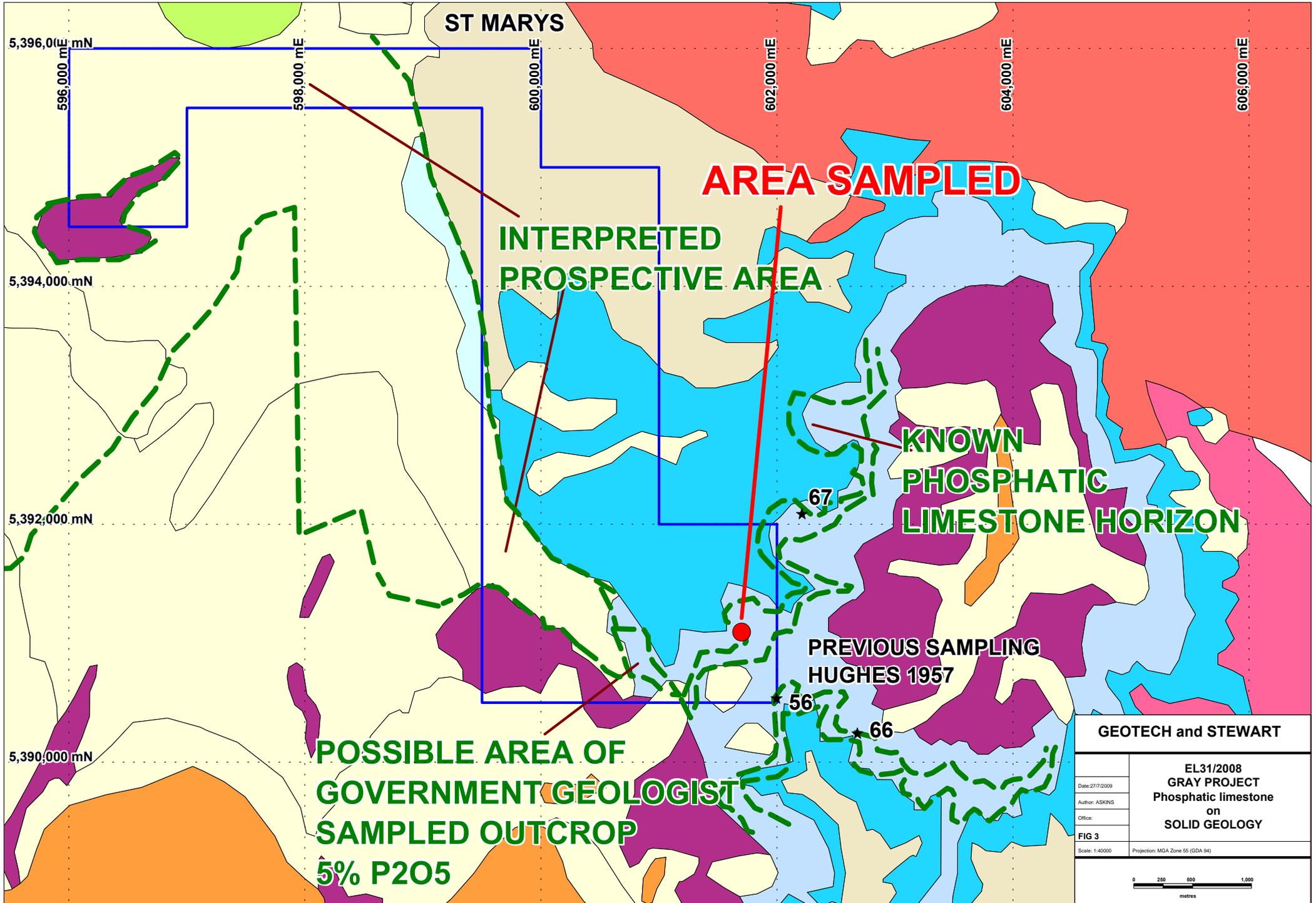


FIG 2



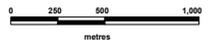
**GEOTECH and STEWART**

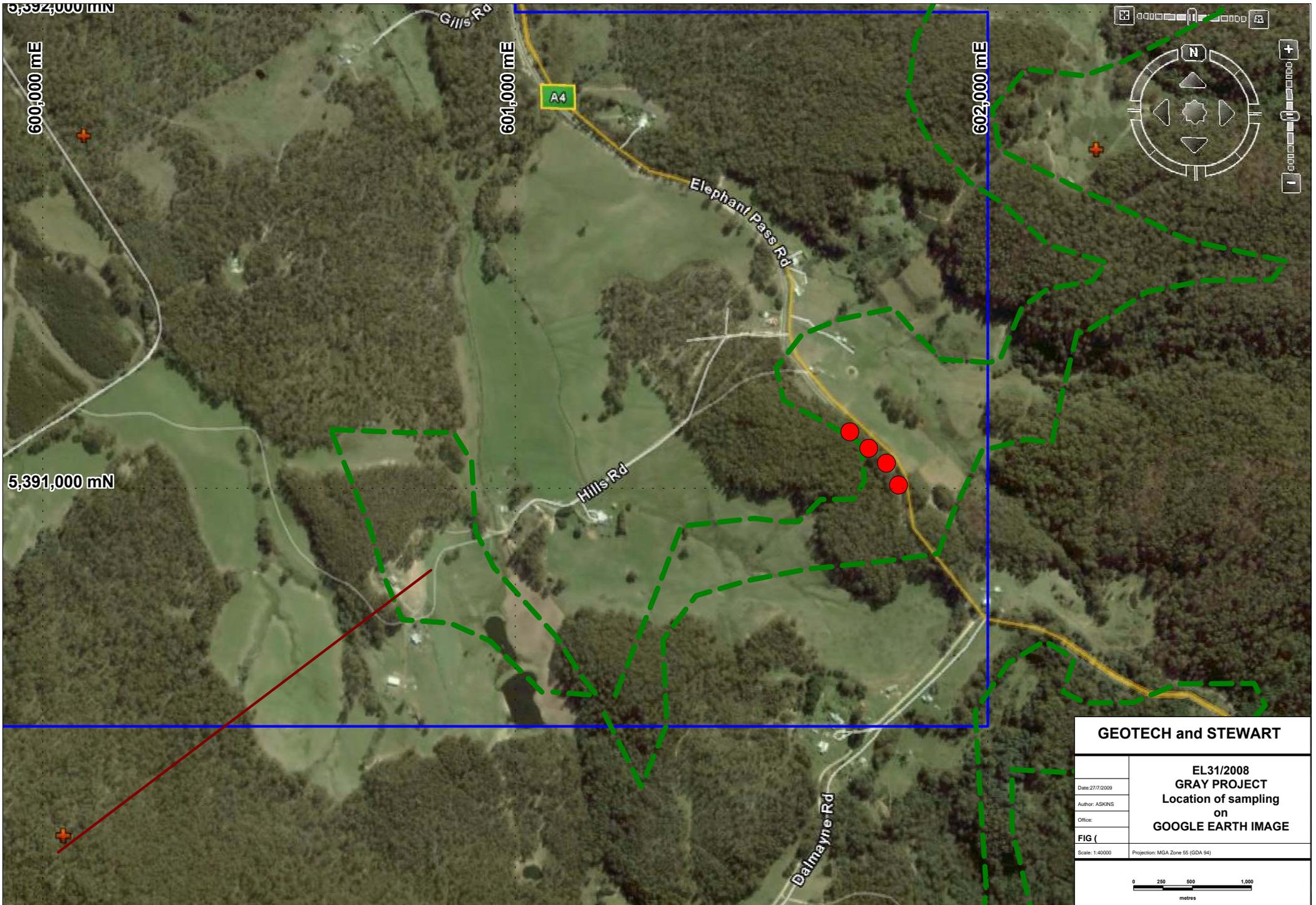
Date: 27/7/2009  
 Author: ASKINS  
 Office:

**EL31/2008  
 GRAY PROJECT  
 Phosphatic limestone  
 on  
 SOLID GEOLOGY**

**FIG 3**  
 Scale: 1:40000

Projection: MGA Zone 55 (GDA 94)





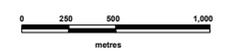
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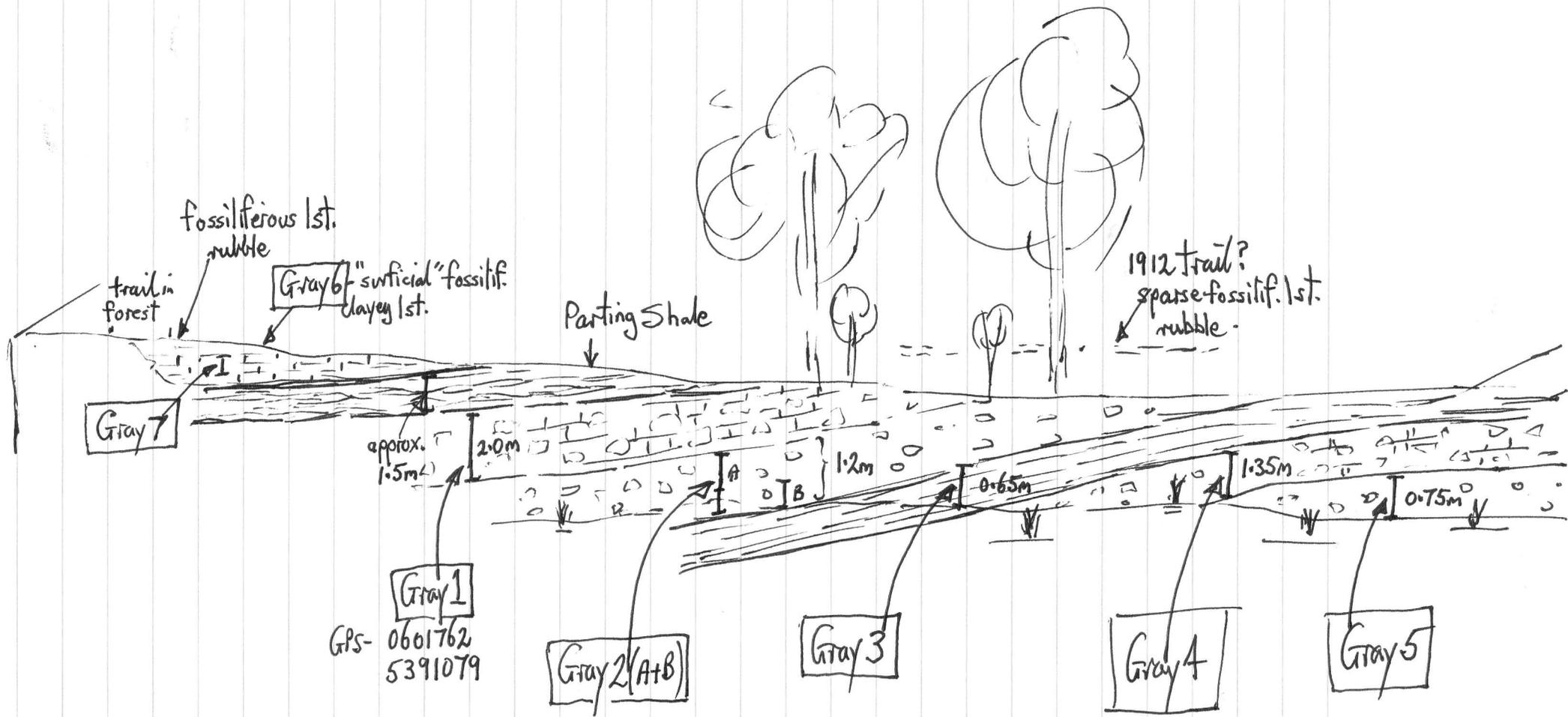
Date: 27/7/2009  
 Author: ASKINS  
 Office:

**EL31/2008  
 GRAY PROJECT  
 Location of sampling  
 on  
 GOOGLE EARTH IMAGE**

FIG (

Scale: 1:40000 Projection: MGA Zone 55 (GDA 94)





Schematic Section - Road Cut Outcrop Sampling - Gray Prospect (looking West)



FIG 6



REGISTRATION No:  
A 03 PE  
MAKE/MODEL:  
"B"  
130  
COLOUR:  
GREY  
MVA No:  
3303694



FIG 7



GRAY  
4

FIG 8

## **APPENDIX**

Extracts of previous investigations

PHOSPHATE MATERIALS

Deposits of phosphate materials of commercial importance have not been so far proved to exist in Tasmania. Apatite, the mineral source of phosphate, has been found only in microscopic crystals in certain igneous and metamorphic rocks. Many of the limestones have analysed to determine their content of phosphoric acid, but only one (a fossiliferous Permo-Carboniferous limestone from near St. Marys) has been proved to contain more than 5% phosphoric acid. The small amount of phosphate material which has been produced has been obtained from guano deposits on small islands off the East Coast of Tasmania and in Bass Strait. Similar deposits may perhaps be of rock phosphate by replacement of limestones underlying the guano deposits. As a matter of fact most of the islands on which the guano occurs are formed of granite so that replacement has been impossible. The location of the above islands are shown on the accompanying plan. The production of guano has been small and the reserves of this material are inconsiderable.

The limestone in the St. Marys district occurs interbedded with the Permo-Carboniferous strata of that district. These strata are either lying horizontal or dipping at only small angles. The limestone beds occupy a zone of about 100 feet thick. It outcrops conspicuously on the flanks of Mt. Elephant and the Mt. Nicholas Range and also underlies the Break O'Day Plain to the west. The sample referred to and which was analysed was obtained from a locality 4 miles south from St. Marys. The quoted analysis is as follows:-

	%
Phosphoric acid	5.12
Silica	22.01
Carbonate of Calcium	40.80
Oxide of Calcium	3.82
Oxide of Magnesium	0.31
Oxide of Aluminium	5.97
Oxide of Iron	2.03
Organic matter	13.88
Water given off at 100°C.	6.11
	100.05

The limestone thus contains 5.12% anhydrous phosphoric acid and would thus come within the range of low-grade phosphate materials being considered. If this sample is representative of the whole or even portion of the limestone zone, the deposit must be considered to be potentially an important one as the possible reserves are enormous.

Fuller descriptions are given in the Tasmanian Geological Survey Mineral Resources No. 3.

P.B. Nye  
GOVT. GEOLOGIST.

Hobart  
5th March, 1925.

## XII

## GRAY

After an examination of the limestone in the vicinity of Gray, near St. Marys, in 1951, G. Everard reported:—

**Introduction.**

This report is concerned with calcareous strata on the southern fall of Mt. Elephant, extending from the immediate neighbourhood of Gray, at the junction of the Tasman Highway and the road to Dalmayne Colliery, along the Tasman Highway past the head of Elephant Pass, and thence about four miles in a north-easterly direction parallel with a short minor road.

**Location and Access.**

Gray is situated about four and a half miles south of the railway terminus at St. Marys, along the Tasman Highway on the East Coast of Tasmania.

**Previous Work.**

Reference is made to the area under consideration in a report by J. Milligan on Fingal and the East Coast published in 1849. Gould's report of 1861 on coalfields is illustrated by a geological sketch map which includes the Gray district. This map is notable for its delineation of limestone outcrops, but the map rather illustrates the geological structure of the district, than gives the correct position and slope of the outcrops; thus limestone is shown close to the summit of Mt. Elephant, whereas, in fact, its position is on the lower slopes. A report made by Twelvetrees in 1901 contains a sketch map showing part of the Gray area.

**Topography.**

The area is one of strong relief, there being a difference in altitude of about two thousand feet between the summit of Mt. Elephant and a point in the bed of Wardlaw Creek, one and a half miles distant.

Two separate drainage systems are represented. To the north and west of Gray are the headwaters of the streams feeding the Break O'Day, a mature river flowing across a flood plain in a broad level valley to join the South Esk near Fingal. South-east of Gray are numerous streams flowing down the slopes of Mt. Elephant to unite as Wardlaw Creek and enter the sea at Saltwater Inlet. These streams, including the Wardlaw, flow through deep chasms with precipitous cliffs. They descend rapidly to sea level whereas the Break O'Day Plain has a general level of about eight hundred feet above the sea. The watershed between these two drainage systems is a narrow ridge carrying the road to Dalmayne Colliery at its junction with the Tasman Highway. In future times river capture seems inevitable at this point, which would result in rejuvenation of the mature valley of the Break O'Day and reversal of its drainage.

In sharp contrast to the broad level Break O'Day Plain, stretching westward from Mt. Elephant, the country to the south and east is a jumble of steep-sided valleys with narrow ridges separating their sinuosities. The denudation of these interfluves is still at an early stage and precipitous cliffs are common in the harder strata at the heads of valleys.

Before entering the sea, streams on the eastern fall cross a narrow coastal plain diversified with sandhills and lagoons.

### Geology.

Upturned edges of Lower Palaeozoic strata, in places invaded by granites, are overlain by an interconformable horizontal succession of Permian and Triassic deposits. The horizontal strata have been discordantly and concordantly intruded by dolerite with the formation of sills at various levels above the limestone, which occupies a more or less central position here, in the Permian succession, together with irregular transgressive intrusions. Mt. Elephant, a residual of erosion, is a flat-topped pile of horizontal sedimentary strata protected by a thick capping of dolerite. Dolerite debris, on the southern slopes, showing fine flat jointing is indicative of small sills, and terraces with springs have been formed where sills outcrop.

The area is crossed from north to south by systems of anastomosing faults which are very difficult to trace in detail. To the west, the Break O'Day Plain is itself a shallow trough-faulted area between the Cornwall and Silkstone faults, and, although the valley is essentially due to erosion and not to faulting, it is perhaps significant that alluvium is much more extensive in this down-faulted area than elsewhere in the valley. Conversely, Mt. Elephant, although a residual of erosion, is bounded longitudinally by sub-parallel zones of faulting on either side.

### The Limestones.

The Permian and Triassic beds are almost horizontal, having but a slight dip to the south, and the limestone occupies a central position in the Permian succession, being overlain by mudstone and underlain in some localities by mudstone or shale and in others by a fine sandstone. The thickness of limestone is about one hundred feet and it outcrops as a fringe or apron around the southern end of Mt. Elephant, below the Tasman Highway on the south-western aspect and below a short branch road on the south-eastern, but is not completely continuous, being cut out in places by faulting. Limestone also extends for a short distance on the south-eastern side of Wardlaw Creek, below the Dalmayne road, and again just to the north of the road junction at Gray, on the side of a gully.

The actual outcrops are in the form of cliffs or protruding joint blocks on steep slopes. The maximum height of sheer cliff is approximately fifty feet, the base of the cliff consisting of talus slopes and fallen blocks.

In hand specimen the rock is light-grey to almost white in colour, with glittering facets of crystalline calcite on newly-fractured surfaces. It is very highly fossiliferous. Under the microscope, innumerable fossils and fossil fragments are seen. The chambers of gasteropod shells and interseptal interstices of corals being filled with crystalline calcite and occasionally with clumps of quartz grains. Small angular fragments of quartz are disseminated through the rock, but in very small amount. The matrix is a very fine grained mass of calcite with a small amount of silica and is stained with very fine laminated material. The bulk of the impurity is contained in the matrix and consists of fine clayey and shaly particles.

Although dolerite appears in the field in close proximity to the limestone, no actual contact was observed and no minerals of thermal metamorphic origin were observed under the microscope.



Reg. No.	Map Ref.	Acid Insol.	P <sub>2</sub> O <sub>5</sub>	R <sub>2</sub> O <sub>3</sub> †	MgO	CaO	Ignition Loss	CaCO <sub>3</sub> calc. ‡
375/51	7	36.2	0.1	1.9	0.6	32.7	28.1	58.4
376/51	36 { 0-10' *	16.8	trace	0.7	0.4	45.4	36.6	81.1
377/51		12.8	0.1	0.5	0.5	48.0	38.0	85.7
378/51		16.2	trace	0.7	0.5	45.7	36.6	81.6
379/51		26.7	trace	1.3	0.5	39.0	31.3	69.7
380/51	39 { 0- 5'	40.8	trace	2.3	0.6	30.2	25.7	53.9
381/51		23.6	trace	2.0	0.5	40.6	33.4	70.7
382/51	43	22.6	trace	0.7	0.4	42.3	34.1	75.5
383/51	47 { 25-35'	37.3	0.2	2.3	0.6	32.2	27.4	57.3
384/51		17.9	trace	0.7	0.5	45.1	36.0	80.1
385/51	56 20-40'	20.8	0.2	0.7	0.5	43.0	34.7	76.8
386/51	66 10-40'	36.2	0.4	2.2	0.6	32.7	27.4	58.4
387/51	67	22.4	trace	0.9	0.4	42.0	33.8	75.0

\* Measured down from surface.

† Calculated from CaO.

‡ R<sub>2</sub>O<sub>3</sub> = Al<sub>2</sub>O<sub>3</sub> + Fe<sub>2</sub>O<sub>3</sub> + TiO<sub>2</sub>.

000

171001

EL 2/67

67-0468.

Report on

Q31

RECONNAISSANCE SEARCH FOR PHOSPHATE  
IN TASMANIA

CR. 575.

May, 1967.

**MICROFILMED**

2

by

Maxwell R. Banks,  
University of Tasmania.

Hobart,  
Tasmania.

St. Pauls Dome:

Eight specimens from the Cascades Group on the south side of St. Pauls Dome, Avoca, all gave negative tests. Their stratigraphic distribution is shown in the columnar section (Appendix 7).

St. Marys Area:

Two sections were sampled, one at Rays Hill, north of St. Marys, the other along Elephant Pass near Grey, south-east of St. Marys, whence Hughes (1957) reported a limestone with 0.87% calcium phosphate and Twelvetrees (1917) reported a sample with 11% calcium phosphate (localities shown in Figs. 12-13).

From Rays Hill (Fig. 13) ten samples were collected (see Appendix 8 for stratigraphic position) but none showed detectable phosphate. The glauconitic sandstone near the top of this section had been analysed previously and showed less than 1% phosphate.

None of the 36 specimens collected in the Elephant Pass section (Fig. 12) from the Grey Mudstone and Berriedale Limestone showed detectable phosphate. The position of the specimens analysed is shown on Fig. 12, and in Appendices 9 and 10. The exact source of the specimen quoted by Twelvetrees at 11% calcium phosphate is unknown.

Cygnets:

Two specimens from the Quamby Group and two from the Bundella Mudstone at Cygnets gave negative phosphate tests.

Maydena:

Four specimens of Darlington Limestone and three of Bundella Mudstone from the Maydena Range gave negative tests.

Hobart:

Specimens of Quamby, Golden Valley and Cascades Group rocks in the Hobart area were analysed, but none of the 26 specimens analysed yielded detectable phosphate.

Coles Bay:

Eighteen specimens from the Cascades Group at Mt. Peter near Coles Bay were analysed and proved negative.

0.12

171046

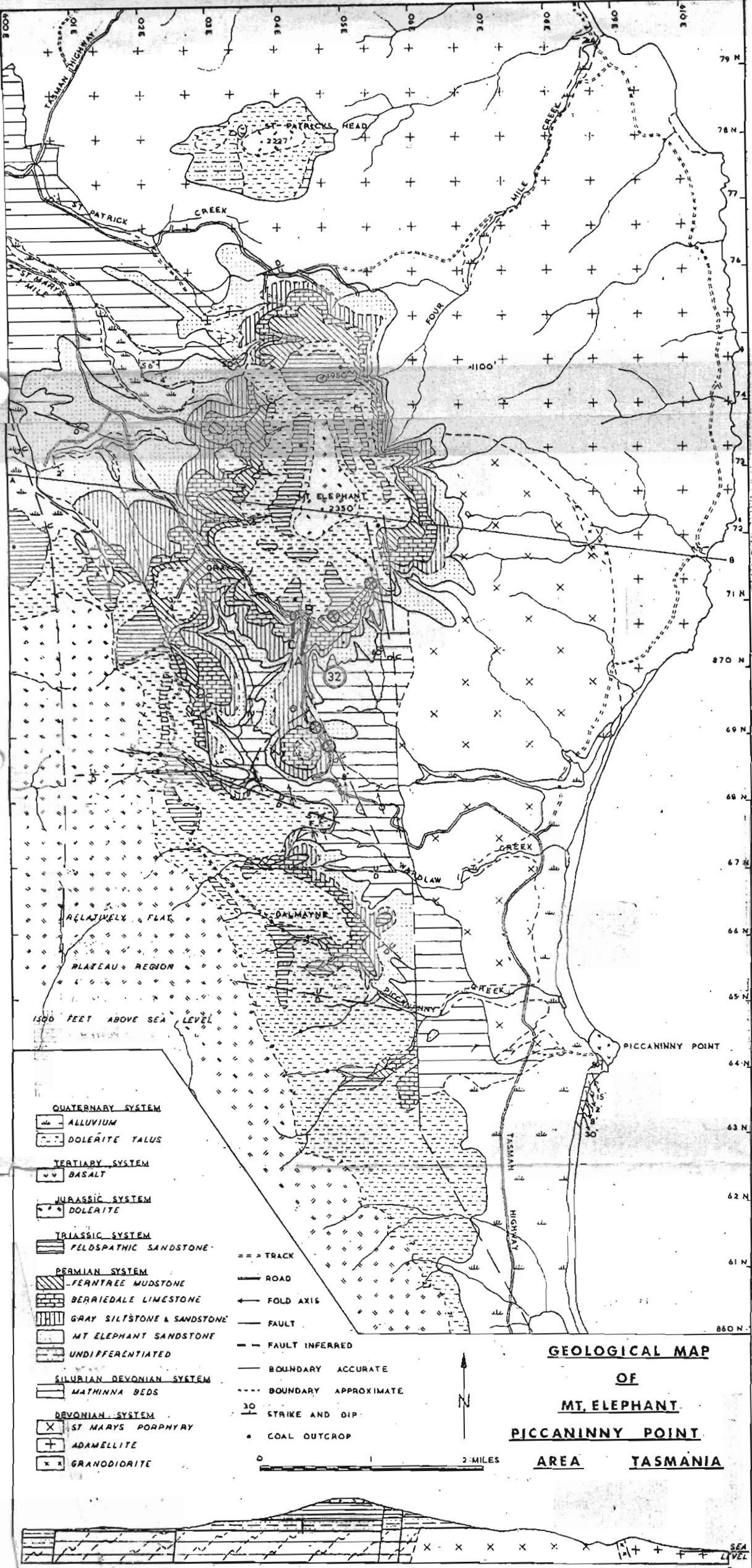


FIGURE 12

A-B } Measured and  
 C-D } sampled sections  
 ⊗ Other samples

QUATERNARY SYSTEM

- ALLUVIUM
- DOLERITE TALUS

TERTIARY SYSTEM

- BASALT

JURASSIC SYSTEM

- DOLERITE

TRIASSIC SYSTEM

- PELOSPATHIC SANDSTONE

PERMIAN SYSTEM

- FERN TREE MUDSTONE
- BERRIEDALE LIMESTONE
- GRAY SILTSTONE & SANDSTONE
- MT ELEPHANT SANDSTONE
- UNDIFFERENTIATED

SILURIAN DEVONIAN SYSTEM

- MATHINNA BEDS

DEVONIAN SYSTEM

- ST MARYS PORPHYRY
- ADAMELLITE
- GRANODIORITE

- == TRACK
- ROAD
- ← FOLD AXIS
- FAULT
- - - FAULT INFERRED
- BOUNDARY ACCURATE
- - - BOUNDARY APPROXIMATE
- 30° STRIKE AND DIP
- COAL OUTCROP

GEOLOGICAL MAP  
 OF  
 MT. ELEPHANT  
 PICCANINNY POINT  
 AREA TASMANIA

